City of Roseville Hazard Mitigation Plan
Pre-Adoption Review Draft
June 2005

PART 1—PRECEDING DOCUMENTS

City of Roseville Hazard Mitigation Plan
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PART 1—PRECEDING DOCUMENTS

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ACKNOWLEDGMENTS

The Roseville City Council acknowledges the following citizen volunteers, consultants, and staff members for their contributions to the Multi-Hazard Mitigation Plan preparation.

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EXECUTIVE SUMMARY

INTRODUCTION

The Disaster Mitigation Act (DMA; Public Law 106-390) is the latest federal legislation enacted to encourage and promote proactive, pre-disaster planning as a condition of receiving financial assistance under the Robert T. Stafford Act. The DMA emphasizes planning for disasters before they occur. Under the DMA, a pre-disaster hazard mitigation program and new requirements for the national post-disaster hazard mitigation grant program (HMGP) were established.

The DMA encourages state and local authorities to work together on pre-disaster planning, and it promotes sustainability as a strategy for disaster resistance. "Sustainable hazard mitigation" includes the sound management of natural resources, local economic and social resiliency, and the recognition that hazards and mitigation must be understood in the largest possible social and economic context. The enhanced planning network called for by the DMA helps local governments articulate accurate needs for mitigation, resulting in faster allocation of funding and more cost-effective risk reduction projects.

Using this initiative as a foundation for proactive planning, the City of Roseville developed this Roseville Hazard Mitigation Plan (RHMP) in an effort to reduce future loss of life and property resulting from disasters. It is impossible to predict exactly when and where disasters will occur or the extent to which they will impact the City. However, with careful planning and collaboration among public agencies, stakeholders, and citizens, it is possible to minimize losses that can occur from disasters.

Hazard mitigation is defined as a way to reduce or alleviate the loss of life, personal injury, and property damage that can result from a disaster through long- and short-term strategies. It involves strategies such as planning, policy changes, programs, projects, and other activities that can mitigate the impacts of hazards on the City of Roseville. The responsibility for hazard mitigation lies with many, including private property owners; business and industry; and local, state, and federal government.

PLAN PURPOSE

Building on a tradition of progressive planning and past mitigation successes, the Roseville planning team set out to develop a plan that would meet the objectives summarized below.

- The plan would meet or exceed program requirements specified under the DMA
- The plan would not only meet state and federal requirements but also the needs of the City. Therefore, it was determined that this plan would include human-caused hazards, which are not required under the DMA.
- Plan development would follow a script prescribed by the Community Rating System (CRS) so that Roseville could meet CRS classification prerequisites, clearing the way for the City to become the very first CRS Class 1 community in the nation.
- The plan would coordinate existing ongoing plans and programs so that high-priority initiatives and projects to mitigate possible disaster impacts would be funded and implemented. The plan would also create a linkage between the

RHMP and established plans such as the City's general and specific plans so that they can work together in achieving successful mitigation for the City.

It should be noted that DMA compliance is not the sole purpose of this RHMP. Roseville has a long- standing tradition of proactive, progressive planning and program implementation. This tradition is further enhanced by the development of this RHMP. Multiple objectives drive this planning effort, one of which is DMA compliance. Elements and strategies included in this plan were not selected only because they meet a program requirement; they were selected because they best meet the needs of Roseville and its citizens

PLAN DEVELOPMENT METHODOLOGY

The development of the RHMP was carried out over the following four principle phases:

- Phase 1—Organize resources and involve the public
- Phase 2—Assess the risk
- Phase 3—Develop the mitigation plan
- Phase 4—Implement, evaluate, and revise the plan.

Phase 1—Organize Resources and Involve the Public

Under this phase, a 13-member steering committee was assembled to oversee the development of the plan consisting of City staff, citizens, and other stakeholders in the planning area. A technical subcommittee consisting of key City staff from city departments and utilities was also assembled to provide technical support to the steering committee. The planning process and steering committee were formally recognized by the Roseville City Council. Full coordination with other county, state, and federal agencies involved in hazard mitigation occurred from the onset of this plan's development through its completion. The Federal Emergency Management Agency (FEMA) provided technical assistance to the City in the form of a contract consultant to assist in the preparation of the risk assessment for this plan. The City also hired its own consultant to facilitate the plan development process and to ensure that all objectives were met. A multi-media public involvement strategy centered on a hazard preparedness questionnaire was also implemented under this phase. This strategy proved to be highly effective in gauging the public's perception of risk and vulnerability to all hazards and their support of mitigation alternatives.

Phase 2—Assess the Risk

To identify potential vulnerability to all hazards that could impact the City, a risk assessment was performed. ***Risk assessment is the process of measuring the potential loss of life, personal injury, economic injury, and property damage resulting from natural hazards.*** This process assesses the vulnerability of people, buildings, and infrastructure to natural hazards. It focuses on the following parameters:

- Hazard identification
- The impact of hazards on physical, social, and economic assets
- Vulnerability identification
- Estimates of the cost of damage or costs that can be avoided through mitigation

The risk assessment for the City of Roseville evaluates eight natural and non-natural hazards:

- Drought
- Earthquake
- Flood
- Landslide
- Human-caused hazards
- Human health hazards
- Severe weather
- Wildfire

Phase 3—Develop the Mitigation Plan

Using the information garnered under Phases 1 and 2, the steering committee and planning team assembled a planning document to meet the requirements of DMA and CRS programs. The first task was to develop a set of goals and objectives for the plan. Once these planning elements were established, the steering committee, with support from the technical committee, performed a series of facilitated exercises in order to generate the following parameters of this plan:

- Rank relative risk according to exposure for the City
- Identify capabilities
- Identify strengths, weaknesses, obstacles, and opportunities
- Create a catalog of mitigation alternatives
- Select mitigation initiatives and prioritize these initiatives, emphasizing benefits vs. costs when appropriate

Phase 4—Implement, Evaluate, and Revise the Plan

This plan includes a plan implementation and maintenance section that details the formal process for ensuring that the RHMP remains an active and relevant document. The plan maintenance process includes a schedule for monitoring and evaluating the plan's progress annually and producing a plan revision every 5 years. This process seeks to keep a steering body that meets the criteria of the original steering committee intact to perform this annual review. This phase includes strategies for continued public involvement and incorporation of the recommendations of this plan into other planning mechanisms of the City, such as the general plan, capital improvement plan, building code, and development design guidelines.

HOW THE PLAN IS ORGANIZED

The RHMP is organized into five basic parts that highlight the phases of the plan's development. Part I contains preceding documents, such as the table of contents, plan point of contact, acknowledgements, and this executive summary. Part 2 of the plan contains a detailed description of the planning process, including purposes for planning, the scope of work, organization of resources, public involvement, and a plan development chronology and milestones. Part 3 contains the risk assessment for the plan, which includes a profile of the City, identification of hazards, inventory of assets, a vulnerability assessment, and a ranking of risk. Part 4 contains the mitigation strategy for the plan, including goals and objectives, a review of alternatives, and an action plan. Part 5 contains a strategy for plan implementation and maintenance, including coordination with other planning mechanisms within the City.

MITIGATION GOALS AND OBJECTIVES

Goals and objectives identified by the steering committee for this plan are summarized below.

- **Goals**
  - G-1: Protect lives and reduce injury
  - G-2: Promote hazard mitigation as an integrated policy
  - G-3: Protect the continuity of local government to ensure no significant disruption of services during or due to a disaster
  - G-4: Improve community emergency management preparedness, collaboration, and outreach
  - G-5: Minimize or reduce damage to property, including critical facilities
  - G-6: Develop and implement mitigation strategies that optimize public funds in an efficient and cost-effective way
  - G-7: Maintain, enhance, and restore the natural environment's capacity to deal with the impacts of disasters
- **Objectives**
  - O-1: Consider the impacts of hazards on future land uses in the City of Roseville by coordinating with other planning mechanisms such as the general plan and land-use code development
  - O-2: Protect and sustain reliable local emergency operations and communication facilities during and after disasters
  - O-3: Develop new or enhance existing early warning response systems and plans
  - O-4: Seek to enhance emergency response capabilities through improvements to infrastructure and City programs
  - O-5: Enhance the understanding of all hazards that impact the City of Roseville and the risks they pose
  - O-6: Seek mitigation projects that provide the highest degree of hazard protection at the least cost
  - O-7: Seek to update information on natural, environmental, and human-caused hazards, vulnerabilities, and mitigation measures by coordinating planning efforts and creating partnerships with appropriate local, county, state, and federal agencies
  - O-8: Seek to implement codes, standards, and policies that will protect life and property, including natural habitat, from the impacts of hazards within the City of Roseville
  - O-9: Educate the public on preparedness for and mitigation of potential impacts of hazards to the City of Roseville
  - O-10: Retrofit, purchase, or relocate structures in high hazard areas, including those known to be repetitively damaged

MITIGATION INITIATIVES

The hazard mitigation action plan is a key element of this plan. It is through the implementation of this action plan that the City of Roseville can strive to become disaster-resistant through sustainable hazard mitigation. This action plan includes an assessment of the capabilities of the

City to implement hazard mitigation initiatives, a review of alternatives, a prioritization schedule, and a mitigation strategy matrix that identifies the following:

- Initiative by hazard addressed
- Goals and objectives addressed
- Lead implementation agency (or agencies)
- Estimated benefits
- Estimated costs
- Timeline for implementation
- Funding sources
- Prioritization

For the purposes of this document, mitigation initiatives are defined as activities designed to reduce or eliminate losses resulting from disasters.

Although one of the driving influences for preparing this plan was grant funding eligibility, this plan is not a "how to get grant money" plan. It was very important to the City and the steering committee to examine initiatives that would work through all phases of emergency management. Some of the initiatives outlined in this plan and the mitigation catalog that guided their selection are not grant- eligible—grant eligibility was not the focus of the selection. Rather, the focus was the initiatives' effectiveness in achieving the goals of the plan and whether they are within the city's capabilities. A summary of the hazard mitigation initiatives identified by this plan are presented in Table ES-1.

TABLE ES-1
SUMMARY OF HAZARD MITIGATION INITIATIVES

Initiative No.	Mitigation Initiative	Lead Agency	Timeline	Priority
Drought Hazard				
D-1	Perform a groundwater recharge feasibility study to determine the most cost-effective way to replenish groundwater resources within Roseville	Environmental Utilities District (EUD)/Public Works	Long -term	Medium
D-2	Implement aquifer storage and recovery program that uses direct injection technique in areas identified as appropriate	EUD	Short-term, ongoing	Medium
D-3	Continue to implement EUD's recycled water program and seek all opportunities to expand its coverage focusing first on the Sunset Industrial area	EUD	Ongoing	High
D-4	Promote active water conservation techniques and strategies to private property owners through City-sponsored outreach projects such as printed media and the City website	Roseville Public Information Office	Short-term, ongoing	High
Earthquake Hazard				
EQ-1	Perform building-specific structural seismic vulnerability assessment of City-owned critical facilities, including infrastructure, constructed before 1980	Public Works	Long-term	Medium
EQ-2	Incorporate earthquake mitigation measures for private property into existing City-sponsored outreach programs such as printed media and the City website	Roseville Public Information Office	Short-term, ongoing	High

TABLE ES-1 (continued)
SUMMARY OF HAZARD MITIGATION INITIATIVES

Initiative No.	Mitigation Initiative	Lead Agency	Timeline	Priority
Earthquake Hazard (continued)				
EQ-3	Reassess overall vulnerability to earthquake hazards using best available science and technology as it becomes available	Planning, Public Works	Short-term	Medium
EQ-4	Implement seismic construction standards under the International Building Code (IBC) as an "alternative means" code until the IBC is formally adopted as the California State Building Code	Community Development	Short-term, ongoing	High
Flood Hazard				
F-1	Designate all areas identified as the 100-year floodplain; 100-year floodplain boundaries shall be as specified in the floodplain designations section of this component of the City's general plan; preserve floodplain areas as specified in the open space and conservation element of the general plan; such preservation may include required dedication to the City; if needed, modify City ordinances to include floodplain use regulations consistent with goals, policies, and implementation measures of the safety, land use, open space and conservation, and parks and recreation elements of the City's general plan	Planning	Ongoing	High
F-2	Refer any development proposal that has a direct or indirect impact on flood protection to Public Works department for comment; in addition, forward such proposals to other agencies as applicable, including U.S. Army Corps of Engineers, California Reclamation Board, FEMA, California Department of Fish and Game, Placer County Resource Conservation District, and Placer County Flood Control District (PCFCD); consider agencies' comments during development review process	Public Works, Planning	Ongoing	High
F-3	Continue City participation in National Flood Insurance Program (NFIP) and CRS; seek CRS classification improvements within capabilities of City programs, including adoption and administration of FEMA-approved ordinances and flood insurance rate maps (FIRM)	Public Works	Ongoing	High
F-4	Continue City's outreach program to flood-prone property owners and Roseville citizens to help make them aware of flood threats and how best to deal with them	Public Works	Ongoing	High
F-5	Continue to pursue regional approach to flood issues by remaining actively involved in the PCFCD	Public Works	Ongoing	High
F-6	Continue City coordination with other agencies on issues of flood control; coordination between City and adjacent jurisdictions occurs through several mechanisms, including distribution of development proposals for review and comment	Planning, Public Works	Ongoing	High

TABLE ES-1 (continued)
SUMMARY OF HAZARD MITIGATION INITIATIVES

Initiative No.	Mitigation Initiative	Lead Agency	Timeline	Priority
Flood Hazard (continued)				
F-7	Continue to develop, implement, and expand the Flood Alert and Early Warning Program systems, and integrate the systems with other local jurisdictions to form a regional warning program	Public Works	Short-term	High
F-8	Ensure that future specific plans and specific plan amendments are consistent with goals and policies of the general plan; specific plans shall include the designation and preservation of floodplain areas and adjacent habitat	Planning, Public Works	Short-term	High
F-9	Monitor and regularly update City flood studies, modeling, and associated land use, zoning, and other development regulations at a minimum of every 5 years or whenever information becomes available that would significantly modify previous data	Public Works	Short-term	Medium
F-10	Require a master drainage plan as part of the approval process for all specific plans and large development projects as determined by the Public Works director	Planning, Public Works	Short-term	High
F-11	Continue the Parks and Recreation Department's regular creek maintenance program within the City's creeks and floodplain areas	Parks and Recreation	Ongoing	Medium
F-12	Continue annual inspection and maintenance of City's storm drain systems; after every major storm, review system function and performance; this program removes debris that could contribute to blockage of storm drain system	Street Department	Ongoing	Medium
F-13	Complete final two phases of Cirby/Linda/Dry Creek flood control project (Phases 1 and 2); basis for determining viability of this project will be a benefit/cost analysis to determine if project meets federal grant eligibility requirements	Public Works	Long-term	Low
F-14	Analyze alternative improvements to the Cirby/Linda/Dry Creek Flood Control Project that may be cost effective in flood-prone areas of Roseville: • Dry Creek from Darling Way to Riverside Avenue • Area on Dry Creek upstream of Folsom Road in the Columbia Avenue/Marilyn Avenue/Bonita Street area • Linda Creek near Champion Oaks Drive/Samoa Way/Hurst Way area • Cirby Creek in the Trimble Way/Zien Court area	Public Works	Long-term	Low
F-15	Replace the Huntington Drive/Cirby Creek culvert with a bridge to protect Queens Court/Huntington Drive area; this project is overseen by Public Works department	Public Works	Short-term	High
F-16	Divert main drainage storm drain system down Crestmont Avenue to Cirby Way and into Dry Creek so that existing system will not exceed capacity	Public Works	Short-term	High

TABLE ES-1 (continued)
SUMMARY OF HAZARD MITIGATION INITIATIVES

Initiative No.	Mitigation Initiative	Lead Agency	Timeline	Priority
Flood Hazard (continued)				
F-17	Continue to promote and sponsor programs to buy out, relocate, and flood-proof existing flood-prone structures within Roseville	Public Works	Short-term	High
F-18	Set back and raise sewer pond levees at Dry Creek Sewer Plant so raw sewage will not enter Dry Creek	Public Works, EUD	Short-term, ongoing	High
F-19	Replace existing wood flood wall along Dry Creek that protects City's Main Library and Public Safety Building because wood wall allows flood water to leak through, and constant pumping is required	Public Works	Long-term	High
F-20	Manage beaver dam sites for flood control protection and habitat restoration after dam removal	Parks and Recreation	Short-term	Medium
F-21	Perform a scenario-based dam failure analysis to determine the probable impact of flooding within Roseville if western levees on Folsom Reservoir fail.	Public Works	Long-term	Low
F-22	Once dam failure analysis is complete, create a dam failure element for the City's emergency response plan.	Police and Fire Departments	Long-term	Low
F-23	Develop a comprehensive interpretive sign program, including trial and open space preserve signage, at road crossings. Create creek corridor trail maps and coordinate with local schools and public stewardship events to increase public awareness of the need to preserve, restore, and proactively manage open space corridors and provide a sense of civic identity and pride.	Community Development	Short-term	High
Landslide Hazard				
LS-1	Once California Geological Survey (CAGS) completes soils mapping for Roseville vicinity under Seismic Hazards Mapping Act, reassess landslide hazard using best available data to gauge true vulnerability	Public Works	Long-term	Low
LS-2	Implement soil testing standards under IBC as an "alternative means" code until IBC is formally adopted as California State Building Code	Community Development	Short-term, ongoing	High
LS-3	Continue to implement policies adopted by the general plan that promote open space land uses within identified steep slope areas of Roseville	Planning	Ongoing	High
Human-Caused Hazard				
HC-1	Incorporate Crime Prevention Through Environmental Design strategies into future enhancements and revisions to community design guidelines	Planning	Short-term	High

TABLE ES-1 (continued)
SUMMARY OF HAZARD MITIGATION INITIATIVES

Initiative No.	Mitigation Initiative	Lead Agency	Timeline	Priority
Human-Caused Hazard (continued)				
HC-2	Commit support to Sacramento Urban Area Security Initiative in the form of staff support from City of Roseville public safety departments	Police and Fire Departments	Short-term	High
HC-3	Enhance emergency response capability of City by contingency planning for specific events based on identified vulnerabilities	Police and Fire Departments	Short-term; ongoing	High
HC-4	Seek to establish appropriate staffing levels of public safety personnel to address vulnerabilities identified	RCC	Short-term	High
HC-5	Prepare site-specific vulnerability assessment of City-owned critical facilities that use the best available science and technology with regards human-caused hazards	Police, Fire, and Planning Departments	Long-term	Medium
HC-6	Develop and enhance a continuity of operations plan (COOP) specific to human-caused hazards	Police and Fire Departments	Short-term; ongoing	Medium
HC-7	Enhance camera surveillance program to improve security at electrical substations, receiving stations, and energy park	Roseville Electric	Short-term	High
HC-8	Address vulnerabilities identified in vulnerability assessment of water facilities performed by EUD in response to U.S. Environmental Protection Agency (EPA) initiative	EUD	Long-term	Medium
Human Health Hazard				
HH-1	Continue to collaborate with the Placer County Health Department to ensure the health and welfare of the community	Fire Department, Public Information Office	Ongoing	High
HH-2	Support the public education efforts of the Placer County Health Department and the Placer Mosquito Abatement District	Public Information Office, Fire Department	Ongoing	High
HH-3	Collaborate with the Placer Mosquito Abatement District to review resource protection policies that conflict with human health protection in the City of Roseville and work to resolve those policy issues	Community Development Departments	Short-term	High
Severe Weather Hazard				
SW-1	Purchase mobile generators to provide redundancy for electrical utilities	Roseville Electric	Ongoing	High
SW-2	Continue “Right Tree, Right Place” program, a community service sponsored by Roseville Electric and Roseville Urban Forest Foundation	Roseville Electric	Short-term	Low
SW-3	Continue ongoing line clearing and weed abatement of electrical utilities to reduce exposure to severe weather hazards	Roseville Electric	Ongoing	High

TABLE ES-1 (continued)
SUMMARY OF HAZARD MITIGATION INITIATIVES

Initiative No.	Mitigation Initiative	Lead Agency	Timeline	Priority
Severe Weather Hazard				
SW-4	Continue education/outreach programs to improve winter preparedness and minimize loss of life or injury	Roseville Electric	Ongoing	High
SW-5	Enhance and implement strategies for debris management and removal during severe weather events	Roseville Fire Department	Short-term; ongoing	High
SW-6	Continue ongoing program of conversion of overhead utilities to underground service	Roseville Electric	Ongoing	Medium
Wildfire Hazard				
WF-1	Continue ongoing line clearing and weed abatement of electrical utilities to reduce exposure to fire and severe weather hazards	Roseville Electric	Ongoing	High
WF-2	Continue "Goat Grazing" program for removal of grassland in areas of Roseville potentially vulnerable to wildfire	Community Development Fire Department	Ongoing	High
WF-3	Enhance existing City public outreach programs to include information on fire safety, defensible spaces, and areas of concern.	Fire Department	Short- term Ongoing	High
WF-4	Purchase a minimum 4,000-gallon water tender with wildfire fighting capability.	Fire Department	Long Term	Medium
WF-5	Consider adopting building code regulations that would allow only class "A" roofing on new or substantially improved structures.	Community Development	Short Term	Medium
WF-6	Enhance wildfire-fighting capabilities of the Fire Department through approaches that include • Use of gel for fire protection of threatened structures, • Equipment with adequate supplies of class A foam, • Expanded vegetation management areas, • Enhanced wildfire training for response personnel, and • Establishment of a reserve supply of wildfire-fighting land equipment.	Fire Department	Short term	High
Multiple Hazards				
MH-1	Adopt IBC as amended once approved as California State Building Code	Community Development	Short-term	High
MH-2	Continue to seek State Office of Emergency Services (OES) certification of all City inspectors for post-disaster damage assessment	Community Development	Ongoing	High

TABLE ES-1 (continued)
SUMMARY OF HAZARD MITIGATION INITIATIVES

Initiative No.	Mitigation Initiative	Lead Agency	Timeline	Priority
Multiple Hazards (continued)				
MH-3	Establish hazard mitigation page on City website that provides following types of information: • RHMP and its progress report(s) • Hazard-specific information • Mitigation information by hazard, with specific emphasis on private property • Emergency response and warning information • Links to county, state, and federal related agencies	Public Information Office	Short-term	High
MH-4	Review existing automatic/mutual aid agreements with outside public safety agencies to identify opportunities for enhancement	Police and Fire Departments	Short-term	High
MH-5	Enhance the post-disaster action plan of the Roseville Emergency Response Plan to include the following elements: • Procedures for public information • Post-disaster damage assessment • Grant writing • Code enforcement • Redundant operations	Police and Fire Departments, and Planning	Short-term	High
MH-6	Relocate City Emergency Operations Center out of the floodplain, and construct new facility to current seismic standards; this project would mitigate impacts of flood, earthquake, and human-caused hazards	Police and Fire Departments	Short-term	High
MH-7	Implement an “Adopt an Open Space” program in coordination with the open space management program.	Community Development	Short-term	Medium
MH-8	Develop and disseminate best practices information to private property owners whose land is adjacent to open space areas describing stewardship opportunities and owners’ role in preserving beneficial uses of open space areas (including vernal pool grassland and creek or riparian uses).	Community Development	Short-term	High
MH-9	Work with the Roseville City School District, local high school districts, and non-profit organizations to promote ecology-oriented curricula and stewardship activities.	Community Development	Short-term	Medium
MH-10	Institute a city program requiring a “Resale Property Report” for all sale of developed real property for a fee. The report would disclose information on hazards to be provided to a prospective buyer.	Community Development	Short-term	High

IMPLEMENTATION

Full implementation of the recommendations of this plan will require time and resources. This plan reflects an adaptive management approach in that specific recommendations and plan review protocols are provided to evaluate changes in vulnerability and action plan prioritization after the plan is adopted. The true measure of the plan's success will be its ability to adapt to the ever-changing climate of hazard mitigation. Funding resources are always evolving, as are programmatic changes based on new state or federal mandates. Roseville has a long-standing tradition of progressive, proactive response to issues that may impact its citizens. This tradition is reflected in the development of this plan. The Roseville City Council will assume responsibility for adopting the recommendations of this plan and committing City resources toward its implementation. Roseville's track record in the mitigation of hazards impacting its citizens is exemplary. The framework established by this plan will help maintain this tradition in that it identifies a strategy that maximizes the potential for implementation based on available and potential resources. It commits the City to pursue initiatives when the benefits of a project exceed its costs. Most importantly, the City developed this plan with extensive public input. These techniques have proven successful for the City of Roseville in its past planning efforts and will set the stage for successful implementation of the recommendations in this plan.

City of Roseville Hazard Mitigation Plan
Pre-Adoption Review Draft
June 2005

PART 2—THE PLANNING PROCESS

CHAPTER 1.
INTRODUCTION TO THE PLANNING PROCESS

1.1 WHY PREPARE THIS PLAN

The sections below discuss why the City of Roseville has prepared this Roseville hazard mitigation plan (RHMP), including "the big picture" and purposes for planning.

1.1.1 The Big Picture

The federal Disaster Mitigation Act (DMA) of 2000 (Public Law 106-390), commonly known as the 2000 Stafford Act amendments, was approved by Congress on October 10, 2000. This act required state and local governments to develop hazard mitigation plans as a condition for federal grant assistance. Prior to 2000, federal legislation provided funding for disaster relief, recovery, and some hazard mitigation planning. The DMA improves upon the planning process by emphasizing the importance of community planning for disasters before they occur.

Using this initiative as a foundation for proactive planning, the City of Roseville developed this hazard mitigation plan in an effort to reduce future loss of life and property resulting from disasters. It is impossible to predict exactly when and where these disasters will occur or the extent to which they will impact the City. However, with careful planning and collaboration among public agencies, stakeholders, and citizens, it is possible to minimize losses that can occur from disasters.

Hazard mitigation is any action taken to permanently eliminate or reduce long-term risks to human life and property from natural hazards. Along with preparedness, response, and recovery, mitigation is an essential element in emergency management. Disasters can have significant impacts on communities. They can destroy or damage life, property, and infrastructure, local economies, and the environment.

The RHMP strives to protect its citizens' health, safety, economic, and environmental interests. Using a systematic planning approach that organizes resources, assesses risk, and identifies actions, Roseville has established a plan for dealing with the impacts of disasters before they occur. This proactive approach helps reduce the impacts of disasters and increase the community's resilience through awareness and implementation of mitigation actions. Fewer lives, homes, and businesses will be lost, and a disaster's disruption to the community will be lessened. Ultimately, a community that is hazard-resilient is more likely to remain intact economically, structurally, socially, and environmentally, even when disaster does occur.

1.1.2 Purposes for Planning

This RHMP is intended to assist the City of Roseville in reducing its risk from all hazards by identifying resources, information, and strategies for risk reduction. The plan will also help guide and coordinate mitigation activities throughout the City. Building on a tradition of progressive planning and past mitigation successes, the Roseville planning team set out to develop a plan that would meet the objectives summarized below.

- The plan would meet or exceed program requirements specified under the DMA
- The plan would not only meet state and federal requirements but also the needs of the City. Therefore, it was determined that this plan would include human-caused hazards, which are not required under the DMA.

- Plan development would follow a script prescribed by the Community Rating System (CRS) so that Roseville could meet CRS classification prerequisites, clearing the way for the city to become the very first CRS Class 1 community in the nation.
- The plan would coordinate existing ongoing plans and programs so that high-priority initiatives and projects to mitigate possible disaster impacts would be funded and implemented. The plan would also create a linkage between the RHMP and established plans such as the City's general and specific plans so that they can work together in achieving successful mitigation for the City.

It should be noted that DMA compliance is not the sole purpose of this RHMP. Roseville has a long-standing tradition of proactive, progressive planning and program implementation. This tradition is further enhanced by the development of this RHMP. Multiple objectives drive this planning effort, one of which is DMA compliance. Elements and strategies included in this plan were not selected only because they meet a program requirement; they were selected because they best meet the needs of Roseville and its citizens.

1.2 WHO WILL BENEFIT FROM THIS PLAN

Ultimately, the benefactors of mitigation efforts are the citizens and businesses of Roseville. The planning area for this RHMP is contiguous with the planning area defined by the City's general plan. The RHMP protects those who live in, work in, and visit Roseville. Although this plan does not establish mandates for the City, it does provide a viable planning framework for all foreseeable hazards that may impact the City. Key "stakeholders" within Roseville participated in the development of this plan. Their involvement will help coordinate mutually beneficial outcomes targeted by this plan. The resources and background information in the RHMP are applicable City-wide, and the plan's goals and recommendations can lay groundwork for the development and implementation of local mitigation activities and partnerships.

1.3 HOW TO USE THIS PLAN

This RHMP is organized into five primary parts that follow the phases of the plan's development as follows:

- Part 1—Preceding Documents (including the table of contents, acknowledgements, and executive summary)
- Part 2—The Planning Process
- Part 3—Risk Assessment
- Part 4—Mitigation Strategies
- Part 5—Plan Implementation and Maintenance

Each part this RHMP includes required elements specified under Section 201.6 of Title 44 of the *Code of Federal Regulations* (44 CFR). As stated earlier, one of the objectives established for this RHMP is to achieve compliance for the City of Roseville under the DMA. The requirements specified for program compliance are often cited at the beginning of a subsection to illustrate how that subsection attempts to comply with the requirement.

At the end of this RHMP are Appendix A – Resolution adopted by City Council to support plan preparation,, Appendix B – a Glossary and definitions, Appendix C – Roseville Hazard Mitigation Questionnaire and summary, Appendix D – Documentation of Public Meetings, Appendix E – quantifiable results of Public involvement strategy and Appendix F- Maps that help illustrate vulnerability

to the risks identified in this plan. These appendices include vital information or explanations to support the main content of this plan. Technical terms, acronyms, and abbreviations are abundant in this document. To aid the reader, technical terms that are defined in the glossary are indicated in bold italics. The list of acronyms and abbreviations defines all shortened forms used in this RHMP.

CHAPTER 2.
ORGANIZING RESOURCES

2.1 PLANNING RESOURCE ORGANIZATION

The first phase in the development of the RHMP was to organize the resources necessary to ensure a successful planning effort. Under this phase, the City of Roseville assessed its readiness for planning by establishing a planning team, seeking technical assistance, securing political support, and engaging the public to determine its perception of risk and support of hazard mitigation. This phase also included thorough coordination with other local, state, and federal agencies involved in hazard mitigation within the region to ensure a consistent platform with other ongoing efforts. This phase had the following six primary objectives to define its scope of work:

- Forming the planning team
- Obtaining political support for the process
- Forming a steering committee
- Coordinating with other agencies
- Reviewing existing plans
- Engaging the public

The first five objectives are discussed below, and the last objective is discussed in Chapter 3 of this RHMP.

2.2 FORMING THE PLANNING TEAM

The RHMP planning team is multidisciplinary, with leadership provided by the City Manager's Office and technical support provided by City departments and contract consultants. As stated in Section 1.1.2, there were multiple reasons for the City of Roseville to prepare this RHMP. To ensure that all City objectives could be met in a manner consistent with other city planning programs, the City Manager's Office appointed the Planning Department as the lead agency for the planning process. Mr. Mike Isom, project planner for the City of Roseville Planning and Redevelopment Department, was appointed as the lead planner for this effort. Mr. Isom's responsibilities for this effort included oversight of the planning process to ensure that City planning protocols were adhered to.

The first planning team element established was a technical subcommittee of key staff from City departments integral to implementing City programs pertinent to hazard mitigation. Table 2.1 lists committee members and affiliations. The purpose of this subcommittee was to provide guidance, support, and feedback to the planning team during all phases of plan development.

Because the City had established multiple objectives for this plan, some of which required compliance elements for program eligibility (DMA and CRS), it was determined that technical assistance in the form of contract consultants would be needed. Two contract consultants provided technical support to the planning team during the development of this RHMP. Specifically, under the Hazard Mitigation Technical Assistance Program, Region IX of the Federal Emergency Management Agency (FEMA), provided staff from Greenhorn and O'Mara Inc. to the City of Roseville to support the City in assessing risks from earthquake, flood, and human-caused hazards.

TABLE 2.1
TECHNICAL SUBCOMMITTEE MEMBERS

Name	Department/Agency
Julia Burrows	City Manager's Office
Mike Isom	Planning Department
Garth Gaylord	Public Works-Floodplain Management
Gene Paolini	Public Works-Building Division
Steve Pitts	Parks and Recreation
Terri Shirhall	Community Development
Mary Lou Pierce	Roseville Fire Department
Jeff Carman	Roseville Fire Department
Don Shingara	Roseville Police Department
Joe Redding	Roseville Electric
Kelye McKinney	Environmental Utilities District (EUD)-Engineering Division
Ed Kriz	EUD-Water Division
Dave Brown	Roseville Electric

Tetra Tech, Inc. (Tetra Tech), was retained by the City of Roseville to assist the planning team in assessing risks for flood, landslide, drought, severe weather, wildfire, and technological hazards. Tetra Tech's primary role was to facilitate the plan development process so that it would meet DMA requirements and the prescriptive CRS planning requirements to ensure compliance with the CRS Class 1 prerequisites.

2.3 OBTAINING POLITICAL SUPPORT FOR THE PROCESS

To be successful, mitigation planning, like all community planning efforts, requires collaboration between and support from all levels of City government. To ensure this City-wide support, formal recognition of the planning team and the plan development process was provided by Roseville City Council in the form of a council resolution adopted by motion on July 4, 2004. Appendix A provides a copy of this resolution.

2.4 FORMING THE RHMP STEERING COMMITTEE

Hazard mitigation planning is one of the best ways to enhance collaboration and gain support among the parties whose interests might be affected by hazard losses. By working together, a broad range of stakeholders can identify and create partnerships that pool resources to achieve a common vision for the community. The work plan established for this process was built around this concept by the formation of a steering committee that would oversee all phases of the RHMP's development. The members of this committee included key city personnel, citizens, and other stakeholders from within the planning area. The planning team assembled a list of possible steering committee candidates, striving to create a committee with a diverse makeup that could best represent all of the interests of the City. Prospective candidates were solicited by the planning team, and a list of 14 volunteers was submitted to the Roseville City Council for approval on July 12, 2004. Table 2.2 provides the roster of steering committee members approved by the City Council.

TABLE 2.2
STEERING COMMITTEE MEMBERS

Name	Title	Jurisdiction or Agency	Representing
Grace Keller, Chair	Member	Community Emergency Response Team (CERT)	Stakeholder
Kim Kelley, Vice-Chair	Safety Manager	Kaiser Permanente, Environmental Health	Stakeholder
Clair Alway	Homeowner	Floodplain resident	Citizen
David Benedetti	Staff Safety Engineer	NEC Electronics America Inc.	Stakeholder
Steve Pease	Member	Roseville Chamber of Commerce	Stakeholder
Dan Dimick	Western Region Environmental Health and Safety Manager	Hewlett-Packard	Stakeholder
Dave Kingsbury	Director of Facilities	Roseville City School District	Stakeholder
Alan Colombo	Director of Facilities	Dry Creek School District	Stakeholder
Jerry Erickson	Member	Roseville Coalition of Neighborhood Associations (RCONA)	Citizen
Don Snow	Manager, Chemical Transportation Safety	Union Pacific Railroad	Stakeholder
Mary Lou Pierce	Emergency Response Manager	City of Roseville Fire Department	City
Mike Isom	Planner	City of Roseville Planning Department	City
Susan Webb	Emergency Management Coordinator	Sutter-Roseville Medical Center	Stakeholder
George Booth **	Assoc. Civil Engineer	Sacramento Department of Water Resources and Roseville city resident	Citizen/Stakeholder
Jim Williams **	Member	RCONA	Citizen

** Mr. Booth and Mr. Williams were both mid-term replacements to the Steering Committee to maintain the Roseville City Council's approved size of the committee at 13 members.

The steering committee first convened on Tuesday August 3, 2004, to initiate the RHMP development process. Leadership roles and ground rules were established during this initial meeting. The steering committee agreed to meet on the third Tuesday of every month throughout the course of the plan's development. The Roseville planning team facilitated each steering committee meeting, which addressed a set of objectives based on the work plan established for the RHMP. The steering committee met a total of nine times from August 2004 to April 2005. Detailed records in the form of meeting agendas, minutes, and attendance logs were maintained by the planning team and are available for review upon request. All steering committee meetings were advertised as public meetings on the City website and through press releases prior to scheduled meeting dates.

First Steering Committee Meeting on August 3, 2004

2.5 COORDINATING WITH OTHER AGENCIES

Section 201.6.b.2 of 44 CFR requires that opportunities for involvement in the planning process be provided to neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development, businesses, academia, and other private and nonprofit interests. This task was accomplished by the RHMP planning team as summarized below.

- **Agency Notification**—A diligent effort was made to keep important agencies apprised of the planning process. The following agencies were invited to participate in this process from the beginning and were kept apprised of plan development milestones:
  - FEMA Region IX
  - California Office of Emergency Services (OES)
  - California Department of Water Resources
  - Placer County Office of Emergency Services
  - Placer County Flood Control District (PCFCD)
  - Placer County Office of Education
  - Sacramento County Department of Water Resources
  - City of Rocklin
  - City of Citrus Heights
  - Roseville Joint Union High School District
  - Eureka School District

  All of these agencies received meeting announcements, meeting agendas, and meeting minutes through e-mail throughout the plan development process. This approach

proved to be beneficial when these agencies supported the effort by attending meetings or providing feedback on issues. All of these agencies were also informed about the RHMP web page for up-to-date information.

- **Steering Committee Involvement**—Members of the agencies listed above were invited to participate on the RHMP steering committee. The Placer County Office of Emergency Services supported the steering committee in an *ex officio* role, and the Sacramento Department of Water Resources agreed to serve as a steering committee member. Stakeholders within the planning area were also invited and agreed to participate on the steering committee.
- **Coordination with Placer and Sacramento Counties**—Both Sacramento and Placer Counties were involved in the preparation of multi-jurisdictional natural hazard mitigation plans concurrently with the Roseville effort. Roseville was invited to participate in each of these planning efforts, most notably in the Placer County planning effort. The City decided against participating in the multi-jurisdictional efforts because of differing planning objectives (non-natural hazards and CRS Class 1). However, the City committed to coordinate their planning efforts with both counties to ensure regional consistence in mitigation measures for similar hazards. Representatives from both counties were actively involved in all phases of the RHMP development, and representatives from the City of Roseville supported the Placer County planning process. An early steering committee action item was to review the California state hazard mitigation plan, the draft Placer County plan, and the draft Sacramento County plan for regional consistency.
- **Pre-adoption Review**—All the agencies listed above were provided the means to review and comment on Part 4 of the RHMP, which includes the mitigation action plan. The predominant means for this review was through the RHMP webpage on the City website. Each agency was sent an e-mail message informing them that draft portions of the RHMP were available for review. In addition, the complete draft plan was sent to FEMA Region IX, OES, and the Insurance Service Office (ISO) for a pre-adoption review to ensure program compliance.

2.6 REVIEWING EXISTING PLAN

Section 201.6.b(3) of 44 CFR states that a hazard mitigation plan shall include a review and incorporation, if appropriate, of existing plans, studies, reports, and technical information as part of the planning process. The City of Roseville has an established reputation as a community that has proactively addressed problems through successful mitigation projects. This was accomplished by proactive, progressive planning through the City's General Plan, which includes a safety element designed to address hazards that could impact the City of Roseville. As the principle planning document that directs the City's growth and land use, the general plan is viewed as an integral part of the RHMP. These two planning documents will work together in their respective arenas to achieve a common goal of hazard risk reduction. Many of the action items identified in Part 4 of this RHMP are policies implemented as recommendations of the general plan. The maintenance strategy identified in Part 5 of this RHMP identifies a plan update trigger for the RHMP tied to an update of the general plan. The general plan purpose and contents are discussed below.

2.6.1 General Plan Purpose

California state law requires that every county and city prepare and adopt a comprehensive long-range plan to serve as a guide for community development. The plan must consist of an integrated and internally

consistent set of goals, policies, and implementation measures. In addition, the plan must focus on issues of the greatest concern to the community and be written in a clear and concise manner. City actions, such as those relating to land use allocations, annexations, zoning, subdivision and design review, redevelopment, and capital improvements, must be consistent with such a plan. The City of Roseville General Plan serves these purposes and

- Enables the Roseville City Council and Planning Commission to establish long-range development policies,
- Provides a basis for judging whether private development proposals and public projects are in harmony with the policies, and
- Guides public agencies and private developers in designing projects consistent with City policies.

The General Plan is designed to be

- Long-range. However imperfect the vision of the future is, almost any development decision has effects lasting more than 20 years. In order to create a useful context for development decisions, the general plan looks toward the year 2010 and beyond.
- Comprehensive. The general plan provides direction to coordinate all major components of the community's physical development.
- General. Because it is long-range and comprehensive, in most cases, the plan is general. The general plan's purpose is to serve as a framework for detailed public and private development proposals. It establishes requirements for additional planning studies that must be completed prior to any future specific plan to modify the general plan's land-use allocation.

Roseville's first General Plan consisted basically of a land-use map and was adopted in 1963. The first comprehensive General Plan for the City was adopted in 1977. Various elements were updated since 1977, but the 1992 General Plan represented the first comprehensive update since that time. Although no new land uses were allocated beyond those identified in the previous General Plan, the 1992 Plan did result in substantial policy revisions. The plan's land-use allocation has been modified by the Roseville City Council several times since the 1992 update with the adoption of the Del Webb, North, Highland Reserve North, and Stoneridge Specific plans, and with the annexation of the Pleasant Grove Waste Water Treatment Plant and Foothill Business Park properties. However, although land use has changed, the core policies of the 1992 update were retained.

A technical update to the General Plan was accomplished in January 2003 that focused on updating information that had changed as a result of previous Roseville City Council actions (adoption of specific plans and update of the Capital Improvement Program, etc). The most recent change to the General Plan also occurred in 2003 with the adoption of the West Roseville Specific Plan annexation and sphere-of-influence amendment. Because of the adoption of the specific plan and annexation, several revisions to the General Plan occurred, including inclusion of the City's previously adopted guiding principles for development west of Roseville, a change in land-use allocation, and map revisions. The general plan integrates the City's nine adopted specific plans. These plans are incorporated as a part of the general plan and should be referred to for specific requirements.

The General Plan places emphasis on "performance" policies or standards that attempt to define levels of service and other less tangible factors that the City is seeking to achieve. It is these factors and requirements that will be paramount in defining Roseville's quality of life.

2.6.2 General Plan Contents

Two primary components constitute the City of Roseville General Plan:

1. The General Plan document, which incorporates goals, policies, and implementation measures
2. The land use map, which graphically represents the City's existing and planned land use mix and pattern

The general plan document is organized into nine separate mandatory and optional elements. The state-mandated elements include Land Use, Circulation, Open Space and Conservation (combined), Safety, Housing, and Noise. The optional elements consist of Air Quality, Parks and Recreation, and Public Facilities.

Each element is organized in the same fashion, with a brief setting and outlook section describing existing conditions and critical issues for the topic area. In each element, goals, policies, and implementation measures are discussed. The goals state the overall desired conditions that the City would like to achieve. The policies indicate an action or direction that the City must take as a step toward achieving the desired conditions or goals. The implementation measures are more specific and include precise actions to achieve the slated policies. Each element contains one or more components structured in a similar manner.

The general content of each element is described below.

- **Land Use Element** discusses existing and projected land-use conditions, land-use designations and standards, community form, community design, and growth management. The goals and policies are intended to promote a balanced land-use pattern that supports innovative land-use approaches and retains and enhances the distinct character and identity of Roseville.
- **Circulation Element** identifies the general locations and extent of existing and proposed roadways, highways, railroads, and transit routes. The element identifies policies and programs to reduce traffic congestion, promote alternative forms of transportation, and provide safe travel throughout the City.
- **Air Quality Element** integrates related land-use, transportation and circulation, transit, and energy issues. The policies and implementation measures are intended to improve air quality and encourage cooperation between the jurisdictions involved in regional air quality efforts.
- **Open Space and Conservation Element** provides for the conservation, development, and use of natural resources; details plans and measures for the preservation of open space; and provides for outdoor recreation, and public health and safety. It is the overall goal of the element to preserve a comprehensive interconnected system of open space encompassing preservation and enhancement of natural habitat areas for the use and enjoyment of the community.
- **Parks and Recreation Element** provides goals and policies for both traditional "active" park lands and non-traditional "open space recreational" park lands. It specifies standards and conditions as guidelines for planning parks and recreation facilities, including size, type, and location.
- **Public Facilities Element** identifies facility and service needs of the community and performance standards to ensure that desired service levels are maintained. Discussed

under this element are civic facilities, libraries, schools, electric and privately owned utilities, water and wastewater systems, solid waste and recycling, water and energy conservation, and the extension of City services. Emphasis is placed on the fair-share contribution of new development toward the provision of services and facilities.

- **Safety Element** establishes standards and plans for the protection of the community from a variety of hazards, including earthquakes, flooding, crime, fire, hazardous materials, and electromagnetic fields.
- **Noise Element** establishes standards for transportation and fixed noise sources to protect the health and welfare of the community.
- **Housing Element** identifies the existing and projected housing needs and establishes goals, policies, and implementation measures for the preservation, improvement, and development of housing to meet the needs of all economic sectors of the community.

The General Plan also includes a glossary and an appendix. The appendix includes a list of references used to prepare the plan, including issue papers, environmental impact reports (EIR), and specific plans. All referenced materials are available through the Roseville Planning Department. The City of Roseville considers that this General Plan (incorporating the land-use map) meets all the state-mandated requirements for the substance and content of a General Plan.

To understand the full intent of the general plan, the goals, policies, and implementation measures must be reviewed together and in combination with the land-use map. In addition, many individual issues have implications that are contained in more than one element throughout the plan. Readers of the General Plan should review other parts of the document where references are made to additional information.

CHAPTER 3.
ENGAGING THE PUBLIC

3.1 INTRODUCTION

Section 201.6.b.1 of 44 CFR requires that the public have opportunities to comment on disaster mitigation plans during the drafting stages and prior to plan approval. The CRS expands on these requirements by making CRS credits available for optional public involvement activities. With these factors in mind, the planning team drafted a public involvement strategy that was comprehensive, using multimedia sources available within the City.

Although the planning team represents a cross-section of the City, it is important to include broad public participation in the planning process as well. Involving those not part of the core team in all stages of the process will introduce the planning team to different points of view about the needs of the City. A conscious effort was made by the planning team to identify stakeholders within the City to target through the multi-disciplinary public involvement strategy discussed below.

3.2 STRATEGY

As part of the work plan for the RHMP, a complete strategy was developed for involving the public that included the following objectives:

- Utilize the vast media resources along with the in-house expertise available to the City
- Use a questionnaire to gauge the public's perception of risk and support of hazard mitigation and to get direction on alternatives
- Attempt to reach as many citizens in the planning area as possible through the use of multimedia
- Identify and involve stakeholders in the planning area

The sections below discuss the steering committee, questionnaire, and multi-media approach taken to achieve these objectives.

3.2.1 Steering Committee

Thirteen of the fifteen people involved on the steering committee represented either the citizens of Roseville or identified stakeholders within the planning area. A primary objective of the public involvement strategy for the RHMP was to involve citizens and stakeholders in the actual planning process. The make-up of the steering committee helped to achieve this objective and proved to be integral in the success of this planning effort.

3.2.2 Questionnaire

A Roseville hazard mitigation survey questionnaire was developed by the planning team to gauge household preparedness for hazards that may impact the City of Roseville and the level of knowledge of tools and techniques to assist in reducing risk and loss from those hazards. The questionnaire asked 25 quantifiable questions about perception of risk, knowledge of mitigation, and support of City programs. The questionnaire also asked several demographic questions to help analyze trends. Survey results were used by the steering committee as a guide when establishing goals, objectives, and mitigation strategies for the RHMP.

A city resource known as the On-line Citizens Advisory Panel (OCAP) was used to e-mail the survey to survey Roseville residents about hazards in Roseville. The OCAP is a panel of 2,400 households in the City that are e-mailed surveys periodically on current Roseville issues. The OCAP responses are tabulated by Data-Cycles, an independent consulting firm that tabulates the data and reports the results in the aggregate so that no individual is identified. Both quantifiable and qualitative responses are received. The Multi-Hazard Mitigation Survey was e-mailed to approximately one-third of the total members or 740 households. The survey was completed and returned by 437 recipients, which represents a 58 percent return rate. Appendix B provides a complete summary of the survey and survey findings. The OCAP members were also invited to the January public meetings via an e-mail from Data-cycles on behalf of the City.

3.2.3 Multimedia Approach

Many media options were available to implement the public involvement strategy. To reach as many citizens in the planning area as possible, the Internet, press releases, public meetings, and cable television coverage were used.

Internet

At the beginning of the process, an RHMP informational web page was created on the City website to keep the public posted on plan development milestones and to solicit information pertinent to the development of the plan. The webpage addresshttp:// www.roseville.ca.us was publicized in all press releases, mailings, questionnaires, and public meetings. Information on the steering committee, meetings, key elements of the plan, the DMA, and phased drafts of the RHMP was made available to the public throughout this process. The City intends to keep an RHMP website active after the plan's completion to keep the public informed about successful mitigation projects and future plan updates.

Press Releases

Several press releases were disseminated throughout the RHMP's development as key milestones were achieved. Press releases were sent out at the initiation of the planning process in July 2004 before the public workshops held in January and prior to the Roseville City Council workshop to review the draft plan in May 2005. The planning effort received good press coverage from both the *Sacramento Bee* and the *Press Tribune*, which ran full-length articles on the RHMP purpose and development in January and May 2005.

Public Meetings

A key objective in the public involvement strategy employed for this planning effort was to give the public as many opportunities to participate in the process as possible. This objective was achieved on many fronts during the RHMP development process. All steering committee meetings were open to the public and publicized as such using the same protocol employed by Roseville City Council. Three key public formatted meetings were also held separate from the steering committee meetings aimed at taking the planning process out to the planning area. Appendix C provides complete documentation of all public meetings.

A traditional format public meeting was held on Tuesday, January 18, 2005, at the Roseville Civic Center. The purpose of this meeting was to present information on terrorism and technological hazards to the public. Members of the steering committee were present and participated in the presentation that centered on identified risks, vulnerabilities, and mitigation alternatives for non-natural hazards to which the City is exposed. This session also covered the reasons for planning, the steering committee, and the committee's

role in the plan's development. Participants in this session were given the opportunity to ask questions that were recorded for future use by the steering committee. A total of 43 people were in attendance at this public meeting.

A second public meeting was held on Wednesday, January 19, 2005, at the City of Roseville Fire Training Center. This meeting had an open-house format designed to present the public with information on risk, vulnerability, and mitigation alternatives for natural hazards that could impact the City of Roseville. Subject matter tables were set up for each of five natural hazards the City of Roseville has potential exposure to. At each of these tables was a map that identified areas potentially exposed to the hazard, estimated vulnerability to that hazard, and a catalog of mitigation alternatives specific to that hazard. Participants were asked specific questions about their perception of risk and support of mitigation. Steering committee members were once again actively involved in this session. A minimum of one steering committee member was assigned to each table to give them an opportunity to interact with the public. Also attending this session were representatives of FEMA Region IX, California OES, and the Placer County Office of Emergency Services. A total of 36 people attended the Natural Hazards Open House.

The third and final public meeting was held on Tuesday May 31, 2005, at the Roseville City Council Chambers. This meeting was a workshop designed to present the draft RHMP to the Roseville City Council for its review and comment prior to the adoption process. Once again, this session was open to the public and was advertised as such. Members of the public were given the opportunity to comment on the draft RHMP during the session. Members of the steering committee participated in this meeting as well as key members of the planning team.

Cable Television Coverage

An additional City resource was used by the planning team to inform the public about RHMP development. The City has access to a cable television channel (Comcast Channel 14 & Sure West Channel 73) used to broadcast important City government events. These events are taped and replayed numerous times according to a schedule. The meetings are also video streamed live on the world wide web and archived on the City's website. The events and replay times are all publicized on the City website. The public meetings on January 18 and May 31, 2005, were both televised and replayed by Comcast Channel 14 & Sure West Channel 73. In addition, the City sponsors a "Focus" television show televised over Channel 14/73. This show's format is a question-and-answer session conducted by a Roseville City Council member with an invited guest. On February 28, 2005, a "Focus" show was televised that addressed the RHMP. Key members of the technical subcommittee were interviewed about the RHMP and emergency preparedness within Roseville. Once again, this session was replayed according to a schedule and was available to the public any time on the City website.

3.3 RESULTS OF PUBLIC INVOLVEMENT

The steering committee considered input received from the public involvement strategy to be invaluable in providing a gauge of the public's perception of risk, vulnerability, and mitigation. This information was used during all phases of the RHMP's development. Appendix D summarizes quantifiable results of this strategy. Complete records of attendance and participation in this strategy were maintained by the planning team are available for review upon request.

CHAPTER 4.
OVERVIEW OF PLAN DEVELOPMENT PROCESS

4.1 PHASES OF DEVELOPMENT

The development of the RHMP occurred in four phases over approximately 10 months. A detailed work plan was developed by the planning team that scripted this process to meet the objectives described in Section 1.1.2. These phases were as follows:

- Organize resources
- Assess risks
- Develop a mitigation plan
- Plan implementation and maintenance

4.2 PLAN DEVELOPMENT CHRONOLOGY AND MILESTONES

Progress in the development of the RHMP is marked by numerous milestone events that occurred over the 10 months of plan development. Table 4.1 summarizes these events.

TABLE 4.1
RHMP DEVELOPMENT CHRONOLOGY AND MILESTONES

Date	Event	Milestone Description	Attendance
2004			
May 28	City selects technical consultant	Assembly of planning team	Not applicable (NA)
June 2	First technical subcommittee meeting	Seismic and human-caused hazards risk assessment review	15
July 21	Steering committee appointment	Roseville City Council recognition of steering committee and RHMP process	NA
July 31	Press release in *Press Tribune* advertising first steering committee meeting	Public involvement strategy	NA
August 3	First steering committee meeting	Established ground rules and steering committee leadership; public involvement strategy	14
September 1	Distribution of hazard mitigation survey questionnaire	Initiation of public involvement strategy	NA
September 21	Second steering committee meeting	Discussion of what RHMP will look like, review of questionnaire results, and flood risk assessment	16
October 19	Third steering committee meeting	Identify critical facilities, finalize risk assessment format, discuss on-line survey results, and determine plan goals	16

TABLE 4.1 (continued)
RHMP DEVELOPMENT CHRONOLOGY AND MILESTONES

Date	Event	Milestone Description	Attendance
2004 (continued)			
November 16	Fourth steering committee meeting	Finalize RHMP table of contents, critical facilities definition and inventory, and goals and objectives; discuss seismic risk assessment	13
December 14	Fifth steering committee meeting	Critical facilities inventory; finalize objectives and review seismic and severe weather risk assessments; discuss January public meeting and open house	15
2005			
January 12	Article on RHMP in *Press Tribune*	Public involvement strategy	NA
January 18	Second technical subcommittee meeting	Review risk assessments, goals, and objectives	10
January 18	First public meeting /Sixth Steering Committee meeting	Terrorism and technological hazards	47
January 19	Second public meeting	Natural hazards open house	36
January 23	Article on RHMP in *Sacramento Bee*	Public involvement strategy	NA
February 15	Seventh steering committee meeting	Review public meetings and finalize critical facilities and mitigation actions	13
February 28	"Focus" show on emergency preparedness	Public involvement strategy	NA
March 15	Third technical subcommittee meeting	Risk ranking; Strengths, Weaknesses, Opportunities, and Obstacles (SWOO) Sessions	13
March 15	Eighth steering committee meeting	Risk ranking; SWOO Session	17
April 19	Fourth technical subcommittee meeting	Establish mitigation action plan, review/approve mitigation catalog	11
April 19	Ninth steering committee meeting	Plan maintenance strategy and finalize mitigation catalog	18
May 11-May 31	Mitigated negative declaration posted for public review and comment	California Environmental Quality Act process	No comments received during 20-day review period
May 31	Roseville City Council workshop	Public and Roseville City Council review of draft plan	5
June 13	Draft plan posted on City website for public review and comment	Public involvement strategy	NA
June 13	Peer review of draft plan	Sent draft plan to FEMA, OES, ISO, and Placer County for pre-adoption review	NA
July 20 (tentative)	Presentation to Roseville City Council for adoption	Adoption	TBD

City of Roseville Hazard Mitigation Plan
Pre-Adoption Review Draft
June 2005

PART 3—RISK ASSESSMENT

CHAPTER 5.
RISK ASSESSMENT METHODOLOGY AND GENERAL CONCEPTS

5.1 INTRODUCTION

"What would happen if a disaster occurred in the City of Roseville?"

A risk assessment answers this fundamental question, which is the cornerstone of the hazard mitigation planning process. Risk assessment is the process of measuring the potential loss of life, personal injury, economic injury, and property damage resulting from natural hazards. This process assesses the vulnerability of people, buildings, and infrastructure to natural hazards. It focuses on the following parameters:

- Hazard identification
- The impact of hazards on physical, social, and economic assets
- Vulnerability identification
- Estimates of the cost of damage or costs that can be avoided through mitigation

Hazard identification is the systematic use of all available information to determine what types of disasters may affect a jurisdiction, how often these events can occur, and the potential severity of their consequences. Vulnerability analysis is the process of determining the impact these events and their collateral effects may have on the people, property, environment, economy, and lands of a region.

In addition to benefiting mitigation planning, risk assessment information allows emergency management personnel to establish early response priorities by identifying potential hazards and vulnerable assets.

The risk assessment for the City of Roseville evaluates the risk of natural and non-natural hazards prevalent within the city and meets the requirements of *44CFR* Section 201.6.c.2.

5.2 METHODOLOGY

Chapters 7 through 14 describe the risks associated with each of eight hazards identified as having a possible impact on the City of Roseville. Also included in this part is a city profile (Chapter 6) and a hazard risk ranking (Chapter 15). Each chapter elaborates on the hazard and the city's vulnerabilities and probable event scenarios. The following steps were used to define the risk of each hazard:

- Identify and profile each hazard—This assessment includes the following information for each hazard:
  - Geographic areas most affected by the hazard
  - Event frequency estimates
  - Severity estimates
  - Warning time likely to be available for response
- Determine exposure to each hazard—Exposure was determined by overlaying hazards with an inventory of potentially vulnerable structures, facilities, and systems to determine which of them would be exposed to each hazard. Roseville's geographical information system (GIS) database contains extensive coverage of infrastructure, including homes, industry, roads, bridges, oil pipelines, hazardous material storage sites, electricity, and water mains.

- Assess the vulnerability of exposed infrastructure and facilities—Vulnerability of the exposed structures and infrastructure was determined by interpreting the probability of occurrence of each event and assessing structures, facilities, and systems that were exposed to each hazard. Tools such a GIS and FEMA's HAZUS program were used in completing this step.

Information was gathered from a variety of sources. Frequency and severity indicators include past events and the expert opinions of geologists, emergency management specialists, and others. To the extent possible, hazard locations were mapped using GIS. The primary data source was the City of Roseville's GIS database, which is extensive, though other sources were also employed. Additional data sources for specific hazards were as follows:

- Earthquake—Earthquake maps prepared by USGS and California Geological Survey involving known faults, soil types, and liquefaction zones, which together define the areas most susceptible to shaking during an earthquake, were used for the analysis of this hazard. HAZUS, a GIS-based loss estimation tool developed by FEMA to model earthquakes in the region, was also used.
- Flood—Flood data, including the floodway and 100-year floodplain and National Flood Insurance Program (NFIP) data were provided by FEMA. The extensive amount of City sponsored data pertinent to this hazard was key to the analysis of this hazard. HAZUS-MH was also used as a resource.
- Severe Weather—Severe weather data involving historical events and storm patterns were obtained from the National Climatic Data Center and the National Oceanic and Atmospheric Administration (NOAA).

5.3 PRESIDENTIAL-DECLARED DISASTERS

Presidential-declared disasters are typically events that cause more damage than state and local governments and resources can handle without assistance from the federal government. Generally, no specific dollar loss threshold has been established that must be met. A Presidential Disaster Declaration puts into motion long-term federal recovery programs, some of which are matched by state programs, and designed to help disaster victims, businesses and public entities. Placer County has been impacted by seven Presidential-declared disasters since 1950 according to Placer County's Multi-Hazard Mitigation Plan and California Office of Emergency Services. These events are listed in Table 5.1.

TABLE 5.1.
PRESIDENTIAL DISASTER DECLARATIONS

Date	Type of Event	Notes
December 23, 1955	Flooding	CD 47-DR-CA
April 4, 1958	Flooding	CD 82-DR-CA
October 24, 1962	Flooding	OEP-138-DR-CA
February 7, 1963	Late Winter Storms/Flooding	OEP-183-DR-CA
February 18, 1986	Spring Storms/Flooding	FEMA 758-DR-CA
January 10, 1995	Late Winter Storms	FEMA 1044-DR-CA; 1046-DR-CA
January 4, 1997	Winter Storms/Flooding	FEMA 1055-DR-CA

Source: Placer County Multi-Hazard Mitigation Plan, January 2005

5.4 CRITICAL FACILITIES

Critical and essential facilities and infrastructure are those that are critical to the health and welfare of the population. These become especially important after any hazard event. Recognizing that the standard generic definition of "critical facilities" lacked the depth to cover all facilities functionally important to Roseville's capabilities, the City of Roseville Hazard Mitigation Plan Steering Committee created a definition of critical facilities specific to Roseville. For the purposes of the Roseville Hazard Mitigation Plan, a critical facility is defined as:

> "A facility that is vital for the City's ability to provide essential services and protect life and property and/or the loss of which would have a severe economic or catastrophic impact."

A database of critical facilities within Roseville was created to identify vulnerabilities to each of the hazards addressed by this plan. The risk assessment for each hazard will anecdotally discuss critical facilities with regard to that hazard. Due to the sensitivity of this information, a detailed list of facilities will not be provided in this plan. The list is on file with the City of Roseville. Figure 5.1 illustrates the critical facilities assessed by this plan

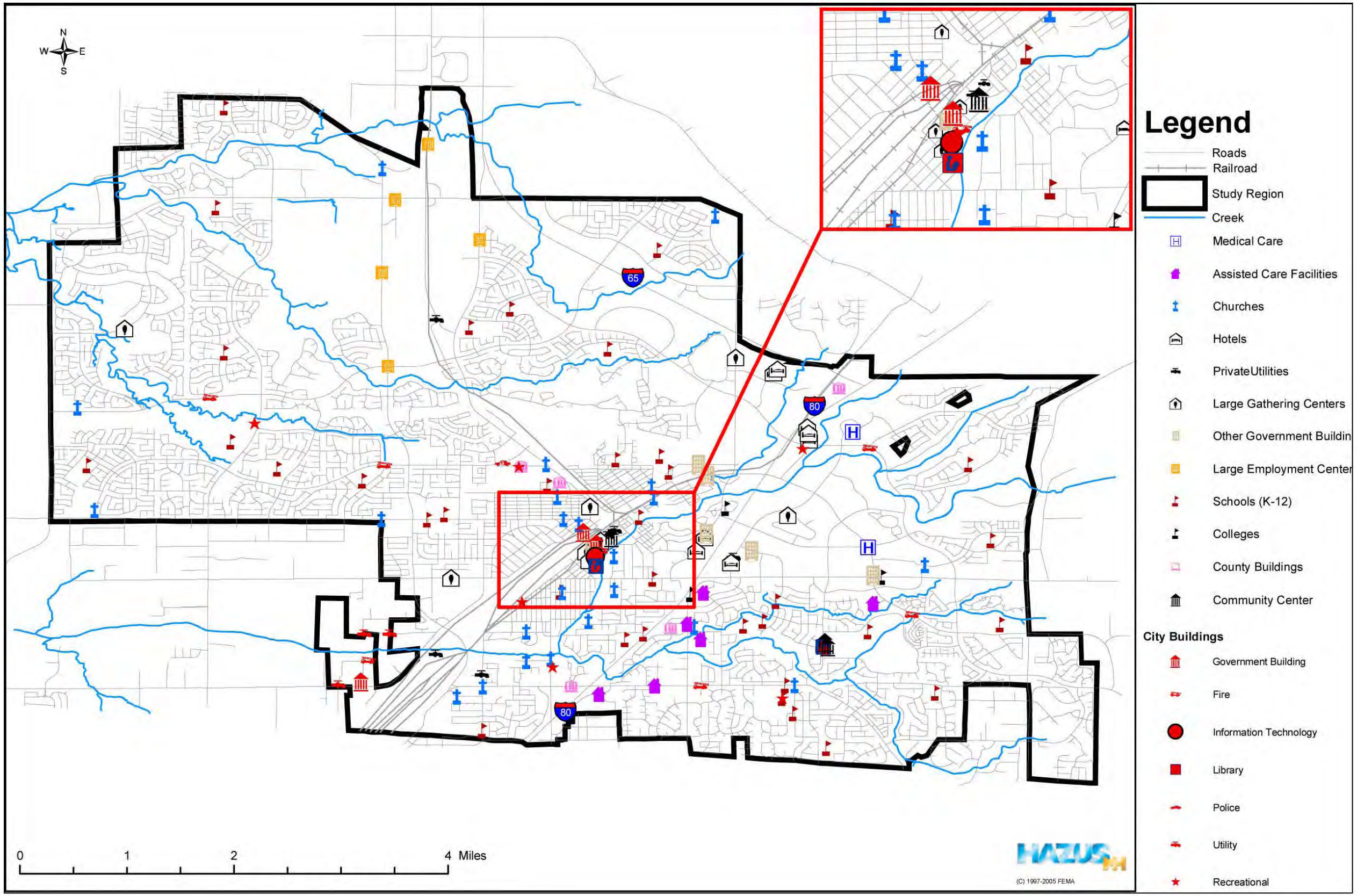


Figure 5.1. Critical Facilities and Infrastructure

CHAPTER 6.
CITY OF ROSEVILLE PROFILE

6.1 HISTORICAL OVERVIEW

For more than 500 years, the rolling hills and grasslands of what is today southwestern Placer County were home to the Maidu Indians. Then, in 1849, gold was discovered, and the tranquil landscape would change forever.

In 1864, track-laying crews from the Central Pacific Railroad pushed eastward from Sacramento across the plains on their way to building what would become the western half of the nation's first intercontinental railroad. At the site of today's Roseville, the rails of the Central Pacific intersected with those of the California Central, a small line which then linked the young towns of Folsom and Lincoln. The place where the two lines joined was listed on railroad maps simply as "JUNCTION."

It was around the junction that a small freight and passenger center called Roseville would develop. Roseville was but one of many ubiquitous shipping points that would pop up along the railroad rights-of-way as a new type of community was introduced to California - as the "railroad town."

For the next 42 years, Roseville would remain a small railroad shipping point of about 250 inhabitants catering to the needs of area farmers and ranchers. The village - it could hardly be classified as a town - centered around the depot and a sprinkling of small business houses that lined the two principal streets, Atlantic and Pacific.

This quiet, almost pastoral setting was abruptly changed in a two-year period between 1906 and 1908, when the railroad roundhouse and repair facilities were moved here from nearby Rocklin, which had heretofore been the area's major railroad service center.

Almost overnight, or so it seemed, the quiet little village of friends and neighbors evolved into a bustling town of two or three thousand. New subdivisions were laid out to accommodate throngs of newcomers, many of whom moved here from Rocklin. The business section, previously limited to Atlantic and Pacific streets, now expanded along Lincoln, Main, Church, and later Vernon streets. A Chamber of Commerce was quickly organized to provide badly needed municipal services such as water, electricity, police, and fire protection. Finally, in April of 1909, the town incorporated and began a steady march of progress until it became Placer County's largest and most important city.

Railroad expansion also continued at an accelerated pace. 1909 saw the first units of the vast Pacific Fruit Express ice plant completed, which by the 1920s was noted as the world's largest artificial ice plant. Southern Pacific also continued to expand, and by the 1920s it boasted the largest freight marshaling yards west of the Mississippi River.

The busy rail yards became even busier during World War II, when thousands of troop and munitions trains made their way through the maze of tracks here on their way to the battlegrounds of the Pacific.

Roseville continued as an unchallenged railroad center into the post-war years, but by the 1950s it faced stiff competition from airlines and interstate truckers. Introduction of jet aircraft and the completion of Interstate 80 through Roseville in 1956 caused the once-booming passenger train service to decline abruptly in favor of air, bus, and automobile service. By 1972, the local depot was closed; it was razed the

following year, as was the massive P.F.E. ice plant (1974), which was rendered obsolete by the introduction of self-refrigerating "reefers."

Completion of Folsom Dam in 1955 created the impetus for the gradual shift in the town's business and commercial center from "downtown" Roseville to what became known as "East Roseville". Roseville Square, the town's first shopping center complex, was completed in 1961. Today Douglas Boulevard., east of the freeway and extending almost to Folsom Lake, is lined with a wide array of modern state-of-the-art shops, markets and business complexes, while downtown Roseville has languished. A vigorous downtown revitalization program expects to remedy this situation in the near future.

The City of Roseville faced the challenge of a rapidly growing population head on. Expanded water, electrical, sewage, police, and fire protection services more than kept pace with growing demand, as did expanded park, recreational, and educational services.

In 1964, Roseville celebrated its 100th birthday with a year-long series of activities. That same year, Roseville was the proud recipient of Look Magazine's prestigious "All America City" awards.

Since that momentous year, the city - it is certainly no longer a town! - has continued to grow outward in all directions, with a current population of nearly [95,000]. Now an expansive industrial zone north of Roseville exists adjacent to Highway 65, along with numerous corporate headquarters along bustling Douglas Boulevard. and the Johnson Ranch Road area. These have brought new dimensions to Roseville, which is no longer just another railroad town. The railroad, though, remains as it has for over a century, a major factor in Roseville's economy, and still one of the principal railroad centers of the West. Reintroduction of passenger traffic in 1987 and the completion of a fine new intermodal depot facility shows every indication of restoring Roseville to its time-honored position as a major railroad passenger center.

Today Roseville has evolved, from what was considered a "bedroom community" in the 1970s, to an emerging urban center with a mix of residential and employment uses. As of January 2001, the city's population was estimated at 83,200 and is expected to exceed 100,000 prior to 2005. In addition, the city has attracted a significant amount of non-residential growth including commercial, office, and industrial development. It is anticipated that Roseville, along with the remainder of the South Placer/Sacramento Region, will continue to be the focus of significant development activity. The city is characterized by a mix of older and newer development. Roseville has generally grown outward from its historic downtown adjacent to the Southern Pacific railroad yard. The center of the city is typified by the downtown and small lot, single-family residences, while newer commercial and office development and larger suburban-type residences characterize the edges of town. The current focus of new development is along the eastern, western, and northern portions of the community within the city's eight specific plan areas and the North Industrial area.

6.2 THE PLANNING AREA

The City of Roseville lies in the foothills of the Sierra Nevada Mountain range on its western slope within Placer County approximately 20 miles east of downtown Sacramento. The focus of this Hazard Mitigation Plan is on the city's primary planning area as defined by its General Plan. Roseville's planning area includes approximately 36.35 square miles of incorporated lands, as well as an additional 6,743 acres, which make up the city's sphere of influence. A graphic representation of the city's planning area is reflected in Figure 6.1. While the city's incorporated area and sphere of influence are the primary focus of General Plan polices, there are "secondary planning areas" that bear relationship to Roseville's planning efforts. These secondary planning areas vary depending upon the type of issue and the impacts associated. For example, for the issue of air quality, the secondary planning area includes the city as well as areas

outside the city but within the associated air basin. Similarly for flood protection, the secondary planning area extends across the entire group of drainage basins, which flow through Roseville. In many other cases, such as solid waste and recycling, transportation, wastewater treatment, etc., the secondary planning areas encompass varying boundaries that exceed the city limits and sphere of influence.

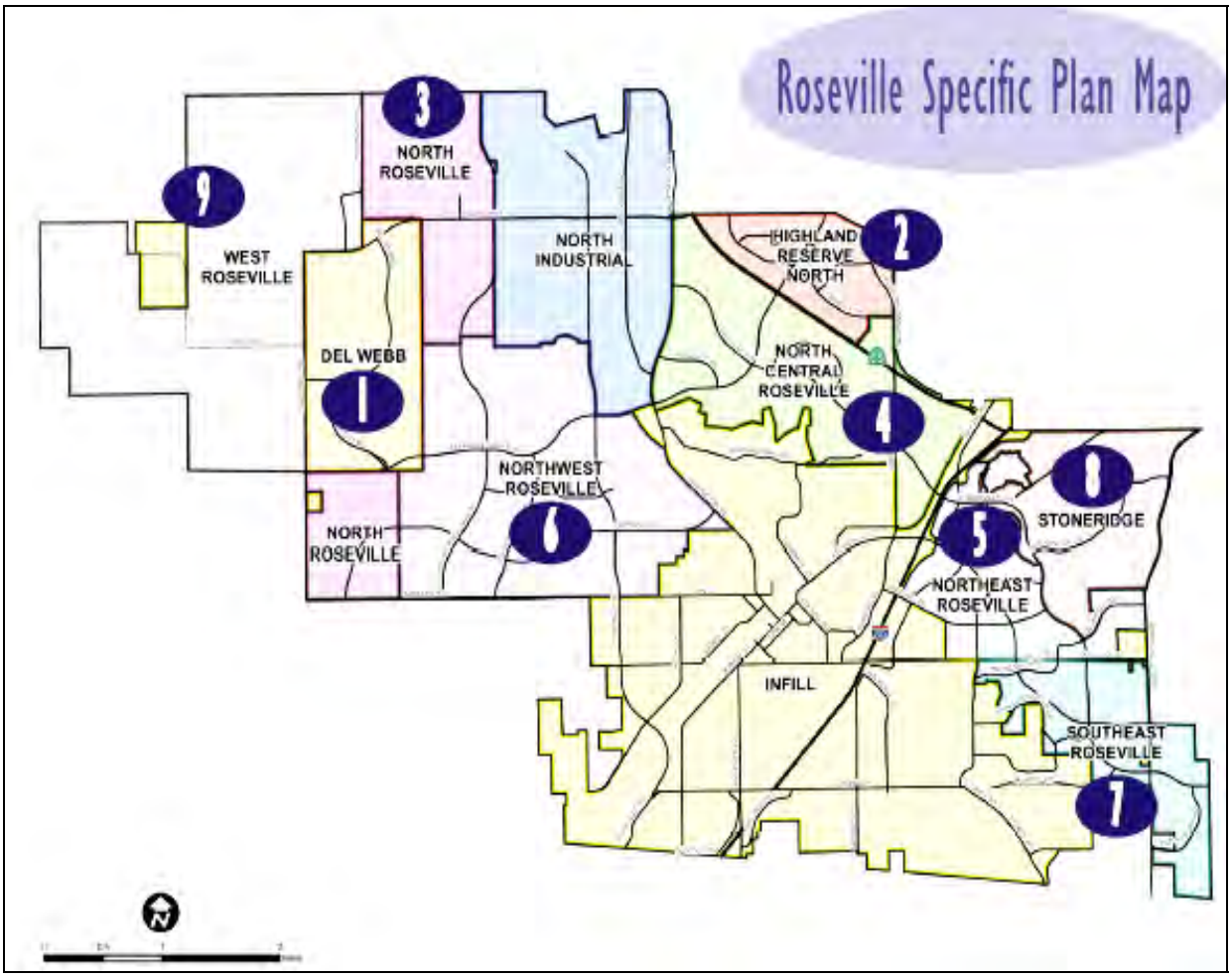


Figure 6.1. Roseville Planning Areas

6.3 DEMOGRAPHICS

6.3.1 Why Consider Demographics in Hazard Mitigation Plans?

It is important for hazard-related plans to consider the demographics of the communities they seek to protect. Some populations experience greater risk from hazard events not because of their geographic proximity to the hazard but because of decreased resources and/or physical abilities. Elderly people, for example, may be more likely to be injured in a disaster and are also more likely to require additional assistance after a disaster. Research has shown that people living near or below the poverty line, the elderly and especially older single men, the disabled, women, children, ethnic minorities and renters all experience, to some degree, more severe effects from disasters than the general population.

Vulnerable populations may vary from the general population in risk perception, living conditions, access to information before, during and after a hazard event, their capabilities during a hazard, and access to resources for post-disaster recovery. Despite the fact that they often disproportionately experience the

effects of a disaster, vulnerable populations are rarely accounted for in the current hazard planning process. A need exists for increased awareness of these differences.

6.3.2 Roseville Population Characteristics

The City of Roseville had a population of 96,900 as of June 30, 2004 according to the State Department of Finance. The City's Planning Department is estimating the population to be closer to 99,482 as of June 30, 2004 based on the number of occupancy permits issued since the 2000 Census. Roseville's daytime population is estimated at 145,000, which includes those coming into Roseville to work, shop, and do business.

Roseville's growth rate for the year of 2003 to 2004 decreased to 3.9 percent, which is below the average growth rate for the past decade (see Figure 6.2). This rate did exceed that for Placer County (3.0 percent) and the State (1.5 percent). The main reason for the decrease was due to lack of housing inventory. Placer County's growth rate also decreased to 3.0 percent but remained the second fastest growing county in California, behind Riverside. Third place was a tie between Kings and Madera Counties at 2.9 percent. This is the fourth year in a row that Placer and Riverside rank one-two among the top 10 fastest growing counties in California.

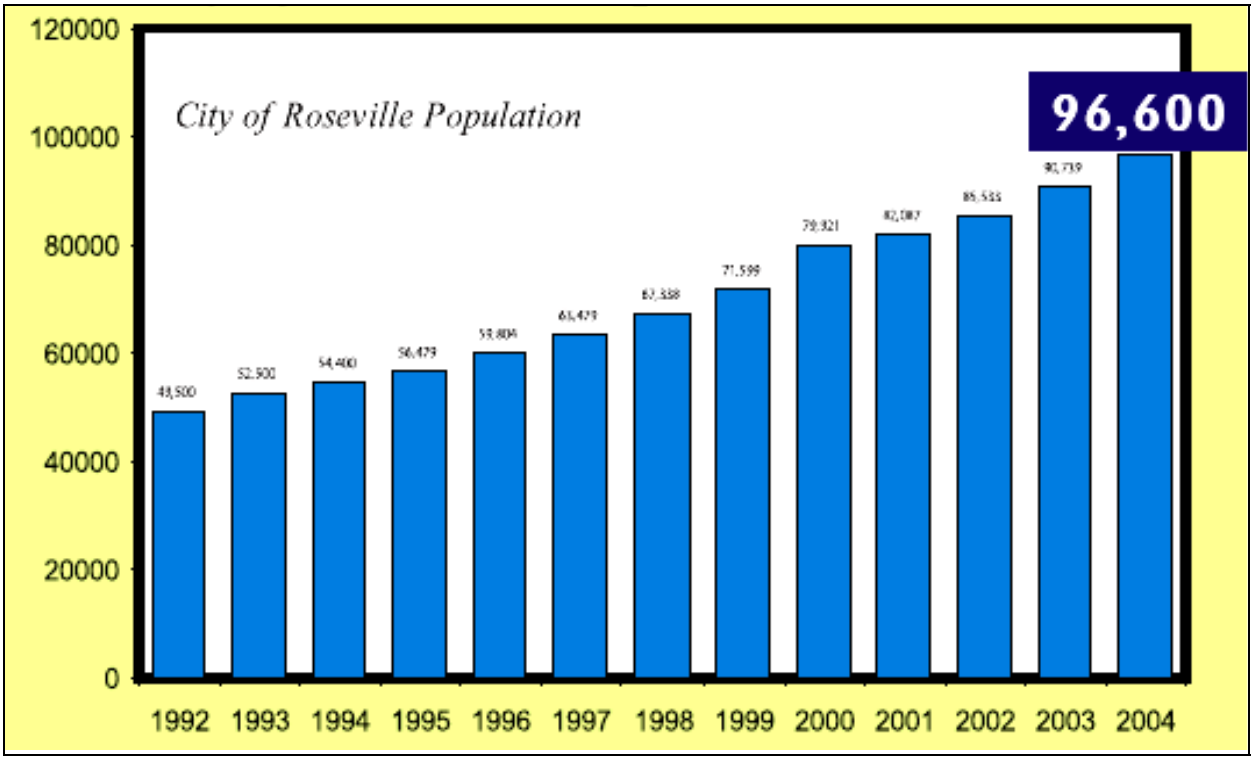


Figure 6.2. Roseville Population Trends

The person per household average in Roseville is 2.35. For planning purposes, this may vary by land use; for example, in Sun City Roseville there are 1.8 persons per household.

Annexation of the West Roseville Specific Plan area in August 2004 will move the expected build-out population forecast from 2010 to 2025. The population forecast, when all residential property is developed, is projected to be at 136,000. Table 6.1 lists the city's actual population and future projections

as projected by Muni-Financial. Table 6.2 shows the population forecast and vital population statistics by Specific Plan area defined by the General Plan.

TABLE 6.1.
ROSEVILLE POPULATION PROJECTIONS

Year	Residents
1985	29,988
1990	44,585
1995	56,479
2000	79,921
2005	103,783*
2015	133,680*
2025	135,922*

* Projected
Source: Muni Financial

TABLE 6.2.
SPECIFIC PLAN POPULATION CHARACTERISTICS

Specific Plan Area	Date adopted	Acres	Developed Units	% of Plan Area Total	Projected Population
Del Webb	December 15, 1993	1200	3179	100	6,300
Highland Reserve North	May 28, 1997	610	897	53	4,120
North Roseville	August 6, 1997	1552	3719	69	13,497
North Central	July 5, 1990	1743	3,929	91	10,555
Northeast Roseville	April 8, 1987	950	1080	87	3,835
Northwest Roseville	May 10, 1989	2616	8620	97	23,678
Southeast Roseville	April 20, 1988	1006	2960	94	9,643
Stoneridge	March 18, 1998	1088	1066	37	7,533
West Roseville	February 23, 2004	3162	8430	0	20,810

6.3.3 Income

Impoverished people may experience greater harm from disasters than members of the general population. In the United States, individual households are expected to use private resources to prepare for, respond to, and recover from disasters to some extent. This expectation means that households living in poverty are automatically disadvantaged when confronting hazards. Additionally, the poor typically occupy more poorly built and inadequately maintained housing. Mobile or modular homes, for example, are more susceptible to damage in hurricanes, tornadoes, and floods than other types of housing. In urban areas, the poor often live in older houses and apartment complexes, which are more likely to be made of unreinforced masonry, which is particularly susceptible to damage during earthquakes. In general, the poor are more likely to die as a result of a disaster because they tend to live in older or poorly constructed homes in more hazardous areas, such as floodplains, and they are less likely to fully recover after one.

According to the 2000 U.S. Census, the per capita income for Roseville was $27,021.00, while the median household income was $57,367.00. Table 6.3 compares income and poverty at the city and state level (US Census Bureau 2000). About 4.9 percent of Roseville residents are below the poverty line (meaning they spend more than a third of income on an economy food budget). Of the 3,916 people living below poverty in Roseville, approximately 5.3 percent are under the age of 18 and 4.1 percent are 65 or older.

TABLE 6.3.
POPULATION UNDER THE POVERTY LINE

	Median Household Income	Percent of Total Population Below Poverty Line	Percent of Children (18 and Under) Below Poverty Line	Percent of Elderly (65 and Older) Below Poverty Line
City of Roseville	$57,367	4.9	5.3	4.1
California	$47,493	13.9	5.2	0.8

6.3.4 Age Distribution

The vulnerability of elderly populations can vary significantly based on health, age, and economic security. However, as a group, the elderly are more apt to lack the physical and economic resources necessary for response and are more likely to suffer health-related consequences and be slower to recover (Morrow 1999). They are more likely to be vision, hearing, and/or mobility impaired, and more likely to experience mental impairment or dementia.

Furthermore, the elderly are more likely to live in assisted-living facilities, where emergency preparedness occurs at the whim of operators (California Office of Emergency Services 1992). Certainly, the elderly require specific planning attention, an especially important consideration given the current aging of the American population.

According to the 2000 U.S. Census data, 14.5 percent of Roseville's population is 65 or older and the median age is 36.4 years of age. Figure 6.3 shows the age distribution for Roseville.

6.3.5 Race, Ethnicity and Language

Many researchers have focused on the increased disaster vulnerability that ethnic minorities experience in the United States. Research shows that minorities are less likely to be involved in pre-disaster planning, that they experience higher mortality rates during an event, and that post-disaster recovery can be ineffective and is often characterized by cultural insensitivity. Because higher proportions of ethnic minorities live below the poverty line than the majority white population, poverty can compound vulnerability.

Racially, Roseville is a homogenous area; about 86 percent of the population is listed as White according to the 2000 U.S. Census. The largest minority population is Hispanic, followed by Asian, Blacks and Native Americans. Figure 6.4 shows the racial distribution of Roseville.

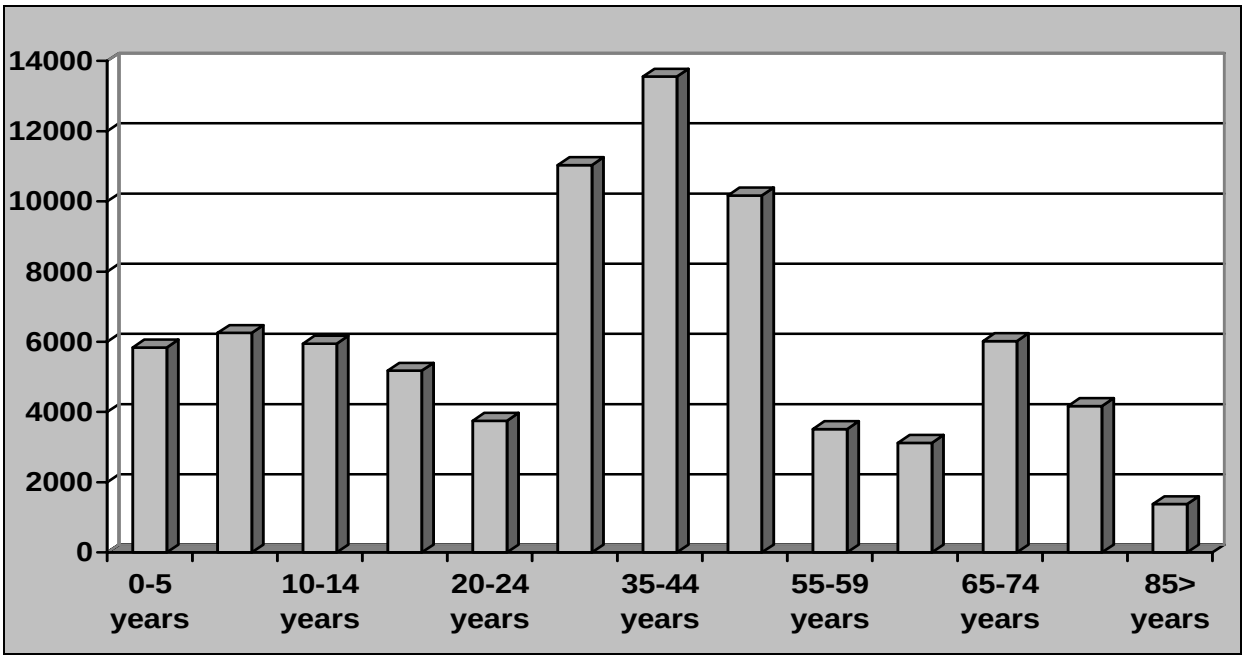


Figure 6.3. City of Roseville Age Distribution

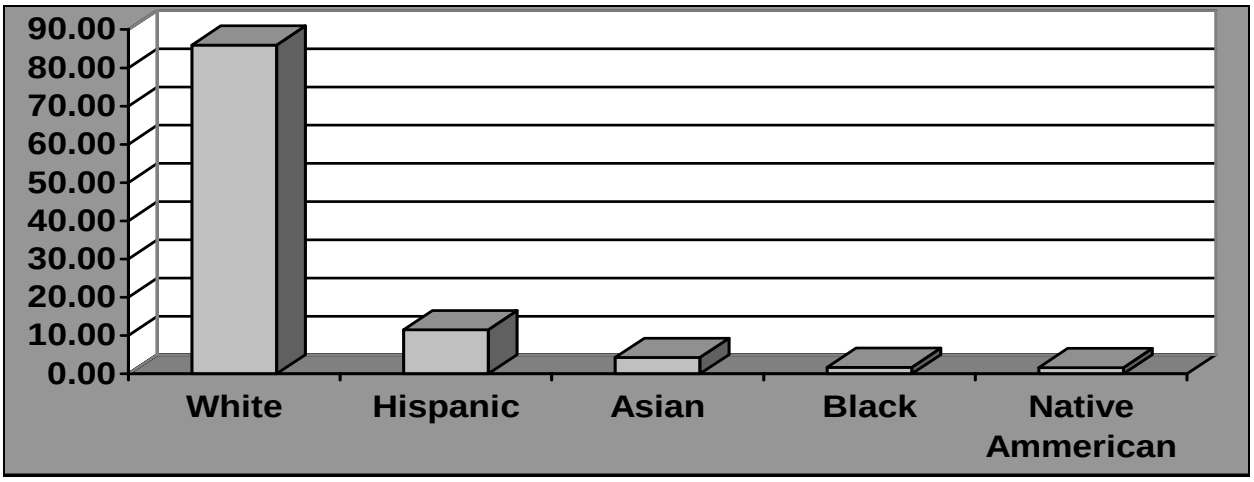


Figure 6.4. Roseville Race Distribution

Roseville has a 9.0 percent foreign-born population. Approximately 5.5 percent, or 4,075, of Roseville residents over the age of 5 reported speaking English "less than 'very well'" in the 2000 Census. The largest group of languages spoken, other than English, consisted of Spanish and other Indo-European languages. Approximately 5.5 percent of all households in Roseville are "linguistically isolated," meaning that all members 14 years old and over have at least some difficulty with English. This has important implications for emergency managers, who must get crucial information out to all members of the population in emergency events.

6.3.6 Disabled Populations

People with disabilities have a special stake in emergency planning because they are more likely to have difficulty responding to a hazard event than the general population. According to the 2000 U.S. Census, roughly 1/5 of the U.S. population lives with a disability. These numbers are rising, and disabled

populations are increasingly integrated into society. This means that a large segment of the population will require assistance during the 72 hours post-event, the period generally reserved for self-help.

Disabilities can vary greatly in severity and permanence, making populations difficult to define and track. There is no "typical" disabled person, which can complicate disaster-planning processes that attempt to incorporate them. Furthermore, disability is likely to be compounded with other vulnerabilities, such as age, economic disadvantage, and ethnicity, all of which mean that housing is more likely to be substandard..

While the percentage of disabled persons in Roseville do not differ much from those of the state as a whole, the overall numbers are significant and warrant special attention from planners and emergency managers (see Table 6.4).

TABLE 6.4.
DISABILITY STATUS OF NON-INSTITUTIONALIZED POPULATION

Age	Number	Percent of age Group Population
5-20 yrs	1,083	5.9
21-64 yrs	6750	15.2
65+ yrs	3970	36.7

6.4 DEVELOPMENT PROFILE

One gage of vulnerability is to analyze exposure in terms of existing land use and structure inventory. Under this section, these parameters will be discussed in the following terms:

- Land use
- Residential Development
- Non-Residential Development

6.4.1 Land Use

Roseville, along with the entire South Placer/Sacramento region, has and continues to experience significant growth. This has led to a transition of the city from a relatively small residential community to a larger center with a mix of uses and increasingly urban character. The city's population has nearly tripled over the past 20 years, from 26,127 in 1982 to 90,739 in 2003. In addition, Roseville has experienced significant non-residential growth including commercial, office and industrial development. As a result, the City has had the challenge of accommodating and providing for growth, while attempting to retain its character and identity.

There are a number of underlying principles that form the foundation for the goals and policies of the land use in Roseville. The policies have been defined in the Land Use Element of the City's General Plan. These principles are based on input the City has received from its residents through various forums such as surveys, tasks forces, and committees. Some of the primary directing principles include the following:

- Promote and enhance Roseville's unique character and identity.
- Distinguish Roseville from adjacent communities through the quality of development and design, and the level of public services and facilities provided.
- Protect and enhance Old Town/ Downtown and the city's established neighborhoods.

- Promote new development, which is an integrated and connected part of the city's land use pattern.
- Provide a variety of housing types and opportunities, including those for all income groups.
- Create a balanced land use pattern with an appropriate mix of uses to accommodate resident employment, service, and social needs within the community.
- Promote a land use pattern that provides a high level of open space and recreational amenities and is sensitive to the natural environment.
- Create a land use mix and pattern that accommodates and promotes alternative transportation modes for ease of access and improved air quality.
- Proactively manage and plan for growth

While not all of the above principles convert directly into a specific land use goal or policy, they have impacted the overall policy direction and the land use pattern. The principles are further carried out through the goals and policies of the other elements of the General Plan. The Land Use Element consists of the land use map and land use polices. The land use map visually illustrates the city's existing and planned land use mix and pattern. A copy of the land use map is available through the Planning Department at 311 Vernon Street. A land use "diagram," which schematically reflects the uses from the land use map, is included in the back of the General Plan. This diagram should be used as a general reference only.

Land use decision-making is guided by the goals, policies and implementation measures contained in the text of the Land Use Element. While the land use map is an illustration of policy, it only reflects those policies that can be graphically shown. As a result, the land use map and land use policies should be used in combination with each other, and the policies from the other elements, to determine consistency with the General Plan. The current land use balance is illustrated in Figure 6.5.

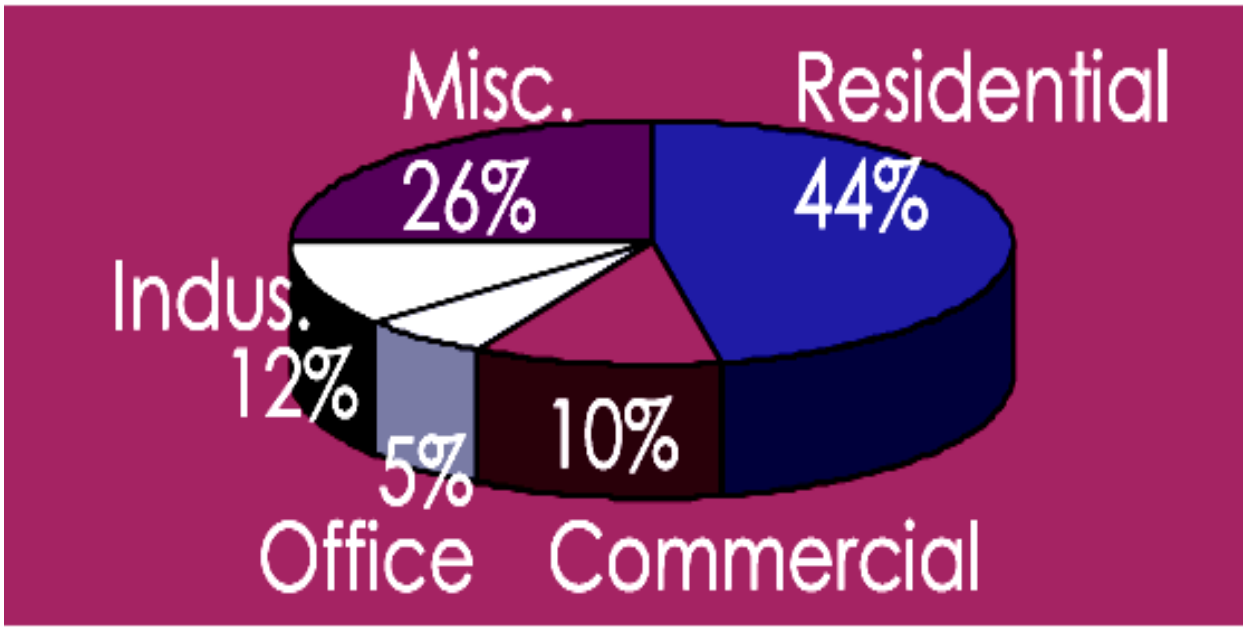


Figure 6.5. Land Use Balance in Roseville

Source: 2004-2005 Demographic, Development and Employment Profile,, City of Roseville

The Land Use Element text and policies are organized into the following six components:

- ***Existing Conditions and Projections*—**provides a description of the planning area, existing land use inventory, and future projections.
- ***Land Use Designations, Definitions and Standards*—**identifies and defines the City's land use categories, incorporating general use, development, intensity, siting, and compatibility standards.
- ***Community Forum*—**provides goals and polices to define and direct the future forum and pattern of the city. Issues addressed include community character; relationship to transit, pedestrian, air quality; downtown, and neighborhoods; relationship of new development; jobs, housing; economic development; community involvement; and inter-jurisdictional coordination.
- ***Community Design*—**includes goals and policies that address aesthetics and function; the integration of the built and natural environment; and community character. Emphasis is placed on the development of a design framework that reflects the city's goal of high quality, community-wide design.
- ***Growth Management*—**focuses on the proactive management of growth in the community. Included is the identification of performance standards to regulate potential future growth areas. Policies addressing annexations and expansion of the city's sphere of influence are also included.
- ***Relationship to Specific Plans*—**discusses the interrelationship between the General Plan and the City's nine existing specific plans.

6.4.2 Residential Development

The Land Use element of the General Plan has identified three primary residential land uses:

- ***Low-Density Residential***: The low-density residential land use category is applied to lands where single-family dwelling units that comprise the majority of Roseville's housing supply are located. The lower densities are assigned to lands with the flexibility to accommodate development constraints (e.g., slopes, trees, etc.). Typically, low-density residential lands should require minimal grading or disturbance of natural features.
- ***Medium-Density Residential****:* The medium-density residential land use category is applied to lands characterized by small lot single family detached dwelling units and attached patio homes, half-plexes, townhouses, condominiums, and mobile home parks. This residential land use will accommodate a variety of housing types and designs, and is often located as a transition or buffer between higher intensity land uses and low density residential land use. It may also be applied as a transition between higher volume roadways and lower density residential uses.
- ***High-Density Residential***: The high-density residential land use category is normally developed with apartments or condominiums with multiple story structures containing multiple, attached, dwelling units. The broad range of densities in this category will yield a variety of design options. In some areas, this land use category may be combined with commercial uses to form a mixed-use development where higher densities could be desirable and beneficial.

As of June 30, 2004, Roseville had 42,209 housing units; single family detached comprise 73 percent of the housing stock, 21 percent are apartments, and 6 percent are duplexes and mobile homes. Residential construction valuation reached an all time high of $677,800,000 in 2003. The building department reports that $560,547,997 in new construction was completed during the 2003 to 2004 fiscal year. As of June 2004, the development departments are working with 64 active subdivisions around the city. Developers are continuing to request over 100 building permits per month and finishing an equal number even during the winter months. The median home price in Roseville continues to climb. The median price increased 33 percent from the year prior to $397,500. The demand for single-family homes continues to increase while available land for single family homes has been decreasing.

6.4.3 Non-Residential Development

The non-residential designations include areas designated for commercial, office, industrial uses, special areas, and combining districts. Special areas include the Central Business District, Public, and Quasi-Public uses, Parks and Recreation, Open Space, and Urban Reserve. Like the residential designations, each non-residential designation includes a purpose statement, primary and secondary uses, and standards for the use including a floor area ratio (FAR). Unlike the specific secondary uses listed in the residential designations, which are intended to be subordinate and may be permitted only to support neighborhood convenience, the relationship of secondary uses in non-residential areas differ. It is the intention of the nonresidential land use designations to permit secondary land uses that are supportive and complimentary of the primary uses and not necessarily subordinate. Like the secondary residential uses, typically the size of these areas would be limited and would therefore not warrant a separate land use designation. A summary of the non-residential land uses are illustrated in Table 6.5. A profile summary of non-residential development within Roseville can be found in Table 6.6.

TABLE 6.5.
NON-RESIDENTIAL LAND USES

Land Use	Designation	Purpose
Neighborhood Commercial	NC	The neighborhood commercial land use designation is intended to provide basic commercial services for the convenience of surrounding neighborhoods within walking distance of major residential areas.
Community Commercial	CC	The community commercial land use category is distinguished from the neighborhood commercial designation by providing a broader range of goods and services to an expanded service area.
Regional Commercial	RC	The regional commercial land use category is intended to accommodate the larger shopping centers and commercial activities where uses provide goods and services to a citywide and regional service area.
Business Professional	BP	To provide areas for small and large office uses, including uses supportive of offices.
Light Industrial	LI	The light industrial land use category is applied to lands reserved for office, industrial, and research and development uses that generate very limited noise, vibration, odor, dust, smoke, light, or other pollutants, and are either integrated or compatible with surrounding uses.
General Industrial	IND	The general industrial land use category is intended to provide areas for industrial uses that tend to generate noise, vibration, odor, dust, smoke, light, and an aesthetic appearance not compatible with residential and other sensitive receptors. The intent of this category is to provide a place for industrial uses within the city that is properly buffered from other uses.

TABLE 6.5 (continued).
NON-RESIDENTIAL LAND USES

Land Use	Designation	Purpose
Central Business District	CBD	The Central Business District is a distinct land use category that acknowledges land use patterns of significantly greater intensities and traditional mixed uses of retail, office, and apartment. The district is limited in its application to Central Roseville, the West Roseville Village Center, and to areas of greater urban intensity.
Open Space	OS	The open space land use designation is used to reserve and protect public and private lands that are significant due to wild life habitat, natural features, or flood hazard. Within new development areas, the 100-year floodplain boundaries will be designated as Open Space. In addition, sensitive or unique natural features, including, but not limited to, wetlands, vernal pools, and oak woodlands are also to be designated as open space as part of specific plans and other major development review processes
Public/Quasi-Public	P/QP	The public/quasi-public land use designation is used to establish areas for education, religious assembly, governmental offices, municipal corporation yards, and water treatment plants.
Urban Reserve	UR	The urban reserve land use designation is applied to those lands that are anticipated to receive urban land entitlements, but at the present time are constrained by growth management policies, availability of services or other limitations.
Floodplain	FP	The floodplain designation identifies those lands that are within the 100-year floodplain boundaries as defined in the Safety Element. Development of lands with a floodplain land use designation is strictly regulated by the City of Roseville. In areas with existing development, the floodplain designation is an overlay or combining land use. As part of a specific plan, the land use designation may be combined with an open space or parks designation, if found consistent with the policies of the Safety Element.
Study Area	SA	The study area land use designation is used as a combining land use to identify future General Plan or neighborhood study areas. This combining designation may be applied to any area where the City believes that additional land use analysis and amendment of the General Plan may be desirable to resolve specific neighborhood or land use issues.
Village Center	VC	The Village Center land use designation is intended allow for a mix and density of land uses common to a traditional downtown, urban setting. It allows for flexibility and deviation from the standards and permitted uses contained in the primary land use designation for which it is combined.
Transfer Station	TS	The transfer station land use designation is intended to reserve and protect industrial areas suitable for a solid waste transfer station.

TABLE 6.6.
NON-RESIDENTIAL DEVELOPMENT PROFILE

Activity/Use	Developed Square Footage	Acres	Specific Plan Area
Developed Industrial	8,126,634	825	North Industrial
Developed Commercial	10,643,633	1,265	All
Developed Office Space	5,774,293	951	All
Open Space		3292	All

CHAPTER 7.
DROUGHT RISK ASSESSMENT

7.1 IDENTIFYING HAZARDS—DESCRIPTION OF THE DROUGHT HAZARD

This section identifies the risks of drought in the City of Roseville.

Rain and snowfall in the American River watershed eventually flowing to and captured in Folsom Lake, a reservoir within the United States Central Valley Project, and to a more limited extent, within the City of Roseville and neighboring jurisdictions, directly affect the water availability for Roseville water users. The City of Roseville owns the Roseville water system and water treatment plant and has negotiated contracts with the U.S. Bureau of Reclamation, the Placer County Water Agency (PCWA), and the San Juan Water District (SJWD) to ensure that water needs for existing and future growth are met.

Drought—Drought is a function of the cumulative impacts of several dry years on water users.

Hydrological Drought—deficiencies in surface and subsurface water supplies.

Socioeconomic Drought—drought impacts the health, well being, and quality of life or is when a drought starts to have an adverse impact on a region.

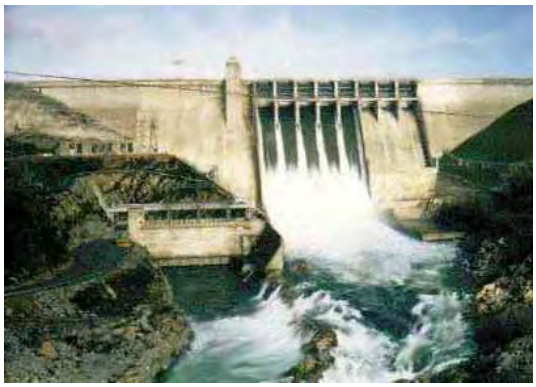
Source: Placer County Multi-Hazard Mitigation Plan, January 2005

Roseville's potential drought impacts are limited to hydrological and socioeconomic. The City is largely urbanized with no agricultural interests remaining. Lack of sufficient water supply would affect residents and businesses that rely on water for their daily household, employee, and industrial needs.

7.1.1 Water Supply Strategy

The water supply strategy for the City of Roseville uses a comprehensive approach to ensure water reliability for customers. The City has a diverse set of water supply options including surface water contracts, recycled water, and groundwater wells to ensure that even following a period of dry years, a combination of available water supplies and water conservation measures will ensure that the community has adequate water.

The City of Roseville has contracts for surface water with three agencies. The primary water contract is with the U.S. Bureau of Reclamation (USBR) for 32,000 acre-feet per year of surface water from Folsom Lake. An acre-foot is the amount of water needed to serve one or two households for one year.



Folsom Dam Spillway

Roseville's secondary supply of surface water is through PCWA. Roseville signed agreements to purchase 10,000 acre-feet of water and has additionally signed for two options for an additional 20,000 acre-feet. Based on the provisions of these contracts, the City of Roseville is entitled to a total of 30,000 acre-feet of water from the Middle Fork of the American River. PCWA has several interconnections between its treated water system and the City of Roseville to supply this water and to enable water supply should an emergency occur. In addition, Roseville is pursuing long-term wheeling agreements that will allow delivery of this PCWA through USBR facilities at Folsom Lake. It is anticipated that this agreement will be

completed in 2005, with use of temporary agreements until completion of the long-term agreement.

The third source of surface water for the City of Roseville is through transfer of underused PCWA water purchased by SJWD and made available to Roseville. SJWD is a water district located in Sacramento and Placer Counties that draws water from Folsom lake. SJWD also wholesales water to Citrus Heights Water District, Fair Oaks Water District, Orangevale Water Company in Sacramento County, which are considered part of the "SJWD Family". After review of available water under contract by SJWD, it was determined that 4,000 acre-feet could be transferred to Roseville in normal water years. The City of Roseville has entered into a reallocation agreement with SJWD for 4,000 acre-feet per year. Table 7.1 provides a list of contractors and the amount of the water supplied.

TABLE 7.1.
CITY OF ROSEVILLE WATER SUPPLY CONTRACTS

Source	Contract Amount (Acre-Feet per Year)
US Bureau of Reclamation	32,000
San Juan Water District	4,000
Placer County Water Agency	
Exercised	10,000
2 – options	20,000
Placer County Water Agency Total	***30,000***
Total	**66,000**

7.1.2 Water Supply Infrastructure

The City of Roseville Water Treatment Plant is located on Barton Road east of Roseville. Constructed in 1971, the water treatment plant treats water to Environmental Protection Agency (EPA) domestic drinking water standards once delivered from Folsom Lake.

The City of Roseville owns the water system network consisting of water mains ranging in size from 4 to 66 inches in diameter. A booster pump station is located near East Roseville Parkway and North Sunrise Boulevard is designed to provide sufficient water pressure to the higher elevations of the city as well as fill and manage the reservoirs in the system. Some areas within the Roseville limits are supplied by either the PCWA or SJWD where due to topography and facility locations it is beneficial to do so. The system is designed to deliver an adequate supply of water throughout the community at an acceptable pressure level for domestic and fire flow purposes.

The City of Roseville supplements its water supply with backup wells located throughout city. These wells are planned to be used primarily to offset cutbacks required from Folsom lake in times of drought or emergencies that may occur. In addition, the City operates a recycled water utility to lessen the use of potable water to irrigate landscaped areas. The City is also pioneering aquifer storage and recovery programs whereby water is proposed to be injected into the underground aquifers in wet years and recovered in dry years for public use.

7.1.3 The Water Forum

In the late 1990s, the City of Roseville Mayor and Environmental Utilities Director participated in the Water Forum, a process and agreement involving regional stakeholders concerned with the protection of

the Lower American River and reliable water supplies. As a result, the City entered into a "Purveyor Specific Agreement" that outlines how the City of Roseville will meet commitments resulting from the Water Forum. These commitments include a strategy for providing a safe and reliable water supply through the year 2030 and protecting resources associated with the Lower American River. A special commitment resulting from the Water Forum Agreement (WFA) is a limitation of diversions from the American River for the City of Roseville from 66,000 acre-feet to 58,900 acre-feet in a normal or wet year.

In the final Water Forum Agreement, Roseville projected a build-out water demand of 54,900 acre-feet for the anticipated growth area at that time. Roseville agreed to limit takes of American River water in reduced amounts based on the supply available, tied to the unimpaired inflow to the American River as described above. In addition, annexations to the city (Foothill Business Park, Doctor's Ranch, and the West Roseville Specific Plan) occurred after completion of Water Forum negotiations and an additional 4,000 acre-feet was provided through an agreement with SJWD. Therefore, the total water supply allocated through the Water Forum process is 58,900 acre-feet. As water shortages occur, Roseville will reduce American River diversions to a minimum of 39,800 acre-feet. When combined with commitments made through the Water Forum by other agencies, the water supply will be sufficient water to meet all needs.

7.2. DROUGHT HAZARD PROFILE

7.2.1 Location and Extent

Droughts affecting urban areas typically occur after two or three consecutive years of below average rainfall for the period between November and March when about 75 percent of the State's average annual precipitation falls. The months of December, January, and February are usually when approximately 50 percent of the rainfall occurs in the State of California.

Droughts can be localized to a particular watershed and may affect only a part of the State or can affect the entire State depending on the weather patterns. Droughts in Northern California, the source of 70 percent of the State's rainfall and much of the developed water supply, rarely last longer than three years.

7.2.2 Drought Event History

State of California

According to the California Department of Water Resources website, the State has measured hydrologic data back to the early 1900s. Data prior to the 19th century are very limited and in some cases have only been discovered through scientific research such as the study of tree rings (http://watersupplyconditions.water.ca.gov). The State's hydrologic data shows multi-year droughts from 1912 to 1913, 1918 to 1920 and 1922 to 1924. Since the early 1920s, three prolonged periods of drought occurred in California.

1929 to 1934 Drought. The 1929 to 1934 drought established the criteria for designing the supply and yield of many large Northern California reservoirs. The Sacramento Valley runoff was 55 percent of average for the time period from 1901 to 1996 with only 9.8 million acre-feet received.

1975 to 1977 Drought. The State of California had one of its most severe droughts due to lack of rainfall during the winters of 1976 and 1977. The year of 1977 was the driest period on record in California with the previous winter recorded as the fourth driest in California's hydrological history. The cumulative impact led to widespread water shortages and severe water conservation measures throughout the State.

Only 37 percent of the average Sacramento Valley runoff was received with just 6.6 million acre-feet recorded. Over $2.6 billion in crop damages were recorded in 31 counties. A Federal Disaster Declaration was declared in Placer County and surrounding counties.

1987-1992 Drought. The State of California received precipitation well below average levels for four consecutive years. While the Central Coast was most affected by the lack of rainfall and low run-off, the Sierra Nevada in Northern California as well as the Central Valley counties including Placer County were also affected. During this drought, only 56 percent of average runoff for the Sacramento Valley was received totaling just 10 million acre-feet. By February 1991, all 58 counties in California were suffering from drought conditions and urban areas as well as rural and agricultural areas were impacted.

Placer County

Placer County also experienced drought conditions in 1977, 1988, and in 1991. The PCWA, the County's primary water provider, declared a water shortage in each of these years and restricted water use at levels that varied according to the severity of the drought. In 1977, water use was restricted for both municipal and industrial customers by 50 percent and rates were increased. The PCWA Board lifted restrictions on water use in January 1978.

In 1988, the PCWA declared a water emergency and all customers were required to reduce water consumption by 25 percent with higher rates for use above the specified limits. An emergency was again declared just three years later with raw water customers having to reduce annual water consumption by 50 percent and seasonal usage by 25 percent. The drought emergency ended in April 1991.

Placer County had two agricultural drought declarations in 2001 and 2003 with some crop damage reported.

Roseville Drought History

Roseville's drought history parallels the water shortages noted for the State of California and Placer County. The Roseville City Council has only declared an official drought once in its history from April 1991 to March 1993 when Stage 2 drought water restrictions were in effect and enforced through full-time water patrols. Water conservation measures included the prohibition of washing streets, parking lots and sidewalks, water was served in restaurants by request only, landscape irrigation was limited to early morning and night hours and commercial irrigation accounts had to reduce consumption by 30 percent when compared to 1990 water consumption levels.

Roseville's drought levels are now defined by the Water Forum Agreement definitions as adopted by the member agencies in 1999. The definition is based on the type of hydrologic year for inflow to the Folsom Reservoir, which serves Roseville among many other purveyors, and 70 years of hydrologic data into Folsom Reservoir.

Local Water Contracts—Definition of Drought

The Water Forum Agreements define various hydrologic water year types. These include Baseline, Wet/Average Years, Drier Years, and Driest Years. Each of these year types along with a description of the amount of water the City may divert under each condition is described below.

Baseline

Baseline means the historical maximum amount of water that suppliers diverted from the American River in any one year through 1995 or in certain appropriate instances other amounts specified in a Purveyor Specific Agreement. For the City of Roseville, the baseline amount is 19,800 acre-feet per year.

Wet/Average Years

Years when the projected March through November unimpaired flow to Folsom Reservoir is greater than 950,000 acre-feet are classified as wet or average years. The City of Roseville can divert (use) up to 54,900 acre-feet per year plus an additional 4,000 acre-feet from the SJWD in this year type.

Dry or Drier Years

Dry or drier years are when the projected March through November unimpaired flow to Folsom Reservoir is less than 950,000 acre-feet and greater than 400,000 acre-feet. Dry years over the 70-year hydrologic record are listed in Table 7.2.

TABLE 7.2.
DRY YEAR FLOWS INTO FOLSOM RESERVOIR

Dry Year	Unimpaired Inflow to Folsom Reservoir (1,000 acre-feet)	Dry Year	Unimpaired Inflow to Folsom Reservoir (1,000 acre-feet)
1931	571	1981	881
1934	690	1987	705
1939	873	1988	545
1959	872	1990	873
1961	854	1992	631
1976	518	1994	649

The City's maximum diversion will decrease from 54,900 acre-feet to 39,800 acre-feet with PCWA Water Agency's Middle Fork Project providing replacement water to the river equivalent to Roseville's diversions above the baseline (1995 levels of diversion = 19,800 acre-feet). Replacement water is required to remain in the river to the confluence of the American and Sacramento rivers, but can be sold to downstream users. During this year type, the PCWA replacement water will be no more than 20,000 acre-feet so the total allocation received by Roseville will be 39,000 acre-feet (20,000 acre-feet plus the baseline of 19,800 acre-feet = 39,800 acre-feet). The Water Forum refers to this replacement water as "re-operation" or "re-op" water. SJWD water is not available in these conditions as a condition of the transfer agreement.

Driest Years (Conference Years)

Years when the projected March through November unimpaired flow to the Folsom Reservoir is less than 400,000 acre-feet are defined as the driest years or conference years per the Water Forum Agreement. Table 7.3 provides a list of driest year flows into the Folsom Reservoir.

TABLE 7.3.
DRIEST YEAR FLOWS INTO FOLSOM RESERVOIR

Dry Year	Unimpaired Inflow to Folsom Reservoir (1,000 acre-feet)
1924	379
1977	332

Conference years require the City and other stakeholders to meet and confer on how best to meet current demands and how to protect the American River. Under this year type, the City will decrease its diversions to 39,800 acre-feet and PCWA's Middle Fork Project water will provide 20,000 acre-feet of replacement water to the river. Should the unimpaired inflow into Folsom Reservoir be insufficient to supply this quantity, Roseville will meet with other purveyors and stakeholders in the region to determine how the available water supply should be managed. The Water Forum Agreement includes a set of guiding principles for such a meeting.

7.2.3 Probability of Future Drought Occurrences

Through the Water Forum process, water supplies from the American River watershed were reviewed based on water available on a 70-year hydrologic pattern and the water rights and water supply contracts that exist for the City. This analysis provided the frequency and duration of anticipated shortages in future years and was compared to commitments made to the water supply. The City used this information to develop conservation measures for a cut back of up to 32 percent from the build-out water demand that is projected.

Unimpaired flow (March through November) into Folsom Reservoir varies and depending on the type of year, Roseville will decrease the amount of surface water taken (54,900 acre-feet to 39,800 acre-feet) in proportion to the decrease in unimpaired inflow, from 950,000 to 400,000 acre-feet.

There have been two years within the 70-year hydrologic record when the unimpaired inflows to Folsom Reservoir did not reach 400,000 acre-feet. The State of California had a multi-year drought from 1922-24 that affected the inflow to the Folsom Reservoir, with the most dramatic impact in the third year 1924.

From November 1975 through November 1977, California had very little rainfall and suffered severe drought conditions. In winter 1976, only 1/2 of the precipitation was received and in 1977, only 1/3 of normal precipitation occurred. This resulted in Folsom Reservoir being at its lowest recorded levels.

The USBR mandated supply cutbacks to Roseville's water supply contract in 1990, 1991, 1994, and 2001. These cutbacks required exercising water options with PCWA to reduce projected shortfalls. This water was conveyed through USBR facilities under a single year, temporary wheeling contract.

7.2.4 Other Potential Factors for Drought Vulnerability

A significant potential factor regarding drought vulnerability includes potential changes in the distribution of water based on increased demand in the region due to growth. The City has long-term contracts now with the federal government and local regional agencies. Should these be renegotiated in the distant future, the potential for water shortages would be present.

7.3 VULNERABILITY ASSESSMENT

Based on the hydrologic data for the American River, there is a probability that rainfall will be insufficient once every 17 years to supply the Folsom Reservoir and guarantee the City of Roseville its existing contract amounts. In these years, the City by agreement is required to find alternate sources of supply to reach the average or wet year supply.

Having the flexibility to use both the USBR and PCWA contractual supplies during a drier or driest year enables the City to provide a 73 percent reliable surface water supply for municipal and industrial uses. By incorporating groundwater into the water supply strategy, the City's reliability increases to 90 percent. The remaining ten percent will be compensated for by water use reductions (implementation of drought stages as outlined in the Roseville Municipal Code) due to conservation.

The City's Environmental Utilities staff acknowledges that in certain extreme conditions, or potentially successive dry years, it is possible, although unlikely, that Roseville's diversion could drop below 39,800 acre-feet per year. The City's Urban Water Management Plan Update of 2003 outlines the Roseville's Water Supply Reliability at Build-out for a three year drought. Water would be supplied by the American River through Folsom Reservoir and groundwater only in the second year of a drought. Roseville's recycled water utility is expected to provide a constant annual supply of 4,526 acre-feet per year. A summary of the water supply reliability at build-out for multiple dry water years is provided in Table 7.4.

TABLE 7.4.
WATER SUPPLY RELIABILITY AT BUILD-OUT (ACRE-FEET)

			Multiple Dry Water Years		
	Normal Water Year	Single Dry Water Year	Year 1	Year 2	Year 3
Surface Water Supply	58,900[5]	54,900[1]	54,900[1]	47,350[3]	39,800[4]
Groundwater	0	0	0	2,739	8,822
Recycled Water	4,526	4,526	4,526	4,526	4,526
Projected Demand	58,662	58,662[6]	56,081[2]	54,615[2]	53,148[2]
Surplus or (Deficit)	4,764	764	3,345	0	0

Notes:
1. Although contracts are in place for normal water year supplies of 62,000 acre-feet, the supply shown is consistent with Water Forum Agreement diversion limits and water is not available from San Juan Water District. Volume is dependent on unimpaired inflow to the American River.
2. Conservation savings in times of shortage is estimated at 5% for the pre-annexation city area in the first year of multiple dry years. Prolonged shortage savings is estimated at 7.5% and 10% in pre-annexation areas and 2.5% and 5% for annexation areas in later years through continued conservation messages.
3. Surface supply is estimated at 50% ramp down, consistent with Water Forum supply agreement (drier years)
4. Surface supply reduction is consistent with Water Forum supply agreement anticipating worst case shortage (driest years)
5. Although additional water is under contract, surface water supplies are available based on Water Forum Agreement diversion commitments.
6. Conservation measures would be implemented in event of supply cutback. Savings are not projected for these programs for reliability in a single dry year.

Source: City of Roseville 2003 Urban Water Management Plan Update

7.3.1 Building Inventory Information

Roseville has a total of 43,099 housing units as of January 1, 2005. Single family detached residential units account for 79 percent of the total developed residential units in Roseville. The total number of units by type of dwelling unit is show in Table 7.5.

TABLE 7.5.
RESIDENTIAL DWELLING UNITS IN THE CITY OF ROSEVILLE AS OF JANUARY 1, 2005

Type of Unit	Existing Citywide Units
Single Family	31,299
Half-Plex	417
Other Attached Single Family	266
Duplex	552
Mobile Home	443
Multi-Family (>=3 units attached)	9,199
Total	**43,099**

Source: City of Roseville Planning Department Quarterly Development Activity Report, January 2005

Roseville has over 27 million square feet of developed non-residential land uses on 3,000 acres city-wide. A majority of this development has occurred since the mid-1980s when the specific plan process was established and large tracts of land were entitled for development. Table 7.6 presents the amount of developed acreage according to type of land use.

TABLE 7.6.
NON-RESIDENTIAL DEVELOPMENT IN THE CITY OF ROSEVILLE AS OF JANUARY 1, 2005

Type of Land Use	Developed Square Feet	Developed Acres
Commercial/Retail	10,818,409	1,279.75
Business/Professional Office	6,000,197	528.73
Daycare	7,500	1.33
Industrial/Warehouse	8,404,151	832.48
Public and Quasi-Public Uses; Churches; Parks and Recreation	2,017,530	372.72
Total	**27,247,787**	**3,051.01**

The City uses the current building inventory information and project development entitled through the specific plan process to estimate future water usage as shown in Table 7.7 later in this section.

7.3.2 Impact of Drought on Life, Safety and Health

The City of Roseville, regional water purveyors, members of the Water Forum agreement, and the USBR have spent considerable time and effort to protect life, safety and health should several consecutive dry years occur. Provisions and measures have been taken to analyze and account for anticipated water shortages. The City has the ability to minimize any impacts on residents and water consumers in Roseville. No significant life or health impacts are anticipated as a result of drought in Roseville.

7.3.3 Impact of Drought on Critical Facilities Inventory

Critical facilities as defined for this plan, will continue to be operational during a drought. Although, critical facility elements such as landscaping may not be maintained due to limited resources, the risk to the city's critical facilities inventory will be largely aesthetic. For example, when water conservation measures are in place landscaped areas will not be watered and may die. These aesthetic impacts are not considered significant.

7.3.4 Structures

No structures will be affected by drought conditions in Roseville.

7.3.5 Economic Impact

Economic impact will be largely associated with those industries that use water or depend on water for their business. For example, landscaping businesses were affected in the droughts of the past as the demand for service significantly declined because landscaping was not watered. The City's Environmental Utilities Department through the water conservation programs works to ensure that those businesses whose product relies on water during the process receive their allotments to continue operating.

7.3.6 Impact of Drought on Future Trends in Development

Table 7.7 illustrates past, current, and projected water use from 1990 to 2020 in acre-feet per year. Water use is estimated by review of existing meter data as well as proportioning un-metered water based on flat rate sales within the service area.

7.4 REVIEW OF EXISTING ORDINANCES, PROGRAMS, AND PLANS

Since California's 1975 to 1977 drought, Roseville has had a policy of no water waste supported by City ordinances. The City adopted a "No Waste" ordinance in 1989 and most recently updated the Water Conservation Ordinance (Roseville Municipal Code Chapter 14.09—Water Conservation) in April 1991 to include drought mitigation measures. The ordinance provides conservation measures for shortages in water supply due to drought conditions. Drought mitigation is achieved through a tiered approach that is based on the surface water available to Roseville. As water supplies decrease, additional restrictions are imposed. Conservation measures (water use restrictions) have been established to address conditions from adequate water supplies to conditions in which surface water supplies are capable of meeting only 50 percent of Roseville's water needs.

A significant portion of Roseville's water is used for landscape irrigation. Landscape irrigation also accounts for a large portion of water wasted in Roseville. Conservation patrols are used to enforce City ordinances restricting water waste. These patrols generally consist of existing service workers that identify and document water waste during daily travels or when responding to complaints. Evening calls are made in response to resident complaints.

In times of reduced water availability, higher drought stages are implemented. In summer 1991, Roseville hired temporary employees to serve as the first dedicated water patrol. This patrol supplemented existing service crew coverage and provided 24-hour per day capability. These patrols led to the issuance of over 500 water waste citations that greatly decreased water wasted through malfunctioning irrigation systems and/or excessive watering.

TABLE 7.7.
CITY OF ROSEVILLE PAST, CURRENT, AND PROJECTED WATER USE (ACRE-FEET PER YEAR)

Water Use Sectors	1990	1995	2000	2005	2010	2015	2020
Single family residential	7,534	9,966	13,566	21,327	23,486	26,164	28,089
Multi-Family residential	589	780	1,061	1,668	1,837	2,047	2,197
Commercial	713	943	1,284	2,019	2,223	2,477	2,659
Industrial	1,507	1,993	2,713	4,265	4,697	5,233	5,618
Institutional and Governmental	717	948	1,290	2,028	2,234	2,489	2,672
Landscape	2,897	3,832	6,216	8,199	9,029	10,059	10,799
Sales to other agencies	0	0	0	0	0	0	0
Groundwater recharge (recycled water)	NA	NA	NA	NA	NA	NA	NA
Conjunctive use[1]	0	0	0	0	0	0	0
Agriculture[2]	0	0	0	0	0	0	0
Unaccounted system loss[3]	285	377	513	806	888	989	1,062
Total	**14,242**	**18,839**	**26,644**	**40,314**	**44,395**	**43,457**	**53,095**

Notes:
1. Conjunctive use programs are currently being developed and will be included in future city studies.
2. No agricultural water use is required in the Roseville service area.
3. Unaccounted system losses are estimated at 2% of total water production, which is not considered unreasonable for well-run and new systems. Actual loss will be evaluated once full system metering is completed.

NA = Not applicable

Source: City of Roseville 2003 Urban Water Management Plan Update

Roseville has a number of programs and policies that are implemented as early as possible to reduce water use in the event of a prolonged water shortage. Roseville, as a USBR contractor, is required to develop and maintain a water conservation plan consistent with the requirements of the Central Valley Project Improvement Act (CVPIA) of 1992. In addition, Roseville is a member and signatory to the American River Water Forum, which also includes requirements for water conservation programs.

To proactively promote water conservation and to be prepared in the event of a water shortage, the City implements Demand Management (Conservation) Measures, is developing supplemental water supplies, and has a Water Shortage Contingency Plan. These are summarized in the City of Roseville 2003 Urban Water Management Plan Update (2003) and detailed in the work programs for the Environmental Utilities Department Water Division.

7.5 REVIEW OF MITIGATION ALTERNATIVES

Chapter 15 of the City's Multi-Hazard Mitigation Plan identifies mitigation measures for all hazards in the Roseville plan including drought. These strategies are included based on a review of Roseville's existing programs and services, potential future resources, capabilities, and the goals of the plan. A comprehensive review of the mitigation alternatives occurred prior to the summary of mitigation strategies. For the drought hazard, mitigation alternatives reviewed include initiatives in the following categories:

7.5.1 Preventive Activities

Preventive activities are those associated with regulation and project conditions. The City of Roseville's existing regulatory approach to managing water supply emphasizes appropriate use of water in all phases of project development. Elements of this program include the following:

- The City's Planning Department adopted Water Efficient Landscape Requirements in 1993. These requirements are applicable to parcels within the City of Roseville to new and rehabilitated landscaping for industrial, commercial, office, institutional, multi-family residential common areas, model homes, developer installed landscaping for single-family residences, and developer and city-installed landscaping which is city maintained. The requirements set forth the general design criteria for the installation of water conservation oriented landscape design making landscapes less vulnerable to periods of severe drought. The Uniform Plumbing Code is updated to include water efficient technologies. Post 1992 homes have been equipped with water efficient devices saving water with each use which results in conservation during typical uses. Features included are low water using interior fixtures and ultra-low flush toilet installations.
- Water use reviews of any new construction is required to insure that appropriate internal conservation measures are taken. These reviews are conducted as part of project conditioning and permitting.
- When appropriate, recycled water is required for use on landscaping. This allows potable supplies to be reserved for applications that recycled water in either not available or its use would be inappropriate.

7.5.2 Property Protection Activities

Property protection activities include assistance related to water waste during times of shortage that can minimize losses associated with prolonged drought conditions. Program elements include:

- Water leaks found on private property are the responsibility of the property owner to repair. The city, however, works with these customers to identify areas in need of repair.
- In times of drought, watering restrictions have been designed to minimize impact to landscape. Water cutbacks could hopefully be monitored to balance water availability with landscape stress, minimizing permanent losses associated with cutbacks.

7.5.3 Resource Protection Activities

Resource protection activities include activities that will make the best use of available water supplies. The City's current policies and programs that emphasize water conservation meet these criteria and should be continued. The City of Roseville has developed a Water Conservation Plan that includes certain Best Management Practices (BMP) regarding all aspects of residential, commercial and industrial applications. Conservation criteria were required and programs were developed to meet these criteria. Each year, the conservation program grows and practices change to best meet the needs of the customers while satisfying the established targets. The program consists of the following:

- Comprehensive water audits performed on all customer types. Certified water auditors perform thorough internal and external water audits on customer's homes and businesses looking for leaks, inefficiencies and opportunities for water savings.

Recommendations are given to the property owner after each audit on the findings and what steps they should take to improve their water usage.

- Providing plumbing retrofit kits to homes constructed prior to 1992. At various community events and at on-site audits plumbing retrofit kits are given away to those that need them. These kits include conservation oriented shower heads, faucet aerators, toilet tank replacement flapper, exterior hose shut-off nozzles, soil moisture meters, and toilet leak detection dye tablets.
- Evaluation of current city owned distribution system checking for leaks and repairing those found. The city's distribution system is tested and monitored to ensure system leaks are found quickly and repaired. New technologies could be used to locate hard to find water losses through expanded programs.
- Residential meter retrofits for homes constructed without a water meter and a tiered meter rate structure. The city developed a meter retrofit program whereby all non-metered residential customers will be metered within 10 years of program development and will be placed on a metered rate. Metered usage allows the city to better track water usage and more quickly identify problem areas. Also, this information provides customers direct feedback on water use and allows them to make lifestyle changes that result in water conservation. Each month, the city reviews the top 20% of water users, contacts them, and works with them to reduce their usage.
- Large landscape audits are offered to all landscaped areas larger than 1 acre in size. The goal is to identify inefficient irrigation systems or system in disrepair and offer recommendations and incentives for repair.
- City departments collaborate to provide school based educational programs. Students are taught, through various means, about ecology, conservation and efficiencies. Taking this message home goes far in developing a conservation minded attitude by future generations.
- The city conducts water waste patrols during peak summer months looking specifically for irrigation abuses and other water loss problems. Also, throughout the year, city employees are encouraged to patrol while responding to other city business.
- New water efficient programs are developed as funding is identified. Conservation oriented rebate programs such as the Water-Wise House Call, Ultra Low-Flush Toilet Rebate Program, the High Efficiency Clothes Washer Rebate Program, the RE-View Energy and Water Audit program, the large landscape audits, residential plumbing retrofits and a new ET irrigation controller replacement program are current programs offered to Roseville customers . As funding becomes available, the City will provide incentives to the development community to produce homes with the utmost efficiencies in mind.

7.5.4 Emergency Service Activities

Emergency services activities include activities that deal with warning and response to events. As illustrated in Section 4.2 of this plan, Roseville's existing programs in this category are exemplary. Possible program enhancements may include the following:

- Early identification of required enforcement of water conservation ordinance and determination of cutbacks required. Keeping public informed as to ongoing water supply issues will allow consumer changes to occur as the need develops.

7.5.5 Structural Activities

These types of activities include structural solutions that could potentially provide additional water supplies on an emergency basis. These projects can be expensive. When reviewing these types of activities, the City of Roseville will emphasize the benefits of the project versus its cost. Structural solutions include the following:

- Roseville is developing alternative water supplies through installation of wells in new development areas. Although water supplies are primarily surface water, groundwater can be used when surface water may not be available due to drought conditions.
- Wells constructed and rehabilitated in Roseville include the necessary features to store surface water, when available, in groundwater basins. Use of this Aquifer Storage and Recovery (ASR) capability insures that groundwater supplies are available when needed and can managed to result in no impact to the basin even when extractions are required for extended periods.
- Roseville looks to develop reliability of the system through system interties with surrounding water purveyors. This allows water transfers as needed to meet purveyor needs. Depending on the agency, water supply availability and transfer capability drought conditions may be able to be mitigated.

7.5.6 Public Information Activities

Public information activities include activities that provide shortage and conservation information to the public that will aid them in preparing, responding, recovering and mitigating from the impacts of a drought or water shortage. Roseville's current programs under this category excel in all facets of this category. Program elements include the following:

- City's water conservation website provides information on water supply availability and potential cutbacks. Also included in considerable information of conservation measures that can be taken to reduce water use.
- Internal media (EU Today, Roseville Reflections, bill inserts and bill messages, government access channel, city council, public utilities commission)
- Regional media conservation efforts (Sacramento Bee, local news stations, press Tribune, billboards). As drought conditions persist Roseville would work cooperatively with other agencies to develop a regional message regarding conservation and water supply conditions.
- Public Outreach events (Downtown Tuesday Night, National Night Out, Earth Day, landscape workshop sponsorships) are all used to work with area water users to educate on conservation techniques and abilities.
- School programs (Newspaper in Education, LivingWise, concerts)
- Development of Utilities Education Center at Mahany Library.

CHAPTER 8.
EARTHQUAKE RISK ASSESSMENT

8.1 IDENTIFYING HAZARDS—DESCRIPTION OF THE EARTHQUAKE HAZARD

Roseville's location in Central California increases the likelihood that the city will be subject to an earthquake at some point in time. California is seismically active because of annual movement of the North American Plate, on which Roseville and everything east of the San Andreas Fault sits, and the Pacific Plate which includes the coast communities from Monterey to San Diego. The movement of the tectonic plates creates stress released as energy that moves through the earth as waves called earthquakes.

> ***Earthquake***—An earthquake is defined as both a sudden slip on a fault, and the resulting ground shaking and radiated seismic energy caused by the slip, or by volcanic or magmatic activity, or other sudden stress changes in the earth.

Active faults are those that have experienced displacement in historic time, while inactive faults have not. However, there is the potential for inactive faults to reactivate or experience displacement along a branch of the zone sometime in the future. An example of a fault zone that has been reactivated is the Foothills fault zone. The zone was considered inactive until evidence of an earthquake (approximately 1.6 million years ago) was found near Spenceville, California. Then, in 1975, an earthquake occurred on another branch of the zone near Oroville, California (now known as the Cleveland Hills Fault). Due to the potential for fault movement, even though the occurrence is low, an earthquake is considered a hazard in the City of Roseville.

Earthquakes can last from a few seconds to over five minutes; they may also occur as a series of tremors over a period of several days. The actual movement of the ground in an earthquake is seldom the direct cause of injury or death. Casualties may result from falling objects and debris, because the shocks shake, damage, or demolish buildings and other structures. Disruption of communications, electrical power supplies and gas, sewer and water lines should be expected. Earthquakes may trigger fires, dam failures, landslides or releases of hazardous material, compounding their disastrous effects.

A direct relationship exists between a fault's length and location and its ability to generate damaging ground motion at a given site. In some areas, smaller, local faults produce lower magnitude quakes, but ground shaking can be strong, and damage can be significant as a result of the fault's proximity to the area. In contrast, large regional faults can generate great magnitudes but, because of their distance and depth, may result in only moderate shaking in the area. Roseville falls within the second category.

Earthquakes are classified according to the amount of energy released as measured by magnitude or intensity scales. While several scales have been defined, the most commonly used are the local magnitude (ML) used by the Richter Scale, and the Mercalli Intensity. Table 8.1 presents a classification of earthquakes according to their Richter Magnitude. Table 8.2 compares the Richter Scale to the Mercalli Intensity scale.

8.2. EARTHQUAKE HAZARD PROFILE

8.2.1 Location and Extent

A significant seismic event could occur in Roseville from earthquake activity along faults some distance from the city limits and could result in severe property damage and injury to building occupants or

passersby. Further damage could result from damage to public and private infrastructure including electric distribution lines, telecommunications infrastructure, water, and gas lines, causing additional issues during the recovery from an earthquake.

TABLE 8.1.
RICHTER SCALE
MAGNITUDE CLASSES

Magnitude Class	Magnitude Range (M = magnitude)
Great	M > 8
Major	7 <= M < 7.9
Strong	6 <= M < 6.9
Moderate	5 <= M < 5.9
Light	4 <= M < 4.9
Minor	3 <= M < 3.9
Micro	M < 3

TABLE 8.2.
EARTHQUAKE MAGNITUDE AND INTENSITY

Magnitude (Richter)	Intensity (Mercalli)	Description
1.0 – 3.0	I	I. Not felt except by a very few under especially favorable conditions
3.0 – 3.9	II – III	II. Felt only by a few persons at rest, especially on upper floors of buildings. III. Felt quite noticeably by persons indoors, especially on upper floors of buildings. Many people do not recognize it is an earthquake. Standing motorcars may rock slightly. Vibrations similar to the passing of a truck. Duration estimated.
4.0 – 4.9	IV – V	IV. Felt indoors by many, outdoors by few during the day. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like a heavy truck striking building. Standing motorcars rocked noticeably.
5.0 – 5.9	VI – VII	VI. Felt by all; many frightened. Some heavy furniture moved; a few instances of fallen plaster. Damage slight. VII. Damage negligible in buildings of good design and construction; slight in well-built ordinary structures; considerable in poorly built or badly designed structures. Some chimneys broken.

The last seismic event recorded in the South Placer area measuring at least 4.0 on the Richter Scale occurred in 1908 on a north-south fault line between Folsom and Auburn and on an east-west line between Placerville and Roseville. No significant seismic events have been recorded since then within the Roseville vicinity. However, the State Division of Mines and Geology indicates that increased earthquake activity throughout California may cause tectonic movement along now “inactive” fault systems.

8.2.2 Earthquake Event History

State of California

The State of California has hundreds of earthquakes each year, most with minimal damage as they do not exceed 3.0 on the Richter Scale. Earthquakes large enough to cause moderate damage to structures occur several times a year. According to the United States Geological Society, a strong earthquake measuring greater than 5.0 on the Richter Scale occurs every two to three years and major earthquakes of more than 7.0 on the Richter Scale occur once every decade.

Significant earthquakes in the State's recent history include the 1906 earthquake in San Francisco, the 1971 San Fernando Earthquake, the 1989 Loma Prieta Earthquake, and the 1994 Northridge earthquake. Figure 8.1 identifies the potential for earthquake shaking in California as of 2003.

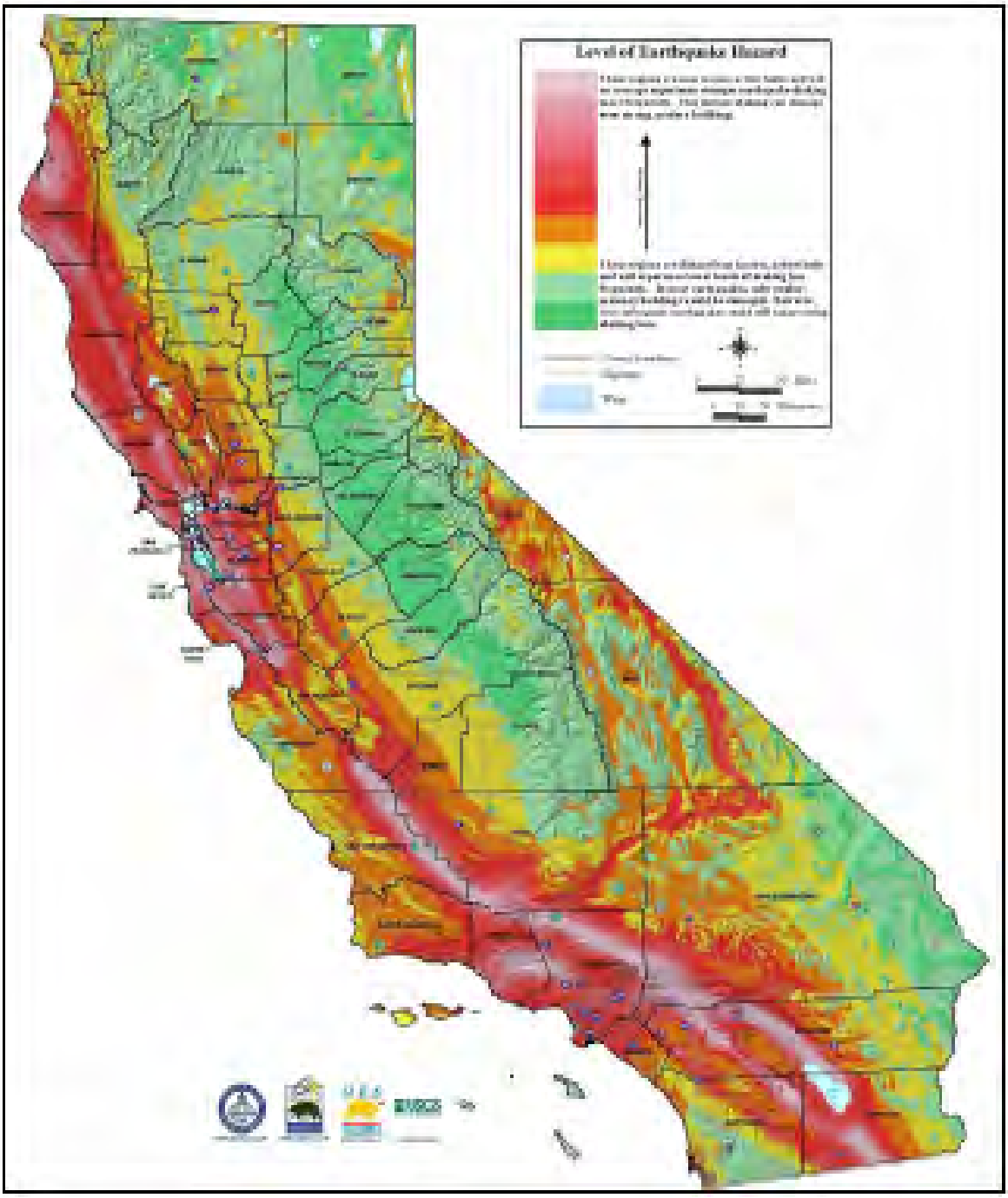
Regional Faults

The City of Roseville is located in a region of moderate seismicity between the seismically active Coast Ranges and the historically seismic Foothills fault zone in the Sierra Nevada. The primary hazard associated with seismic activity is the potential ground shaking from more distant faults. Table 8.3 lists significant known faults within 100 miles of Roseville.

TABLE 8.3.
SIGNIFICANT KNOWN FAULTS WITHIN 100 MILES

Fault	Distance (miles/direction)	Maximum Credible Earthquake (MCE) Magnitude	Peak Ground Acceleration
Dunnigan Hills	30 miles/W	6.25-6.5	0.10 g
Midland Fault	37 miles/ W	7.0	Not available
Foothills Fault System			
Bear Mountain	20 miles/ E	5.7-6.0	0.25 g
New Melones	65 km from Sac	6.5	
Stockton	63 mi/S	5.0	Not available
Coastal Range—Sierra Block Boundary	40 miles/ SW	6.5	Not available
Cleveland Hill	47 miles/ N	6.5	<0.0 6g
San Andreas Fault System			
Antioch	70 km from Sac	Not available	Not available
Greenville	70 km from Sac	6.5	Not available
Concord	75 km from Sac	6.9	Not available
Green Valley	58 miles/ W	7.0	<0.06 g
Sierra Frontal Faults	64 miles/ E	6.5	<0.05 g
Healdsburg/Rogers Creek	73 miles/ W	7.25	<0.05 g
Hayward	78 miles/ SW	6.5-7.0	Not available
Calaveras	55 miles/ SW	6.5-7.0	Not available
San Andreas	93 miles/ W	8.5	<0.05 g

Sources: North Central Roseville Specific Plan Final Environmental Impact Report, 1990; Harding Lawson, 1992, Stock Ranch Guide for Development Draft Environmental Impact Report, 2000.
Notes:
E =East N = North
g = Gravitational acceleration S = South
km =Kilometer W = West



Source: California Office of Emergency Services website
Figure 8.1. Earthquake Shaking Potential for California

Regional faults to the west include the Hayward fault, to the east the Bear Mountains and the Melones faults in the Foothills fault zone. In addition the Willows fault (7 miles) and Stockton fault are also in the Roseville vicinity but are considered inactive as displacement occurred greater than 1.8 million years ago.

The intensity of earthquake shaking lessens with distance. Tabulated peak ground accelerations for the listed MCE earthquakes are a measure of how the site will be affected by seismic events on more distant

faults. While there are several faults with the potential for large-magnitude earthquakes in the vicinity, the distance between the faults and the City of Roseville would result in very low, peak-ground accelerations. The biggest contributor to the potential intensity of shaking in Roseville is the Foothills Fault System.

The Lake Tahoe Basin is seismically active with earthquakes greater than 7.0 that have occurred beneath Lake Tahoe. According to the Placer County Multi-Hazard Mitigation Plan, a series of small earthquakes also occurred in late 2003 and early 2004 due to volcanic magma (molten rock) moving 20 miles below the Sierra Nevada Mountains. The earthquakes reflect the movement of the Sierra Nevada range to the northwest at a rate of 12 to 14 millimeters per year.

Local Faults

Although faults have been identified within the Sacramento region, no active faults are known to exist within Placer County. Placer County and Roseville are identified as a low-severity zone. In previous environmental documents for several Roseville specific plan areas and the Safety Element of the Roseville General Plan, three inactive faults are identified within the city limits and shown on Figure 8.2.

The Volcano Hill fault extends northwesterly from Volcano Hill for a distance of 1 mile, terminating near Eureka Road. No activity has been recorded along this fault; therefore, it is considered inactive.

Identified in 1973, the Linda Creek fault is located along Linda Creek in Roseville and Sacramento County. Again, no activity has been recorded along this fault.

An unnamed fault extends east to west between Folsom Lake and the City of Rocklin. Segments of the fault are concealed and consequently, unmapped. However, the east/west alignment suggests that the fault could connect to Bear Mountain faults, branches of which are located beneath Folsom Lake. The Bear Mountain fault is identified as one of the faults that could be undergoing reactivation as a result of continental tectonic activity. However, no evidence has been identified along the unnamed fault alignment of such reactivation. Table 8.4 presents a list of recent earthquakes with a magnitude of 5.0 or greater within a 100-mile radius of Roseville

TABLE 8.4.
RECENT EARTHQUAKES MAGNITUDE 5.0 OR LARGER (100-MILE RADIUS)

		Epicenter Location		
Date	Magnitude	Distance	Direction	Nearest City
8/10/2001	5.50	14 km	W	Portola, CA
9/3/2000	5.17	13 km	NW	Napa, CA
10/30/1998	5.35	7 km	SSE	Truckee, CA
12/28/1995	5.33	11 km	ENE	Markleeville, CA
12/23/1995	5.08	13 km	E	Markleeville, CA
9/12/1994	5.95	11 km	NNE	Markleeville, CA
9/12/1994	5.12	11 km	NNE	Markleeville, CA
3/31/1986	5.70	20 km	ENE	Milpitas, CA

Source: Earthquake Catalogs, Northern California Earthquake Data Center, 2004

8.2.3 Probability of Future Earthquake Occurrences

Both the San Andreas Fault and the closer Hayward Fault have the potential for experiencing major to great events. The U.S. Geological Survey (USGS) recently (February 2004) estimated that there is a 62 percent probability of at least one 6.7 or greater magnitude earthquake occurring that could cause widespread damage in the greater San Francisco Bay area before 2032.

Another potential earthquake source are the faults associated with the western edge of the Central Valley, recently defined as the Coast Range Central Valley (CRCV) boundary thrust fault system. Various documents define portions of this little known system as the Midland Fault Zone or the Dunnigan Hills fault where the 1892 Vacaville-Winters earthquake occurred. A southern part of the CRCV system may have been the source of the 1983 Coalinga earthquake.

The Foothill Fault Zone, a complex series of northwest trending-faults that are related to the Sierra Nevada uplift, and whose activity also is little understood, runs from about Oroville in the north to east of Fresno in the south. Earthquakes on nearby faults in the zone can be the source of ground shaking in the Sacramento area. The closest potentially active faults are the Bear Mountain and Melones Fault that are in the near vicinity of the Roseville city limits.

The Petrolia (coastal Humboldt County) earthquake increased concern about how amplified long period motions from much closer major events, such as on the San Andreas Fault or the Hayward Fault, might reach damaging levels and affect Sacramento.

Alquist-Priolo Act

The Alquist-Priolo Special Studies Zone Act of 1972 is directed at areas identified by the State Geologist as likely to experience earthquakes. The act focuses on surface fault rupture and not shaking. The Act addresses earthquake safety in building permits and subdivision procedures by requiring project applicants to submit a registered geologist's report for on-site surface rupture. Roseville is not included within any special study area and is not subject to these requirements.

8.2.4 Other Potential Factors for Earthquake Vulnerability

Liquefaction

Liquefaction involves loose sandy soil with a high water content that undermines the ground's ability to solidly support building structures during an earthquake. Foundations supported on liquefiable soils can lose their ability to support load, and can experience settlement on the order of several inches or more. Differential settlement can cause significant damage to buildings, lifelines, and transportation structures with partial or total collapse. According to the State Division of Mines and Geology, the City of Roseville is not specifically addressed in currently available liquefaction risk data. No determination has been made that liquefaction exists in Roseville. The most likely location for liquefaction would be along the city's creek beds. The City's policy to protect the city's floodplain areas has avoided development in many of the most susceptible areas. Based on project-specific analysis that has been done for many of Roseville's development projects, liquefaction has not been identified as a significant problem in Roseville.

In addition, the prevailing water table in the vicinity of Roseville is approximately 80 feet below grade. Without water to saturate the soil, liquefaction is not possible. The liquefaction potential in Roseville is, therefore, considered to be very low. This conclusion is supported by information contained in geotechnical reports available for sites in the vicinity of Roseville.

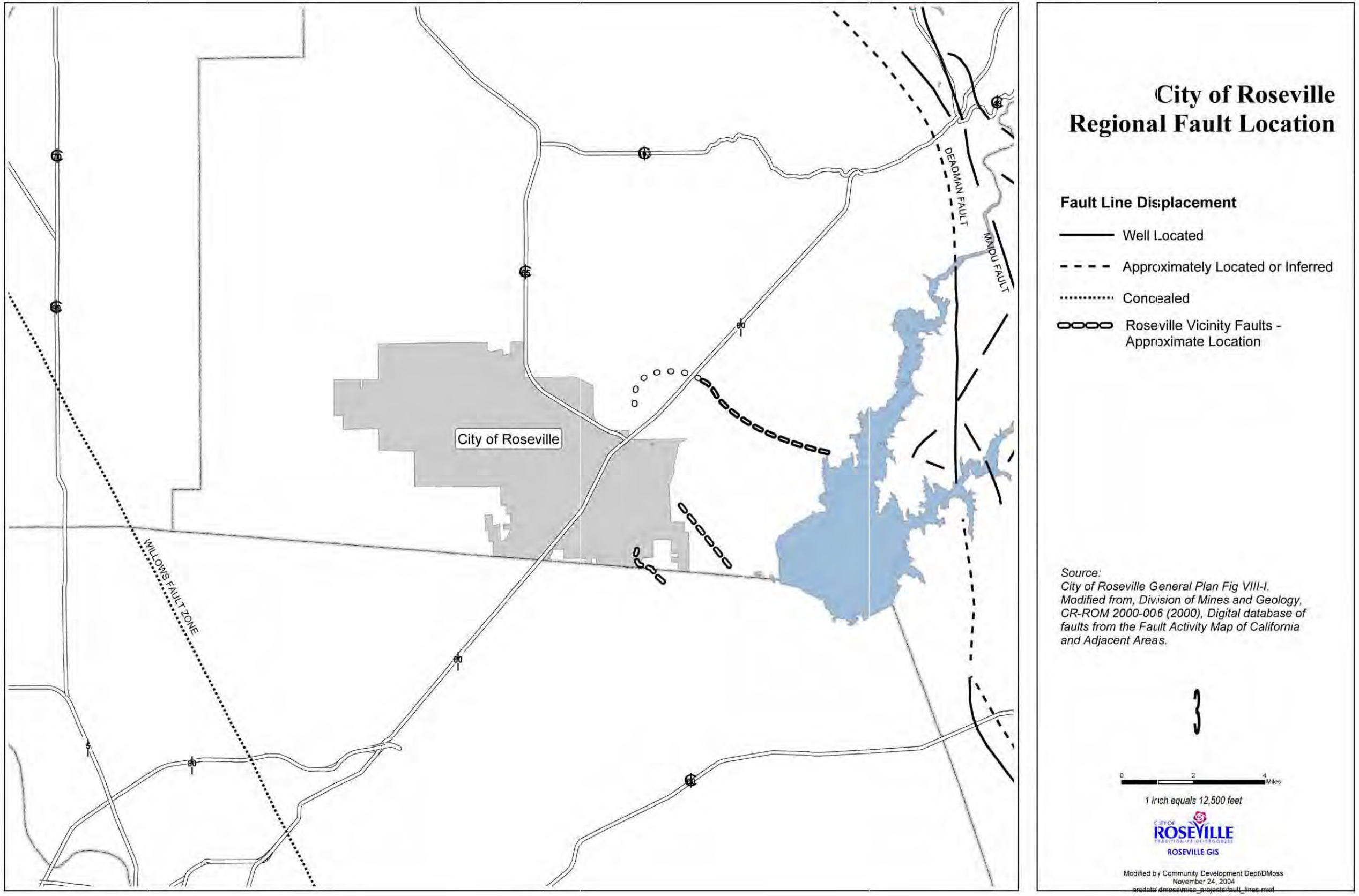


Figure 8.2. Fault Locations.

Ground Failure

Roseville's geographic location, soil conditions, and surface terrain combine to minimize risk of major damage from landslides, subsidence (gradual shrinking of the earth's surface due to underground resource extraction), or other geologic hazards resulting from seismic activity and related natural forces.

Slopes

Roseville is located on relatively level terrain with land that gradually increases in slope to the north and east. Recent development in the Stoneridge Specific Plan and Northeast Roseville Specific Plan is adjacent to ravine areas and developed property would be more susceptible in the event of seismic activity due to steep slopes in some areas.

8.3 VULNERABILITY ASSESSMENT

DMA2K requires risk assessments to include a description of the vulnerability to specific hazards and the impact on the community. A vulnerability assessment is an evaluation of the community's susceptibility to a specific hazard. It estimates the impact and describes the effect of the hazard on the community. The following sub-sections present the results of the earthquake vulnerability assessment.

8.3.1 The Earthquake Problem

The vulnerability of a community to the earthquake hazard is based on a variety of factors including proximity to active and inactive earthquake faults, the age of structures, the density of the population and development, the value of property and infrastructure, the construction materials used in residential and non-residential buildings, and the location of critical facilities in a community.

Age of Structures

The City of Roseville is a relatively new community with a majority of the development occurring since 1976. The State of California Multi-Hazard Mitigation Plan identifies significant milestones in building and seismic code requirements that directly affect the structural integrity of development in California. Using these time periods, the City of Roseville mapped the structures using age of structure layers from the City of Roseville Land Inventory Database. The number of structures is approximate and is based on best available data currently entered into Roseville and Placer County databases. The number of structures does not reflect the number of total housing units as many multi-family units and attached housing units are reported as one structure. Table 8.5 provides a list of the approximate number of structures built in Roseville from pre-1933 to 2005.

Over 76 percent of the city's structures were constructed since the Uniform Building Code (UBC) was amended in 1994 to include seismic safety provisions. Approximately 10 percent of the city's structures were built before 1933 when there were no building permits, inspections, or seismic standards. As shown on Figure 8.3, these are located in Central Roseville and straddle the Union Pacific Railroad tracks. There are also a few structures in south Roseville that were built during this time period.

TABLE 8.5.
AGE OF STRUCTURES IN THE CITY OF ROSEVILLE

Time Period	Number of Structures Built in Roseville	Significance of Time Frame
Pre-1933	3,594	Before 1933, there were no explicit requirements for earthquakes in building codes. State law did not require local governments to have building officials or issue building permits.
1933-1940	73	In 1940, the first strong motion recording was made in El Centro.
1941-1960	2,685	In 1960, the Structural Engineers Association of California reached the first statewide consensus on recommended earthquake provisions and published the guidelines.
1961-1975	2,375	In 1975, significant improvements were made to lateral force requirements that were then enforced throughout the state.
1976-1994	14,850	In 1994, the Uniform Building Code was amended to include provisions for seismic safety.
1994 to present	15,220	Seismic code is currently enforced.
Total	**35,203**	

Density of Population and Development

Roseville is the largest city in Placer County with an estimated 102,191 residents as of January 1, 2005 and a daytime population of 150,000 people including workers, visitors and shoppers who commute in to Roseville. Roseville has 5,700 businesses, 47 developed parks, and 2,600 acres of dedicated open space. The city has evolved from an established railroad town to a bedroom community for employees who commuted to Sacramento, and now is an urban center with a significant amount of non-residential growth including commercial, office and industrial development.

The city has a total of 43,099 housing units as of January 1, 2005. Single family detached residential units account for 79 percent of the total developed residential units in Roseville. The total number of units by type of dwelling unit is shown in Table 8.6.

TABLE 8.6.
RESIDENTIAL DWELLING UNITS IN THE CITY OF ROSEVILLE AS OF JANUARY 1, 2005

Type of Unit	Existing Citywide Units
Single Family	31,299
Half-Plex	417
Other Attached Single Family	266
Duplex	552
Mobile Home	443
Multi-Family (>=3 units attached)	9,199
Total	**43,099**

Source: City of Roseville Planning Department Quarterly Development Activity Report, January 2005

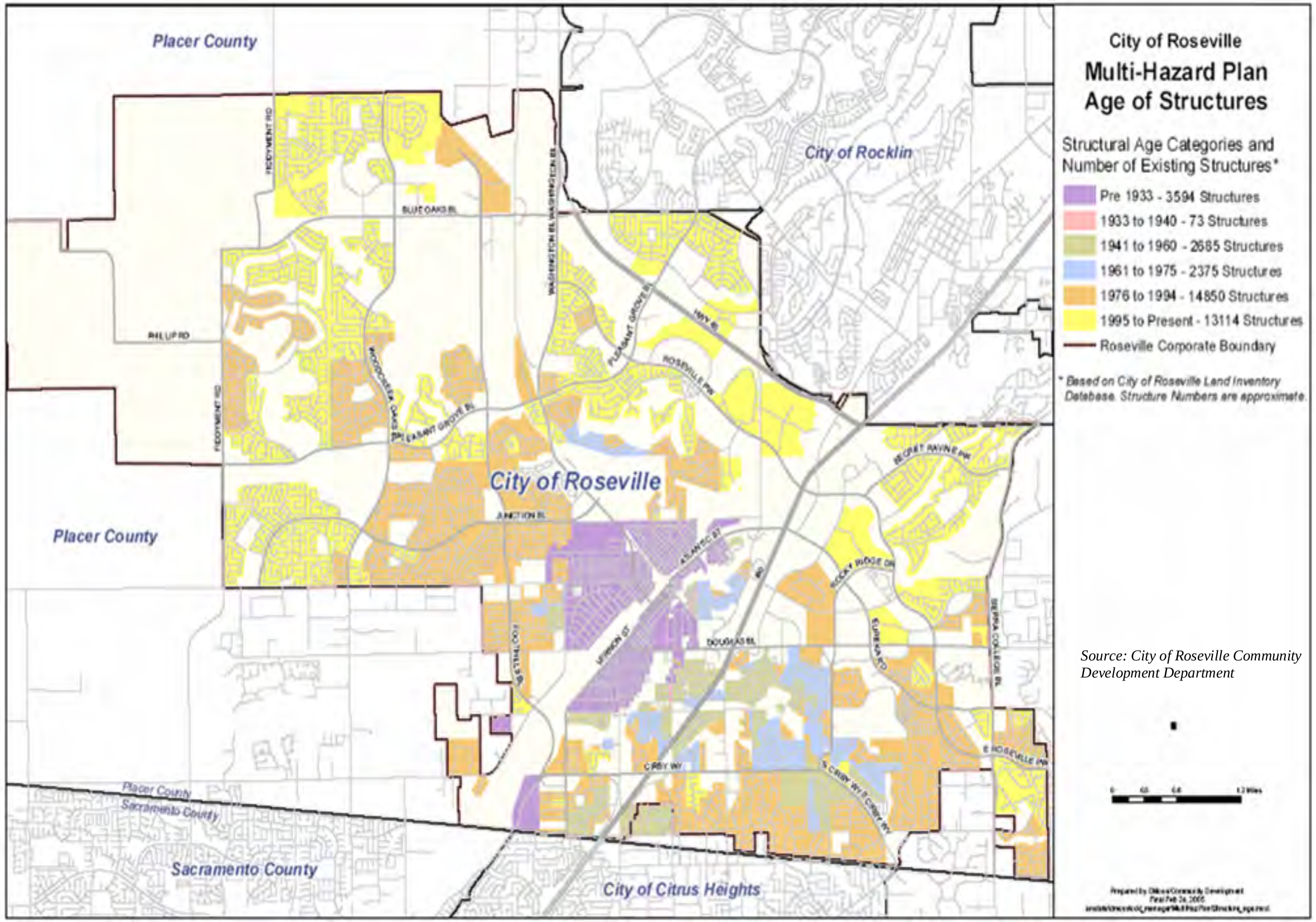


Figure 8.3. Age of Structures in the City of Roseville.

The City of Roseville has over 27 million square feet of developed non-residential land uses on 3,000 acres city-wide. A majority of this development has occurred since the mid-1980s when the specific plan process was established and large tracts of land were entitled for development. Table 8.7 provides a list of non-residential development in the relation to the type of land used as of January 1, 2005.

TABLE 8.7.
NON-RESIDENTIAL DEVELOPMENT IN THE CITY OF ROSEVILLE AS OF JANUARY 1, 2005

Type of Land Use	Developed Square Feet	Developed Acres
Commercial/Retail	10,818,409	1,279.75
Business/Professional Office	6,000,197	528.73
Daycare	7,500	1.33
Industrial/Warehouse	8,404,151	832.48
Public and Quasi-Public Uses; Churches; Parks and Recreation	2,017,530	372.72
Total	**27,247,787**	**3,051.01**

Value of Property and Infrastructure

Public and private property owners have structures valued at nearly $8.7 billion on land in Roseville. Tables 8.8 presents a list of structure assessment values according to the type of land use.

TABLE 8.8.
2004-05 CITY OF ROSEVILLE STRUCTURE ASSESSMENT VALUES

Type of Land Use	Total Assessed Value ($)
Residential	5,896,766
Commercial	1,905,124
Industrial	611,675
Religion	74,552
Education	9,977
Government	200,000
Agriculture	0
Total	**8,698,094**

Sources: Placer County Assessor's Office, Certified Roll Values for Roseville, 2004-05

Construction Materials

The type of construction is a factor in a building's ability to withstand shaking and liquefaction should an earthquake occur. Developers in Roseville have built primarily wood frame structures. The tallest building in Roseville is currently three stories. The first four-story building is under construction with steel and concrete as the building materials. Plans for high rise buildings (greater than seven stories based on Fire Department standards) are being discussed. Should plans for a high rise hotel and/or office buildings in Roseville be approved by the City Council, the City would require they be constructed with the latest building materials under supervision of contract experts in high-rise construction and inspection.

HAZUS-MH (Hazards U.S. Multi-Hazard) generated the percentages of each building type in Roseville as shown in Table 8.9. The City's Chief Building Inspector reviewed the percentages and agreed that these are still close estimates through the current year's development.

TABLE 8.9.
BUILDING TYPE

Building Type	Percent of Total
Wood	95%
Reinforced Concrete	Less than 1%
Concrete	Less than 1%
Reinforced Masonry	1%
Un-reinforced Masonry	Less than 1%
Steel	Less than 1%
Manufactured Homes	3%
Other	Less than 1%
Total	**100%**

Sources: US Census, Dunn and Bradstreet Corporation (2002)

Location of Critical Facilities

The City's Water Treatment Plant on Barton Road is the only critical facility located near an identified local inactive fault. All other City facilities are within Roseville and are not located in close proximity to an identified, inactive local fault.

Most of the City's critical facilities have been built since the UBC was amended to include provisions for seismic safety. For example, the two major hospitals, Sutter Roseville Medical Center and Kaiser Permanente were both constructed in the 1990s as were the Roseville Police Department and Roseville Civic Center.

Critical industrial facilities are of concern because of potential hazardous materials spills or the potential for critical employment centers to continue operating. Many forms of hazardous materials are present in Roseville at private businesses, in permanent storage locations, along the Union Pacific Railroad, and on Interstate 80 and Highway 65. Roseville's location at the junction of two major rail lines with two freeways increases the potential for a hazardous materials event should a major earthquake occur.

8.3.2 Level 1 HAZUS-MH Analysis

The city-wide seismic vulnerability analysis was conducted and the loss estimates determined using HAZUS-MH analysis, the Federal Emergency Management Agency's (FEMA) loss estimation software. A Level 1 analysis, with national level data sets, was used for this analysis due to the complexity of the seismic software. The data sources include Dunn & Bradstreet and RS Means (updated for 2002). The City will include a mitigation measure to update the data through 2004 and conduct a Level 2 HAZUS-MH analysis with current, locally-generated demographic and building stock data. Population data in the HAZUS-MH software are from the 2000 Census.

The HAZUS-MH was conducted at the census tract level for Roseville. The data included a total city population of 90,338 and 34,131 households. Current City data show a population of 100,500 and over 43,000 households. A possible mitigation strategy for this plan would be to update this data using a Level

2 HAZUS-MH analysis should the planning team determine that more accurate data is needed to determine the true vulnerability to this hazard. The Level 2 analysis will use current City data versus a ten-year old data currently contained in the HAZUS software programs with verification of the analyses by local officials with more knowledge of the actual structures in Roseville.

Of the total housing units included in the FEMA software, 3.37 percent or 1,185 units were built prior to 1940. The remaining units in Roseville were built since 1940 with over half of the total housing units constructed in the 1980s and 1990s.

Building Inventory Information

The HAZUS-MH software identified a total building exposure of 66 million square feet of residential, commercial, industrial, religious, government, and education development in Roseville. A small amount of agricultural building stock was also identified, but is no longer actively used for agricultural purposes in Roseville.

In addition to the total building stock, HAZUS also identified a replacement value for the various classifications of buildings based on mean cost estimating values in 1994 dollars. Given the significant rise in property values and development that has occurred in Roseville ($3.6 billion worth of construction valuation from 2000 to 2004), the numbers underestimate the amount of replacement dollars that would be needed to rebuild in Roseville should there be a significant seismic event. Again, most of the construction is new and in compliance with State seismic building codes.

Impact of Earthquake on Life, Safety and Health

Although Roseville is in the State of California and has three faults documented in the City's General Plan, the seismic hazard is not considered to be a serious risk to life or property. Earthquakes can be devastating should the activity be located close enough to a city to cause significant shaking. Roseville is fortunate in that more than three-quarters of the development in the city has occurred in the past two decades and all applicable seismic building codes have been enforced through the planning and development process.

Earthquakes are devastating also because there will be no warning such as with flood or severe weather hazards. Geologists and seismologists are predicting that a large earthquake will occur in California; in fact, the State Hazard Mitigation Plan cites the USGS and other scientists as saying that an earthquake of magnitude 6.7 or greater will strike the San Francisco Bay Area before 2032 and that there is a 95 percent probability that a major quake will occur in California in the next thirty years. However, studies have not identified the Sierra Foothills including Placer County as a likely location for a significant seismic event.

The life-safety exposure to earthquake in Roseville is low and would most likely occur in buildings as a result of damage to the structure. The measurable impact of earthquake on loss of life is minimal in Roseville and has not been estimated for this plan. To prevent damage to structures and loss of life, the City enforces all building codes and has a strict code enforcement policy to prevent improper alterations to original buildings. The City has funded façade grants to renovate older commercial structures, and has established an Infill development team to work with property owners and tenants to upgrade and add value to older properties in Roseville.

The City does encourage residents to be prepared through public education and training via the Roseville Fire Department and local non-profits. Local employers such as Union Pacific, Sutter Roseville Medical Center, Kaiser Hospital, HP, and NEC maintain emergency response plans that include earthquake

preparedness and response training to protect life and property. Earthquake preparedness and response training prepares employees to continue service to the community in the event of a seismic event.

Property damage would occur in a small percentage of the city's buildings built prior to 1933 and structures such as manufactured homes and older homes that have not been well maintained. Roseville's utilities all have funded rehabilitation programs that identify and replace worn infrastructure to ensure continuous service. The latest technologies including computerized alarms, video inspections, and mapping of all of the City's water, wastewater, recycled water and electric systems would identify damaged sections in the event of a seismic event. Private utilities in Roseville also use modern technology to monitor their infrastructure in Roseville and respond quickly to service interruptions.

Impact of Earthquake on Critical Facilities Inventory

As defined for this plan, a critical facility is essential to the provision of vital services to the community or if lost, there would be a severe economic or catastrophic impact. These facilities are categorized as essential facilities that include hospitals, medical clinics, schools, fire stations, police stations, and emergency operations facilities; and high potential loss facilities that include large gathering places and hazardous materials sites.

A majority of Roseville's critical facilities, including the Civic Center, Roseville Police Department, five of the six fire stations, and the two hospitals have all been constructed since the seismic section of the UBC became state law. The likelihood that any of Roseville's critical facilities would be damaged by a seismic event is very slim.

Structures Inventory and Dollar Exposure

Transportation Systems

The transportation system dollar exposure for the area is estimated at $ 582.6 million. Of this, approximately $ 357.6 million is highway infrastructure and $ 225 million is attributed to railway infrastructure. Listed below in Table 8.10 are definitions of the transportation systems. No airports, ports, or light rail infrastructure have been built in Roseville.

TABLE 8.10.
TRANSPORTATION SYSTEM DOLLAR EXPOSURE (THOUSANDS)

Segments	Roadway - Roseville	Highway- CalTrans	Railway— Union Pacific
Bridges & Interchanges	—	$77,000	—
Tunnels	—	$22,000	—
Roadways/Facilities	$153,557	$105,000	—
Total	**$153,557**	**$204,000**	**$225,000**

Sources: Roseville Finance Department (2005): California Department of Transportation (2005) and Union Pacific Railroad (2005)

Utility Systems

Utility systems in Roseville include potable water, wastewater, oil, natural gas, electric power, and communication systems. These systems are defined below in Table 8.11. The utility system dollar exposure for the area is estimated at $404.85 million.

TABLE 8.11.
UTILITY SYSTEM DOLLAR EXPOSURE (THOUSANDS)

	Facilities (treatment plants, pumping stations, substations)	Distribution (pipelines)	**Total**
Electric Utilities	$40,000	$690,000	**$730,000**
Potable Water	$55,698	$497,882	**$553,580**
Wastewater	$199,632	$405,603	**$605,235**
Natural Gas—Kinder Morgan*	Did not separate values	Did not separate values	**$200,000**
Communications—SureWest, Comcast	—	$17,957 – Comcast $185,000 – Sure-West	**$202.957**
Total	**$295,330**	**$1,796,442**	**$2,091,772**

Sources: Roseville Electric (2005), Roseville Environmental Utilities (2005), Comcast (2005), SureWest Communications (2005), *Pacific Gas & Electric did not provide facility valuation data despite repeated requests by the Roseville City Manager's Office.

Economic Impact

To determine the degree of damage to the City of Roseville from an earthquake, three probabilistic scenarios were run for different return periods: 100-year, 500-year, and 2,500-year, representing the 50 percent per 50-year, 10 percent per 50-year and 2 percent per 50-year probabilities of exceedance. For HAZUS-MH ground failure estimates, the magnitude in all cases was set at 7.0. These scenarios were chosen to provide a range of potential earthquake loss estimates because smaller, more frequent (100-year) earthquakes may cause less, but more frequent damage, while larger (2,500-year) earthquakes occur much less frequently, but could cause devastating damage to the community.

Because Roseville is in an area of moderate seismicity, there is not much difference between the level of shaking and potential damage that can occur in the 500-year and 2,500-year earthquakes. Tables 8.12, 8.13, 8.14, and 8.15 below display the level of damage by land use and construction type. Under each damage category, the number of buildings affected is displayed in the count column. The percent column displays the percent of the buildings in the land use or construction type category of the total number of buildings in the damage category. For example, in Table 8.12, 7,986 single-family structures would receive slight damage in a 500-year event. The 7,986 structures amount to 94.66 percent of the total structures to receive slight damage.

For these return periods, it is estimated that approximately 2,418 buildings (2,205+180+33) in the regions will be at least moderately damaged. This is approximately 7 percent of the total number of buildings in the Roseville area. Of the 33 buildings expected to be completely destroyed, 22 are expected to be single-family residences and two are expected to be commercial buildings. Of those buildings that would incur moderate damage, 1,849 (83 percent) will be single-family residences and 285 will be multi-family residences (13 percent).

In terms of building type, wood structures are likely to experience the most damage followed by manufactured homes. It is estimated that approximately 1,983 wood buildings (1,890+71+22) will incur at least moderate damage during an earthquake.

For the 100-year return period, it is estimated that approximately 654 buildings (617+31+6) in the regions will be at least moderately damaged. This is approximately 2 percent of the total number of buildings in

the Roseville area. Approximately six buildings, of which five are single-family residences and one is another type of residential structure, will be completely destroyed.

TABLE 8.12.
DEGREE OF DAMAGE BY LAND USE (500-YEAR)

	None		Slight		Moderate		Extensive		Complete	
	Count	% of Total	Count	% of Total	Count	% of Total	Count	% of Total	Count	% of Total
Agriculture	0	0	0	0	0	0	0	0	0	0
Commercial	197	0.81	78	0.92	64	2.88	17	9.26	3	7.38
Education	0	0	0	0	0	0	0	0	0	0
Government	3	0.01	0	0	0	0	0	0	0	0.02
Industrial	12	0.05	5	.06	5	0.22	2	0.83	0	0.75
Other Residential	821	3.37	365	4.33	285	12.92	84	46.88	8	25.1
Religion	4	0.02	3	0.02	2	0.06	0	0	0	0.19
Single Family	23,311	95.74	7,986	94.66	1,849	83.92	77	42.78	22	66.56
Total	**24,348**		**8,437**		**2,205**		**180**		**33**	

Notes:
Totals may not add correctly due to rounding.

TABLE 8.13.
DEGREE OF DAMAGE BY BUILDING TYPE (500-YEAR)

	None		Slight		Moderate		Extensive		Complete	
	Count	% of Total	Count	% of Total	Count	% of Total	Count	% of Total	Count	% of Total
Concrete	57	0.23	2	0.03	3	0.12	1	0.32	0	0
Manufactured Homes	382	1.57	225	2.67	235	10.62	75	41.37	8	21.52
Precast	31	0.09	9	0.1	9	0.37	3	1.21	0	0
Reinforced Masonry	331	1.36	68	0.84	56	2.52	13	7.23	1	1.2
Steel	57	0.23	5	0.05	5	0.22	2	1	0	0
Unreinforced Masonry	20	0.08	10	0.11	7	0.3	2	1	1	1.2
Wood	23,420	96.19	8,079	95.4	1,890	83.37	71	39.14	22	66.91
Total	**24,348**		**8,437**		**2,205**		**180**		**33**	

Notes:
Totals may not add correctly due to rounding.

In terms of building type, wood structures are likely to experience the most damage, followed by manufactured homes. It is estimated that approximately 510 wood buildings will incur at least moderate damage during an earthquake.

In terms of building uses, over 66 percent of the buildings that are expected to incur complete damage are single-family dwellings and 25 percent are multi-family dwellings.

TABLE 8.14.
DEGREE OF DAMAGE BY LAND USE (100-YEAR)

	None		Slight		Moderate		Extensive		Complete	
	Count	% of Total	Count	% of Total	Count	% of Total	Count	% of Total	Count	% of Total
Agriculture	0	0	0	0	0	0	0	0	0	0
Commercial	291	0.95	43	1.1	22	3.49	3	10.04	0	0
Education	0	0	0	0	0	0	0	0	0	0
Government	3	0.01	0	0	0	0	0	0	0	0
Industrial	18	0.06	3	0.08	2	0.31	0	0	0	0
Other Residential	1,280	4.18	175	4.44	94	15.26	15	47.57	1	12.68
Religion	6	0.02	1	0.03	0	0	0	0	0	0
Single Family	29,014	94.78	3,715	94.35	499	80.85	13	41	5	81.66
Total	**30,612**		**3,937**		**617**		**31**		**6**	

Notes:
Totals may not add correctly due to rounding.

TABLE 8.15.
DEGREE OF DAMAGE BY BUILDING TYPE (100-YEAR)

	None		Slight		Moderate		Extensive		Complete	
	Count	% of Total	Count	% of Total	Count	% of Total	Count	% of Total	Count	% of Total
Concrete	88	0.03	1	0.04	1	0.14	0	0	0	0
Manufactured Homes	719	2.35	111	2.81	81	12.75	13	42.08	1	10.07
Precast	44	0.1	6	0.14	4	0.55	1	1.81	0	0
Reinforced Masonry	410	1.34	34	0.86	20	3.24	3	9.41	0	0
Steel	92	0.30	3	0.07	2	0.34	1	1.31	0	0
Unreinforced Masonry	28	0.09	6	0.14	3	0.44	1	1.72	0	1.55
Wood	29,218	95.23	3,740	94.99	494	79.74	11	35.5	5	82.4
Total	**30,612**		**3,937**		**617**		**31**		**6**	

Notes:
Totals may not add correctly due to rounding.

Impact of Earthquake on Future Trends in Development

Roseville is expected to grow considerably in the next 10 years. Total population with the recently annexed West Roseville Specific Plan will exceed 138,000 people with another 8,000 housing units planned for this area alone. Significant non-residential development will occur as well with development of a high-rise hotel and office buildings likely in the near future. The moderate potential for earthquake in Roseville is not likely to lessen or prohibit development in Roseville.

The City's development departments will strictly enforce all seismic building codes and design standards to prevent loss of life and property due to earthquake. Public education, cooperation with the development

community, and individual preparedness are essential as Roseville welcomes thousands of new residents and hundreds of new businesses to the city each year.

8.4 REVIEW OF EXISTING ORDINANCES, PROGRAMS, AND PLANS

8.4.1 Uniform Building Codes

The State of California provides minimum standards for structural design and site development through the California Building Standards Code (California Code of Regulations [CCR], Title 24). The California Building Code (CBC) is based on the UBC, which is widely used throughout the United States and has been modified for California conditions with numerous more detailed and stringent regulations.

Chapter 18 of the UBC/CBC regulates the excavation of foundations and retaining walls, and Appendix 33 regulates grading activities, including drainage and erosion control, and construction on expansive soils. The State Earthquake Protection Law (California Health and Safety Code 19100 et seq.) requires that structures be designed to resist stresses produced by lateral forces caused by wind and earthquakes. Specific minimum seismic safety and structural design requirements are set forth in Chapter 16 of the UBC/CBC. The UBC/CBC requires a site-specific geotechnical study to address seismic issues and identifies seismic factors that must be considered in structural design.

The following Uniform Codes have been adopted in Chapter 16 of the Roseville Zoning Ordinance to ensure that buildings are designed and sited properly to protect against seismic and unstable soil conditions: UBC (1998), Uniform Plumbing Code (1998), Uniform Housing Code (1998), and the Uniform Mechanical Code (1998).

To reduce the risk of seismic-related safety hazards and structural damage (to pipelines, roads, and residential homes) from ground shaking to an acceptable level, the City of Roseville conditions of approval for development projects require that at the time of tentative map approval, construction is in accordance with the UBC and local building standards, as administered by the Roseville Building Division. Regular monitoring and enforcement of the UBC requirements regarding seismic and geologic safety by the City of Roseville through the building permit and plan check process ensures that new development and construction meet all seismic and geologic safety standards, ultimately protecting the public by reducing the risk of building damage or collapse.

8.4.2 Improvement Standards

The City of Roseville Improvement Standards require the development of a grading plan, an erosion and sedimentation control plan, and mitigation monitoring requirements to reduce the exposure of people and structures to seismic hazards.

8.4.3 Geotechnical Studies

The City of Roseville requires the preparation of site-specific geotechnical studies as part of the building permit process. The technical information that must be compiled for these studies, which address both seismic hazards and soil conditions, is specified in Chapters 16 and 18 of the UBC. Implementation of the recommendations within the site-specific geotechnical evaluation ensures that impacts associated with the exposure of people and structures to seismic hazards, development of structures on expansive soils, grading activities increasing slope instability, and increased erosion along stream channels and soil erosion from grading are minimized. The studies provide grading and design recommendations to address potential slope and foundation instability, stream bank protection, and slope evaluation as well an evaluation of expansive soils and differential settlement.

8.5 REVIEW OF MITIGATION ALTERNATIVES

After assessing the vulnerabilities to this hazard through the risk assessment process, the Planning Team and Steering Committee have determined the probable impacts on the City of Roseville from this type of hazard event to be very low due to the low probability of occurrence. Therefore the time and effort allocated to the review of possible mitigation alternatives for this hazard was kept to a minimum. The list of possible mitigation measures considered for this hazard can be found in the catalog of mitigation measures for the landslide hazard in Chapter 17 of Part 4 of this plan.

CHAPTER 9.
FLOOD RISK ASSESSMENT

9.1 IDENTIFYING HAZARDS—DESCRIPTION OF THE FLOOD HAZARD

Under Title 44 of the *Code of Federal Regulations* (44 CFR), Section 201.6(c)(2)(i) of the DMA, local mitigation plans are required to include a risk assessment describing the types of natural hazards that could affect the jurisdiction. This section identifies risks faced by the City of Roseville from the flood hazard.

9.1.1 Flood Hazard Assessment

Cirby Creek at Tina Way, January 1995

The City of Roseville is located within portions of two major drainage basins: the Pleasant Grove Creek Basin and the Dry Creek Basin. Pleasant Grove Creek and its tributaries drain most of the western and central areas of the City, and the Dry Creek Basin and its tributaries drain the rest of the City. The Dry Creek system has year-round flow in its major watercourses, and the Pleasant Grove system is intermittent, with only seasonal flow. As a result, portions of the City lie within a flood hazard area. However, since 1950, there have been no reports of structural flood damage along Pleasant Grove Creek and presently, no structures within the Pleasant Grove Creek Basin are subject to flooding due to the City's floodplain management policies. Therefore the focus of the flood problem is the Dry Creek Basin. Seven creeks and streams that drain the 80-square-mile Upper Dry Creek Basin pass through and join within the city limits of Roseville.

Upstream flows generated within Placer County enter Roseville's creeks and tributaries from the east and north. Picking up additional storm water runoff, the creek systems flow west-southwest through Roseville. These flows continue to move west-southwest, draining through Placer, Sacramento, and Sutter Counties to their ultimate destination, the Sacramento and American Rivers.

In Roseville, two types of flooding typically occur: flash flooding and riverine flooding. Flash floods, as the name suggests, occur suddenly after a brief but intense and concentrated downpour. They move fast, terminate quickly, and can occur in areas generally not associated with flooding (such as subdivisions not adjacent to a water body and areas serviced by underground drainage systems). Although the duration of these events is usually brief, the damage they cause can be quite severe.

Riverine floods are described in terms of their extent (including the horizontal area affected and the vertical depth of floodwater) and the related probability of occurrence. Flood studies use historical records to determine the probability of occurrence for different extents of flooding. The probability of occurrence is expressed as the percentage chance that a flood of a specific extent will occur in any given year. However, flash floods cannot be predicted accurately and happen whenever there are heavy storms.

Flooding within Roseville is associated with storm water runoff exceeding creek and storm drainage capacities. As a result, flooding in the City is generally confined to limited areas of low elevation adjacent

to creek systems, and low elevation topographical depressions with little or no drainage outlet. In addition to localized flooding, dam failure could result in significant flooding within the southern portion of Roseville if the western levees on Folsom Dam fail. This scenario would impact Linda Creek and eventually the entire Dry Creek watershed. It should be noted that for this scenario to occur, Folsom Lake would have to be at a maximum containment level with no release, and there would have to be a complete and instantaneous failure of the western levee systems. Although the probability of this scenario occurring is low, a detailed scenario based on dam failure analysis is needed to determine true vulnerability to this risk. The Bureau of Reclamation has mapped inundation areas for dam failure and developed a response plan if this situation occurs. This plan recommends inclusion of a dam failure element in the City of Roseville's emergency response plan once true vulnerability to this risk can be determined.

Regulatory Floodplain is an area regulated by the City of Roseville as a floodplain through land-use regulations and improvement standards. Floodplains include (1) areas identified by FEMA and published on Flood Insurance Rate Maps (FIRM) and (2) areas identified by Roseville as being susceptible to flooding. These areas include the Nolte Future Floodplain.

Based on a detailed modeling approach, the City of Roseville has identified a regulatory floodplain that exceeds the special flood hazard area (SFHA) mapped by FEMA. Figure 9.1 shows the regulatory area authorized by the Roseville City Code to which the Roseville general plan safety element will be applied. A regulatory floodplain is defined by the City of Roseville as an area susceptible to risk from flooding based on City-approved studies. These areas are based on detailed hydrologic and hydraulic floodplain modeling that meets or exceeds FEMA criteria for mapping and modeling floodplains. The flood event used to delineate these boundaries will hereafter be referred to as "the regulatory flood" to differentiate it from the "base flood" used by FEMA.

Nolte Future Floodplain is a portion of the regulatory floodplain based on the City of Roseville floodplain analysis published by Nolte and Associates in August 1986. This analysis used hydrology that represented observed flooding scenarios in Roseville. The study also used hydrology based on projected growth for the region instead of existing conditions used by FEMA. This approach generated a floodplain area greater than that on the FIRM for portions of Roseville. Although this study was never formally adopted, it is used by the City as the best available information for regulatory and land-use programs such as the specific plan program and improvement standards.

The City of Roseville shall designate the regulatory floodplain area on a land-use map authorized by the general plan in accordance with the best available floodplain information as determined by the Public Works Director. In many portions of the City, the Nolte Future Floodplain has been used to designate floodplain boundaries. The Nolte Future Floodplain defines floodway and floodway fringe boundaries within the floodplain. The floodway fringe is an area along the boundary of the floodplain that, if totally obstructed, would not result in more than a 1-foot rise in the water surface elevation. The floodway constitutes the remainder of the floodplain area and is typically where floodwaters have the most velocity.

9.1.2 Degree of Flooding

Table 9.1 shows observed flooding characteristics for the Pleasant Grove and Dry Creek watersheds. The parameters listed include velocity, flow rate, base flood elevation (BFE), depth of flooding (DOF), and warning time. This table represents the range of observed measurements based on conditions during past flood events. The higher velocities cited in this table were observed in the channel, and the lower velocities were observed in the over-bank area. Also, it is the City's policy to strive for 3 hours advance warning time based on its flood threat recognition system capability.

Depth of Flooding (DOF) is the difference between the BFE or regulatory flood elevation (RFE) and the elevation of the lowest grade adjacent to a structure.

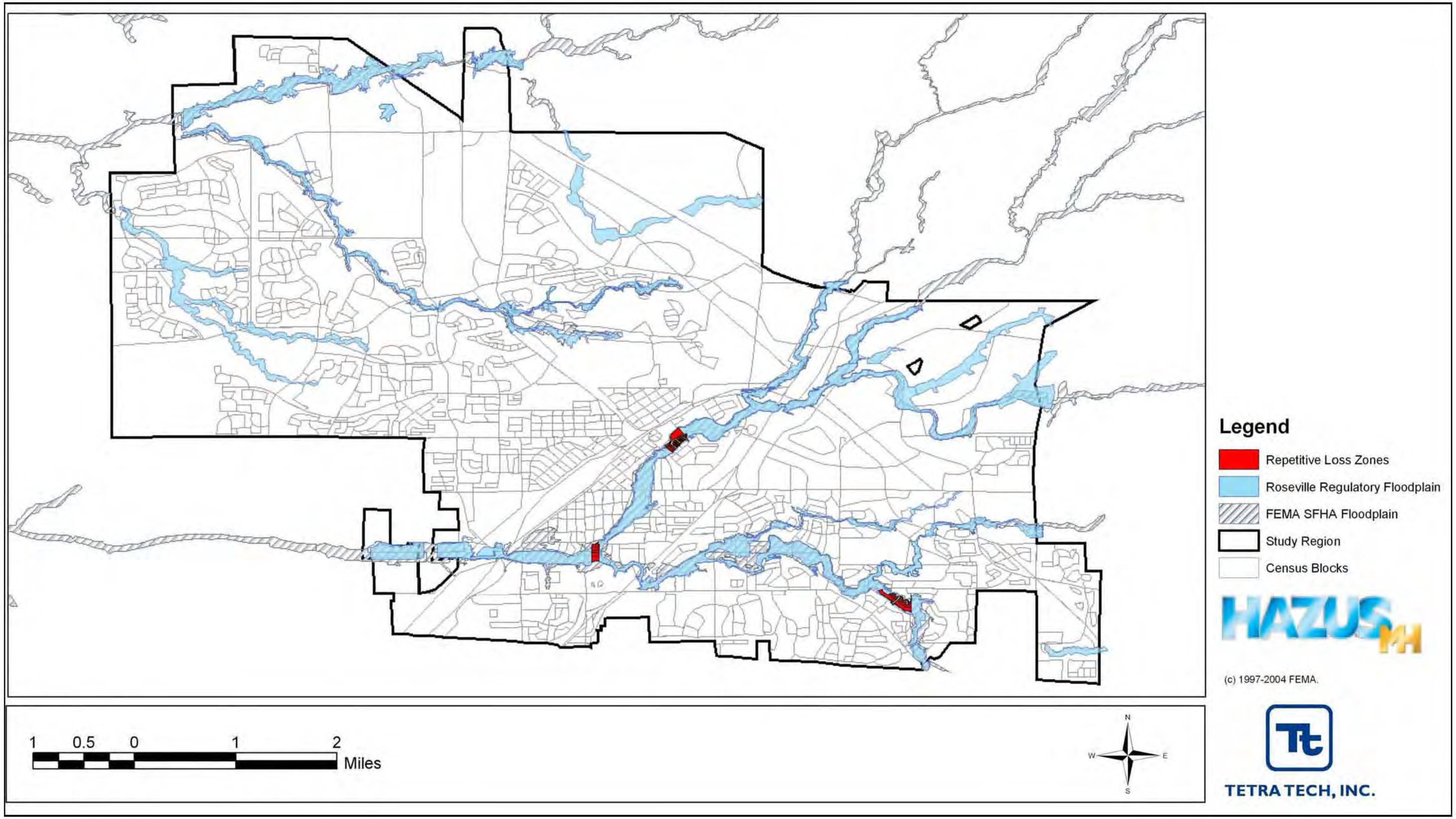


Figure 9 -1 Comparison of FEMA SFHA and Roseville Regulatory Floodplains

TABLE 9.1
OBSERVED CHARACTERISTICS OF FLOODING

Parameter	Pleasant Grove Creek Watershed	Dry Creek Watershed
Approximate Base Flood Velocity	0.5 to 8.0 ft/s	2.0 to 14.0 ft/s
Flow Rate	1,100 to 5,000 cfs	900 to 15,000 cfs
BFE	Downstream limit = 89.7 feet NGVD Upstream limit = 150.0 feet NGVD	Downstream limit = 79.7 feet NGVD Upstream limit = 210.0 feet NGVD
Approximate DOF (Overbank Area)	0 to 2 feet (above existing grade)	0 to 3 feet (above existing grade)
Approximate Warning Time	3 hours	3 hours

Notes:
Cubic feet per second (cfs) is the common measurement for discharge or river flow. One cubic foot is about 7.5 gallons.
Feet per second (ft/s) is the common measurement for the velocity of a flowing body of water.
NGVD = National Geodetic Vertical Datum

The probability of a flood is based on a statistical chance of a particular sized flood (expressed as cfs of water flow) occurring in any given year. The annual flood is usually considered the single greatest event expected to occur in any given year. Flood studies use historical records to determine the probability of occurrence for the different extents of flooding. The probability of occurrence is expressed as the percentage chance that a flood of a specific extent will occur in any given year. The extent of flooding associated with a 1 percent annual probability of occurrence (that is, the base flood) is used as the regulatory boundary by a number of agencies. Also referred to as the SFHA, this regulatory boundary is a convenient tool for assessing vulnerability and risk in flood-prone communities because many communities have maps that show the extent of the base flood and the likely DOF. The base flood is often referred to as the "100-year flood."

Special Flood Hazard Area (SFHA) is the base floodplain delineated on a FIRM. The SFHA is mapped as Zone A in riverine areas and Zone V in coastal areas. The SFHA may or may not encompass all of a community's flood problems.

The frequency and severity of flooding are measured using a discharge probability, which is a statistical tool used to define the probability that a certain discharge level will be equaled or exceeded within a given year. The discharge level is the volume of water that will flow into a stream or river and over its banks during a given time. The discharge probability equals 100 divided by the flood frequency. For example, the 100-year discharge has a 1 percent chance of being equaled or exceeded in any given year.

The BFE is also computed using discharge probabilities. The corresponding water-surface elevations describe the exact elevation of water that will result from a given discharge level, which is one of the most important factors used in estimating the potential flood damage in a given area.

Base Flood Elevation (BFE) is the elevation of a 100-year flood event, a flood that has a 1 percent chance of occurring in any given year as defined by the National Flood Insurance Program (NFIP).

9.1.3 The National Flood Insurance Program and the City of Roseville

In 1968, Congress created the National Flood Insurance Program (NFIP) in response to the rising cost of taxpayer-funded disaster relief for flood victims and the increasing damages caused by floods. The NFIP

makes federally backed flood insurance available to homeowners, renters, and business owners in communities participating in the program. For most communities participating in NFIP, FEMA has prepared detailed flood insurance studies that present water surface elevations for floods of various magnitudes, including (1) a flood that has a 1 percent probability of being equaled or exceeded in any given year (also called the "100-year" or "base" flood), and (2) a flood that has a 0.2 percent probability of being equaled or exceeded in any given year (also called the "500-year flood"). The water surface elevation of the 100-year flood event is called the BFE. BFEs and the boundaries of the 100- and 500-year floodplains are shown on the participating community's FIRM.

> ***Flood Insurance Rate Map (FIRM)*** is an official map of a community on which the Federal Insurance and Mitigation Administration has delineated the SFHA and the risk premium zones applicable to the community. Most FIRMs include detailed floodplain mapping of some or all community floodplains.

Roseville entered the regular phase of the NFIP on December 15, 1983. The current effective FIRM date is November 21, 2001. As a participant in the NFIP, the City must, at a minimum, regulate development in its floodplain areas in accordance with NFIP criteria. Before a permit to build in a floodplain area is issued, the City must ensure that two basic criteria are met:

- All new buildings and developments undergoing substantial improvements must, at a minimum, be elevated to protect against damage by the 100-year flood, and
- New floodplain developments must not aggravate existing flood problems or increase damage to other properties.

Structures permitted or built in the City before the NFIP regulatory requirements were incorporated into the City's ordinances (before the effective date of the City's FIRM) are called "pre-FIRM" structures. For the City of Roseville, per-FIRM structures were permitted or built before December 15, 1983.

9.1.4 The Community Rating System

The Community Rating System (CRS) is a voluntary incentive program that is part of the NFIP. The CRS recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements (FEMA 2002). As a result, flood insurance premium rates are discounted to reflect the reduced flood risk resulting from community actions meeting the following three goals of the CRS:

- Reduce flood losses
- Facilitate accurate insurance rating
- Promote awareness of flood insurance

For communities participating in the CRS, flood insurance premium rates are discounted in increments of 5 percent. For example, a Class 1 community would receive a 45 percent premium discount, and a Class 9 community would receive a 5 percent discount. (A Class 10 community does not participate in the CRS and receives no discount.) The CRS classes for local communities are based on 18 creditable activities organized under the following four categories:

- Public Information
- Mapping and Regulations
- Flood Damage Reduction
- Flood Preparedness

Currently, 1,006 communities receive flood insurance premium discounts based on implementation of local mitigation, outreach, and educational activities that go well beyond minimum NFIP requirements.

Although insurance premium discounts are one benefit of participation in the CRS, more important benefits result from activities that save lives and reduce property damage. Communities participating in the CRS represent a significant portion of the nation's flood risk as evidenced by the fact that over 66 percent of the NFIP's policy base is located in these communities. Communities receiving premium discounts through the CRS range from small to large and represent a broad mixture of flood risks, including both coastal and riverine flood risks.

The City of Roseville began its official participation in the CRS program in 1991 and achieved its current CRS rating of Class 5 on October 1, 2002. This classification provides flood insurance policy holders in Roseville up to a 25 percent reduction in flood insurance premiums and represents an annual savings of approximately $33,785 in flood insurance premiums. As one of the premier floodplain management communities in the country, Roseville has long supported the concept of the CRS program as evidenced by its participation as a pilot-test community during CRS development in the late 1980s. Figure 9.2 shows the number of CRS communities by class as of May 1, 2004.

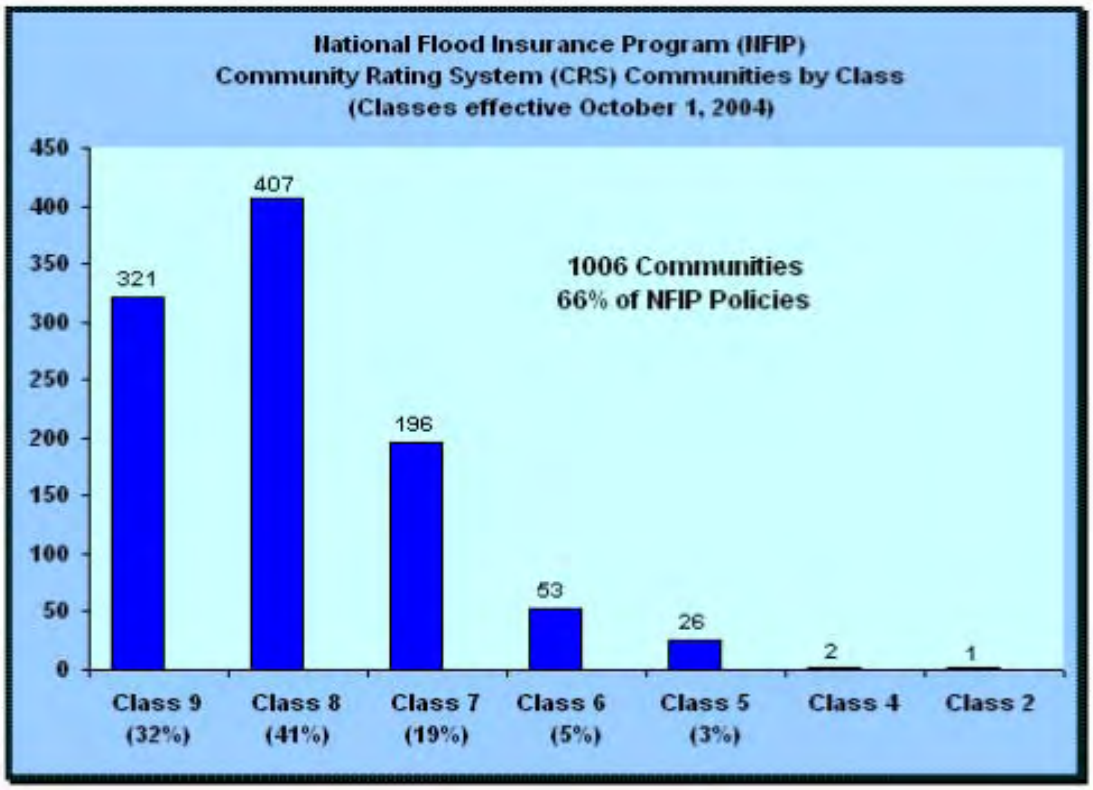


Figure 9.2 CRS Communities by Class

9.2 FLOOD HAZARD PROFILE

Under 44 CFR, Section 201.6(c)(2)(i) of the DMA, risk assessments are required to include a description of the location and extent of hazards that can affect the jurisdiction. This section includes information on flood location and extent, previous flood occurrences in the City of Roseville, and the probability of future flood occurrences.

9.2.1 Flood Location and Extent

Floods along Dry, Antelope, Cirby, and Linda Creeks have been recorded from the 1930s to the present time. Correspondence between the U.S. Army Corps of Engineers and the City of Roseville dating back to the 1930s indicated a need for establishing flood control measures along Dry, Cirby, and Linda Creeks. Recent flooding resulting in property damage has occurred about every 3 to 5 years since 1950, except for the period from 1973 to 1981, when no significant flooding occurred. Until recently, the largest flood on record occurred in February 1986. This flood caused substantial property damage and was considered to be a 70- to 100-year event, depending on location. However, in January 1995, the City was subject to flooding that exceeded the 1986 flood event in most streams in Roseville, and that flood is now considered to be the flood of record.

Additional details related to the location and extent of flooding in Roseville are provided below. Figure 9.1 shows Roseville's regulatory floodplain.

9.2.2 Previous Occurrences—Roseville's Flood History

Based on data from the National Climactic Data Center and the University of South Carolina's Spatial Hazard Events and Losses Database for the United States, 10 major flood events were reported in Placer County between January 1950 and December 2003, with an estimated $37,329,746 in property damage. Table 9.2 shows the estimated damage from flooding in Roseville from 1973 to 2003.

TABLE 9.2
REPORTED DAMAGE FROM MAJOR FLOODING
IN ROSEVILLE (1973 TO 2003)

Date	Hazard Type	Reported Damage*
January 1973	Flooding, Severe Storm, Thunderstorm	$86,207
March 1983	Flooding	Not Available
February 1986	Flooding	$5,000,000 (Roseville only)
January 1995	Flooding	$8,000,000 Total ($4.4 million structural)
January 1997	Flooding	$43,600 (structural)
February 1998	Flooding	$20,000 (structural)
Total		**$13,149,807.00**

*Values not adjusted for inflation

No damages caused by flooding have reported since 1998. Significant flood events impacting the City of Roseville are discussed below with respect to damages, frequency, and whether or not injuries or fatalities were associated with the event. Although no injuries or fatalities may have been reported for a given event, unreported injury or illness could be associated with each event.

In addition to the events discussed below, flooding has occurred during numerous other storms in 1950, 1952, and 1963. However, little information is available to define the extent of flooding and the impacts of these events.

December 1955

Flooding occurred primarily along Dry Creek. Homes in the Douglas Boulevard area were surrounded by floodwater, and one family was evacuated. Douglas Boulevard was impassable, and pavement was damaged. Royer Park was also inundated, with floodwater extending across Park Drive. No reported injuries or fatalities were associated with this flood event.

April 1958

This flood was the second largest event on record at the time. Flood conditions were most severe on Sunrise Avenue in the southeast portion of the City, on Douglas Boulevard, in the Royer Park area, and on Riverside Avenue at Dry Creek. Agricultural damage occurred along Dry Creek immediately west of the City. Many homes and businesses were surrounded by floodwater at the peak of the flood. Several families were evacuated by boat from homes in the Columbia Street and Douglas Boulevard areas. As in the past, Royer Park became inundated, and floodwater covered the ball field and extended across Park Drive. Part of the sewage treatment plant was flooded, but the plant remained operational throughout the flood, which continued for at least 12 hours. No reported injuries or fatalities were associated with this flood event.

October 1962

This flood event was considered the flood of record at the time. Over 9 inches of rain fell during the storm. Creeks overflowed their banks throughout the City, but the areas most severely affected were along Linda Creek in the Sierra Gardens Subdivision and along Dry Creek. A number of families were evacuated from their homes on Lee Way and Douglas Boulevard. Royer Park was completely inundated for a time, and one deer in the zoo was drowned before animals could be evacuated. Other flood losses in the park included bank erosion, destruction of fencing, damage to one of the footbridges, and damage to the recreation building and the park office. Restoration of the park required 2 weeks. Water mains were damaged by flood flows in the Cresthaven and Atlantic Street areas. The Dry Creek Bridge on Riverside Avenue and the Antelope Creek Bridge on Atlantic Street were also damaged. No reported injuries or fatalities were associated with this flood event.

December 1964

During this flood event, the fire and police departments evacuated four families when floodwater from Linda Creek surrounded their homes on Champion Oaks Drive and Lee Way. Dry Creek overflowed its banks in several locations, and flood-borne debris was removed during a fight to keep the stream flowing at Booth Road and the Southern Pacific railroad tracks. Floodwater at this location was deep enough to submerge a car stalled in the underpass. Stream-bank erosion occurred along the east bank of Dry Creek behind the Campfire Girls lodge on Sutter Avenue. No reported injuries or fatalities were associated with this flood event.

January 1969

During a series of downpours beginning on January 16, 1969, flooding occurred in Roseville along Dry Creek, affecting Royer Park, the Champion Oaks area, and the intersection of Cirby Way and Old Auburn Road. Five homes were nearly evacuated on January 20 along Champion Oaks Drive after rising water from Linda Creek crested at the doorsteps of the homes at 1:00 a.m. before receding at 3:00 a.m. City crews stood watch prepared to load belongings into vehicles if flood water entered the homes.

A second severe storm during the week of January 25, 1969 swept through Placer County, downing trees and causing a brief power outage. Rising water in Linda Creek caused the evacuation of five homes on Champion Oaks Drive on January 25 and 26. Dry Creek Bridge on Douglas Boulevard at Royer Park was closed on January 25 for the second time in 5 days when swelling water in Dry Creek washed out the fill placed by City crews when the street gave way the week before. No reported injuries or fatalities were associated with the January 1969 flood events.

January 1970

Heavy rains and severe winds in mid-January caused flood conditions in Roseville and throughout northern California. High water levels were reported on Champion Oaks Way, Subway Road, and Royer Park. No reported injuries or fatalities were associated with this flood event.

January 1973

Heavy rain and high winds impacted northern California to the Oregon border during the week of January 16, 1973. City crews kept watch on Linda Creek at Champion Oaks Drive and closed Subway Road because of flooding from January 16 through 18. Royer Park flooded after Dry Creek overflowed its banks. No reported major problems, fatalities, or injuries were associated with this flood event.

March 1983

This flood event damaged approximately 25 residences along Linda and Cirby Creeks. Portions of Royer Park were under water as well as areas in the Sierra Lakes Mobile Home Park. Dry Creek overflowed the Darling Way and Riverside Avenue bridges, disrupting traffic and flooding six businesses along Riverside Avenue. No reported fatalities or injuries were associated with this flood event.

February 1986

This flood event caused widespread damage in most of the Dry Creek watershed. Nearly all bridges and culverts were overtopped, with 30 sustaining embankment damage. In addition, the crossing at Rocky Ridge Drive washed out. Two bridges over Dry Creek were damaged, and street cave-ins occurred at a number of locations. Approximately 209 homes along Dry, Linda, and Cirby Creeks reported flood damage, with water levels up to 5 feet above finished floor levels. The Roseville City Library was temporarily closed due to flooding, and floodwaters reached the foundation of the Public Safety Building but did not cause any damage. One reported fatality was associated with this flood event.

January 1995

This flood event exceeded the flood event of 1986 on Cirby and Linda Creeks. This event is now considered the flood of record for Dry Creek based on flood heights. The flood was calculated to be the 100-year flood event. This flood event resulted in 358 structures in the Dry Creek Basin being inundated by floodwaters. No reported injuries or fatalities were associated with this flood event.

Dry Creek Flooding, January 1995

January 1997

The flood events of 1997 were some of the most severe on record for the region as far as rainfall and observed stream flows. An isolated storm event typical for the Roseville area occurred on soils saturated from repetitive storm events, causing a flash flood. This flooding resulted in 21 structures being inundated with floodwater. The impact of this event was significantly reduced by a partially completed Cirby, Linda, and Dry Creek flood control project. No reported injuries or fatalities were associated with this flood event.

Riverside Flooding, February 1998

February 1998

A small flood occurred on February 3, 1998, resulting in eight structures being inundated by floodwater in the Dry Creek Basin. Once again, this event was caused by an isolated storm event centered over the watershed. No reported injuries or fatalities were associated with this flood event.

9.2.3 Probability of Future Flooding

Chapter 15 of this plan ranks risks pertaining to the City of Roseville. One of the parameters in establishing this ranking is probability of occurrence. The following thresholds have been established by the RHMP steering committee to rank the probability of occurrence:

- **High:** Event likely to occur within 25 years
- **Medium:** Event likely to occur within 100 years
- **Low:** Event not likely to occur within 100 years

Based on historical records of occurrence and the thresholds above, the probability of occurrence for flooding in Roseville is considered high.

9.3 VULNERABILITY ASSESSMENT

Under 44 CFR, Section 201.6(c)(2)(ii) of the DMA, risk assessments are required to include a description of the jurisdiction's vulnerability to specified hazards and their potential impact on the community. This description should also describe the community's vulnerability in terms of the types and numbers of existing and future buildings, infrastructure, and critical facilities located in the floodplain hazard area; estimated potential dollar losses for vulnerable structures; and an analysis of development trends. The flood vulnerability assessment for Roseville is discussed below.

9.3.1 Overview of Vulnerability—The Flood Problem

Flooding in Roseville can be associated with storm water runoff exceeding creek and storm drainage capacities. A similar link can be identified for all flood events that have impacted the City of Roseville. Because of the City's geographical location in the watershed, flooding the City of Roseville is typically caused by isolated, high-intensity storms of relatively short duration (1 to 3 hours) that concentrate along a stream reach on already saturated soil. These storms are often referred to as "convection storms" and typically generate runoff that exceeds the capacity of storm water conveyance systems.

Based on Roseville's flood history, the flood scenario is similar to that experienced by most communities. Development exists in low-lying areas adjacent to creek or stream systems needed to convey over-bank flooding that can occur during storm events. In Roseville's case, this development occurred because the science and information available at the time of development did not accurately project flood heights that could occur from rainfall events typical for the region. Development therefore occurred in areas needed for stormwater conveyance with insufficient levels of flood protection. Recognizing this fact, the City decided to model flooding within Roseville using the best available hydrologic and hydraulic science to better reflect the actual rainfall events that could impact the City. The results of this study generated a much more applicable projection of flood heights and areas of inundation that were well supported by observed conditions during the 1986 flood events. The City has since used this information to create and enhance its floodplain management program to minimize flood risk to all new developments.

The focus of the flood problem is therefore centered on existing development that occurred prior to 1986. As stated in Section 9.1.1 above, two basins drain the City of Roseville: Pleasant Grove Creek Basin and Dry Creek Basin. No reports of structural flood damage along Pleasant Grove Creek have been reported since 1950. No structures are subject to flooding within the Pleasant Grove Creek Basin resulting from floodplain management policies adhered to by the City of Roseville. Therefore, the focus of the flood problem is the Dry Creek Basin.

Three primary creeks impact the City of Roseville in the Dry Creek Basin: Cirby, Dry, and Linda Creeks. The City of Roseville has recently completed five phases of a seven-phase structural mitigation project called the "Cirby-Linda-Dry Creek Flood Control Project." The purpose of this project is to reduce storm water back-up at constrictions and increase the overall capacity of the floodplain during storm conditions. This project was designed to provide 1 foot of freeboard above the projected 500-year flood elevation where elements of the project were in place. This project significantly reduced the flood risk exposure for this area. However, this project did not mitigate 100 percent of the exposure to flooding within the basin. Therefore, a flood risk exposure still exists within this basin, although it is measurably less than exposure prior to construction the flood control project.

Like every city, localized flooding not associated with creek or stream bank overflow occurs to some degree in Roseville. This type of flooding occurs when rainfall and runoff volumes exceed the design capacity of drainage facilities or when there are no drainage facilities to control flows. The City of Roseville has attempted to address this type of flooding with regulations that require an "overland release" of storm water generated at a site to a recognized storm water facility. The City also requires mitigation of the increase in runoff generated from new development. However, some developments and facilities in the City were put in place prior to the effective dates of the policies summarized above. These areas could be subject to flooding from the same events that cause flooding on the creeks and streams within Roseville.

This section evaluates the potential impact of flooding on Roseville with respect to the following:

- Impact on life, safety, and health of Roseville residents
- Impact on critical facilities
- Impact on existing structures at risk
- Natural and beneficial floodplain functions
- Economic impact
- Repetitive losses
- Impact of flooding and floodplain management on development and redevelopment trends

9.3.2 Impact on Life, Safety, and Health

Although one flood-related fatality in Roseville has been recorded, the flood hazard is not generally considered to pose a serious risk to life in this area. However, flooding can be a deadly hazard. Roads running through low-lying areas prone to sudden and frequent flooding are a serious threat. Motorists often attempt to drive through barricaded or flooded roadways. Because only 18 to 24 inches of water moving across a roadway can carry away most vehicles, floods can present significant potential safety risks. The second largest potential for injuries from flooding results from people walking or playing in or near flooded areas. Generally, floods kill people in one of two situations: when people ignore basic safety precautions (such as evacuations and warnings), and when a flash flood hits an area with no warning. It is possible to analyze life and safety impacts resulting from the flood hazard. However, injuries and casualties are typically negligible for this hazard because of the typical warning times associated with the flood hazard. Therefore, injuries and casualties were not estimated for this hazard.

Life and safety impacts from flooding in Roseville are low compared to the measurable impacts of structural damage. This situation can be attributed to several factors. First, flooding has been rapid in terms of the rise and fall of floodwaters. Also, because of the City's geographical location in the watershed, floods tend to come and go quickly as they move toward their drainage endpoints, thereby decreasing the threat that people become trapped by floodwaters. Additionally, the City has made it a priority to warn and educate its citizens on the dangers and impacts of flooding. The City implements public outreach programs that provide information on flood warnings, property protection, flood safety, and flood insurance. The City also has developed a comprehensive flood warning program that can deliver real-time data to citizens and emergency management personnel through cable television and the Internet. The program can provide a warning up to 3 hours before a flood event occurs in the 100-year floodplain. The City‘s approach has resulted in an educated and well-informed constituency.

Of Roseville's two wastewater treatment plants, only the Dry Creek Plant is partially located in the floodplain. The storm sewer system is separate from the sanitary sewer system, so the sanitary sewers are not significantly affected by storm events. Overflow is more typical in combined sewer systems (such as in Sacramento). Regarding health concerns, one of Roseville's sewage treatment facilities is located on the downstream end of Dry Creek. This facility has overflow ponds within the 100-year floodplain. The treatment facility itself is located above the 100-year floodplain. Flood waters could be contaminated when plant demands exceed the plant capacity, resulting in the discharge of raw, undiluted sewage to the overflow ponds. If this scenario occurred simultaneous with a 100-year flood event, flood waters could be contaminated. The probability of occurrence for this type of scenario is considered low. This situation has not occurred during past flood events. Therefore, its potential impacts on health were not estimated as part of this assessment.

9.3.3 Impact on Critical Facilities

Critical facilities are structures where vital community operations are performed. If these facilities are flooded or damaged, severe consequences to public health and safety could result. Therefore, it is imperative that critical facilities be adequately protected from flooding. Critical facilities are not strictly defined by FEMA. Rather, local governments are encouraged to evaluate their own communities to determine which facilities are necessary during an emergency event. The RHMP steering committee defines a critical facility as "a facility that is vital for the City's ability to provide essential services and protect life and property and/or the loss of which would have a severe economic or catastrophic impact."

Table 9.3 lists the critical facilities in Roseville's 100-year floodplain.

TABLE 9.3
CRITICAL FACILITIES IN ROSEVILLE'S
100-YEAR FLOODPLAIN*

Facility Type	Number
Sewage Treatment Facility	1
Library	1
Fire Station/Emergency Operations Center	1
County Courthouse	1
Churches	2
Total	**6**

*If the critical facility (such as a building) is not physically located within the regulatory floodplain, it was not counted as vulnerable to flooding.

Based on the RHMP steering committee's definition, six critical facilities are considered to be exposed and vulnerable to flooding in Roseville. A detailed vulnerability analysis of all critical facilities has been created for all hazards addressed by this plan. This analysis is on file with appropriate City staff and will not be published for public review. Table 9.3 summarizes critical facility information related to flooding only.

Critical facilities can also include critical infrastructure (such as roads) that could cause isolation and evacuation problems during flood events. The City of Roseville has determined that the following major roadways and stream crossings (bridges or culverts) would be impassable during a 100-year flood event:

- Dry Creek Road Crossings
  - Vernon Street
  - Riverside Avenue
  - Darling Way
  - Douglas Boulevard
  - Folsom Road
- Linda Creek Road Crossings
  - Rocky Ridge Drive
  - Champion Oaks Drive
  - Sierra Collage (College) Boulevard
- Cirby Creek Road Crossings
  - Sunrise Avenue
  - Coloma Way
  - Oakridge Road
  - Sierra Gardens Drive
  - Huntington Drive
- Miners Ravine
  - Sierra Collage (College) Boulevard

9.3.4 Impact on Existing Structures at Risk

In order to be progressive in its approach to managing floodplains in Roseville, the City has created tools that provide a wealth of information about the risks and vulnerabilities from flooding. The City has created a "Flood Inventory database" that is utilized to track pertinent, site specific information for each property located in the regulatory floodplain (RF). This database includes information for the following basic categories:

- Buildings Located in the Regulatory Floodplain
- Building Use
- Building Area
- Building Value
- Permit History
- Flood Loss History
- Regulatory Flood Elevation
- BFE
- Pre- and Post-FIRM Structures
- Elevation of Lowest Adjacent Grade

Table 9.4 summarizes the information contained in the "Flood Inventory Database". This database is maintained by the Department of Public Works and is available for review upon request.

TABLE 9.4
SUMMARY OF STRUCTURES AT RISK

	Roseville Regulatory Floodplain	FEMA SFHA
Area of Floodplain (acres)	1,493.43	1,098.08
Residential Buildings	135	126
Non-residential Buildings	12	12
Total Buildings	147	138
DOF less than 1 foot*	41	50
DOF 1 to 3 feet*	67	64
DOF greater than 3 feet*	39	24
Lowest Floor Elevated	87	89

NOTE:
* Depth of Flooding (DOF) is the difference between the BFE or Regulatory Flood Elevation (RFE) and the elevation of the lowest grade adjacent to a structure.

Another gage of vulnerability for structures in a floodplain is date of construction. As stated in Section 9.1.3, the NFIP provides federally backed flood insurance to communities that adopt and enforce floodplain regulations for new developments within identified floodplains. The NFIP recognizes two types of structures: pre- and post-FIRM structures. A pre-FIRM structure was constructed prior to the effective date of the regulations required as a condition of participation in the NFIP. A post-FIRM structure was constructed after the effective date of the regulations. Because post-FIRM buildings are constructed in accordance with regulatory standards that require flood protection, they are considered less vulnerable than pre-FIRM structures to flood events. Although a pre-FIRM structure was not built in accordance with flood protection regulatory standards, they may not necessarily lack flood protection. Many pre-FIRM homes are sufficiently flood protected due to sound building practices employed by the property owners and builders.

Figure 9.3 illustrates the number of pre- and post-FIRM structures within the City of Roseville. The number of post-FIRM structures within Roseville is extremely low because of the City's proactive floodplain management policy of not allowing new development to occur within the identified floodplain.

9.3.5 Natural and Beneficial Floodplain Functions

The City recognizes that open space land is limited and that valuable resources must be conserved wherever possible. For many, the City's open space setting is a highly valued natural resource. Given the strong interrelationship between open space and conservation issues, the City of Roseville has chosen to address these issues in a single open space and conservation element of its general plan.

Vegetation and wildlife resources and corridors are an important component of the overall open space system. These resources, including trees, wetlands, and riparian areas, have been the historic focus of preservation efforts in Roseville. If future generations are to enjoy and benefit from the resources available to the present generation, these finite and fragile resources must be preserved and managed.

The vegetation and wildlife resources of Roseville can be broadly classified by habitat type. Grasslands, oak woodlands, riparian areas, and seasonal wetlands support a wide variety of plant and animal species. Whenever possible, the focus of preservation efforts shall be multipurpose. It is therefore preferred, for example, to preserve woodlands, grasslands, and wetlands in combined rather than separate and unconnected settings. Each type of habitat in Roseville is discussed below.

Annual Grasslands. Relatively small amounts of self-sustaining grasslands still exist in the northern and western undeveloped edges of Roseville. Less extensive areas of grassland are present in smaller undeveloped areas scattered throughout the City. Before Spanish and later immigrants arrived in the Central Valley, the grasslands contained native species. The effects of grazing and clearing of large tracts for agriculture resulted in the decline of native species. Today, most of the grasslands in the region contain non-native species. These areas do, however, provide important habitat for birds and other wildlife.

Oak Woodlands and Riparian Areas. Oak woodlands are generally present near the City's major stream channels. The microclimates and alluvial soils in the woodlands provide ideal conditions for deep-rooting shrubs and trees. Most woodland areas are relatively open, with little shrub growth.

Riparian areas support a much wider biological diversity. Situated along and within the City's creeks and water courses, riparian corridors are a source of food and water and provide cover, nesting sites, and migration and dispersal corridors for wildlife. Riparian areas are also important in flood protection and improve air and water quality through natural filtering.

Oak woodland and riparian areas are City resources not only because of the diversity of species they support but also because they provide natural open space and aesthetic value. The City's creek systems are described in detail the groundwater recharge and water quality component of open space element of the General Plan. The City regulates the protection of native oak trees through the Tree Preservation Ordinance, which includes standards that limit disturbance within protected zones of oaks and emphasizes avoidance of tree removal. Where avoidance is not feasible and tree removal is authorized by the City, mitigation is required on an inch-for-inch basis. The Tree Preservation Ordinance is a highly valuable tool in protecting Roseville's oak trees and habitats. Consistent with open space implementation measure 7, a creek and riparian management and restoration plan is being developed that will provide standards for riparian area management and enhancement.

Seasonal Wetlands. Many of the wetland areas in Roseville are seasonal and therefore receive, retain, and transport water only during the wet season. Wetlands are subject to the regulations of the U.S. Army Corps of Engineers under the provisions of Section 404 of the Clean Water Act. Two primary types of seasonal wetlands are present in the City: intermittent drainage and vernal pool wetlands. Intermittent drainage wetlands typically consist of channels 1 to 10 feet wide that flow over a variety of substrata.

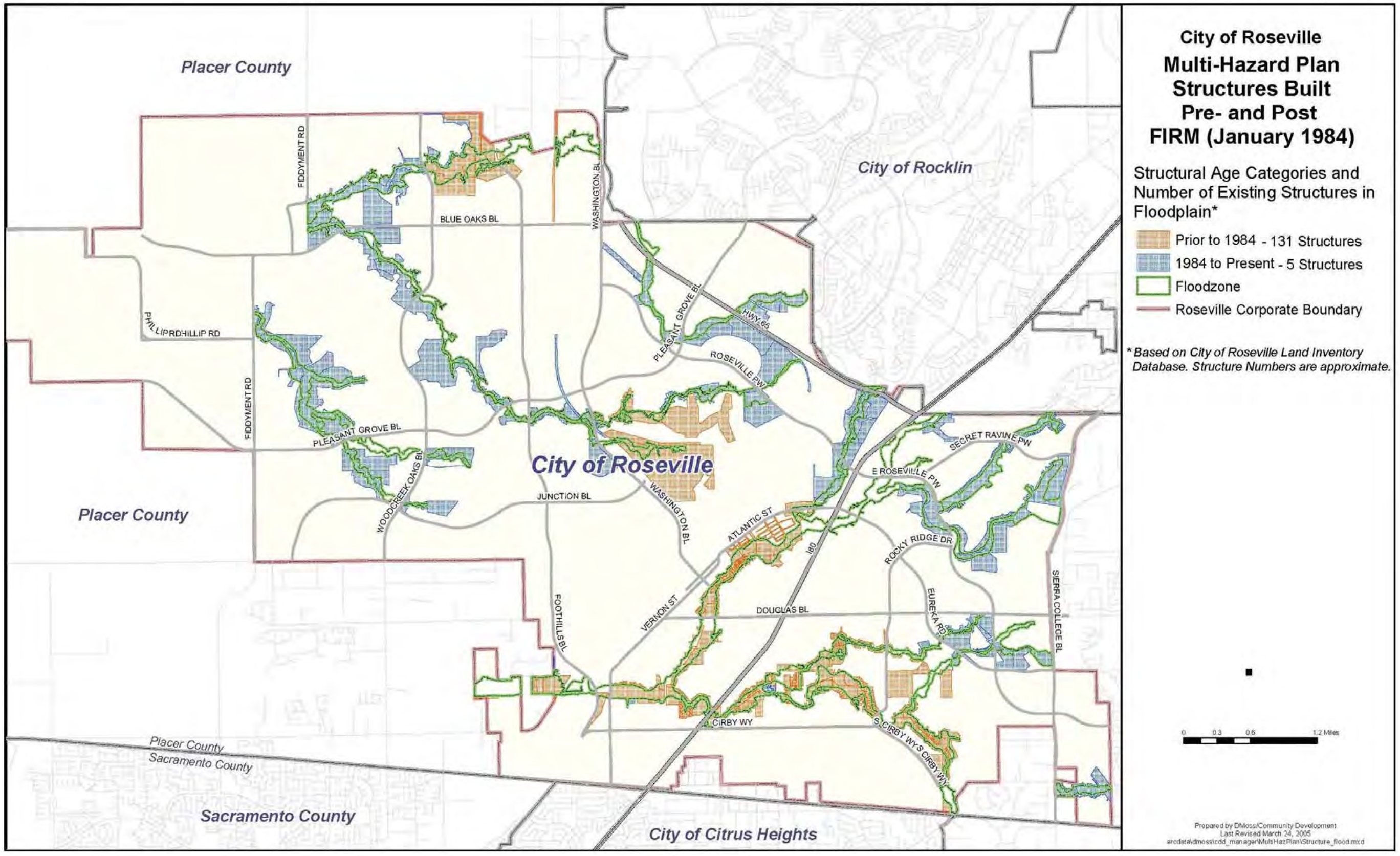


Figure 9.3 Pre- and Post-FIRM Structures

Most are wet only during winter and transport run-off. They are typically dry during summer, with scattered ponds, but may contain water from adjacent urban runoff. Vernal pools represent a significant seasonal wetland resource in Roseville. Such pools are considered unique not only because of their limited natural occurrence and distribution but also because of the unique native plant and animal species they support. Found in valley grassland areas, vernal pools are typically small, shallow, hardpan-floored depressions that fill with water during the wet winter season, gradually drying by late spring or early summer.

Two types of vernal pools are present in the Roseville area. The first, northern volcanic mud flow vernal pools, occur in shallow depressions on Mehrten mud flow formations where the slope is generally less than 2 percent. The second type of vernal pool is the northern hardpan pool. These pools generally occur on the Inks or Cometa soil series at the lower watershed portions of creek floodplains. During the wet season, the pools provide special habitat for unique plant and animal species whose germination, growth, and reproductive cycles coincide with the availability of collected water. Individual pools vary significantly in the length of time they remain wet and in the diversity of plant species present.

Vernal pool habitats, although relatively abundant in Roseville and the Sacramento/Placer County region, are considered unique on a statewide basis. Several plant species occur only in association with these special habitats, which has triggered concern about their inventory and preservation. The California Department of Fish and Game maintains the California Natural Diversity Data Base, which includes known locations of state and federally listed endangered, rare, and threatened plant and animal species, including species considered by the scientific community to be deserving of such listing.

The sensitive plant species that may be present within Roseville are primarily associated with vernal pool environments and include the following: Bogg's Lakehedge Hyssop (*Gratiola heterosepala*), Dwarf Downingia *(Downingia humilis*), and Vernal Pool Brodiaca (*Dichelostemma lacunavernalis*). Bogg's Lake Hyssop is listed as endangered by the state and California Native Plant Society. Dwarf Downingia and Vernal Pool Brodiaca are both included on the California Native Plant Society "watch list" and have sufficiently limited distribution to warrant continued monitoring. Vernal pools in the City may also contain federally listed, endangered vernal pool tadpole shrimp (*Lepidurus packardi*) and federally listed threatened vernal pool fairy shrimp (*Branchinecta lynchi*).

Anadromous chinook salmon (*Oncorhynchus tshawytscha*) and Central Valley steelhead (*Oncorhynchus mykiss*) are known to be present seasonally in Dry Creek and its upper tributaries. Steelhead is listed by the U.S. Fish and Wildlife Service as a threatened species under the Endangered Species Act. Chinook salmon within the Central Valley Fall/Late Fall Run are listed as a candidate species. In addition to the federal and state classified rare or endangered wildlife species known to inhabit Roseville, favorable habitats for other listed species are present in the area. Other special status species potentially present in Roseville include Cooper's Hawk, Swainson's Hawk, Valley Elderberry, Longhorn Beetle, Sanford's Arrowhead, and the Northwestern Pond Turtle. Bald eagles have been sighted near Folsom Lake, and the American peregrine falcon is present in the Sacramento Valley. All of these species thrive in riparian habitats synonymous with floodplain environments.

To preserve the natural and beneficial functions of open space resource areas adjacent to the floodplain areas of Roseville, the City has adopted policies under its open space element of the general plan that include the following:

- Preserve and rehabilitate continuous riparian corridors and adjacent habitat along the City's creeks and waterways
- Require dedication of the 100-year floodplain or comparable mechanism to protect habitat and wildlife values in perpetuity

- Require preservation of contiguous areas in excess of the 100-year flood plain as merited by special resources or circumstances, which may include, but are not limited to, sensitive wildlife or vegetation, wetland habitat, oak woodland areas, grassland connections in association with other habitat areas, slope or topographical considerations, recreation opportunities, and maintenance access requirements
- Limit recreation activities within the 100-year floodplain and require additional setback areas for trails and other public recreation uses so that natural resource areas are not adversely impacted
- Provide for protection and enhancement of native fishery resources, including continued coordination with the California Department of Fish and Game to release water into Linda Creek

Because of these policies, a large proportion of the floodplains within Roseville are held for an open space use, many in a natural or beneficial state. As of the preparation of this RHMP, approximately 78.5 percent (1,172.3 acres) of the regulatory floodplain within Roseville is designated for open space use as defined in the open space element of the general plan.

9.3.6 Economic Impact

Past experience has shown that flooding can have a major economic impact on a community beyond the flood damage that occurs to buildings. Business revenues as well as tax revenues funding city governments can both be affected. All of these factors cumulatively can have a long-term impact on the local economy.

HAZUS-MH is a geographic information system (GIS)-based program that can be used for loss estimation to support the development of risk assessments as required under the DMA. The HAZUS-MH software program assesses risk in a quantitative manner to estimate damages and losses associated with natural hazards. HAZUS-MH is FEMA's nationally applicable, standardized methodology and software program that contains modules for estimating potential losses from earthquakes, floods, and wind hazards. HAZUS-MH has also been used to assess vulnerability (exposure) for a number of other hazards facing Roseville.

An analysis of the potential economic impact of the regulatory flood for the City of Roseville was performed using a loss estimation tool created by FEMA called HAZUS-MH. HAZUS-MH has been used to streamline the risk assessment process for specific hazards because it (1) uses a consistent and FEMA-approved methodology and (2) produces maps and loss estimates that state and local governments, and the private sector can apply to develop quantifiable risk assessments that form the basis for programs and plans required for emergency management.

It is important to note that HAZUS-MH is a loss estimation tool used for planning purposes only. The underlying basis of the analysis is census tract data, and HAZUS-MH makes numerous assumptions in the compilation of this data. For this risk assessment, the loss estimates and exposure calculations rely on the best available data and methodologies. Uncertainties are inherent in any loss estimation methodology and arise in part from incomplete scientific knowledge concerning natural hazards and their effects on the built environment. Uncertainties also result from (1) approximations and simplifications necessary to conduct such a study; (2) incomplete or outdated data on inventory, demographic, or economic parameters; (3) the unique nature and severity of each hazard when it occurs; and (4) the amount of advance notice that the residents have to prepare for the event. These factors result in a range of uncertainty in loss estimates, possibly by a factor of two or more. As a result, potential exposure and loss estimates are approximate. Results should not be interpreted or used as precise results from a hazard event and should be used only to understand relative risk.

Table 9.5 summarizes potential dollar losses based on Roseville's HAZUS-MH analysis for the regulatory flood.

TABLE 9.5
SUMMARY OF POTENTIAL DOLLAR LOSS

	Residential Structures	Commercial Structures
Building Loss	$282,688	$32,648
Contents Loss	$199,634	$77,505
Relocation Costs	$16,285	$10,472
Income Loss	$3,263	$38,709
Rental Income Loss	$9,191	$7,753
Wages and Direct output loss	$7,711	$185,525
Total Losses	**$518,772.00**	**$352,612.00**

Other potential impacts estimated by HAZUS-MH from the regulatory flood event that would affect the local economy are summarized below.

- The regulatory flood event would displace an estimated 2,992 people.
- Up to 2,434 people would have short-term shelter needs.
- Potentially up to $4,971,745 in vehicular damage could result.
- Up to 189,079 ton of debris could be created.

9.3.7 Repetitive Losses

Repetitive loss properties make up only 1 to 2 percent of the flood insurance policies currently in force, yet they account for 40 percent of the country's flood insurance claim payments. A report on repetitive loss structures recently completed by the National Wildlife Federation found that 20 percent of these structures are listed as outside the 100-year floodplain. In 1998, FEMA reported that the NFIP's 75,000 repetitive loss structures have already cost $2.8 billion in flood insurance payments and that numerous other flood-prone structures are in the floodplain and continue to remain at high risk. To address this ongoing issue, the government has initiated several programs that encourage communities to identify and mitigate the causes of their repetitive losses.

A Repetitive Loss Property is defined as any NFIP-insured property that, since 1978 and regardless of any change(s) of ownership during that period, has experienced any of the following:

- Four or more paid flood losses exceeding $1,000.00 each
- Two paid flood losses exceeding $1,000.00 each within any 10-year period since 1978
- Three or more paid losses that equal or exceed the current value of the insured property.

A repetitive loss area is the portion of the floodplain where buildings have been subject to repetitive flooding. The key identifier for these areas is a list of structures identified by FEMA as meeting the definition of repetitive loss due to the existence of a flood insurance policy and based on flood insurance payments paid. The purpose of identifying repetitive loss areas is to identify structures in addition to those on FEMA's list that are subject to the same risk but are not on FEMA's list because a flood insurance

policy was not in force at the time of loss. The cause of repetitive flooding can be attributed to the same causes of flooding discussed in Section 9.3.1 of this assessment—concentrated, intense storms isolated over a watershed and creating storm water runoff volumes exceeding the capacity of creeks and storm drainage systems.

According to the list of repetitive loss properties maintained by FEMA, as of February 29, 2004, Roseville has three identified repetitive loss properties. Figure 9.1 illustrates areas associated with repetitive flooding. Roseville is required to address its repetitive loss areas as a condition of its participation in the CRS program. This mitigation plan meets this CRS requirement. When Roseville first began its participation in the CRS program in 1991, the list of repetitive loss properties totaled 24 locations. Since then, flood protection and mitigation projects (including purchase and relocation of structures) have occurred at 21 repetitive loss locations and all 21 locations are no longer subject to repetitive flood losses. This represents an 88 percent reduction in exposure of insured properties to repetitive flood losses. This reduction is a prime example of how the City of Roseville's proactive flood mitigation practices have decreased the exposure of its citizens to the flood hazard, reduced the number of repetitive loss properties, and minimized reliance on post-disaster assistance provided by the federal government and the nation's taxpayers.

Flood insurance statistics can help identify vulnerability by regionally isolating areas where claim activity is high and a high rate of flood insurance is in force. Table 9.6 summarizes vital insurance statistics that can be used to help identify vulnerability in Roseville. It should be noted that amount of flood insurance claims filed within Roseville has significantly decreased since 1997 due to the impact of the Cirby-Linda-Dry Creek Flood Control Project.

TABLE 9.6
FLOOD INSURANCE STATISTICS FOR THE CITY OF ROSEVILLE

Number of flood insurance policies in force as of 12/31/2004	331
Total annual premium	$171,567
Average policy cost	$518.33 (National Avg. = $412.00)
Total insurance coverage	$74,407,600
Total claims filed (1978 to 2004)	290
Value of claims paid	$9,880,765.72
Average claim paid	$34,071.61
Number of flood insurance policies in force within SFHA	89
Number of flood insurance policies in force outside SFHA	242

Some conclusions based on the flood insurance statistics in Table 9.6 are summarized below.

- 71% of the structures in the SFHA are currently covered by a flood insurance policy.
- 73% of the current policies in force are for properties located outside the SFHA.
- The high percentage of policies outside the SFHA are probably due to the impact of the Cirby-Linda-Dry Creek Flood Control Project and resulting remapping.
- Based on the average cost of a flood insurance policy and high number of policies outside the SFHA, a large number of flood insurance policies currently in force are apparently mis-rated.

- No conclusions can be made based on the sporadic locations of policies for some areas outside the SFHA.
- There appears to be a need for public education about flood insurance.

Figure 9.4 shows locations of areas with flood insurance policies in force in Roseville as of April 2005.

9.3.8 Impact on Development and Redevelopment Trends

State law requires that every county and city prepare and adopt a comprehensive long-range plan to serve as a guide for the development of the community. Recognizing the flood hazard problem and that typical growth patterns in California would impact and exacerbate that risk, the City of Roseville took an aggressive, proactive approach to managing its floodplains through the development of its general plan in 1992. The general plan serves as a long-term policy guide for the physical, economic, and environmental growth of the City and includes a statement of the community's vision of its ultimate physical growth. With respect to floodplain management, City actions, such as land-use allocation, annexations, zoning, subdivision and design review, redevelopment, and capital improvements, must be consistent with the general plan.

The general plan also designates land-use categories for the entire City. Each land-use category is defined within the general plan and includes information on the general uses, development, intensity, siting, and compatibility standards in relation to the flood hazard. Roseville's current general plan was adopted by the Roseville City Council in 1992, and a technical update was adopted in 2003.

One element of the City's general plan is the safety element. The citizens of Roseville rely on the City for many safety needs such as fire and crime prevention. They also count on the City to plan for and protect them from natural hazards such as flooding, earthquakes, and other potentially dangerous situations. The safety element in the general plan addresses community safety concerns and sets forth goals and policies essential for their resolution. For the flood protection component of the safety element of the general plan, Roseville established policies such as those prohibiting new development in an identified floodplain or, if development were to occur in the floodplain, policies requiring an appropriate level of flood protection in design and construction. The flood protection component identifies 9 flood protection policies and 12 implementation measures to achieve the following goals:

- Minimize the potential for loss of life and property due to flooding
- Pursue flood control solutions that are cost-effective and minimize environmental impacts

One significant policy identified in the flood protection component of the safety element of the general plan is that development within designated 100-year future floodplain areas shall be regulated as summarized below.

- Infill Areas—No development is permitted within the future floodway. However, development may be permitted by the City within the future floodway fringe. In accordance with the Nolte Future Floodplain definition, such development is limited to areas falling within the assumed cumulative 1-foot rise in water surface elevation provided that it can be demonstrated that the development will not impact flood levels.

FEMA Floodway is an area within a floodplain reserved for the purpose of conveying flood discharge without increasing the BFE by more than 1 foot. Generally speaking, no development is allowed in floodways because any structures located there would block the flow of floodwaters.

FEMA Floodway Fringe is an area in the floodplain but outside of the floodway. Some development is generally allowed in these areas with a variety of different restrictions.

- Remainder of the City (Specific plans and north industrial area)—No development is permitted within the future floodplain (floodway and floodway fringe). Exceptions may be considered by the City on a case-by-case basis if encroachment is limited to only the future floodway fringe and would not result in any off-site increase in the water surface elevation.

Figure 9.5 shows the areas within Roseville with the designations defined above.

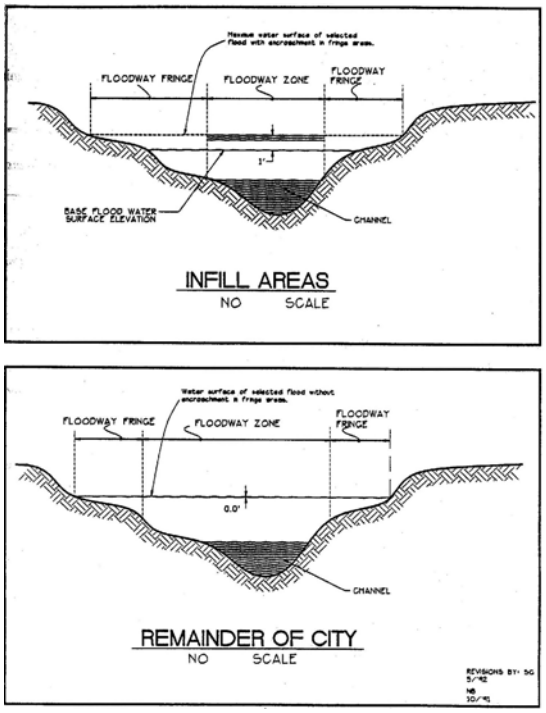


Figure 9.5 Floodplain Designation Cross-Sections

Increased urbanization of western Placer County within the Pleasant Grove and Dry Creek Basins has resulted in the potential for increased flooding problems in Roseville. Land development typically results in increased hard surfaces and decreased vegetation, conditions that limit infiltration opportunities and, without adequate mitigation, can increase storm water runoff rates and volumes and decrease the time required to reach peak discharge.

The goals, policies, and implementation measures of the flood protection component focus on minimizing damage from flood hazards. Key to this effort is the clear definition and application of floodplain boundaries. Emphasis is placed on protecting floodplain areas and on pursuing regional cooperation on flooding issues. The City is committed to exploring environmentally sensitive flood control solutions. As a result, this component is intended to be used in combination with the goals, policies, and implementation measures contained within the open space and conservation element of the general plan.

Based on the policies, activities, and mitigation measures described above, it can be concluded that future land development trends will not impact or be impacted by flooding in Roseville as long as existing policies remain in force through the City's existing programs. Only three parcels within the regulatory floodplain are in the current "buildable" lands inventory. These parcels were all created before the policies described were enacted and in essence were "grandfathered" in under the City's flood protection program. Any development that occurs on these parcels would be subject to strict regulations as discussed above.

9.4 REVIEW OF EXISTING ORDINANCES, PROGRAMS, AND PLANS

The City of Roseville has established a long-standing policy to proactively manage its floodplains. Under the guidance of the general plan and its safety element, Roseville has been able to decrease the exposure of its citizens to flooding with a comprehensive approach that includes the following measures:

- Structural mitigation (flood control)
- Non-structural mitigation (elevation or acquisition)
- Regulations
- Stormwater Management
- Flood warning
- Outreach and public education.

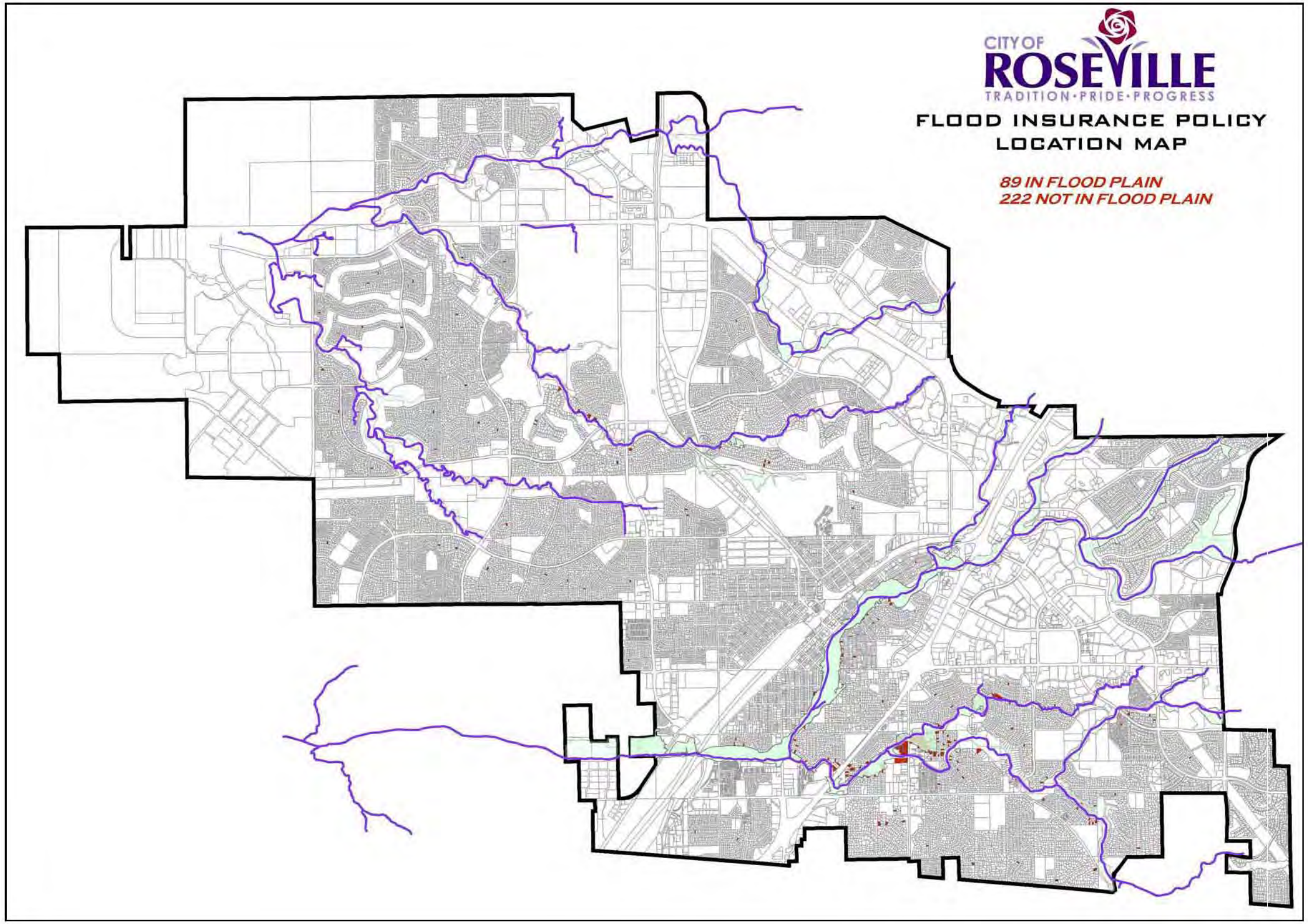


Figure 9.4 Flood Insurance Policies in Force as of April 2005

This section discusses each element to identify strengths and weaknesses to be addressed by this plan.

9.4.1 Structural Mitigation (Flood Control)

Major flood control improvements accomplished by the City of Roseville since the January 1995 flood event are summarized below. The City has spent more than $22 million on flood mitigation since that time and has eliminated 445 flood-prone structures from the floodplain.

- **Tina Way/Elisa Way Area—**Completed in 1996 at the cost of $3 million (100 percent City-funded), this project included channel excavation and construction of berms and floodwalls. The project removed 40 structures from the floodplain. Based on the pre-project location and construction of these structures, the entire area would have flooded during the 1997 flood if the improvements had not been implemented.
- **Riverside Ave./Vernon St. Area—**Completed in 1996 at the cost of $2 million (90 percent funded by the Union Pacific Railroad and 10 percent funded by the City), the construction project included replacing culverts with a new bridge over Dry Creek. The net effect of this project lowered flood elevations for the reach by 5 to 7 feet and removed 150 structures from the floodplain.
- **Sunrise Ave./Oakridge Dr. and Champion Oaks Areas—**Completed in 2001 at the cost of $16.1 million ($8.7 million from FEMA and $7.4 million from the City), this construction project included several elements. Culverts were replaced with a new bridge over Linda Creek at Sunrise Avenue. Twin 9-foot-diameter bypass pipes were installed in the Oakridge Drive Area. The project also included channel excavation and berm and floodwall construction. Benefits from this project include the removal of 233 structures from the floodplain; 44 structures remained in the floodplain after the project, but these structures were less likely to flood. Key project features included maintaining a channel in as natural a state as possible; planting of over 500 new oak trees; assigning biologists, ornithologists, and arborists to minimize environmental impacts; and monitoring for fish passage and plantings for 5 years.

9.4.2 Non-Structural Mitigation (Acquisition/Elevation)

Even though structural mitigation projects reduced the flood exposure of property by approximately 91 percent, Roseville proactively offered mitigation through acquisition or home elevation to the remaining 9 percent of the properties still exposed to flooding. Completed in 2001 at the cost of $1 million (50 percent funded by FEMA, 40 percent funded by the property owners, and 10 percent funded by the City), the project included elevating 27 homes and acquiring (buying out) 2 homes. This effort resulted in 22 flood-prone homes with post-project floor levels higher than the floodplain level.

9.4.3 Regulations

The City of Roseville regulates its floodplain areas through land use, zoning, and other development restrictions, including a policy that requires the dedication of and prohibits most development within the 100-year floodplain area. The regulation of development in floodplain areas in Roseville is restricted by the following:

- 2020 General Plan, Safety Element, Flood Protection Component
- Improvement Standards

- Flood Damage Prevention Ordinance (Roseville Municipal Code [RMC] Chapter 9.80)
- Zoning Ordinance (RMC Chapter 19.18)

2020 General Plan, Safety Element, Flood Protection Component

The goals, policies, and implementation measures of this component focus on minimizing damage due to flood hazards. Key to this effort is the clear definition and application of floodplain boundaries. Emphasis is placed on protecting floodplain areas and on pursuing regional cooperation on flooding issues. The City is committed to exploring environmentally sensitive flood control solutions. As a result, this component is intended to be used in combination with the goals, policies, and implementation measures contained within the open space and conservation element of the general plan. As stated in Section 9.3.8, the flood protection component identifies 9 flood protection policies and 12 implementation measures. These policies and implementation measures have been adopted by the RCC and are incorporated into the area-specific plans. These policies and implementation measures are legally enforceable.

Improvement Standards

The purpose of improvement standards is to provide minimum standards for (1) improvements dedicated to the public and accepted by the City for maintenance or operation, (2) certain private works, and (3) improvements to be installed within existing rights-of-way and easements. Improvement standards are necessary to provide coordinated development of required facilities used by and for the protection of the public. These standards apply to, regulate, and guide preparation of traffic impact studies and the design and preparation of plans for construction of streets, highways, alleys, drainage systems, sewage systems, traffic signals, site access structures, water supply facilities, and related public improvements. The standards also set guidelines for private works that involve drainage, grading, tree removal, and related improvements. Section 10 of the improvement standards deals with drainage and includes the following provisions:

- Requires residential lots developed in and adjacent to a designated floodplain to have a pad elevation a minimum of 2 feet above the regulatory flood elevation
- Storm water management provisions that require mitigation of the increase in runoff generated by new development
- Provisions that require the building pads of structures built outside of the regulatory floodplain to be a minimum of 1 foot above the 100-year water surface elevation for the site assuming total blockage of drainage facilities

Flood Damage Prevention Ordinance (RMC Chapter 9.80)

The flood damage prevention ordinance provides regulatory provisions for the floodplains of Roseville and is a requirement for participation in the NFIP. Chapter 9.80 of the RMC meets requirements established under 44 CFR, Section 60.3, and includes the following standards that exceed federal requirements:

- Adoption of a regulatory floodplain that includes areas not mapped by FEMA for application
- Requirement for elevation to 2 feet above the RFE for all residential and non-residential structures within the flood hazard area
- Provisions that track substantial improvements to structures cumulatively over a period of 10 years

Zoning Ordinance (RMC Chapter 19.18)

Updated in July 1996, the zoning ordinance implements the City's general and specific plans and establishes regulations governing the use, placement, spacing, and size of land and buildings. The zoning ordinance also describes various permits available through the Planning Department, when permits are needed, and the process for obtaining permits. This ordinance includes policy that prohibits most development within the 100-year floodplain. Certain exceptions to this policy exist primarily within the infill area and for the maintenance of essential services. Where encroachments may be permitted, improvements are required to minimize cumulative upstream and downstream effects. The zoning ordinance identifies floodway and floodway fringe zoning districts. The floodway zoning district is not synonymous with FEMA's defined floodway. Development is generally prohibited in the floodway zone, with some level of development allowed in the floodway fringe zones with restrictions. The floodway fringe and floodway zone boundaries are based on previous hydraulic modeling conducted by the U.S. Army Corps of Engineers. The floodplain boundaries have changed over time since this modeling, but the zone district boundaries have not changed. The zone boundaries can and are updated on a parcel-by-parcel basis at the land owner's request using best available data.

9.4.4 Stormwater Management

The City of Roseville uses a number of adopted documents to address stormwater management and system planning. Some documents deal with the "large picture" of regional planning, and others deal with lot drainage. Stormwater management within the City of Roseville is accomplished through a multi-tiered approach. The City uses a combination of regional development impact studies, sub-regional impact studies, the City of Roseville improvement standards, the City of Roseville grading ordinance, and the Placer County stormwater management manual. All of these tools manage the stormwater system throughout Roseville at different levels. The City of Roseville general plan is the principal planning document that lays out goals for managing all aspects of the flooding hazard. Each update to the general plan reviews these goals to determine their effectiveness in managing watershed characteristics. Regional master planning, sub-regional master planning, and project drainage design are discussed below.

Regional Master Planning

Two major watersheds flow through the City of Roseville, the Dry Creek Watershed and the Pleasant Grove Creek Watershed. City ordinances are used to collect developer fees to pay for mitigation projects to reduce development impacts on flooding on major streams within both watersheds. Regional master planning for each watershed has been conducted through the Placer County Flood Control District (PCFCD). Seven communities, including the City of Roseville, are members of this district.

The Dry Creek and Pleasant Grove Creek Watersheds each have a detailed hydrology report that calculates the 5-, 10-, 50-, and 100-year storm frequencies based on total build-out of the watershed. Each report defines development impacts on the watershed and specifies mitigation procedures and improvements to the developer's mitigation. Both reports indicate a strategy for mitigation of flood resulting from new development on a regional scale. Each report is discussed below.

- **Dry Creek Watershed Report—**The report for the Dry Creek Watershed is entitled "Final Report For the Dry Creek Flood Control Plan" and was adopted by the Roseville City Council in April 1992. This document was co-sponsored, supported, and approved by the PCFCD and the Sacramento County flood control agency that oversees floodplains downstream of Placer County.
- **Pleasant Grove Creek Watershed Report—**The report for the Pleasant Grove Creek Watershed is entitled, "Cross Canal Study." Pleasant Grove Creek is one of several

major streams that flows to a reclamation district canal and overflow is stored behind levees during Sacramento River flooding. Except for the PCFCD, this report was supported, sponsored, and approved by all agencies within the watershed, in particular Sutter County and the State Reclamation Board Districts 1001 and 1000.

The reports indicate that most of Roseville is in the part of the watershed where detention is not recommended. These studies have been submitted to FEMA for approval, and FEMA is currently using the hydrology and hydraulics information provided in the reports to update the FIRMs.

Sub-Regional Master Planning

Besides the two regional master planning reports, the City requires each sub-region to develop a master plan and mitigation strategy in a specific plan. Specific plans currently exist for Southeast Roseville, Northeast Roseville, Stoneridge, North Central Roseville, Northwest Roseville Plan, North Roseville, Del Webb, and the In-Fill Area. Before zoning and development rights are issued for these newly developing areas, a detailed hydrology and hydraulic study dealing with that sub-region's concerns is required to examine local drainage problems, define flood levels based on total build-out of the watershed, and set aside floodplain areas as open space. Floodplains are defined on swales with drainage areas greater than 300 acres. The City of Roseville and PCFCD review and approve each specific plan.

Major drainage infrastructure in the specific plans is designed as part of the infrastructure of the sub-regions and is constructed prior to development in the area in order to eliminate the need for on-site detention requirements because regional detention, if required, is built into the infrastructure for the entire specific plan and not on a project-by-project basis. This approach allows for more control of the design and easier maintenance of the facility. In addition, in newly developing areas, hydraulic requirements used to define floodplains assume heavily and well-vegetated swales and creeks, which reduces the need to provide constant cleaning of these streams by maintenance crews.

Project Drainage Design

As each project in the specific plan is developed, the City requires the project to meet drainage improvement standards. The standards require storm drain systems that support more than one parcel to be dedicated to the City for maintenance or that the project owner(s) maintain the system. In both cases, the storm drain system is reviewed by the City's Public Works department to meet the same hydraulic standards. Project owners must demonstrate that in the case of total system failure, surface water would be able to exit the project area without causing damage. For example, if drain inlets are not maintained on a commercial site and water ponds, surface water should be able to discharge into the public drainage system without entering any on- or off-site buildings. This requirement eliminates the need for the City to monitor private storm drain systems to verify that they are adequately maintained.

9.4.5 Flood Warning

A flood warning system has been implemented by the City of Roseville for many areas within or adjacent to the 100-year floodplain. In case of flooding in these areas, warnings will be broadcast on Roseville's Government Access Channel (Cable Channel 14) and the City's "auto-dialer" system will be activated. Roseville's flood warning system is designed to provide residents with up to 3 hours of advance warning of flooding within the 100-year floodplain. Figure 9.6 illustrates a schematic diagram of the City's flood alert system. Stream gauge locations are available at http://www.roseville.ca.us/alert/floodalert.html.

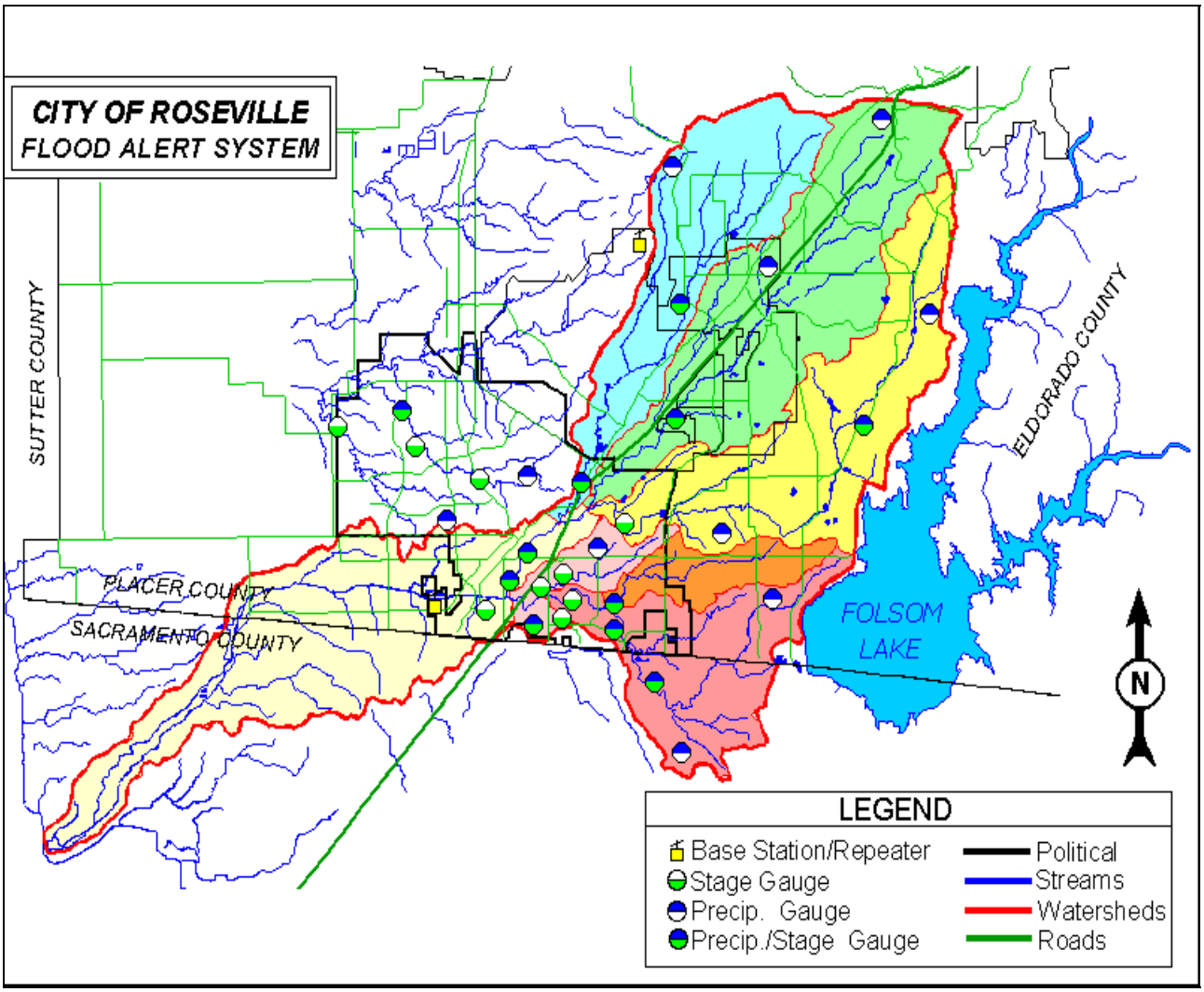


Figure 9.6 Roseville's Flood Alert System Map

9.4.6 Outreach and Public Education

The City of Roseville makes a concerted effort to educate and inform its citizens on the impacts of flooding and how to prepare for flooding impacts. The ongoing outreach and public education program uses multiple media as summarized below.

- Floodplain information is published in "Roseville Reflections," a City-sponsored newsletter sent to all citizens.
- Flood information is published on the City's website and includes real-time flood warning and flood threat recognition information. The website address is http://www.roseville.ca.us/alert/floodalert.html.
- On-line surveying is used to identify public perception of flood risk and support of mitigation.
- An informational brochure, "Weathering the Storm," is available to the public.
- Literature on flood warning, property protection, and flood safety is mailed annually to Roseville residents.

9.5 REVIEW OF MITIGATION ALTERNATIVES

Chapter 15 of this plan identifies mitigation strategies for all hazards including flooding to be pursued and implemented by the City of Roseville. These strategies were selected based on Roseville's resources, capabilities, and goals for hazard mitigation. To ensure that these strategies are appropriate for Roseville's needs, a comprehensive review of mitigation alternatives was completed to examine the alternatives in terms of manipulating the hazard, reducing exposure to the hazard, reducing vulnerability to the hazard, and increasing capability to deal with the impacts of the hazard. For the flood hazard, mitigation alternatives in the following categories were reviewed:

- Preventive activities
- Property protection activities
- Resource protection activities
- Emergency services activities
- Structural flood control activities
- Public information activities

Each category is discussed below.

9.5.1 Preventive Activities

Preventive activities are associated with regulation and land use. The City of Roseville's existing regulatory approach to managing floodplains is very comprehensive, with an emphasis on managing new development so that such developments will not adversely impact the floodplain. The centerpiece of this regulatory program is the general plan and its flood protection component. Maintaining the enforcement of this policy document will have a significant impact on reducing risk exposure to flooding. Possible enhancements to preventive activities are summarized below.

- The boundaries of the 100-year floodplain could be as specified in the floodplain designations section of this component of the City's general plan. Floodplain areas shall be preserved as specified in the open space and conservation element. Preservation may include required dedication to the City. If needed, the City's ordinances can be modified to include floodplain use regulations consistent with the goals, policies, and implementation measures of the safety, land use, open space and conservation, and parks and recreation elements of the City's general plan. This effort would be overseen by the Planning Department and would require no special funding.
- The consistency of future specific plans and specific plan amendments with the goals and policies of the general plan could be ensured. The specific plans should include the designation and preservation of floodplain areas and adjacent habitat. Provisions could be incorporated to ensure that public infrastructure, utilities, and emergency services remain functional during flood conditions. Infrastructure and facilities include water, sewer, and gas mains; telephone and electric lines; streets and bridges; hospitals; and fire and police stations. Financing mechanisms could be explored to fund necessary flood protection improvements and maintenance. Development agreements may be used to secure implementation and funding provisions. This effort would be overseen by the Public Works department and would require no special funding (specific plans have 100 percent cost recovery for developers).

- A master drainage plan could be required as part of the approval process for all specific plans and large development projects as determined by the Public Works Director. The master drainage plan could consider cumulative regional drainage and flooding mitigation. The intent of the plan would be to ensure that the overall rate of run-off from a project does not exceed pre-development levels. If necessary, this goal should be achieved by incorporating run-off control measures to minimize peak flows and/or assistance in financing or otherwise implementing comprehensive drainage plans. This effort would be overseen by the Public Works department and would require no special funding.
- Regulations could be adopted that would prohibit construction of new critical facilities in regulatory floodplain areas. If no alternative locations are feasible because of other program requirements, the critical facility should be flood-protected to the 500-year flood event elevation, plus freeboard.
- The level of flood protection (freeboard) standard could be increased from the current 2-foot standard to 3 feet to provide the maximum flood insurance benefit through rating and CRS credits.
- The Parks and Recreation Department's regular creek maintenance program should be continued in the City's creeks and floodplain areas. This program clears and removes debris that could contribute to blockage and flooding and may include the removal of silt. This program is only implemented in areas of high risk to flood damage. This effort is overseen by the Parks and Recreation Department. Annual funding is currently about $100,000 per year from the City's General Fund.
- Annual inspection and maintenance of the City's storm drain systems should continue. After every major storm, system function and performance could be reviewed. Debris that could contribute to blockage of the storm drain system would be removed. This effort is overseen by the Street Department. Annual funding is currently about $400,000 per year from the City's General Fund and gas taxes.
- City flood studies, modeling, and associated land use, zoning, and other development regulations should be annually inspected and maintained. The City's flood studies, modeling, and regulations should be updated at a minimum of every 5 years or whenever information becomes available that would significantly modify previous data. "New information" could take the form of new studies, changes in City policy, consideration of a major development project or specific plan, and implementation of a flood control project. This effort would be overseen by the Public Works department. When a new flood study is deemed appropriate, funding may be by city, state, and/or federal sources or private funds from developing areas. An annual cost of about $15,000 per year from the General Fund is required to update the City's existing flood model.

9.5.2 Property Protection Activities

Property protection activities include acquisition or relocation of flood-prone structures from the floodplain, retrofitting vulnerable structures, and promoting flood insurance. Once again, Roseville has been successful in the past implementing these type of activities as discussed in Section 9.4. Possible property protection enhancements are summarized below.

- A "willing seller" program could be implemented to target identified repetitive loss properties in Roseville for buy-out once mitigation funding opportunities become available.
- Vulnerable flood-prone structures, including identified critical facilities, could be acquired, relocated, or retrofitted. Acquisition would be the preferred City-sponsored alternative over retrofitting depending on funding availability. The basis for this preference is that it would reduce exposure for response to these areas by emergency services and could enhance the City's open space inventory. This effort would be overseen by the Public Works department. The cost for this effort could be about $100,000 per structure for buy-out or about $50,000 per structure to flood proof. Funding could be from city, state, and/or federal sources or from private developers and property owners.
- The Increased Cost of Compliance Program under the NFIP Program could be promoted as a viable means for property owner-sponsored retrofitting of flood-prone structures.

9.5.3 Resource Protection Activities

Resource protection activities include efforts to protect, create, or enhance natural and beneficial functions of the floodplain. The City's current policies and programs that emphasize open space uses in the floodplain meet these criteria and should be continued. The City received national recognition for its environmental and ecologically sensitive design of the Cirby-Linda-Dry Creek Flood Control Project. Possible resource protection activity enhancements are summarized below.

- Beaver dam sites could be managed for flood control protection and habitat restoration after dam removal. One of the primary issues is impacts to the floodwater capacity of creeks. Part of the desired comprehensive approach to beaver dam management includes (1) establishment of quantitative and qualitative "carrying capacities," including acre-feet of flood capacity lost; (2) implementation of a standard monitoring and reporting process to track beaver dam locations, beaver population levels, and dam impacts; and (3) gaining of regulatory approval for beaver dam management techniques such as biological control and habitat manipulation using the most benign options first.
- An Adopt an Open Space program could be implemented in coordination with the Open Space management program. "Adoption contracts" could be developed with neighborhoods, organizations, businesses, and other entities that describe the level of stewardship they will assume and the terms of the "adoption." These activities could be publicized through an online resource directory and other media to encourage participation.
- A comprehensive interpretive program could be developed that includes trial and open space preserve signage, signs at road crossings, creek corridor trail maps, coordination with local schools, and public stewardship events to increase public awareness of the need to preserve, restore, and proactively manage open space corridors, and to provide a sense of civic identity and pride. Interpretive signs are particularly important along the many trails adjacent to or provide access to the City's open space resources, which are habitat for endangered species.
- Education partnerships could be formed with the Roseville City School District, local high school districts, and non-profit organizations to promote ecology-oriented curricula and stewardship activities. Resource and administrative barriers could be

identified that may be limiting schools' abilities to more actively participate in stewardship, and work to identify solutions should be collaborative.

9.5.4 Emergency Services Activities

Emergency services activities include activities that deal with warning and response to events. As discussed in Section 4.2 of this plan, Roseville's existing programs in this category are exemplary. Possible emergency services activities enhancements are summarized below.

- The development, implementation, and expansion of the Flood Alert and Early Warning Program systems should be continued, and the systems should be integrated with other local jurisdictions to form a regional warning program. This effort is overseen by the Public Works department. Annual funding is provided through the City's General Fund and is about $100,000 per year.
- The City could apply to the National Weather Service's "Storm Ready" program. The program began 1999 in Tulsa, Oklahoma, and helps provide America's communities with the communication and safety skills needed to save lives and property before and during a storm event. The Storm Ready program also helps community leaders and emergency managers strengthen local safety programs.
- The existing emergency response program could be enhanced by including a scenario for dam failure following the State of California and Placer County model.
- The existing emergency response plan could be enhanced by including an element that provides for early warning and coordination with the operators of critical facilities identified by this plan.
- A scenario-based dam failure analysis could be performed to determine the probable impact of flooding within Roseville if the western levee system of Folsom Dam fails. This analysis should include a dam failure inundation map that would reflect portions of the City possibly impacted by such an event.
- Based on information generated from a scenario-based, dam failure analysis, a dam failure element could be added to the City's emergency response plan.

9.5.5 Structural Flood Control Activities

Structural flood control activities include structural solutions such as flood control reservoirs, channel modifications, and drainage system enhancements. These approaches can be highly successful as evidenced by the impact of the Cirby-Linda-Dry Creek Flood Control Project. However, these projects can be expensive. When reviewing these types of activities, the City of Roseville will emphasize the benefits of the project versus cost. Possible structural solutions in Roseville are summarized below.

- By remaining actively involved in the PCFCD, the City of Roseville should continue to pursue a regional approach to flood issues. Involvement includes cooperation in the development of a comprehensive regional database. Regional drainage planning and design for all individual developments in the Placer County Flood Control District should be encouraged to address cumulative flooding impacts. The City should also continue to participate in regional flooding studies, including the Auburn Creek/Coon Creek/Pleasant Grove Creek flood mitigation plan and the Dry Creek Watershed flood control plan. Efforts would be overseen by the Public Works department. Annual funding for membership to the PCFCD is currently provided by the City's General Fund and is about $90,000 per year.

- The City should continue coordination with other agencies on issues of flood control. Coordination between the City and adjacent jurisdictions occurs through several mechanisms including the distribution of development proposals for review and comment. The City should also continue its cooperation with federal, state, and local agencies, including the U.S. Army Corps of Engineers, California Reclamation Board, FEMA, California Department of Fish and Game, Placer County Resource Conservation District, and PCFCD. This effort would be overseen by the Community Development Department, Planning department, and Public Works department as appropriate and should not require special funding.
- The final two phases of the Cirby-Linda-Dry Creek Flood Control Project (Phases 1 and 2) should be completed. Five of the seven phases of this project have been completed at a cost of about $18,000,000. This project is overseen by the Public Works department. The cost for the last two phases would be about $3,000,000. Funding could be from City, state, federal, or private developer sources.
- The benefits and cost of completing the last two phases (Phases 1 and 2) of the Cirby-Linda-Dry Creek Flood Control Project should be reviewed. This effort would be overseen by the Public Works department and cost about $10,000. Funding could be from City, state, federal sources, or private developer sources.
- Alternative improvements to the Cirby-Linda-Dry Creek Flood Control Project could be analyzed. These improvements may be cost effective in the following flood-prone areas of Roseville:
  - Dry Creek from Darling Way to Riverside Avenue
  - The area on Dry Creek upstream of Folsom Road in the Columbia Avenue, Marilyn Avenue, Bonita Street area
  - The Linda Creek area near Champion Oaks Drive, Samoa Way, and Hurst Way
  - Cirby Creek in the Trimble Way and Zien Court area;

  These efforts would be overseen by the Public Works department and cost about $30,000 to $100,000 per study. Funding could be from City, state, federal, or private developer sources.
- The Huntington Drive and Cirby Creek culvert could be replaced with a bridge to protect the Queens Court and Huntington Drive area. This effort would be overseen by the Public Works department and cost about $100,000. Funding could be from City, state, federal, or private developer sources.
- The main storm drain system down Crestmont Avenue to Cirby Way and then into Dry Creek could be diverted so that the existing system does not exceed capacity. If system capacity is exceeded, the intersection on Cirby Way and Crestmont Avenue and nearby homes would flood during major flood events. The cost for this effort would be about $150,000. Funding could be from City, state, federal, or private developer sources..
- The existing wood flood wall along Dry Creek that is protecting the City's Main Library and Public Safety Building could be replaced. The wood wall allows floodwater to leak through, and constant pumping is required. This effort would be overseen by the Public Works department and cost about $300,000. Funding could be from City, state, federal, private developer, property owner sources.

9.5.6 Public Information Activities

Public information activities include activities that provide valuable risk-based information to the public that will aid them in preparing for, responding to, recovering from, and mitigating the impacts of a hazard. Roseville's current programs under this category excel in all facets of this category. With a commitment to maintaining this excellence, the City could implement the enhancements summarized below.

- The City's website could be enhanced to include a page dedicated to hazards identified in this plan. This page would be interactive and provide information on risk, vulnerability, and mitigation by hazard. Most importantly, this page would provide information for technical assistance available to the constituency from City, state and federal agencies. This page could also be used to monitor the progress of this plan.
- The City should continue participation in the NFIP and the CRS. This involvement would include adoption and administration of updated FEMA model ordinances and FIRM. This effort is overseen by the Public Works department and should not require special funding.
- The City should continue participation in FEMA's CRS to help reduce flood insurance rates to property owners. This effort is overseen by the Public Works department and should not require special funding.
- The City's outreach program to flood-prone property owners and the citizens of Roseville should be continued. This program helps promote awareness of the flood threat and how best to deal with it. This effort is overseen by the Public Works department. Annual funding is currently about $5,000 per year and is provided by the City's General Fund.

CHAPTER 10.
LANDSLIDE RISK ASSESSMENT

10.1 IDENTIFYING HAZARDS—DESCRIPTION OF THE LANDSLIDE HAZARD

Under 44 CFR Section 201.6(c)(2)(i) of DMA2K, local mitigation plans are required to include a risk assessment with a description of the types of natural hazards that can affect the jurisdiction. This section identifies the risks faced by the City of Roseville from the landslide hazard.

10.1.1 Background

Landslides can be described as the sliding movement of masses of loosened rock and soil down a hillside or slope. Fundamentally, slope failures occur when the strength of the soils forming the slope exceeds the pressure, such as weight or saturation, acting on them. Mudslides or mudflows (or debris flows) are rivers of rock, earth, organic matter and other soil materials saturated with water. They develop in the soil overlying bedrock on sloping surfaces when water rapidly accumulates in the ground, such as during heavy rainfall or rapid snowmelt. Water pressure in the pore spaces of the material increases to the point that the internal strength of the soil is drastically weakened. The soil's reduced resistance can then easily be overcome by gravity, changing the earth into a flowing river of mud or "slurry." Landslides can be initiated by storms, earthquakes, fires, volcanic eruptions, and by human modification of the land. A debris avalanche (Figure 10.1) is a fast-moving debris flow that travels faster than about 10 miles per hour (mph) or approximately 25 yards in about 5 seconds. Speeds in excess of 20 mph are not uncommon, and speeds in excess of 100 mph, although rare, can occur.

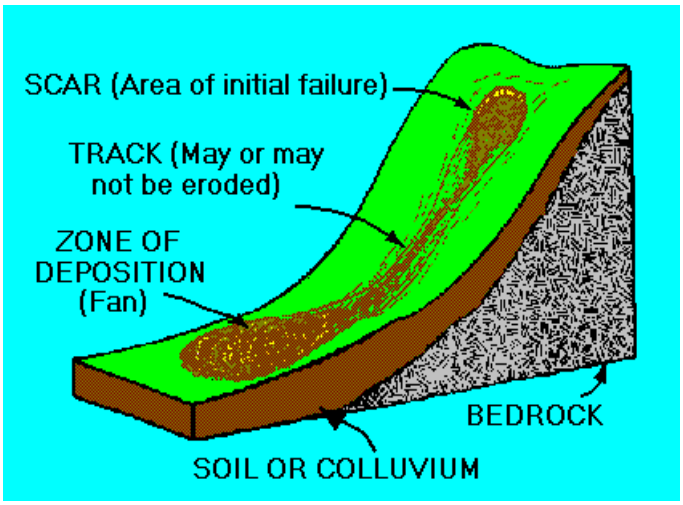


Figure 10.1. Sketch of a typical debris avalanche scar and track. Although this figure shows the "zone of deposition" as quite near the source, debris avalanches can travel thousands of feet or, in exceptional cases, miles from the point of origin.

A debris flow or mudflow can move rapidly down slopes or through channels, and can strike with little or no warning at avalanche speeds. The slurry can travel miles from its source, growing as it descends, picking up trees, boulders, cars, and anything else in its path. Although these slides behave as fluids, they pack many times the hydraulic force of water due to the mass of material included in them. Locally, they can be some of the most destructive events in nature.

A sinkhole is a collapse depression in the ground with no visible outlet. Its drainage is subterranean; its size is typically measured in meters or tens of meters, and it is commonly vertical-sided or funnel-shaped.

In general, landslide hazard areas occur where the land has certain characteristics, which contribute to the risk of the downhill movement of material. These characteristics include the following:

- A slope greater than 15 percent
- Landslide activity or movement occurred during the last 10,000 years
- Stream or wave activity, which has caused erosion, undercut a bank or cut into a bank to cause the surrounding land to be unstable
- The presence or potential for snow avalanches
- The presence of an alluvial fan, which indicates vulnerability to the flow of debris or sediments
- The presence of impermeable soils, such as silt or clay, which are mixed with granular soils such as sand and gravel

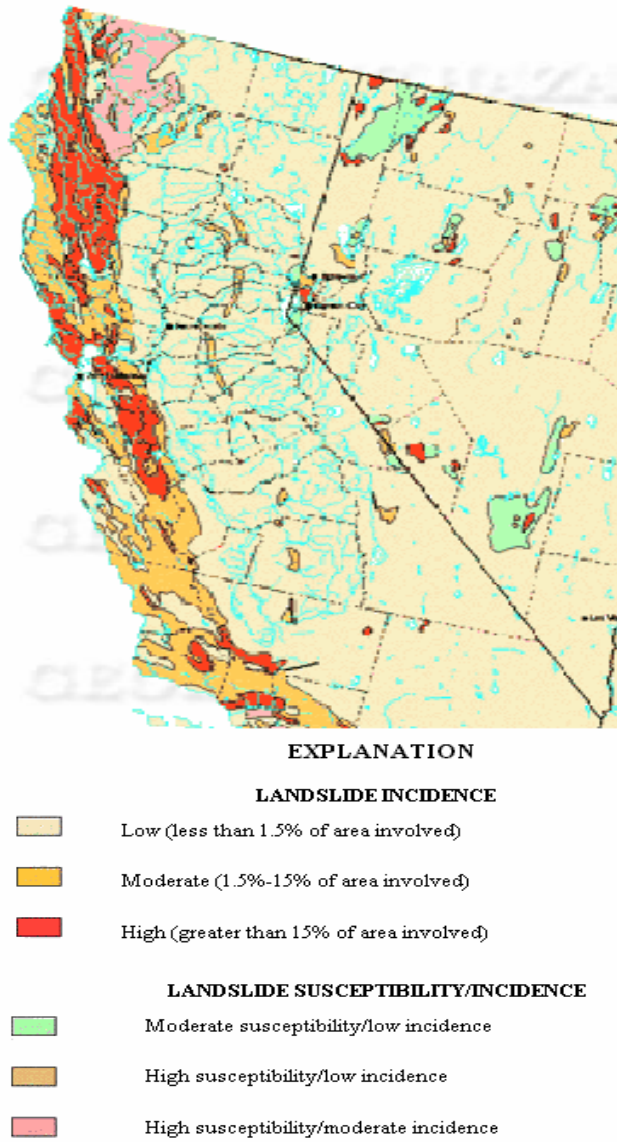


Figure 10.2. Rates of Landslide Incidence

10.1.2 Landslide Hazard Assessment

Using the criteria listed above, portions of Roseville reflect the characteristics for potential landslide hazard areas. These are areas with steep slopes in excess of 15 percent in the Stoneridge Specific Plan area. Land sliding has likely occurred numerous times in the past as evidenced by past deposits exposed in erosion gullies. The time frame for these past occurrences is most likely in geologic terms, probably over the last several hundred, if not thousands of years. There is little or no record of landslides occurring within Roseville that caused damage to property. However, with the presence of steep slopes in excess of 15 percent, and the frequent occurrence of multiple intense storms that can saturate the soil, there is an exposure to landslides within Roseville. The USGS has identified geologic hazard areas and their associated susceptibility and rate of incidence. Placer County and the Roseville vicinity has been classified as a low rate of incidence with less than 1.5 percent of the area susceptible to landslides (see Figure 10.2).

Roseville's most likely risk exposure to landslides is as a secondary risk exposure to an earthquake or wild land fire. The ground shaking that could occur during a regional earthquake could trigger landslides in the steep slope areas. This scenario could be further enhanced should an earthquake occur during a time where the soils are saturated due to repeated storm events typical for this region. After a wild land fire, the landscape becomes denatured and unable to absorb the impacts of repeated intense rainfall. This can cause the soil to become saturated and vulnerable to sliding.

10.2 LANDSLIDE HAZARD PROFILE

Under 44 CFR Section 201.6(c)(2)(i) of DMA2K, risk assessments are required to include a description of the location and extent of the hazards that can affect the jurisdiction. This sub-section includes information on previous landslide occurrences in the City of Roseville (location, extent, and historic damages) and on the probability of future occurrences.

10.2.1 Landslide Location and Extent

Little or no existing scientific analysis is available with regards to this hazard for the Roseville area. Any and all assessment of the risk from this hazard is based on, past occurrences, observed conditions, and guidance from state and federal agencies. Any future assessment of the risk from this hazard could be enhanced with better data specific to this hazard.

The city's geographic location, soil conditions, and surface terrain combine to minimize risk of major damage from landslides, subsidence (gradual shrinking of the earth's surface due to underground resource extraction), or other geologic hazards resulting from seismic activity and related natural forces. While Roseville is located on relatively level terrain, the land gradually increases in slope to the east and north. The most significant slope areas are located along creeks and ravine areas. The soil type in these ravine areas is a mehrten soil typical associated with post volcanic activity. This soil is very dense and not considered to be erosion prone. Therefore, the extent of the risk exposure to landslides would be considered negligible based on observed conditions.

Landslide Hazard Identification Program

This Landslide Hazard Identification Act directs the State Geologist to identify and map hazardous landslide areas for use by municipalities in planning and decision-making on grading and building permits. Three factors that characterize landslide hazard areas include significant slope, weak rocks, and heavy rains. This program focuses on urban areas and growth areas that exhibit these characteristics. Roseville and the surrounding Sacramento region are not identified as areas prone to landslide hazards. Therefore, the region has not been included as a part of this study program.

10.2.2 Previous Occurrences

Little recorded information for Roseville is available regarding previous landslide occurrences. Three landslide events have been recorded within Placer County according to the Placer County hazard Mitigation Plan. These events occurred in the eastern portion of the county, which is significantly different in geologic terms. Therefore, no parallel's can be interpolated from these events for the City of Roseville.

10.2.3 Probability of Future Landslides

Chapter 15 of this plan ranks the risks as they pertain to the City of Roseville. One of the parameters in establishing this ranking is probability of occurrence. The following thresholds have been established by the Hazard Mitigation Plan Steering Committee to rank the probability of occurrence.

- High: Event likely to occur within 25 years
- Medium: Event likely to occur within 100 years
- Low: Event not likely to occur within 100 years

Based on historical records of occurrence and the above definitions, the probability of occurrence for landslides in Roseville is considered low.

10.3 VULNERABILITY ASSESSMENT

Under 44 CFR Section 201.6(c)(2)(ii) of DMA2K, risk assessments are required to include a description of the jurisdiction's vulnerability to specified hazards and their potential impact on the community. This description should also describe Roseville's vulnerability in terms of the types and numbers of existing and future buildings, infrastructure, and critical facilities located in the hazard area and estimate potential dollar losses to vulnerable structures as well as analyze development trends. This sub-section presents the results of the landslide vulnerability assessment for Roseville.

10.3.1 Impact of Landslides on Life, Safety, and Health

Based on the best available data, observed conditions and past occurrences, it would appear that the probable impact of landslides on the life, safety, and health of the citizens of Roseville would be little or no impact. This is based on the lack of exposure of any structure or facility critical to the safety and health of the citizens of the city.

10.3.2 Impact of Landslides on Critical Facilities

Critical facilities are structures where vital community operations are performed. If these facilities are damaged, there could be severe consequences to public health and safety. Therefore, it is imperative that critical facilities be adequately protected from the impacts of hazard events. Critical facilities are not strictly defined by FEMA. Rather, local governments are encouraged to evaluate their own community and determine which facilities would be necessary during an emergency event. As such, the Steering Committee has defined a critical facility as:

> "A facility that is vital for the City's ability to provide essential services and protect life and property and/or the loss of which would have a severe economic or catastrophic impact."

Based on this definition, there are no Critical facilities subject to a landslide risk exposure. This is based on the information available at the time of this planning process. As stated earlier the data necessary to truly identify the potential vulnerability to landslides, if it exists, is not currently available. A critical facilities analysis should be performed as new risk based information (mapping) becomes available.

10.3.3 Impact of Landslides on Existing Structures At Risk

Based on observed characteristics such as location and estimation of slope percentage, there would appear to be no structures that are vulnerable impacts from a landslide. There have been no reported damages from this type of event and no record of past occurrences. Once better data in the form of landslide hazard and landslide susceptibility mapping become available, a more thorough vulnerability analysis can be performed.

10.3.4 Economic Impact from Landslides

There would appear to be little or no economic impact of a landslide should one occur within the city of Roseville. Based on observed conditions, those areas with potential susceptibility to a landslide due to slope, have no economic significance to the City of Roseville. The majority of these areas are in an open space use due to current City policies required by the General Plan, Safety Element. Roads and

infrastructure that service these areas could possibly be impacted, should a landslide occur. However, without better detailed data to analyze this susceptibility, this potential exposure and vulnerability simply can not be determined.

10.3.5 Impact of Landslides on Development and Redevelopment Trends

The area considered to be the most vulnerable to this risk exposure is a small geographical area in terms of entire city limits of Roseville. As stated earlier, these are ravine areas in the south eastern portion of Roseville, and are considered to be non-developable areas. This along with the fact that the probability of occurrence of this type of hazard is so low primarily due to the soil type in this region, would lead to the assumption that this hazard would have little or no impact on future development and redevelopment trends. The City's current land use policies would also ensure that no future development or re-development would be impacted by this hazard (see Section 4.2).

10.4 REVIEW OF EXISTING ORDINANCES, PROGRAMS, AND PLANS

The City of Roseville General Plan, Safety Element includes components that address geologic hazards such as landslides. Since 1975, state law has required that a safety element be included as part of all general plans. In 1984, the legislature consolidated the safety and seismic elements into one element that includes seismic safety, geologic hazards, fire safety, and flooding. The seismic and geologic hazards component includes goals and policies to protect the city's residents from danger associated with active faults, liquefaction, ground failure (landslides), and steep slopes. While the potential for seismic and geologic hazard occurrences in Roseville is not high, the soil and geologic characteristics of the city continue to play an important role in determining safety procedures.

While the potential for geologic hazards such as landslides in Roseville is not high, the soil and geologic characteristics of the city continue to play an important role in determining safety procedures. Current policies and ordinances reflect the City's ongoing obligations to protect lives and property and include ongoing monitoring of seismic activity and periodic updating of plans for emergency events. Continued implementation of these polices and enforcement of City ordinances and General Plan policies will ensure that efforts are maximized in protecting the safety of Roseville's citizens from potential geologic safety hazards. Policies and implementation measures were identified in the Seismic and Geologic component of the Safety Element that will mitigate the potential exposure to geologic hazards within Roseville. These policies are as follows:

- Continue to mitigate the potential impacts of geologic hazards through building plan review.
- Minimize soil erosion and sedimentation by maintaining compatible land uses, suitable to the existing environment.
- Develop appropriate building designs and implement appropriate construction techniques to decrease the impact of a landslide.
- Create and adopt slope development standards prior to or as part of the planning process for any area identified as having significant slope.
- Require contour grading, where feasible, and re-vegetation to mitigate the appearance of engineered slopes and to control erosion.

These policies are implemented through existing, ongoing programs that include the following:

- **California Building Code**—Through the Building Division of the Public Works Department, continue to enforce and keep abreast of the most recent updates to the CBC that include construction standards for seismic and geologic safety.
- **Development Review Process**—Refer any development proposal that may be impacted by grading, soil, or geologic issues to the Public Works Department. Consider the comments of the Public Works Department in the development review process. The environmental review for projects shall include a full inventory of potential grading impacts and any potential soil or geologic concerns, assessment of potential project impacts, and identification of mitigation and monitoring measures. Issues relating to slopes, liquefaction, ground failure and erosion shall be addressed. Project design, grading, and building construction techniques shall be used, as applicable, to minimize impacts. Sites that are determined to have significant slope shall be identified and appropriate design restrictions shall be implemented to avoid the risk of erosion or landslide. Graded slopes shall generally be limited to 2:1 where feasible. Slopes that are less than 2:1 should be encouraged. The use of retaining walls or stepped building designs should be pursued as an alternative to high or steep slopes where feasible and desirable.
- **Grading Ordinance**—Enforce and regularly evaluate the Grading Ordinance. The Grading Ordinance includes specific standards for project construction and erosion control. This ordinance requires prompt re-vegetation of disturbed areas, avoidance of grading activities during wet weather, avoidance of disturbance within drainage ways, and other erosion control measures.
- **Specific Plans**—Ensure that specific plans are consistent with the goals and policies of the General Plan. Specific plans shall identify potential geologic, soil, and seismic hazards within the planning area and shall also include measures to reduce the risk of such hazards. Proposed specific plans shall identify criteria for development on steep slope areas, as applicable, in order to ensure public safety and minimize environmental and aesthetic impacts.
- **Land Use Designation**—In areas where potentially significant soil and erosion impacts are identified, the City should consider open space or other appropriate land use designations, as specific in the Land Use Element, to minimize potential impacts.

10.5 REVIEW OF MITIGATION ALTERNATIVES

After assessing the vulnerabilities to this hazard through the risk assessment process, the Planning Team and Steering Committee has determined the probable impacts to the City of Roseville from this type of hazard event to be very low. Therefore the time and effort allocated to the review of possible mitigation alternatives for this hazard was kept to a minimum.. The list of possible mitigation measures for this hazard can be found in the catalog of mitigation measures for the landslide hazard in Chapter 17 of part 4 of this plan.

CHAPTER 11
HUMAN-CAUSED HAZARD RISK ASSESSMENT

Under 44 CFR Section 201.6(2)(i) of DMA2K, local mitigation plans are required to include a risk assessment with a description of the types of natural hazards that can affect the jurisdiction. While DMA 2K does not require the assessment of human-caused hazards, City of Roseville officials are including human-caused hazards in the City's Multi-Hazard Mitigation Planning effort. This decision was based on several factors:

- The City of Roseville takes a proactive approach to customer service and disaster preparedness, especially in an effort to protect the public safety of our citizens;
- Any preparation for and response to a human-caused disaster will involve many of the same staff training, critical decisions, and commitment of resources as a natural hazard;
- The Multi-Hazard Mitigation Planning effort is an opportunity to better inform the public about all hazards including human-caused hazards;
- The likelihood of a human-caused hazard in Roseville is greater than several of the identified natural hazards in this Plan; and
- The City has a Terrorism Contingency Plan (June 2004) and a Hazardous Materials Contingency Plan (September 2004) already in place with instructions for a response by City of Roseville first responders and staff to the Emergency Operations Center (EOC).

11.1 IDENTIFYING HAZARDS—DESCRIPTION OF HUMAN-CAUSED HAZARD

Human-caused hazards fall into two categories:

- Acts of Terrorism are intentional, criminal, and malicious. According to the Federal Bureau of Investigation (FBI), terrorism is either foreign or domestic, depending on the origin, base, and objectives of the terrorist or organization.
- Technological hazards refer to incidents that arise from human activities such as the manufacture, transportation, storage and use of hazardous materials. These incidents are assumed to be accidental in nature with unintended consequences.

Acts of Terrorism are intentional, criminal, and malicious. According to the Federal Bureau of Investigation (FBI), terrorism is either foreign or domestic, depending on the origin, base, and objectives of the terrorist or organization.

Technological Hazards are incidents that arise from human activities such as the manufacture, transportation, storage and the use of hazardous materials. These incidents are assumed to be accidental in nature with unintended consequences.

This report does not include the risk assessment, vulnerability analysis, or mitigation for protection of the City of Roseville's Water Treatment Facilities. Roseville has already evaluated water treatment facilities per EPA requirements in a separate report. For vulnerability assessment results as well as suggested mitigation strategies to protect the City's water infrastructure, contact the Roseville City Manager's Office.

11.1.1 Terrorism and Weapons of Mass Destruction

The FBI categorizes terrorism in the United States primarily as one of two types—domestic terrorism or international terrorism. Domestic terrorism involves groups or individuals whose terrorist activities are

directed at elements of our government or population without foreign direction. The bombing of the Alfred P. Murrah federal building in Oklahoma City is an example of domestic terrorism. The Department of Justice FBI is the primary response agency for domestic terrorism. The FBI coordinates domestic preparedness programs and activities of the United States to limit acts posed by terrorists including the use of WMDs.

International terrorism involves groups or individuals whose terrorist activities are foreign-based and/or directed by countries or groups outside the United States or whose activities transcend national boundaries. The 1993 bombing of the World Trade Center, the U.S. Capitol, and Mobil Oil's corporate headquarters and more recently, the events of September 11, 2001 at both World Trade Center buildings and the Pentagon were examples of well-planned terrorist attacks involving the use of commercial aircraft as high profile, flying bombs.

The three key elements to defining a terrorist event are as follows:

- Activities involving the use of illegal force
- Actions are intended to intimidate or coerce
- Actions are committed in support of political or social objectives

As detailed in the City's Terrorism Contingency Plan, at least three important considerations distinguish terrorism hazards from other types of hazards. First, in the case of chemical, biological, and radioactive agents, their presence may not be immediately obvious, making it difficult to determine when and where they may have been released, who has been exposed, and what danger is present for first responders and emergency medical technicians. Second, there is limited scientific understanding of how these agents affect the population at large. Third, terrorism evokes very strong emotional reactions, ranging from anxiety, to fear, to anger, to despair, to depression.

Those involved with terrorism response including Public Health and Public Information staff are trained to deal with the public's emotional reaction swiftly as response to the event occurs. The area of the event must be clearly identified in all emergency alert messages to avoid the those not affected by the incident from overwhelming local emergency rooms and response resources therefore reducing service to those actually affected. The public will be informed clearly and frequently about what government agencies are doing to mitigate the impacts of the event. The public will also be given clear directions on how to protect the health of individuals and families.

Pursuant to FEMA 386-7, terrorism refers to the use of weapons of mass destruction (WMD), including biological, chemical, nuclear and radiological weapons; arson, incendiary, explosive and armed attacks; industrial sabotage and intentional hazardous materials releases; agro-terrorism and cyber-terrorism.

Weapons of Mass Destruction are defined as chemical, biological, radiological, nuclear, and explosive weapons associated with terrorism.

The following hazards are potential methods used by terrorists that can affect the City of Roseville either as a target directly or collaterally:

- Conventional bomb
- Biological agent
- Chemical agent
- Nuclear bomb
- Radiological agent
- Arson/incendiary attack
- Armed attack
- Cyberterrorism
- Agro-terrorism
- Intentional hazardous material release

Table 11.1 provides a hazard profile summary for terrorism related hazards. For each type of hazard, the following factors are addressed:

- **Application Mode**—Application mode describes the human act(s) or unintended event(s) necessary to cause the hazard to occur.
- **Duration**—Duration is the length of time the hazard is present on the target. For example, the duration of a tornado may be just minutes, but a chemical warfare agent such as mustard gas, if unremediated, can persist for hours or weeks under the right conditions.
- **Dynamic or Static Characteristic**—These characteristics of a hazard describe its tendency, or that of its effects, to either expand, contract, or remain confined in time, magnitude, and space. For example, the physical destruction caused by an earthquake is generally confined to the place in which it occurs, and it does not usually get worse unless aftershocks or other cascading failures occur; in contrast, a cloud of chlorine gas leaking from a storage tank can change location by drifting with the wind and can diminish in danger by dissipating over time.
- **Mitigation and Exacerbating Conditions**—Mitigating conditions are characteristics of the target and its physical environment that can reduce the effects of a hazard. For example, earthen berms can provide protection from bombs; exposure to sunlight can render some biological agents ineffective; and effective perimeter lighting and surveillance can minimize the likelihood of someone approaching a target unseen. In contrast, exacerbating conditions are characteristics that can enhance or magnify the effects of a hazard. For example, depressions or low areas in terrain can trap heavy vapors, and a proliferation of street furniture (trash receptacles, newspaper vending machines, mail boxes, etc.) can provide hiding places for explosive devices.

Most terrorist events in the United States have been bombing attacks, involving detonated and undetonated explosive devices, tear gas, pipe bombs, and firebombs. The effects of terrorism can vary from loss of life and injuries to property damage and disruptions in services such as electricity, water supplies, transportation, or communications. Any of the methods above may have an immediate effect or a delayed effect. Terrorists often choose targets that offer limited danger to themselves and areas with relatively easy public access. Foreign terrorists look for visible targets where they can avoid detection before and after an attack such as international airports, large cities, major special events, and high-profile landmarks.

In dealing with intentional human-caused hazards, the unpredictability of human beings must be considered. People with a desire to perform criminal acts may seek out targets of opportunity that may not fall into established lists of critical areas or facilities. The City of Roseville first responders train not only to respond to organized terrorism events, but also to respond to random acts by individuals who, for a variety of reasons ranging from fear to emotional trauma to mental instability, may choose to harm others and destroy property.

While education, heightened awareness, and early warning of unusual circumstances may deter crime and terrorism, the possibility exists that intentional acts that harm people and property are possible at any time. Public safety entities would then react to the threat, locating, isolating, and neutralizing further damage and investigating potential scenes and suspects to bring criminals to justice.

TABLE 11.1.
EVENT PROFILES FOR TERRORISM

Hazard	Application Mode	Hazard Duration	Extent of Effects; Static/Dynamic	Mitigating and Exacerbating Conditions
Conventional Bomb	Detonation of explosive device on or near target; delivery via person, vehicle, or projectile.	Instantaneous; additional "secondary devices, and/or diversionary activities may be used, lengthening the time duration of the hazard until the attack site is determined to be clear.	Extent of damage is determined by type and quantity of explosive. Effects generally static other than cascading consequences, incremental structural failure, etc.	Overpressure at a given standoff is inversely proportional to the cube of the distance from the blast; thus, each additional increment of standoff provides progressively more protection. Terrain, forestation, structures, etc. can provide shielding by absorbing and/or deflecting energy and debris. Exacerbating conditions include ease of access to target; lack of barriers and shielding; poor construction; and ease of concealment of device.
Chemical Agent	Liquid/aerosol contaminants can be dispersed using sprayers or other aerosol generators; liquids vaporizing from puddles/ containers; or munitions.	Chemical agents may pose viable threats for hours to weeks depending on the agent and the conditions in which it exists.	Contamination can be carried out of the initial target area by persons, vehicles, water, and wind. Chemicals may be corrosive or otherwise damaging over time if not remediated.	Air temperature can affect evaporation of aerosols. Ground temperature affects evaporation of liquids. Humidity can enlarge aerosol particles, reducing inhalation hazard. Precipitation can dilute and disperse agents but can spread contamination. Wind can disperse vapors but also cause target area to be dynamic. The micro-meteorological effects of buildings and terrain can alter travel and duration of agents. Shielding in the form of sheltering in place can protect people and property from harmful effects.
Arson/ Incendiary Attack	Initiation of fire or explosion on or near target via direct contact or remotely via projectile.	Generally minutes to hours.	Extent of damage is determined by type and quantity of device, accelerant, and materials present at or near target. Effects generally static other than cascading consequences, incremental structural failure, etc.	Mitigation factors include built-in fire detection and protection systems and fire-resistive construction techniques. Inadequate security can allow easy access to target, easy concealment of an incendiary device, and undetected initiation of a fire. Non-compliance with fire and building codes, as well as failure to maintain existing fire protection systems, can substantially increase the effectiveness of a fire weapon.

TABLE 11.1 (continued).
EVENT PROFILES FOR TERRORISM

Hazard	Application Mode	Hazard Duration	Extent of Effects; Static/Dynamic	Mitigating and Exacerbating Conditions
Armed Attack	Tactical assault or sniping from remote location, or random attack based on fear, emotion, or mental instability.	Generally minutes to days.	Varies based on the perpetrators' intent and capabilities.	Inadequate security can allow easy access to target, easy concealment of weapons, and undetected initiation of an attack.
Biological Agent	Liquid or solid contaminants can be dispersed using sprayers/ aerosol generators or by point or line sources such as munitions, covert deposits, and moving sprayers.	Biological agents may pose viable threats for hours to years depending on the agent and the conditions in which it exists.	Depending on the agent used and the effectiveness with which it is deployed, contamination can be spread via wind and water. Infection can spread via human or animal vectors.	Altitude of release aboveground can affect dispersion; sunlight is destructive to many bacteria and viruses; light to moderate wind will disperse agents but higher winds can break up aerosol clouds; the micro-meteorological effects of buildings and terrain can influence aerosolization and travel of agents.
Cyber-terrorism	Electronic attack using one computer system against another.	Minutes to days.	Generally no direct effects on built environment.	Inadequate security can facilitate access to critical computer systems, allowing them to be used to conduct attacks.
Agro-terrorism	Direct, generally covert contamination of food supplies or introduction of pests and/or disease agents to crops and livestock.	Days to months.	Varies by type of incident. Food contamination events may be limited to specific distribution sites, whereas pests and diseases may spread widely. Generally no effects on built environment.	Inadequate security can facilitate adulteration of food and introduction of pests and disease agents to crops and livestock.
Radiological Agent	Radioactive contaminants can be dispersed using sprayers/ aerosol generators, or by point or line sources such as munitions.	Contaminants may remain hazardous for seconds to years depending on material used.	Initial effects will be localized to site of attack; depending on meteorological conditions, subsequent behavior of radioactive contaminants may be dynamic.	Duration of exposure, distance from source of radiation, and the amount of shielding between source and target determine exposure to radiation.

TABLE 11.1 (continued).
EVENT PROFILES FOR TERRORISM

Hazard	Application Mode	Hazard Duration	Extent of Effects; Static/Dynamic	Mitigating and Exacerbating Conditions
Nuclear Bomb	Detonation of nuclear device underground, at the surface, in the air, or at high altitude.	Light/heat flash and blast/shock wave last for seconds; nuclear radiation and fallout hazards can persist for years. Electromagnetic pulse from a high-altitude detonation lasts for seconds and affects only unprotected electronic systems.	Initial light, heat, and blast effects of a subsurface, ground, or air burst are static and determined by the device's characteristics and employment; fallout of radioactive contaminants may be dynamic, depending on meteorological conditions.	Harmful effects of radiation can be reduced by minimizing the time of exposure. Light, heat, and blast energy decrease logarithmically as a function of distance from seat of blast. Terrain, forestation, structures, etc. can provide shielding by absorbing and/or deflecting radiation and radioactive contaminants.
Intentional Hazardous Material Release (fixed facility or transportation)	Solid, liquid, and/or gaseous contaminants may be released from fixed or mobile containers	Hours to days.	Chemicals may be corrosive or otherwise damaging over time. Explosion and/or fire may be subsequent. Contamination may be carried out of the incident area by persons, vehicles, water, and wind.	As with chemical weapons, weather conditions directly affect how the hazard develops. The micro-meteorological effects of buildings and terrain can alter travel and duration of agents. Shielding in the form of sheltering in place can protect people and property from harmful effects. Non-compliance with fire and building codes, as well as failure to maintain existing fire protection and containment features, can substantially increase the damage from a hazardous materials release.

Source: FEMA 386-7

11.1.2 Technological Hazards

Technological hazards refer to incidents that arise from human activities such as the manufacture, transportation, storage and the use of hazardous materials. These incidents are assumed to be accidental in nature with unintended consequences. Technological hazards in Roseville can be categorized as follows:

- Hazardous Materials Incidents
- Utility Losses
- Data and Telecommunications Disruptions
- Water/Wastewater Disruption
- Air and Transportation Accidents
- Infrastructure Threats

Hazardous Material—Hazardous material is a substance or combination of substances which because of quantity, concentration, physical, chemical, or infectious characteristics, may cause or contribute to an increase in mortality or an increase in serious irreversible or incapacitating reversible illness, or pose a present or potential hazard to human life, property, or the environment. Hazardous waste is included in the City's working definition.

Source: City of Roseville Hazardous Materials Contingency Plan

Hazardous Materials Incidents

Except for severe weather and flooding, hazardous materials incidents are the most likely hazards to affect the City of Roseville.

Title 49 of the CFR lists thousands of hazardous materials including flammable substances such as gasoline, insecticides, household cleaning products, and radioactive materials. State regulated substances that have the greatest probability of adversely impacting the community are listed in the CCR, Title 19.

Hazardous material incidents typically occur in two ways, fixed facility incidents and transportation incidents. The major difference between the two is that it is possible to identify and prepare for a fixed site incident because federal and state laws require those facilities to notify state and local authorities about what is being used or produced at the site. Transportation incidents are more difficult to prepare for because there is little if any notice about what materials could be involved should an accident happen.

Hazardous materials are present in nearly every city and county in the United States in facilities that produce, store, or use them. For example, water treatment plants use chlorine on-site to eliminate bacterial contaminants. Hazardous materials are transported along interstate highways and railways daily. Even the natural gas used in every home and business is a dangerous substance when a leak occurs.

Fixed Facility Hazardous Materials Incident

This is the occurrence of uncontrolled release of materials from a fixed site capable of posing a risk to health, safety and property as determined by the EPA's Resource and Conservation Act (RCRA).

Hazardous Materials Transportation Incident

This is any occurrence resulting in uncontrolled release of materials during transport that can pose a risk to health, safety, and property as defined by Department of Transportation Materials Transport regulations. Hazardous materials are transported via ground along highways and railways. The volume of materials including everything from acutely hazardous materials to ordinary household products is high when considering the use of materials in every home and local government in the country.

According to a February 20, 2005 *Sacramento Bee* article, "Union Pacific carried 9.2 million carloads of freight in 2003…throughout the West and part of the South and Midwest." The article also quotes a Union Pacific spokeswoman as estimating that "'Less than 5 percent of cargo that moves through our West Coast operations is hazardous material."

In addition to materials such as chlorine that are shipped throughout the country by rail, thousands of shipments of radiological materials, mostly medical materials and low-level radioactive waste, take place via ground transportation across the United States. Many incidents occur in sparsely populated areas and affect very few people. There are occasions, however, where materials are involved in accidents in areas with much higher population densities such as the January 6, 2005 train accident in Graniteville, South Carolina that released chlorine gas killing nine, injuring 500, and causing the evacuation of 5,400 residents. Fortunately, such events are rare.

Hazardous materials transportation incidents can occur at any place within the country, although the vast majority occur on the interstate highways or major federal or state highways, or on the major rail lines.

Interstate Pipeline Hazardous Materials Incident

There are a significant number of interstate natural gas, heating oil, and petroleum pipelines running through the State of California. These are used to provide natural gas to the utilities in California and to transport these materials from production facilities to end-users.

Utility Losses

The City of Roseville provides electricity, water treatment and distribution, and wastewater collection and treatment services to citizens and businesses within the city limits. The City also provides solid waste collection and disposal at the Regional Landfill located just north of the city limits in unincorporated Placer County. Loss of these services would mean a potential life-threatening situation in the case of electricity for medically dependent residents, and a public health threat if the services are disrupted for some time due to accidental or terrorist acts.

A power failure is any interruption or loss of electrical service due to disruption of power generation or transmission caused by an accident, sabotage, natural hazards, equipment failure, or fuel shortage. These interruptions can last anywhere from a few seconds to several days. Power failures are considered significant only if the local Emergency Management Organization is required to coordinate basic services such as the provision of food, water, and heating as a result. Power failures are common with severe weather and winter storm activity.

The City of Roseville Electric Utility is responsible for operating and maintaining the electrical transmission and distribution system in Roseville. The City supplies electricity to over 41,000 residential customers and 5,200 commercial and industrial customers within the city's 35 square mile area.

The City of Roseville maintains approximately 49 miles of electrical transmission lines, 13 miles of distribution lines, and 13 electrical substations in Roseville. The distribution lines and substations deliver 315 megawatts during peak demand period that occur from June through September.

The City has the highest reliability in the country for municipal utilities of Roseville Electric's size, due in large part to a redundant system with sophisticated interconnection between the facilities and immediate notification should failure occur along the distribution system. Despite the recent California electric crisis and brownouts in some parts of the state in 2000 and 2001, the City of Roseville, through its load management program and load shedding agreements with large, local electric users, avoided any outages as a result of the State's energy woes.

The City is taking a proactive approach to maintaining its reliability standards by building a local generation source—the Roseville Energy Park—scheduled to come on-line in summer 2007. The Roseville Energy Park will be a natural gas-fired, combined-cycle electrical generating facility and will provide 60 percent of the city's electricity needs. The project is proposed for a 12-acre site off of Phillip Road and will be owned by the City of Roseville.

Data and Telecommunications

The loss of data and/or telecommunications is often a secondary hazard to many of the natural and other human-caused hazards experienced by cities throughout the country. Data and telecommunications provide a primary method for service to the community by the government and the private sector. A loss of data and telecommunications could result in loss of emergency dispatch capabilities, emergency planning services, infrastructure monitoring capabilities, access to statistical data, and loss of financial and personnel records.

Water/Wastewater Disruption

Water and/or wastewater disruption would also be a secondary impact from a natural disaster or intentional act. The City of Roseville receives surface water from the Folsom Reservoir, a one million acre-feet multi-purpose facility located due east of the city limits. A breach in the dam or the pipelines that carry water to the City's Water Treatment Plant on Barton Road in Granite Bay would have significant temporary impacts on the city until such time that alternative water sources including water from other regional purveyors and groundwater are pumped and treated. Long-term disruption of the water source from Folsom Lake would have significant impacts on the residences and businesses in Roseville should the demand exceed secondary supplies and water conservation measures do not provide enough relief to reduce demand equal to the secondary supplies.

Disruption of the City's wastewater collection and wastewater treatment plants at Dry Creek and the new $120 million facility on Pleasant Grove Creek would also have significant citywide and regional impacts should the system be overwhelmed by a significant storm or discharge of materials in such quantities that the treatment plant cannot adequately treat the waste. Natural hazards such as earthquake, flood damage or major power outages, or terrorism directed at the facilities and systems could disrupt the process of treating millions of gallons of waste.

Wastewater treatment plants may also have emergencies internal to the plant such as chlorine gas leaks or oxygen deficiencies that render them incapable of treating waste. The disruption of service may also have significant environmental impacts to the waterways adjacent to the treatment plants.

Air and Transportation Accidents

Air and transportation accidents are incidents involving air or rail passengers resulting in death or serious injury. As the population in Roseville, the region and the state increase, the likelihood of transportation accidents increases with higher volumes and additional roadway miles being constructed.

Infrastructure Threats

Infrastructure threats include threats to telecommunications, utility transportation, economic, information and other systems that allow society to function as it is accustomed to. This threat will increase in the future, and such an event directed at any one of these systems could affect the ability of the city's population to go about life in a normal manner.

11.1.3 Civil Disorder

Civil disorder includes incidents intended to disrupt a community to the degree that law enforcement intervention is required to maintain public safety, these incidents are generally associated with controversial political, judicial, or economic issues and/or events and may occur at any time of the year, although statistics indicate they are more frequent during the summer months. While the City of Roseville does not have a history of civil disorder or rioting, large public gatherings, often associated with concerts or sports events, have overburdened local law enforcement and fire protection resources in the past.

The effects of civil disorders and riots are varied and on the type of event, its severity, scope, and duration. Essential services (e.g., electricity, water, public transportation, communications, etc.), may be disrupted, or property damage, injuries, and loss of life may occur.

Certain facilities may be at risk more than others during civil disorders, including the following:

- Federal, state and local government buildings

- Schools and colleges
- Utilities
- Correctional facilities

11.2 HUMAN-CAUSED HAZARD PROFILE

11.2.1 Location and Extent

State of California

The State of California and Office of Homeland Security have identified numerous high profile targets for potential terrorists in California. Large population centers, high visibility tourist attractions, and critical infrastructure accessible to the public present security challenges of an ongoing nature in California.

The network of highways, railways, ports and airports used to transport significant amounts of hazardous materials for commercial and industrial uses in the United States and foreign countries poses a significant technological hazards threat.

Region

Hazardous materials incidents may occur at any time, in populated or remote areas of Placer County, Multiple incidents may happen simultaneously and all typically require a multi-agency, multi-jurisdictional response.

Local

The Roseville Hazardous Materials Contingency Plan lists those local areas with the greatest likelihood of hazardous materials incidents.

Transportation Routes

Highways, railways, and commercial or military aviation routes constitute a major threat due to the number of chemicals and hazardous substances, including radioactive materials, transported in vehicles, trains, and aircraft.

The City of Roseville includes several transportation facilities, all with the potential for human-caused hazards to occur. Interstate 80 and State Route 65 bisect the City of Roseville.

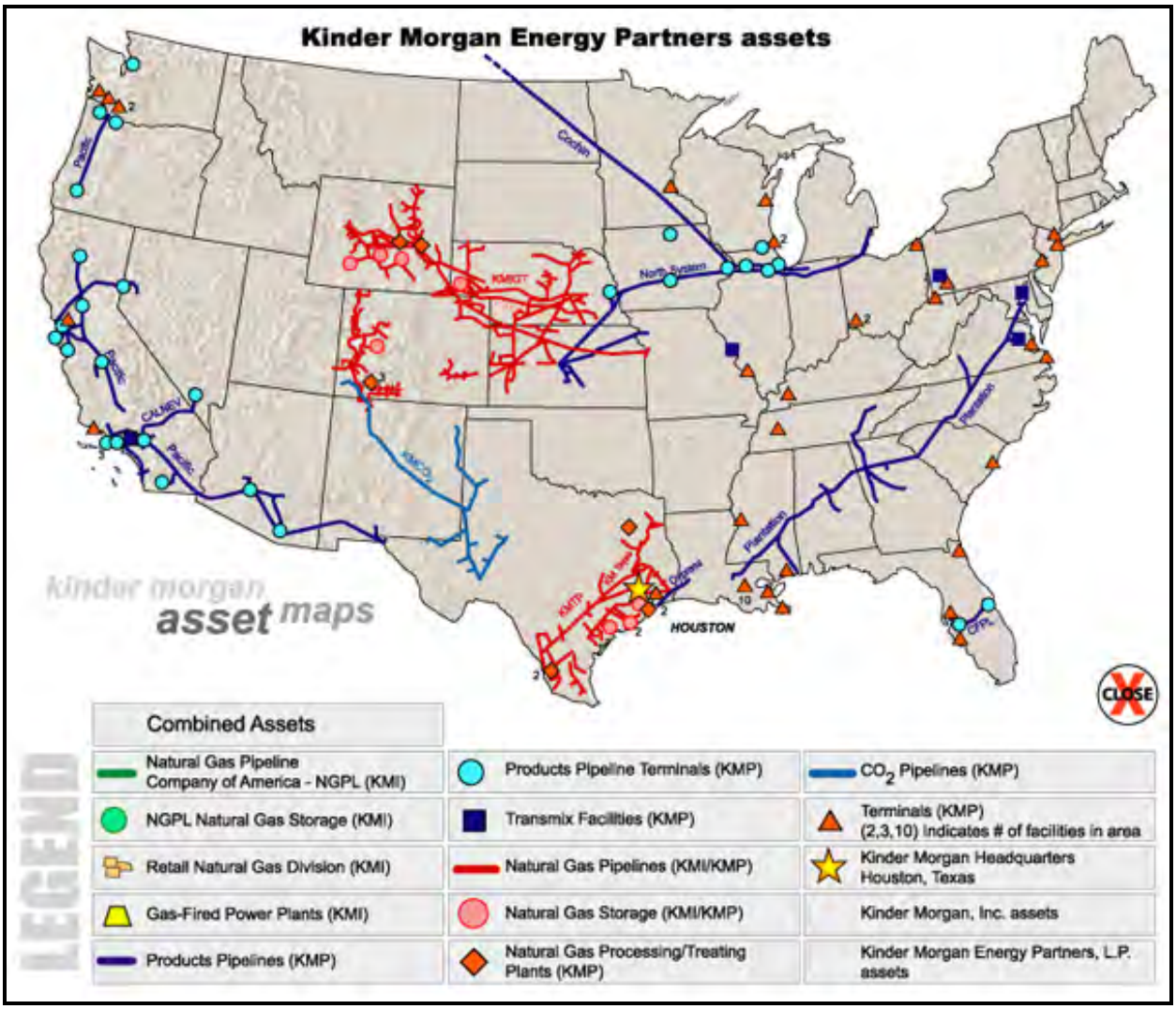
The City of Roseville is the location of the largest train yard west of the Mississippi. The J.R. Davis Yard in Roseville is a major Union Pacific (UP) switching center built in 1907. The 850-acre yard includes136 miles of track. The site includes a former railcar rebuilding

facility, the Antelope Yard, fueling areas, and diesel servicing facilities. The site has been designated as contaminated by the federal government with substances including volatile organics, chlorinated solvents, polynuclear aromatic hydrocarbons, and heavy metals present due to the nearly 90 years of continuous use as a railroad repair and switching facility. Remediation is ongoing at the site.

The city is more than 20 miles from Sacramento International Airport and is not in the direct flight path for the airport, although planes do cross Roseville continuously at high altitudes. Beale Air Force Base is 34 miles to the north and is the closest active military installation.

Pipelines

Pipelines transport an assortment of liquid fuels under pressure. The Kinder Morgan company owns three miles of pipeline facilities generally parallel to the Union Pacific railroad tracks in Roseville that transport high volumes of natural gas through the city. Other natural gas pipelines run along Interstate 80 with connections between Roseville and Chico. The route to Chico travels from the tank farm in Rocklin, through residential areas to Chico. The trans-Sierra route from the tank farm in Rocklin to Reno roughly follows the same track as Interstate-80. Pacific Gas and Electric maintains natural gas pipelines in and through Roseville as well.



Business and Industrial Areas

Retail, manufacturing and light industrial firms near State Route 65 (northeastern Roseville and the Sunset Industrial Area of Rocklin) are areas of concern. These facilities have the highest concentration of hazardous materials at fixed facilities in Roseville due to their manufacturing operations. Each business is required to file a detailed, confidential plan with the Roseville Fire Department regarding materials on-site and safety measures taken to protect the public.

Agricultural

Accidental releases of pesticides, fertilizers, and other agricultural chemicals may be harmful to both humans and the environment. Agricultural pesticides are transported daily in and around the City of Roseville en route to their destination in the more rural areas of Placer County.

Illegal Drug Operations

Illegal operations such as methamphetamine or drug laboratories pose a significant threat. Laboratory residues are often dumped along roadways or left in rented hotel rooms, creating a serious health threat both to unsuspecting individuals and to the environment.

Illegal Dumping Sites

Hazardous wastes such as used motor oil, solvents, or paint are occasionally dumped in remote areas of Placer County and Roseville or along roadways, creating a potential health threat both to unsuspecting individuals and to the environment.

Radioactive Materials

Licensed carriers transport radioactive materials along several transportation routes (Interstate 80 and the railroads) through the City of Roseville. The City is notified in advance of these shipments and commits resources as a standby measure should an accident occur.

11.2.2 Human-Caused Hazard Event History

State of California

Terrorism Events

According to the Governor's Office of Emergency Services Terrorism Response Plan, the State of California has had a long history of defending the public against terrorist groups, including domestic and foreign terrorists. Domestic terrorist groups in California have been focused on political or social issues, while the limited internationally based incidents have targeted the state's immigrant communities due to foreign disputes. Advanced technologies and communication have allowed these groups to become more sophisticated and better organized with remote members linked electronically.

Technological Hazard Incidents

No comprehensive source was found either through the State of California websites or through personal contact with the Sacramento Regional Office of Homeland Security for Technological Hazard Incidents

in the State of California. Given the complex system of transportation networks, the large population, and the number of businesses in California, incidents occur on a regular basis throughout the State as reported by the news media.

Region

Terrorism Events

Eco-terrorism. Development projects in Placer County were the subject of arson activity by an individual who claimed to be an eco-terrorist from the Earth Liberation Front or ELF. ELF is a splinter group of Earth First!, a radical environmental activist movement. ELF is a somewhat active domestic terrorism group that uses eco-sabotage to protect the Earth and seek revenge on "those who are destroying the Earth and its inhabitants."

Domestic Terrorism. On December 3, 1999, the FBI arrested two anti-government militia members who planned a bomb attack at the Suburban Propane facility in Elk Grove, CA. The alleged plot involved a plan to blow up the Suburban Propane site which stores about 24 million gallons of liquefied propane and is located one mile from residential homes. According to the Sacramento Bee, the plot resulted in heightened on-site security and a year-long investigation resulting in the two arrests.

Technological Hazard Incidents

Placer County and the incorporated cities within the City have been the location of many accidental hazardous materials incidents in the past. With the presence of high pressure gas lines in the County, accidents have occurred that have caused injury and property damage.

An underground Kinder Morgan pipeline failed in 2002 (Source: Roseville Fire Department, pers. Com with Battalion Chief Jeff Carman) causing a significant spill of diesel fuel within a Rocklin neighborhood adjacent to where the breach occurred.

Air and Transportation Accidents

The Sacramento region was once the location of three large military installations including the Sacramento Army Depot, Mather Air Force Base and McClellan Air Force Base. All three have been decommissioned and transferred to civilian uses. The only active military installation is Beale Air Force Base located to the north near Yuba City, California.

The risk of airline accidents in the area has diminished with the closure of McClellan Air Force Base, the closest military base to the City of Roseville. A review of the McClellan Fire Department history (in Table 11.2, shows that several responses were made to aircraft accidents near Roseville, but never within the city limits.

On February 16, 2000, an aircraft crashed after take-off from the Sacramento Mather Airport in Rancho Cordova, California. The cargo flight was bound for Dayton, Ohio and all three crewmembers were killed. The cause of the accident was a mechanical failure. The aircraft crashed into an automobile salvage yard. This is the most recent airplane accident in the Sacramento Region as reported on the National Transportation Safety Board (NTSB) website.

TABLE 11.2.
ACCIDENTS RESPONDED TO BY MCCLELLAN FIRE DEPARTMENT 1950-1980s

Timeframe	Incident
Early 1950s	Apparatus responded to Code 3 alarm at Travis Air Force Base for B29 crash that involved a nuclear weapon
October 29, 1951	B29 making an emergency landing crashed and caught fire on Runway 16 injuring 11 crewmen. One firefighter died.
Mid-1950s	EC-121 crashed near Watt Avenue and U Street in Sacramento
Mid-1960s	F-104 crashed next to Haggin Oaks Golf Course.
April 28, 1973	McClellan Fire Department responded to mutual aid at Roseville Railyard fire
1982	Multiple alarm structure fire including a chemical warehouse. Toxic smoke column closed Interstate 80 for several hours
Early 1980s	HH-53 helicopter crashed near PFE Road during an air show at McClellan Air Force Base. The helicopter was attempting a refueling operation with a C-130 refueler when the hose became entangled in the rotor.
Early 1980s	F-111 crashed near Woodland

Source: McClellan Fire Department History

Local

Terrorism

Terrorism incidents in Roseville have been limited to individuals seeking to cause damage in domestic disputes or at Roseville schools. Pipe bombs have been left at a school facility in one past occurrence. No WMDs have been used in a terrorist attack in Roseville.

Technological Hazards

The City of Roseville has had a number of accidental incidents at the Roseville Railyard, private businesses and City facilities. The Fire Department has been called to both the Oakmont High School pool and the Roseville Aquatics Center for chlorine leaks. Sewage spills have occurred on occasion and overflowed into the city's creeks. Roseville railyard accidents have included derailments and leaks of toxic chemicals from transporting hazardous materials in the wrong type of railcars.

Hazardous Materials Transportation Incidents

The worst disaster in Roseville's history occurred on April 28, 1973 when a train loaded with munitions bound for Vietnam caught fire in the Roseville Yard (see box on next page). No lives were lost, but significant damage to property in Roseville and jurisdictions in Sacramento County occurred during the 18 hours of explosions.

In 1997, a number of unexploded bombs were discovered at the yard during construction of a modernization project (see box on page 11-16).

1973 ROSEVILLE RAILYARD DISASTER

Roseville's history parallels that of the transcontinental railroad. The federal government passed the act to build the transcontinental railroad in 1862 and shortly thereafter the Central Pacific Railroad was started in Sacramento in 1863. A northern route for the first transcontinental rail line was selected when the South seceded from the Union during the Civil War, and Trustees Charles Crocker, Mark Hopkins, Collis P. Huntington and Leland Stanford started construction on this northern line. The line extended from Sacramento to Rocklin by May 1864 and then construction across the Sierra Nevada Mountains began.

The first structure in Roseville was built in 1864 to serve as a freight and passenger depot for the fledgling railroad. In December 1905, a decision by the Central Pacific Railroad to move the division headquarters from Rocklin to Roseville meant a development boom for Roseville. The junction of the Central Pacific Railroad and the California Central, a north-south line became Roseville, where the largest artificial ice plant in the world operated to keep California's fruit and vegetables fresh as they were transported by rail car to the East. The Pacific Fruit Exchange Ice Plant operated from 1908 to 1974 when all of Southern Pacific's 21,000 rail cars were self-refrigerating.

During wartime, Roseville was a hub of activity as troops and war materials moved through the Roseville rail yards. Thousands of munitions shipments moved through Roseville during World Wars I and II, the Korean and Vietnam conflicts, and Desert Storm.

The largest human-caused disaster in the local area occurred on April 28, 1973 when a wooden floor in a munitions boxcar caught fire from brake shoe sparks. A train engine pulling 103 cars, including 21 Department of Defense freight cars with 7,056 Mark 81 bombs, was loaded at the Navy's ammunition depot in Hawthorne, Nevada on their way to western ports and the Vietnam War.

As the train pulled in to the Roseville yard just west of the Roseville city limits, one of the cars caught fire and the flames spread, igniting other freight cars on the tracks, which were 21 rails wide. Nearly every car was loaded with cargo including paint, lumber, and fertilizer. The most dramatic explosions occurred when cars carrying liquid propane caught fire resulting in explosions that blew out windows five miles away and could be heard 100 miles away. Metal and wood was thrown 3,000 feet into the air.

The result was a series of explosions that caused damages of more than $5.6 million in Roseville and the neighboring communities of Citrus Heights, Antelope, and North Highlands. No lives were lost, but over 100 people were treated for assorted cuts and bruises caused by broken glass and flying debris.

After 18 hours of explosions, Army munitions teams recovered 1,200 unexploded bombs scattered around the area and collected another 300 from rail cars. Aerial photographs from that time show a railroad smoldering and piled with twisted track, shattered cars, and scraps of metal from bomb casings. Much of the debris was buried in the 10-foot-deep craters left by the blast.

Milestones & Memories: the Story of Roseville, California, 1850-2000 by Leonard "Duke" Davis

1997 BOMB DISCOVERY

In 1997, Union Pacific Railroad began work on a $130 million project to modernize the Roseville train yard, including significant automation improvements and the replacement of 86 miles of track with 136 miles of new track.

During project grading, backhoe operators uncovered a Mark 81 bomb intact. Bomb disposal experts from Moffett Field in Mountain View, California were flown in by the Sacramento Sheriff's Department to dispose of the bomb, which they do by digging a pit and exploding the ordnance. When another eight bombs were discovered at the western end of the yard in Antelope, California unexploded ordnance experts from Moffett Field were called back and made the decision to place the bombs in pits and build berms around them. The Sacramento County Sheriff evacuated 300 to 400 homes near the rail yard, and at 2 a.m. blew up the bombs. The explosions shattered windows, cracked walls, and rained shrapnel through the roofs of nearby homes

In all, recovered materials included 16 unexploded MK 81 bombs; 11 partial fragments containing explosive residue; 8,625 pounds (4.31 tons) of bomb fragments; and 131,560 pounds (65.78 tons) of ferrous material. Experts found the bombs were not fused (armed), making them less likely to accidentally detonate. The bombs not destroyed on-site were packaged and transported to a facility in Colfax, Louisiana for detonation.

Air and Transportation Accidents

An aviation accident has never occurred in the City of Roseville. Regional airports include Sacramento International Airport located in northwestern Sacramento County and the Lincoln and Auburn Airports in Placer County. Sacramento International Airport operates continuously with two major runways and thousands of passengers traveling via commercial and private airlines. Several major airlines operate out of Sacramento International Airport with most flying light to medium weight passenger jets. General approaches to Sacramento International Airport are from the north and south. Approach and takeoff

patterns are usually over rural farmland, however, occasionally patterns are adjusted over more populated locations including Roseville.

Additional airports within a 20-mile radius of Roseville include the Auburn Municipal Airport, Beale Air Force Base, McClellan Airfield, and the Yuba County airport. Most of the flights only cross Roseville at high altitudes as they travel to and from these smaller airport facilities.

Sutter Roseville Medical Center maintains a helistop adjacent to the emergency room at the medical facility. The Level II trauma center treats critically injured patients from the region who are flown by helicopter to the hospital. At one time, the facility was limited to accepting just one helicopter. If another patient was being transported to the medical center, the Roseville Fire Department had to respond to the helipad and emergency medical personnel were on standby should anything occur with more than one helicopter using the helipad. The landing area has been expanded and now the helistop has the capacity to accept more than one helicopter at any one time.

Emergency and public safety helicopter traffic as well as media aircraft and small commercial aircraft frequently fly over the interstates to respond to emergencies and provide public information via local news media.

With growth in the region and in trips through the region to tourist destinations such as the ski resorts at Lake Tahoe, the number of traffic accidents has been steadily increasing. Annual traffic accidents since 1995 are shown in Table 11.3. Truck with trailer accidents account for a very small percentage of the city's reported traffic accidents and are highlighted here as these represent the highest potential for hazardous materials incidents on roadways in the City of Roseville.

TABLE 11.3.
TRAFFIC ACCIDENT COUNTS—1999 TO 2004

	1999	2000	2001	2002	2003	2004
Accidents	1,262	1,527	1,771	1,908	1,835	2,014
Fatalities	3	1	6	5	7	7
Accidents-Commercial Trucks	24	23	35	29	36	32

Source: City of Roseville Police Department

The Fire Department responds to The Roseville Fire Department responds to an average of 480 hazardous conditions incidents annually with nearly a third being cleanup after a vehicle accident where the fuel and other vehicle fluids on the ground are considered a hazardous material. Table 11.4 summarizes annual hazardous incidents since 2000.

In addition to the hazardous condition incidents described above that do not involve a fire, the Roseville Fire Department responds to each year to several hundred fires within the city. The percentage of the fires at facilities with the highest potential for a technological hazard—along the railroad or as road freight are listed in Table 11.5.

A majority of the mobile vehicle fires are for passenger vehicles with on average just one rail car fire each year. Approximately one percent of the total incidents requiring a response from the Roseville Fire Department are fires involving mobile vehicles.

TABLE 11.4.
HAZARDOUS CONDITIONS INCIDENT (NO FIRE) COUNTS—2001 TO 2004

Incident	2000	2001	2002	2003	2004
Hazardous condition (other)	13	—	18	14	—
Flammable gas or liquid condition (includes spill or leak of gas, oil, or other flammable liquid)	83	80	90	109	52
Toxic condition (includes chemical hazard no spill/leak and spill/leak and carbon monoxide incident)	42	30	37	24	22
Electrical incident (includes wiring, short circuit problems, power line down, arcing)	42	54	53	51	35
Accident or potential accident involving hazardous materials	73	84	69	64	60
Aircraft standby (helipad at Sutter Roseville Medical Center when more than one Life Flights are inbound)	21	31	19	2	3
Vehicle accident, general cleanup (fuels on ground are considered hazardous materials)	138	205	205	236	343
Total—Hazardous Conditions Incidents	**412**	**484**	**491**	**500**	**515**
Total Incidents	6,899	7,521	7,799	8,008	8,511
% Hazardous Conditions of Total Incidents	**5.97%**	**6.44%**	**6.30%**	**6.24%**	**6.05%**

Source: City of Roseville Fire Department Incident Type Count Reports 2000-2004

TABLE 11.5.
FIRES INVOLVING MOBILE VEHICLES—2000 TO 2004

Incident Type	2000	2001	2002	2003	2004
Fire in motor home, camper, recreational vehicle, or water vehicle	4	3	2	—	1
Mobile property (vehicle fire), other	6	4	3	3	3
Passenger vehicle fire	59	73	72	83	73
Road freight or transport vehicle fire	2	1	5	2	6
Rail vehicle fire	3	1	—	2	3
Total—Mobile Vehicle Fires	**74**	**82**	**82**	**90**	**86**
Total Incidents	6,899	7,521	7,799	8,008	8,511
% Mobile Vehicle Fires of Total Incidents	**1.07%**	**1.09%**	**1.05%**	**1.12%**	**1.01%**

11.2.3 Probability of Future Occurrences

Terrorism

The threat of terrorism is real in Placer County and Roseville. In September 2003, with input from the City of Roseville, the county conducted a State Homeland Security Assessment Survey, funded by the Department of Homeland Security. The survey reviewed the current vulnerabilities in Roseville and

Placer County, the personnel available to respond, and the equipment needed. The resulting information is classified and available only to first responder at the time of an emergency (per state and federal laws).

Placer County's proximity to the capitol of the seventh largest economy in the world presents unique conditions and possibilities. The transportation, energy, and communications systems that cross the county have impacts on the local, regional, and even national economy.

In general the risks of a terrorist event involving a WMD are described below:

- Chemical—The risk of a chemical event is present in the City of Roseville. The agricultural community in Placer County uses and stores significant amounts of chemicals for peaceful and productive means. Unfortunately, similar to how airplanes were used as flying bombs to attack the World Trade Center in New York and the Pentagon in Washington, DC, these agricultural products could be used in destructive ways.
- Biological—The City of Roseville is at risk for a biological event. The white powders spills and anthrax hoaxes that occurred in October 2001 demonstrate the potential for spreading terror. The introduction of Newcastle disease in the United States demonstrates how an agent can be introduced to livestock, causing harm to public health and the economy.
- Radiological/Nuclear—The major transportation arteries for vehicles or rail that cross through or nearby the City of Roseville contributed to the risk of such an event. Such products can unknowingly pass through any one of the county's transportation corridors.
- Explosives—Placer County has a long history as a gold mining county when explosives were used in a productive manner. Pipe bomb and suspicious package events have occurred in Placer County and Roseville in the past. While none of the events has been specifically identified as a WMD, the elements necessary to construct a WMD are readily available. Additionally, the agricultural communities maintain sufficient products and quantities for use in explosive events, such as the Oklahoma City bombing.
- Combined Hazards—The previously identified WMD agents can be combined to have a greater total effect. When combined, the impacts of the event can be immediate and longer-term. Casualties will likely suffer from both immediate and long-term burns and contamination. Given the risks associated with chemical agents in Placer County and the City of Roseville, the possibility exists for such a combined event to occur.

Technological

Hazardous material incidents may occur at any time in the City of Roseville given the presence of transportation routes bisecting the city, the location of businesses and industry that use hazardous materials, the presence of scattered illegitimate businesses such as clandestine drug laboratories at any given time, and the improper disposal of hazardous waste.

11.2.4 Other Potential Factors for Human-Caused Hazards; Multi-Casualty Incidents

The term multi-casualty incident (MCI) is often applied to transportation accidents involving air and rail travel, as well as multi-vehicle highway accidents. However, MCIs may also result from hazardous

materials incidents or acts of violence, such as shootings or hostage situations. Effects may include serious injuries, loss of life, and associated property damage.

Because large numbers of patients may be involved, significant MCIs may tax local emergency medical and hospital resources, and therefore require a regional response. MCIs may occur throughout the City, day or night, at any time of the year: Interstate 80, State Route 65, and State Route 49 offer the potential for MCIs because of the heavy volume of traffic, although no highway or surface street in the county is exempt from this hazard.

The railroad tracks traversing Placer County, carrying Amtrak passengers as well as freight, also face the risk of an MCI, as do the air corridors above the county. Adverse weather may also play a role in roadway, air, or rail accidents. MCIs may also result from acts of violence or terrorism, which could include a chemical, biological or radiological incident, contaminating persons and requiring mass decontamination processes.

In the Placer Operational Area (Placer County), a multi-casualty incident is defined as any incident with three or more fatalities or critically injured. The first responders including Roseville Fire, Roseville Police, and emergency room staffs at the local hospitals follow the same protocol for an MCI whether the number of dead and injured is three, thirty or three hundred persons. Mutual aid is requested should the City of Roseville officials be unable to respond appropriately with available personnel and equipment.

11.3 VULNERABILITY ASSESSMENT

DMA2K requires risk assessments to include a description of the vulnerability to specific hazards and the impact on the community. A vulnerability assessment is an evaluation of the community's susceptibility to a specific hazard. It estimates the impact and describes the effect of the hazard on the community. The following sub-sections present the results of the human-caused hazards assessment.

11.3.1 Overview of Risk Assessment Methodology

The Human-Caused Hazard Risk Assessment is based on a system that measures a facility's criticality and physical vulnerability. Criticality is a measure of the potential consequence of an accidental or terrorist event as well as the attractiveness of the facility to a potential adversary or threat. The criticality for each critical facility is based on the following:

- Visibility—How aware is the public of the existence of the facility, site, system, or location?
- Hazardous Materials—Are flammable, explosive, biological, chemical and/or radiological materials present on site?
- Collateral Damage Potential—What are the potential consequences for the surrounding area if the asset is attacked or damaged?
- Site Population—The potential for mass causalities, based on the maximum or capacity of the facility.
- Public or Emergency Functions—Does the facility perform a function during an emergency? Is this facility or function capable of being replicated elsewhere?

Table 11.6 provides assessments for the above criteria.

TABLE 11.6.
CRITICALITY FACTORS

Criterion	Low	Medium	High
Awareness	Not known/Neighborhood	City/Region/County	State/National
Hazardous Materials	None / limited & secure	Moderate—Large Secure	Large/Minimum or no Security
Collateral Damage Potential	None or low	Moderate/Immediate Area or within 1 mile radius	High/Immediate Area or within 1 mile radius
Site Population	0 - 300	301-1,000	1,001 or greater
Public/ Emergency Function	No emergency function, or could be used in the future for emergency function	Support Emergency Function—Redundant Site	Emergency Function—Critical Service with or without redundancy

The vulnerability factor is a measure of the physical opportunity for an accident or an adversarial attack. This assessment takes into consideration physical design, existing countermeasures, and site layout. The vulnerability for each critical asset is based on the following:

- Accessibility—How accessible is the facility or site to the public?
- Automobile Proximity—How close can an automobile get to the facility? How vulnerable is the facility to a car bomb attack?
- Asset Mobility—Is the facility or asset's location fixed or mobile? If mobile, how often is it moved, relocated, or repositioned?
- Proximity to other critical facilities—If the facility is close to other critical facilities than there could be an increased probability of the facility receiving collateral damage.
- Secure design—General evaluation of areas of obstruction, air intake locations, parking lot and road design and locations and other site design aspects.

Table 11.7 provides the assessment for the above vulnerability criteria.

TABLE 11.7.
VULNERABILITY CRITERIA

Criterion	Low	Medium	High
Accessibility	Fenced remote locations, secure perimeter, armed guards, tightly controlled access	Controlled access, protected or unprotected entry	Open access, unrestricted, patrolling security, sign restrictions
Automobile Proximity	Not within 75—100'	Not within 25 - 50'	Adjacent or not within 10'
Asset Mobility	Moves or is relocated frequently-	Mover or is relocated occasionally	Permanent/Fixed
Proximity to other Critical Facilities	Greater than 1.5 - 2 miles	Greater than ¾ - 1 mile	Within ½ - ¾ of a mile
Secure Design	No areas for concealment of packages, air intakes are on roof, access ways are not under the structure.	Area of concealment present, greater than 25' from the structure—Air intakes located at least 10' above ground, may have under structure access drives.	Areas of concealment within 25', air intakes at ground level, under structure access drives.

11.3.2 Building Inventory

Roseville has a total of 43,099 housing units as of January 1, 2005. Single family detached residential units account for 79 percent of the total developed residential units in Roseville. The total number of units by type of dwelling unit is shown in Table 11.8.

TABLE 11.8.
RESIDENTIAL DWELLING UNITS IN THE CITY OF ROSEVILLE
AS OF JANUARY 1, 2005

Type of Unit	Existing Citywide Units
Single Family	31,299
Half-Plex	417
Other Attached Single Family	266
Duplex	552
Mobile Home	443
Multi-Family (>=3 units attached)	9,199
Total	**43,099**

Source: City of Roseville Planning Department Quarterly Development Activity Report, January 2005

Roseville has over 27 million square feet of developed non-residential land uses on 3,000 acres city-wide. A majority of this development has occurred since the mid-1980s when the specific plan process was established and large tracts of land were entitled for development.

TABLE 11.9.
NON-RESIDENTIAL DEVELOPMENT IN THE CITY OF ROSEVILLE AS OF JANUARY 1, 2005

Type of Land Use	Developed Square Feet	Developed Acres
Commercial/Retail	10,818,409	1,279.75
Business/Professional Office	6,000,197	528.73
Daycare	7,500	1.33
Industrial/Warehouse	8,404,151	832.48
Public and Quasi-Public Uses; Churches; Parks and Recreation	2,017,530	372.72
Total	**27,247,787**	**3,051.01**

Roseville and Placer County are among the fastest growing communities in the State of California making them a higher profile target for terrorism events. New development has been the target of arson fires and eco-terrorism in new developments in the County.

11.3.3 Impact on Life, Safety and Health

A human-caused hazard could range from a simple, isolated attack or accident to a complex, sophisticated, highly coordinated act of destruction, using multiple agents aimed at one or multiple targets. According to the Roseville Terrorism Contingency Plan, only five percent of all terrorism

incidents are preceded by a warning, and in the case of a technological hazard, accidents occur without predictability under circumstances that give responders very little time to prepare.

Large-scale incidents have the potential to kill or injure many citizens in the immediate vicinity of the attack or accident, and depending on a host of variables, may also affect people a relative distance from the initial event. Variables for both a WMD attack and a hazardous material accident include the type of product, the physical and chemical properties of the substance(s), the physical state of the product (solid, liquid, or gas), the ambient temperature, wind speed, wind direction, barometric pressure, and humidity. Therefore, this report does not consider a set distance to determine those more or less at risk, as this will depend on the specific chemical incident at that time.

Computer models are used by Roseville's Hazardous Materials teams to provide general data to first responders to advise evacuations or shelter in place. With so many variables to determine "toxic endpoints" as defined by the California Environmental Protection Agency, distances are difficult to forecast. In general, those in close proximity to the city's transportation corridors or businesses with acutely hazardous materials are more at risk for some sort of effect, but again, each chemical incident will be different and the scenarios are too numerous to describe in this plan.

Hazardous materials pose a significant risk to emergency response personnel. All potential first responders and follow-on emergency personnel in the City of Roseville currently are and will be properly trained to the level of emergency response actions required for of their individual position at the response scene. Hazardous materials also pose a serious long-term threat to public health and safety, property and the environment.

11.3.4 Impact on Critical Facilities

Definition of Critical Facilities

The City of Roseville for purposes of this planning effort has defined a critical facility as a

> "facility that is vital for the City's ability to provide essential services and protect life and property and/or the loss of which would have a severe economic or catastrophic impact."

The definition was expanded to include the word "catastrophic" specifically to address impacts that may occur in the event of a human-caused disaster. In other words, the City is looking at critical facilities both in terms of the need for the facility in the event of a disaster and the impact on the community should a building be damaged or destroyed in the event of a human-caused disaster.

Critical Facilities at Risk to a Human-Caused Hazard

Roseville has no high profile federal or state buildings within the city limits. Critical facilities are limited to City facilities, Placer County facilities, and other government facilities such as the U.S. Post Office, private utility infrastructure and administrative offices, and medical facilities.

Based on the criticality factors and vulnerability criteria described in this vulnerability assessment section, all facilities are at risk, largely because of the accessibility, proximity to automobile accessibility, and the lack of a secure or hardened design.

Roseville's civic facilities are designed to welcome the public, with convenient parking and customer service areas. Except for the Roseville Police Facility, there are limited secure areas that are restricted to the public.

Several of Roseville's critical emergency response facilities are located adjacent to the Roseville Rail yard and pressurized underground pipelines including the Roseville Civic Center, a primary location for City staff and services and the Roseville Fire Department, which houses the Fire Department administration functions in Fire Station No. 1, and the City's EOC. Significant regional critical facilities such as the Placer County Courts and the main office for the U.S. Post Office are also within close proximity to the rail yard.

Large Gathering Places

To assess the risk of "catastrophic" consequences of a human-caused disaster, the Roseville Hazard Mitigation Plan Steering Committee and City staff assessed the number of large gathering places in the City of Roseville. These sites are defined as follows:

- Any facility listed as a Type A-2.1 in the city per the California UBC. These facilities have an assembly room with an occupant load of 300 or more without a stage (34 locations)
- All buildings listed as E-1 in Roseville used for educational purposes through the 12th grade by 50 or more persons for more than 12 hours per week or four hours in any one day (29 facilities)
- Any facility likely to have an occupancy greater than 300 such as a large employment center, retail center, cultural center, or place of worship

The large gathering places are vulnerable to a human-caused hazard due to several factors. First, all are accessible to the general public, again in deference to aesthetically pleasing urban design and customer service. Design features, including types of building materials, and screened enclosures for mechanical equipment and solid waste, limit visibility and may actually contribute to the damage incurred should an intentional or accidental event occur.

Automobile access is also a feature required in the design of most buildings in Roseville with disabled access parking and easily accessible parking a valued feature. Restricted access to large employment center sites with acutely hazardous materials is built into the design at these facilities. Most high population centers do not feature any limitations to access by the public or vehicles.

11.3.5 Impact on Structures

All structures in Roseville are physically vulnerable to a human-caused hazard. Again, the emphasis on accessibility, design, the opportunity for roof access, driveways underneath some structures, unmonitored areas, and the proximity of many structures to the city's transportation corridors, underground pipelines, and the potential for a terrorist to strike any structure randomly has an impact on the vulnerability of structures in Roseville.

Specific vulnerabilities are on file with the Roseville Fire Department as part of the 2003 State Homeland Security Assessment Survey and surveys conducted to complete this Multi-Hazard Mitigation Plan.

11.3.6 Economic Impacts

Economic impacts from human-caused hazards could be significant. The cost of a terrorist act would be felt in terms of loss of life and property, disruption of business activity and long-term emotional impacts. Recovery would take significant resources and expense at the local level.

Utility losses could cause a reduction in employment, wholesale and retail sales, utility repairs, and increased medical risks. The City may lose sales tax and property taxes and the finances of private utility companies and the businesses that rely on them would be disrupted.

The economic impact of data and telecommunications losses can be staggering as computer security breaches, crime conducted via the world wide web such as identify theft, and many more forms of human-caused economic losses occur daily. Millions of dollars are lost each year as criminals and cyber-terrorist steal sensitive information and funds from individuals and organizations.

The economic impacts should a transportation facility be rendered impassable would be significant. The loss of a roadway or railway would have serious affects on the city's economy and ability to provide services. Loss of travel routes on Interstate 80 or State Route 65 would result in loss of commerce, and may impact the City's ability to provide emergency services to its citizens by delaying response times or limiting routes for equipment such as fire apparatus, police vehicles, and ambulances. The ability to receive fuel deliveries would also be impacted.

The effects of re-routed traffic could also have a serious impact on local roadways. For example, the closure of the roadway at Folsom Dam has resulted in severe local traffic and the closure of businesses in downtown Folsom due to lack of traffic along the Dam Road route. Heavy traffic on routes through central Roseville already occur at peak commute times when Interstate 80 is congested. Traffic control may burden the City's Public Works Department. Mass transit services would also be impacted as routes may be delayed or forced to be detoured causing economic impacts to Roseville transit and to those who ride the bus in Roseville.

11.3.7 Impact of Human-caused Hazards on Future Trends and Development

Roseville is expected to grow by nearly 40,000 residents in the next 10 years. Total population with the recently annexed West Roseville Specific Plan will exceed 138,000 people with another 8,000 housing units planned for this area alone. Significant non-residential development will occur as well with development of a high-rise hotel and office buildings likely in the near future. The potential for human-caused hazards in Roseville is not likely to lessen or prohibit development in Roseville.

The threat of human-caused hazards and the availability of Homeland Security Funds will influence future development of the city's critical facilities. For example, as the City's fire facilities are planned, a redundant or backup EOC is a critical need for the City of Roseville. The design of multi-purpose use facilities, such as the Mahany Library (which also includes a Community Center and the Public Access Studio) can be used as both an emergency response command center on the west side of Roseville and an information center to inform the public through the internet and broadcast facilities that will be on site.

11.4 REVIEW OF EXISTING ORDINANCES, PROGRAMS, AND POLICIES

In the subsequent sections summaries of ordinances, programs, and policies that provide specific standards and practices for protecting the health and safety of the community during a human-caused risk assessment are presented.

11.4.1 City of Roseville Emergency Response Plan

Adopted on July 21, 2004, the current Roseville Emergency Operations Plan addresses the planned response to extraordinary emergency situations associated with natural disasters, technological (human-caused) emergencies, and war emergency operations in or affecting the City of Roseville. The plan is both

an operational plan as well as a reference document for pre-emergency planning and emergency operations. The plan establishes the following:

- An Emergency Management Organization is required to mitigate any significant emergency or disaster affecting the city of Roseville
- The policies, responsibilities and procedures that are required to protect the health and safety of citizens, public and private property, and the environment from the affects of natural and human-caused emergencies and disasters.
- The operational concepts and procedures that are associated with field response to emergencies, EOC activities, and the recovery process.
- The organizational framework for implementation of the Standardized Emergency Management System (SEMS) within the City of Roseville.

The Emergency Operations Plan also outlines the natural and human-caused hazards most likely to occur in the City of Roseville. Significant detail for each responding section—Management, Operations, Planning, Logistics, and Finance that are assigned to City staff and mutual aid agencies prior to an emergency. Roseville's Emergency Preparedness Manager conducts periodic tabletop and simulated exercises in conjunction with the Placer County Office of Emergency Services and affiliate agencies such as Sutter Roseville Medical Center and Kaiser Permanente Medical Center to ensure that staff is prepared and adequate resources are in place prior to any incident.

11.4.2 City of Roseville Terrorism Contingency Plan

The Terrorism Contingency Plan was prepared in 2004 with grant funds provided by the State Office of Emergency Services through the Department of Homeland Security. The Plan was prepared in collaboration with the Placer County Office of Emergency Services, Placer County staff and representatives of the six incorporated cities within the Placer County Operational Area.

The City of Roseville Terrorism Plan provides an overview of how the City of Roseville Emergency Operations Plan will be activated, resources will be organized, and how staff will respond with state and federal resources to such an event. Specifically, the Plan has the following provisions:

- Identifies how local, state, and federal response resources are integrated;
- Establishes a common response protocol to terrorist threats and events;
- Implements existing mutual aid programs, and;
- Outlines a unified strategic plan for all responders.

The City of Roseville Terrorism Plan is on file with the City of Roseville Fire Department. The City's Emergency Response Manager conducts training for all those assigned responsibilities as part of the plan in addition to coordinating with the Placer County Office of Emergency Services and other agencies charged with protecting the public in the event of a terrorist attack.

11.4.3 City of Roseville Hazardous Materials Contingency Plan

The Hazardous Materials Contingency Plan, completed in September 2004, identifies non-terrorist related hazard materials responsibilities in order for the City to prepare, respond and recover from an event. The objectives of the Hazardous Materials Plan are as follows:

- Establish policies and responsibilities for protecting the health and safety of the general population and visitors in the City of Roseville, the surrounding communities, the

environment, and both public and private property from the effects of accidental hazardous materials incidents.

- Identify the emergency response organizations that are responsible for management hazard materials incidents in or near the City of Roseville.
- Establish operational concepts for staffing, training, operating and supporting the City of Roseville Hazard Materials team. The Plan is coordinated with the Placer Operational Interagency Response Team Hazard Plan.
- Directs all individuals, agencies, and departments referenced in the Plan to develop Standard Operating Procedures and emergency response checklists that are consistent with the Plan and the City's Emergency Operations Plan.

11.4.4 State of California Certified Unified Program Agency

The City of Roseville is a State of California Certified Unified Program Agency (CUPA). This designation identifies the City of Roseville as a licensing agency for six hazardous materials related programs. The CUPA designation enables the City of Roseville to implement its own hazardous materials emergency response program. Mutual aid agreements are also in place for incident response. Each business that responds yes to any of the following questions must submit a Unified Program Consolidated Form with facility information to the Roseville Fire Department.

- Hazardous Materials—Do you have on site hazardous materials at or above 55 gallons for liquids, 500 pounds for solids, or 200 cubic feet for compressed gases, or the applicable federal threshold for an extremely hazardous substance specified in federal law or handles radiological materials in quantities for which an emergency plan is required pursuant to applicable law?
- Underground Storage Tank (UST)—Do you have on site USTs?
- Aboveground Storage Tank (AST)—Do you have on site ASTs for storage of petroleum?
- Hazardous Waste—Do you operate a facility that generates, recycles, or treats hazardous waste, among other activities?

11.4.5 Roseville Police Department

Roseville public safety entities are prepared to meet the challenge of intentional criminal acts and/or acts of terrorism, as well as technological, accidental, or natural hazards in the following ways:

- Use multi-disciplinary resources, including but not limited to, local municipal and county law enforcement, FBI, the California Anti-terrorism Information Center, military personnel, and private resource agencies.
- Deploy SWAT, hostage negotiators, rapid containment, tactical communication and Explosive Ordnance personnel
- Use the Crime Scene Investigations Unit for post-incident investigation
- Investigate each incident and regard each incident in a serious manner. The response to such incidents will be based on incident command system (ICS) principles indicating that any incident involving six (6) or more victims and/or patients will be considered a MCI. Response and recovery functions will be based on a modular concept and can be built according to the size and scope of the incident.

11.4.6 Roseville Public Safety Communications

Communications personnel are prepared to take the following actions:

- Appropriately recognize and document citizens' reports of suspicious activity
- Deploy appropriate resources to prevent, investigate, mitigate, and provide recovery services following incidents of human caused hazards, as well as natural and technological disasters
- Coordinate resource management of personnel, equipment, and facilities during established crisis incidents
- Work within the framework of the State Emergency Management System to provide emergency communications to field units and emergency operations personnel during emergency events
- Deploy mutual aid assistance in support of local, state, and national entities during crisis incidents
- Provide life-saving pre-arrival instructions on emergency medical incidents, both large in scale and of an individual nature

11.4.7 Roseville Fire Department

Training

Roseville Fire Department personnel are highly trained to handle all aspects of emergency service. All first response personnel are trained in advanced firefighting skills, basic life support, essential rescue skills, and basic hazardous materials response.

To support these first responders, specialized teams of personnel are trained in tower rescue, above/below grade rescue, confined space rescue, trench rescue, technical rescue, swift water rescue, dive rescue, specialized hazard materials response, hazard materials railcar and tank truck response, terrorism response, multi-casualty management, and advanced life support.

Response Time and Mutual Aid

The Roseville Fire Department is a fully functional agency that primarily provides fire suppression and emergency medical services for the urban environment of the city.

The Roseville Fire Department operates six stations with the seventh currently under construction in north central Roseville. The Department operates six paramedic engine companies, with a minimum staffing of three, one Emergency Medical Technician (with defibrillator) (EMT-D) truck company with a minimum staffing of four, and one Battalion Chief. The Department also operates a Hazardous Materials Response Unit (cross-staffed by the truck company); four Grass/Wildland units, and one Technical Rescue unit (all cross-staffed by Engine Companies). The Department currently maintains three reserve engines and one reserve truck.

The Fire Department has established a Standards of Response Coverage Plan that includes a travel time standard of four minutes from the time the apparatus leaves the station to the arrival of the first engine on scene. Due to significant growth in the city, additional fire stations are needed to achieve this response time. A temporary facility near the intersection of Blue Oaks Road west of Foothills Boulevard will serve

as Fire Station No. 7 until the permanent station is constructed and opened in late 2006. Fire stations Nos. 8 and 9 are currently being planned to serve the new development anticipated in Roseville.

The City of Roseville has mutual aid agreements with local fire departments and districts in surrounding Placer County and Sacramento County. These personnel cooperate in the same training program as do the City firefighters to ensure a high level of competency even with borrowed resources. If this level of aid does not meet the incident needs, the department participates in the statewide mutual aid system to bring additional resources from anywhere in California, and if needed, the nation.

Hazardous Materials Response

Hazardous Materials Listing

All hazardous materials handlers that store in excess of 55 gallons, 500 pounds, or 200 cubic feet of gas are required to submit Hazardous Materials Management Business Plans (HMBP). From these plans, emergency responders are provided emergency contact information, site-specific chemical inventories, and vicinity as well as facility maps. Facilities storing materials that are "acutely" hazardous and in excess of the quantities in CCR, Title 19, Tables 1, II or III must submit a more comprehensive Risk Management Plan, which includes off-site consequences analysis, maintenance, and training programs, and an executive summary. Owners/operators of aboveground tanks containing in excess of 660 gallons of petroleum hydrocarbons (or an aggregate quantity of 1,320 gallons) must comply with the state Aboveground Petroleum Storage Act, which requires the preparation of a Spill Prevention, Control, and Countermeasure (SPCC) Plan.

Fire Department staff requires the submittal of lists of hazardous materials used in existing and proposed industrial and commercial businesses by those businesses. The list is maintained by the Fire Department Life Safety/Hazardous Materials Officer and updated periodically.

Development Review Process

The Fire Department reviews any development proposal that may be impacted by or cause an impact related to the storage, handling, or disposal of hazardous materials. A Hazardous Materials Management Plan and if necessary, a Risk Management Prevention Plan is required as part of the development process per state law. The use of toxic or hazardous materials requiring the filing of a business plan for emergency response pursuant to Section 25503.5 of the California Health and Safety Code or materials identified in Section 5194, Title 8 of the CCR is critically analyzed by the City when considering any use. All users shall submit a list of hazardous and toxic materials with a qualified discussion of potential chronic and acute long-term health effects, including those on children, from acute short-term or chronic long-term exposure.

In addition, a plan shall be submitted specifying procedures for mitigating the emissions of toxic substances and groundwater monitoring and for identifying methods of hazardous waste disposal. All projects shall be reviewed for compliance with the Placer County Hazardous Waste Management Plan.

Intergovernmental Coordination

The Roseville Fire Department works cooperatively with other local and state agencies in a coordinated effort to inform and educate the public regarding the storage, handling, and disposal of household hazardous materials. This includes continued coordination with the Placer County Hazardous Materials Response Teams.

Hazardous Waste Drop-off

The City of Roseville partners with both public and private entities to remove household hazardous waste from Roseville's waste stream. The disposals include the following:

- Household Hazardous Waste Collection—The Western Placer Waste Management Authority provides a collection for household hazardous .waste every Wednesday, Saturday and Sunday from 8 am to 4 pm at the Materials Recovery Facility north of Roseville. Acceptable materials include paints, cleaners, solvents, oil and poisons that should not be disposed of at the landfill. Materials prohibited by California State law include explosives, radioactive materials, and business or contractor waste. According to state law, the amount of waste per visit must not exceed five gallons or 50 pounds. More information is available at http://www.wpwma.com/hhw.htm.
- Used Electronic Equipment—Disposal of television sets and computer monitors must be handled in a special way to avoid polluting the environment. The Materials Recovery Facility accepts old televisions and computer monitors. Fees for television disposal are $15 for a TV less than 21 inches and $21 if larger than 21 inches. Computer monitors can be disposed of for $12.
- Used Motor Oil Recycling—There are six locations in Roseville designated for used motor oil recycling drop-off.
- Sharps (or Needles)—Roseville residents who use medical needles for in-home care are encouraged to purchased sharps containers, which hold 100 needles at a nominal cost from several drug stores within the city. Residents are asked to dispose of all medical needles and containers properly so they do not enter the waste stream.

Hazardous Materials Database

The City of Roseville Fire Department maintains a database that includes chemical inventory disclosure, emergency contacts, and facility maps for all business plans of 400 businesses including five businesses with acutely hazardous materials. The businesses are subject to the California Accidental Release Prevention Program.

Interagency Cooperation for Emergency Response

Respond in accordance with the City of Roseville Hazardous Materials Emergency Response Plan to hazardous materials emergencies. Both the California Highway Patrol and the City of Roseville have developed a Hazardous Materials Emergency Plan that discusses the participant's responsibilities, organization and operation to be complied with in the event of a hazardous materials emergency including clean-up and decontamination procedures.

Hazardous Materials Truck Route

The City of Roseville does not have specific truck routes for hazardous materials. The City of Roseville does have established truck routes in the city limits, and in the event hazardous materials are to be transported within the city limits, a permit is required from the Roseville Police Department. Typically trucks with bulk deliveries of hazardous materials use State Route 65 to Blue Oaks Boulevard and then access any of the north-south corridors including Washington Boulevard, Industrial Avenue, and Foothills Boulevard where local businesses use hazardous materials in their business activities.

Routes for hazardous materials are coordinated with the California Department of Transportation (Caltrans), the California Highway Patrol, and the Roseville Police, Fire, and Public Works Departments.

Hazardous Materials Fee Program

The Roseville Fire Department has adopted a fee schedule for hazardous material permitting, storage, use, handling, and generation. The Roseville Fire Department also charges for fire and life safety inspections, plan review, and miscellaneous activities such as a Hazardous Materials Business Plan Review.

11.5 REVIEW OF MITIGATION ALTERNATIVES

Chapter 18 of the Roseville Multi-Hazard Mitigation Plan identifies strategies for all hazards including human-caused hazards that will be planned for and implemented by Roseville City staff and elected officials. The human-caused hazard mitigation alternatives reflect an emphasis on regional prevention and preparedness efforts and Roseville's ongoing training and preparedness programs.

11.5.1 Preventive Activities

Preventive activities are largely associated with activities to anticipate and prevent terrorism or accidental occurrences in Roseville and the Sacramento region. Roseville City staff will participate in **local efforts** including to prevent human-cause hazards including the following initiatives:

- Participate in regional, state and federal efforts to gather terrorism information at all levels and keep public safety officials briefed at all times regarding any local threats. Staff will then further develop response capabilities based on emerging threats.
- Continue all facets of emergency preparedness training for Police, Fire, Public Works, and City Manager/Public Information staff in order to respond quickly in the event of a human-caused disaster.
- Enhance awareness training for all city employees to recognize threats or suspicious activity in order to prevent an incident from occurring.
- Continue all facets of the City's hazardous materials team training and response through commitment of resources from the Fire Department budget and the addition of funding through the Sacramento Regional Homeland Security budget
- Continue to improve response times for public safety throughout the City so as to reduce exposure to human-caused incidents. The City will also maintain appropriate staffing levels of public safety personnel to address vulnerabilities identified in this Chapter.
- Train First Responders and all appropriate City staff to implement the protocol contained in the City of Roseville Terrorism Response Plan
- Continue to implement the City of Roseville Hazardous Materials Contingency Plan with enhancements as warranted by the type of uses in the City and new technologies in preventing hazardous materials incidents.
- Continue to work proactively with Union Pacific Railroad regarding placards and labeling of containers, emergency plans and coordination, standardized response procedures, notification of the types of materials being transported through Roseville on at least an annual basis; random inspections of transporters as allowed by Union Pacific; installation of mitigating techniques along the rail yard at critical locations; routine hazard communication initiatives; enhancing security along the rail corridor

should the alert system go higher than Orange; and continuously looking to the use of safer alternative products to conduct the rail transport operations.

- Continue regular testing of the alarm system along the Union Pacific railroad tracks in Central Roseville.

The City's participation in **regional efforts** to prevent human-caused hazards include the following:

- Commit support to the Sacramento Urban Area Security Initiative by dedicating fire and police personnel to the Sacramento office as funded with Homeland Security grants
- Participate in the Governor's Office of Emergency Services Disaster Resistant California annual conference and other training sessions sponsored by regional, state and federal agencies.

11.5.2 Property Protection Activities

Property protection activities for human-caused hazards in the City of Roseville will be focused on Crime Prevention Through Environmental Design (CPTED) in future planning efforts as well as enhancing existing infrastructure and buildings to prevent or mitigate human-cause incidents. CPTED is an urban planning design process that integrates crime prevention with neighborhood design and community development. CPTED is based on the theory that the proper design and effective use of the built environment can reduce crime and the fear of crime, and improve the quality of life. CPTED creates an environment where the physical characteristics, building layout, and site planning allow inhabitants to become key agents in ensuring their own security.

CPTED utilizes three primary strategies: natural surveillance, natural access control, and territorial reinforcement.

- *Natural surveillance* is a design concept directed primarily at facilitating continual observation, thus preventing the opportunity of crime (e.g., proper placement of windows overlooking sidewalks and parking lots, using transparent vestibules at building entrances to divert persons to reception areas, etc.). A key element of natural surveillance is the careful placement of physical features, activities, and people in ways that maximize the ability to see what is going on around them. Landscaping and lighting are also important elements that must be taken into consideration during the design of development projects.
- *Natural access control* focuses on limiting and providing guided access. Properly located entrances, exits, fencing, landscaping, sidewalks and roadways, signage, and lighting, all can assist in directing both pedestrian and vehicle traffic in ways that discourage crime.
- *Territorial reinforcement* promotes a sense of expressed ownership and social control. People living, visiting or working in or around an area that is physically designed to protect designated space are more likely to challenge intruders or report suspicious activity. Such an environment also causes strangers or intruders to stand out and makes them more easily identified. The use of fencing, seating areas, pavement treatments, art, signs, landscape and good maintenance of facilities and grounds promotes a perception that these defined areas are controlled.

While the City has not required the use of CPTED strategies in development review through ordinance or other policy directive, the Planning & Redevelopment Department frequently incorporates many of the CPTED strategies noted above in consultation with the Police Department. Though not specifically identified as CPTED strategies, the City's Community Design Guidelines (CDG) incorporate measures that attempt to increase site and building security for commercial, industrial, and multi-family residential projects. While these guidelines have proved effective in projects developed throughout the City, opportunities do exist for improvement of the CDG document's effectiveness in preventing human-caused hazards.

Mitigation alternatives for property protection include:

- Incorporate formal CPTED strategies and apply those strategies to future development projects by adopting the in the Community Design Guidelines for the City of Roseville.
- Enhance a camera surveillance program to improved security at electrical substations, receiving stations, and the future Roseville Energy Park
- Address vulnerabilities identified in the Vulnerability Assessment of the City of Roseville water facilities completed by the Environmental Utilities Department in response to requirements by the U.S. Environmental Protection Agency (EPA)

11.5.3 Resource Protection Activities

No resource protection mitigation alternatives were identified for human-caused hazards.

11.5.4 Emergency Service Activities

Emergency service activities include warning methods and response to events. Program enhancements may include the following projects and programs.

- Participate in regional training exercises per the requirements of Homeland Security Presidential Directive #8 in support of national preparedness. These training exercises, sponsored by the Sacramento Regional Office of Homeland Security will test and evaluate the ability to coordinate the activities of City, County and State Government first responders, volunteer organizations and the private sector in responding to terrorism and technological hazards. The trainings will enhance interagency coordination, provide training to staff, test response and recovery capabilities, activate the National Incident Management System (NIMS), and the mutual aid system.
- Work with the private sector to enhance and create Business Continuity Plans in the event of an emergency.
- Review existing automatic/mutual aid agreements with other public safety agencies to identify opportunities for enhancement.
- Relocate or construct a redundant Emergency Operations Center farther from the Roseville Railyard and floodplain.
- Maintain an emergency services information line (774-5812) that the public can contact 24 hours a day during an emergency incident to ask questions of emergency staff.
- Coordinate with all Roseville school districts to ensure that their emergency preparedness plans include preparation for human-caused incidents.
- Evacuation plans

- Encourage local businesses to adopt Information Technology and telecommunications recovery plans.

11.5.5 Structural Activities

Structural solutions have been identified that largely affect private and public property damage and have significant mitigation results in also protecting life and limb.

- Incorporate Crime Prevention through Environmental Design strategies into future enhancements and revisions to community design guidelines.
- Prepare site specific vulnerability assessment of City-owned critical facilities that use the best available science and technology with regards to human-caused hazards. Once the assessment is completed, apply for and secure funding to make the necessary structural improvements to protect the critical facilities in the event of a human-caused incident.

11.5.6 Public Information Activities

Public information activities include activities that provide information to the public that will aid them in all stages of a disaster. Roseville's current program for human-caused hazards includes emergency notifications from the time of detection in the Public Safety Dispatch system to warning systems at the rail yard, the City's Teleminder (reverse 9-1-1), emergency broadcast capabilities at Channel 14/73, the Roseville government access system, and Roseville's AM radio station 530.

Public information mitigation alternatives include:

- Promotion of 72-hour self-sufficiency through the Emergency Preparedness Manager's efforts, the Roseville website, Roseville Coalition of Neighborhood Associations (RCONA), and various other media.
- Continue to share the human-caused hazard risk and preparedness presentation given at the public meetings and City Council workshop as part of this preparedness effort.
- Maintain the on-line Citizens Advisory Panel of 2400 households and periodically e-mail emergency preparedness information including human-caused hazard preparedness instructions and reminders.

CHAPTER 12.
HUMAN HEALTH RISK ASSESSMENT

12.1 IDENTIFYING HAZARDS—DESCRIPTION OF THE HUMAN HEALTH HAZARD

Human health risks include diseases that are communicated by either people or insects. Human health hazards in California may also include exposure to extreme heat either as a result of severe weather or power outage in combination with severely high temperatures. This section discusses the human health hazards that have either been a recent occurrence or are an endemic risk to Roseville.

Communicable Diseases that are discussed in this section are; Severe acute respiratory syndrome (SARS), Flu virus, Small Pox, and diseases carried by insects. Diseases carried by insects are Plague (fleas), Encephalitis, Malaria and West Nile virus (WNV) (mosquitoes) and Lyme disease (ticks). Extreme heat is also addressed in this chapter.

12.1.1 SARS

SARS is a recently recognized, contagious febrile lower respiratory infection cause by a novel corona virus called SARS-CoV, which is usually a potential hazard to a port city (either travelers arriving by ship or aircraft). The worldwide outbreak of SARS between November 2002 and July 2003 began in China and then spread as infected travelers returned to their home countries.

California Health and Safety Code and the CCR list SARS as a communicable disease that must be reported to the appropriate authorities. Placer County is authorized to collect records and data, initiate disease control measures, control property and manage persons (including isolation and quarantine) with respect to communicable diseases.

12.1.2 Influenza (Flu)

Epidemics of influenza typically occur during the winter months and have been responsible for an average of approximately 36,000 deaths per year in the US from 1990 through 1999. Although rates of infection are highest among children, rates of serious illness and death are highest among persons aged 65 and over, and among persons who have medical conditions that place them at an increased risk for complications from influenza.

Influenza vaccination is the primary method for preventing influenza and its severe complications. The ability of the vaccine to protect against flu depends on 1) the match between the strains in the vaccine and the strains in the community, and 2) the ability of the individual's system to use the vaccine to fend off the virus. An influenza pandemic occurs when the virus strain shifts dramatically, making the match and individual's system less effective, leading to more rapid spread and more severe cases, including deaths.

12.1.3 Small Pox

Small pox is another disease that has recurred due to the increase in travelers from countries where the vaccine is not universally used. Small pox can be easily transmitted person to person, results in high mortality rates, and has the potential for major public health impact. Because smallpox had been

"eliminated" for so many years in the US, high priority has been placed on vaccinating first responders, health professionals, and then the general public.

12.1.4 Plague

Plague is a disease caused by *Yersinia pestis (Y. pestis*), a bacterium found in rodents and their fleas in many areas around the world. There are two types of plague—bubonic plague and pneumonic plague. Transmission occurs when the bacterium infects the lungs that can occur if someone breathes *Y. pestis* in particles, which could happen in an aerosol release during a bioterrorism attack, or by breathing droplets from a person or animal with pneumonic plague.

The World Health Organization reports 1,000 to 3,000 cases of plague each year. An average of five to 15 cases occur each year in the western United States. These cases are scattered and occur in rural to semi-rural areas. Most cases are the bubonic form of the disease. Treatment includes doses of antibiotics that should be administered within 24 hours of the first symptoms to reduce the risk of death.

12.1.5 Mosquito-Borne Disease

Several of the 48 known species of mosquitoes in California can carry disease under the right conditions. The two mosquito-borne diseases most affecting humans are encephalitis and malaria. Recently, the addition of WNV has been publicized as another potential hazard to human health carried by mosquitoes.

Encephalitis

There are two forms of viral encephalitis transmitted by mosquitoes in California - St. Louis and Western Equine. Both are carried into an area by wild birds that are infected elsewhere. These birds show no symptoms. Local mosquitoes that can pass the virus on to humans through future bites then feed infected birds. Symptoms of encephalitis range from mild flu-like illness to sever brain involvement that can cause death. Western Equine Encephalitis can affect horses and other equine animals as well as humans.

Malaria

Malaria is much less likely to occur in California due to the necessity for human reservoirs of the disease. Anopheles mosquitoes, the vectors of malaria, are found in some areas of California, and there have been isolated instances where human reservoirs from other countries temporarily provided a source of malaria infection to local residents.

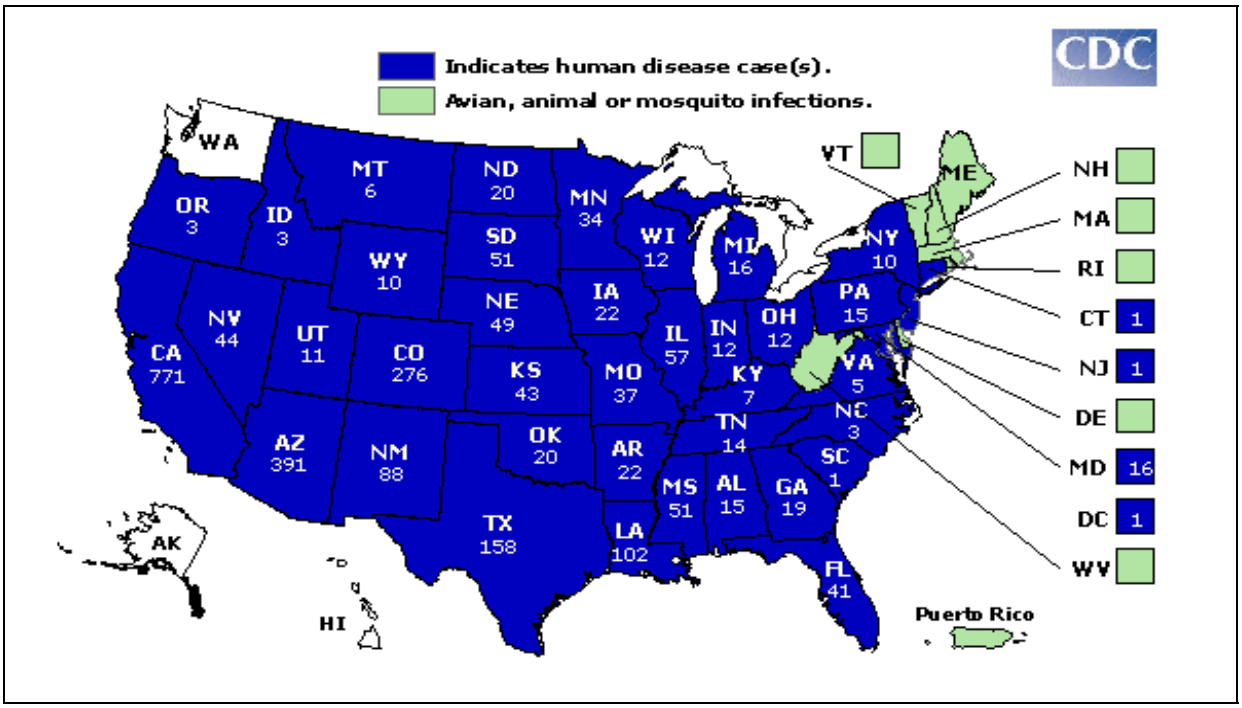
West Nile Virus

A recent natural hazard to affect California is the WNV. Mosquitoes transmit this potentially deadly disease to livestock and humans alike. WNV first struck the northern hemisphere in Queens, N.Y. in 1999 and killed four people. In 2003, all 50 states warned of an outbreak from any of the 30 mosquito species known to carry it. From 62 severe cases in 1999, confirmed human cases of the virus spread to 39 states in 2002, and killed 284 people. Less than one percent of those infected develop severe illness. People over 50 years of age appear to be at high risk for the severe aspects of the disease.

12.1.6 Lyme Disease

Lyme Disease is a bacterial infection. The bacteria that causes Lyme disease is called Borrelia burgdorfer. Lyme disease has been reported in 49 states. Blacklegged ticks transmit the Lyme disease bacteria in the eastern, northeastern, and southern parts of the U.S. The western Blacklegged tick is the vector on the

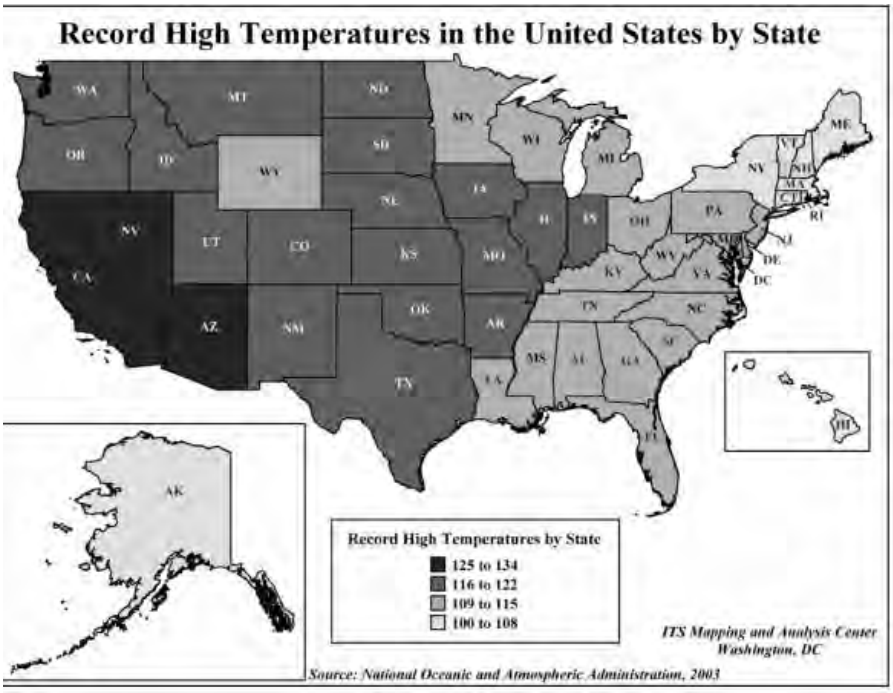
west coast. Lyme Disease may include head and muscle aches, sore throat, nausea, fever, stiff neck, or fatigue. About 50 percent of infected people develop a rash at the bite site, which sometimes resembles a "bull's eye." Later, symptoms may involve the skin, eyes, heart, nervous system, brain or joints. Early detection is important in the treatment of Lyme Disease.



2004 West Nile Virus Activity in the United States (reported to CDC as of January 11, 2005)

12.1.7 Extreme Heat

The western United States is subject to extreme heat in the summer months with record temperatures found in California, Nevada and Arizona. While central air conditioning is the standard in new home construction in the west and southwest, older homes were not built and may not have been retrofitted with air conditioning. In the event of a prolonged power outage, those susceptible to extreme heat may suffer from dehydration, heat stroke and heat exhaustion requiring medical attention.



12.2 HUMAN HEALTH HAZARD PROFILE

12.2.1 Location and Extent

Placer County recognizes the potential for mosquito-borne diseases to occur within the County and has initiated a public outreach campaign. The City of Roseville actively supports this activity. The Placer WNV task force has prepared for the possible arrival of WNV the last two years through focused efforts on reducing the mosquito population and educating the public. In 2004, the voters approved extending the Mosquito Abatement District to cover the entire County.

12.2.2 Human Health Event History

State of California

Communicable Diseases

In California, there were a total of 29 cases of SARS during the worldwide outbreak with a majority of the cases being watched in Los Angeles County. Only two of the cases were confirmed as SARS. Thousands of influenza cases are diagnosed or left untreated each year in California. The flu has caused worldwide pandemics most recently in 1968, but in 1918, killed more Americans in Europe than died in World War I.

West Nile Virus

WNV was detected on a very limited basis in horses and humans in California in 2003. San Diego County reported one veterinary case; Imperial County and Riverside County each reported one human case. According to the California West Nile Virus Surveillance Information Center sponsored by the California Department of Health Services, as of November 2, 2004, a total of 737 human WNV infections have been reported in 23 counties in the State.

Extreme Heat

Extreme heat is a potential any summer in California. Data for the number of deaths due to heat conditions was not readily available.

Regional Issues

By July of 2004, WNV had arrived in Placer County. A dead western scrub jay bird discovered July 22 in Auburn tested positive for the disease. As of November 8, 2004, the California West Nile Virus Surveillance Information Center reported the virus being detected in one human, 47 birds, 26 horses, and three mosquito pools within Placer County. The first human case of WNV in Placer County was diagnosed the week of September 27, 2004. The 56-year old male patient was recovering from meningitis in a local hospital.

12.2.3 Probability of Future Human Health Occurrences

Communicable Disease

Due to the increase in air travel, growing populations, and the country's aging population, the probability of a communicable disease epidemic or pandemic is increasing. The winter 2005 influenza vaccine shortage caused by a flaw in a European manufacturer's supply also raised concerns about the protection

of at-risk populations; a nationwide public outreach campaign was launched to ensure that at-risk populations received vaccines before additional vaccine was made available to the general public.

The impact of SARS on the health workers attempting to diagnose and treat those stricken with the disease also highlighted how vulnerable populations may be if the health care community is one of the first groups in an area to become sick with a communicable disease.

West Nile Virus

To date, across the United States, the incidence rate for WNV has been the worst in its second year with impacts tapering off after that period. In Southern California, 2004 was the second year of exposure with 25 deaths reported. The Placer Mosquito Abatement District is predicting that the 2005 season in Northern California will bring more positive mosquito, equine, and human cases in Placer County and Roseville. If the national pattern holds true, the likelihood of future occurrences will continue to decrease, beginning in 2006.

Extreme Heat

Heat illnesses are a factor of the weather and in some cases technological hazards. Again, with the aging population, heat illnesses will increase with a more susceptible population.

12.3 VULNERABILITY ASSESSMENT

DMA2K requires risk assessments to include a description of the vulnerability to specific hazards and the impact on the community. A vulnerability assessment is an evaluation of the community's susceptibility to a specific hazard. It estimates the impact and describes the effect of the hazard on the community. The following sub-sections present the results of the human-health hazards assessment.

12.3.1 The Human Health Problem

West Nile Virus is spread through mosquito bites. Thus, people and livestock frequenting areas with the greatest concentration of mosquitoes, and during the times of greatest concentration, are most likely to become infected. Areas with standing water are where mosquitoes breed, and therefore are an area of higher risk. Standing water can be found along the river and creek areas of the County as well as in swimming pools, ponds, birdbaths, ditches, and old spare tires—so the risk areas could be in many locations and in differing concentrations

According to the CDC, even though last years outbreak was the largest in the country, fewer people died or had serious brain damage from the virus compared to 2002. The 9006 cases of the virus last year were more than double the 4,156 cases in 2002; however, there were only 220 deaths and 2,695 cases of severe brain damage were reported in 2003, compared to 228 deaths and 2,944 cases of severe neurological disease in 2003. Researchers think that the larger number of confirmed cases in 2003, could be due to an increase in testing and reporting compared to 2002.

Although the potential for exposure exists in Roseville during 2004, the risk should be considered in terms of adverse effects due to exposure. Roseville already has an active control program for mosquitoes due to the past concern with equine encephalitis. Also, protective measures to prevent exposure, such as wearing long sleeved clothing and using bug spray, are relatively simple and cost effective. Thus, the responsibility for protection is considered an individual responsibility. The County Health Department has undertaken a solid public education program that provides the community with the knowledge to effectively counter the risk and impact from WNV.

12.3.2 Impacts

Life, Safety, and Health

The protection of human life is the ultimate goal of the City's multi-hazard mitigation planning effort. A large outbreak or epidemic of a communicable disease or West Nile virus could have devastating effects on the population in Roseville. The city has a large elderly community with a concentration of older residents in areas such as Sun City Roseville. The introduction of a disease such as the plague or influenza could rapidly impact those most at-risk.

West Nile virus is of significant concern in 2005 with the wet winter and strong presence of the disease in local wetlands and to the west of Roseville in the flooded rice fields. The adult mosquitoes of last year will begin feeding during the warm weather in the spring of 2005 and again, a concentrated at-risk population is on the western border of the city limits very near to the rice fields where the mosquitoes breed.

Critical Facilities

Healthcare facilities (and veterinary clinics) have prepared for all of the afore-mentioned health hazards. The acute care hospitals in Roseville collaborated on a local and regional level to be able to provide immediate and comprehensive medical care to citizens of Roseville and the greater western Placer population. Emergency management planning incorporates all disciplines responding to an event, (fire agencies, law enforcement, first responder ground and air ambulance agencies, public health, mental and spiritual health). Planning includes identifying shelters, alternate treatment facilities, isolation capacity, and methods to immediately expand physical and human resources.

Structures

No impact on structures is anticipated from human health hazards.

Economic Impact

The economic impact of a human health hazard could be localized to a single population or could be significant depending on the number of cases and available resources to care for those affected. Other financial impacts are absorbed or managed by the organization affected (i.e., healthcare facilities and veterinary offices train their personnel at their own cost).

Future Trends in Development

The potential for human health hazards is not likely to slow the expected growth in Roseville. Total population including the residents of the recently annexed West Roseville area will exceed 138,000 people with another 8,000 housing units planned for this area alone. Significant non-residential development will occur as well with development of a high-rise hotel and office buildings likely in the near future. The potential for communicable diseases, vector-borne diseases or extreme heat in Roseville is not likely to lessen or prohibit development in Roseville.

12.4 REVIEW OF EXISTING PROGRAMS, PLANS AND ORDINANCES

12.4.1 Hospital Expansions to Care for Growing Populations

Kaiser Permanente Hospital in Roseville is currently planning an expansion of its Emergency Department, Women and Children's wing and Oncology services in Roseville. Sutter Roseville's expansion (nearly 200 percent expansion) will be complete in fall of 2005. The expansions will enhance both the capacity and the services offered to treat illness in Roseville and the surrounding region.

12.4.2 Memorandum of Agreement for Isolation Treatment

In addition, Sutter Roseville has a Memorandum of Agreement with the Department of Quarantine, a division of the CDC, to provide isolation treatment areas in the event of a highly contagious airborne disease (SARS or smallpox).

12.4.3 Integrated Emergency Response

It is the expectation of the Joint Commission for Accreditation of Healthcare Organizations (JCAHO) that all acute care facilities will provide for mass casualties, whether they are naturally occurring or human-caused, biologic, chemical, explosive, nuclear, radiological, or any combination of causes. JCAHO further mandates integrating all emergency response planning with local community response agencies, thereby ensuring that the community will receive the highest level of response and protection available. These planning efforts are supported by regional, state, and federal grant funding.

12.5 REVIEW OF MITIGATION ALTERNATIVES

The organizations charged with protecting human health in the City of Roseville including public safety staff, the medical providers, the Placer County Department of Public Health and the Placer Mosquito Abatement District. Human health mitigation alternatives include preventive, emergency and public information activities. No structural or resource protection activities were identified.

12.5.1 Preventive Activities

The Placer County Department of Public Health monitors trends and provides information to help county residents protect themselves from contracting communicable diseases. Information is provided to the general public via the County website and printed materials; information is also provided to at-risk populations to prevent the spread of disease.

- The City of Roseville will work with the Department of Public Health and Roseville medical providers to quickly disseminate information should a communicable disease be diagnosed in the County to prevent the spread of disease.

The Placer Mosquito Abatement District provides vector control and mosquito abatement throughout the County including the City of Roseville. The District conducts constant surveillance to locate mosquito-breeding sources and eliminate existing sources while preventing new sources. The City of Roseville appoints a Trustee to the Board to participate in policy and program decisions of the District.

- The City of Roseville will enhance its preventive activities through increased citizen and staff awareness and reporting of sources such as creeks, wetlands, and habitat as well as man-made sources. The City reports and facilitates the monitoring of natural and developed sources of for mosquito and vectors in Roseville. The City will promote

the immediate reporting of areas within the City that may be trouble spots as well as infestations that originate outside the City's borders in nearby agricultural areas.

- The City will support the efforts of the County's West Nile virus Task Force that has planned for surveillance and abatement activities throughout the County; has mapped many of the standing water sources throughout the County and Roseville; has conducted surveillance and abatement services; and has provided public information and conducted public education in the County.

12.5.2 Property

Not applicable to human health hazard.

12.5.3 Resources

The City Community Development staff will work with the Placer Mosquito Abatement District to provide alternatives to both protect habitat and eliminate or reduce sources for mosquito and vermin breeding. This will include forwarding habitat and wetland preserve project proposals to the Placer Mosquito Abatement District staff for review and comment. Their recommendations will be incorporated into the project proposals whenever possible. The recommendations will ultimately enhance the projects and allow Placer Mosquito Abatement staff to have early notification for areas that may need surveillance or treatment.

12.5.4 Emergency Service Activities

Emergency service activities include warning methods and response to events. Program enhancements may include the following projects and programs.

- Continue emergency response training for every type of incident including an epidemic affecting multiple and at-risk populations in the City of Roseville.
- Enhance emergency notification efforts throughout the community by using the On-Line Citizen's Advisory Panel e-mail system, the Teleminder Autodial system, the City's website, Channel 14/73, video news releases, and any means possible to notify at-risk populations. Protocol for immediate notification will be established and included in future editions of the City's Emergency Response Plans.

12.5.5 Structural

Structural solutions have been identified that largely affect private and public property damage and have significant mitigation results in also protecting life and limb.

The City will support the expansion of medical facilities in the city limits to ensure that adequate staff, equipment, clinic, office, and hospital space is provided in the event of a human health emergency. Significant investment by Kaiser Permanente and Sutter Roseville Medical Center operators are under construction and will greatly enhance the health care capacity and availability in Roseville and the entire region. This will be critical should a human health emergency occur in the area.

12.5.6 Public Information Activities

Public information activities include activities that provide information to the public that will aid them in all stages of a disaster. Roseville's public information mitigation alternatives include:

- The City will continue to enhance collaborative efforts with Placer County and the Placer Mosquito Abatement District to raise public awareness of the potential for communicable diseases and West Nile virus.
- The City will enhance the current information via the Roseville website, publications, and Channel 14/73 regarding the human health hazard and ways to reduce the likelihood of an event in Roseville.

CHAPTER 13.
SEVERE WEATHER HAZARD RISK ASSESSMENT

This chapter identifies the risks faced by the City of Roseville from the following severe weather hazards that cause any destruction:

- Tornado
- Windstorm
- Fog
- Heavy rains, thunderstorms, and lightning

The organization of this section follows the general risk assessment methodology used throughout this mitigation plan and includes hazard profiles and vulnerability assessments for each severe weather hazard. These are followed by a review of any existing programs, plans and ordinances as well as a review of mitigation alternatives to address weather hazards.

13.1 IDENTIFYING HAZARDS—DESCRIPTION OF THE SEVERE WEATHER HAZARD

The City of Roseville sits in the rolling hills and grassland of southwestern Placer County just 16 miles northeast of Sacramento. Although the climate of Roseville is relatively nice with an average of 257 sunny days each year, the city sits in the shadow of the Sierra Nevada mountain range and as a result can experience severe weather conditions resulting from rapid changes in topography (Roseville California Resource Guide, http://www.usacitiesonline.com/cacountyroseville.htm).

Severe weather conditions occur throughout the region and vary greatly from the western portion of Placer County to the eastern portion. This is primarily due to topographical changes and variance in elevation as the county extends east towards the Sierra Nevada Mountain Range.

Heavy rainfall and snowfall result when humid air masses blow in from the ocean and move up the mountain ranges. Moist air, traveling inland on prevailing westerly winds push up against the Sierra Nevada mountains, which wrings moisture out of the air as it rises, cools, and condenses. Precipitation generally increases 2 to 4 inches for each 300-foot rise in elevation.

Figure 13.1 shows Roseville's elevation at approximately 165 feet above sea level. Roseville's location in the western, low-lying portion of the county helps explain why, at well below the 4,000 foot snowfall region, the city avoids the harshest of winter conditions that occur in eastern Placer County (Roseville California Resource Guide). However, the city's proximity to the foothills ensures it has been and will continue to be subject to periodic, but infrequent severe weather events.

Figure 13.2 illustrates regional average precipitation ranges from 1971 to 2000. Digital climate maps created using the Parameter-elevation Regression on Independent Slopes Model (PRISM) available through the Spatial Climate Analysis Service (SCAS) indicate that annual precipitation for the Roseville area averages between 16 and 20 inches.

Most of the federal and state disaster declarations declared in the Roseville area and Placer County are related to severe weather conditions. Federal disaster declarations may be issued by the U.S. Department of Agriculture and the Small Business Administration (SBA), as well as through FEMA. The quantity and

character of the damage are the determining factors for which agency will authorize the disaster declaration. A sample of federal, state, and local declarations related to severe weather disasters in and around Roseville and Placer County are listed in Table 13.1

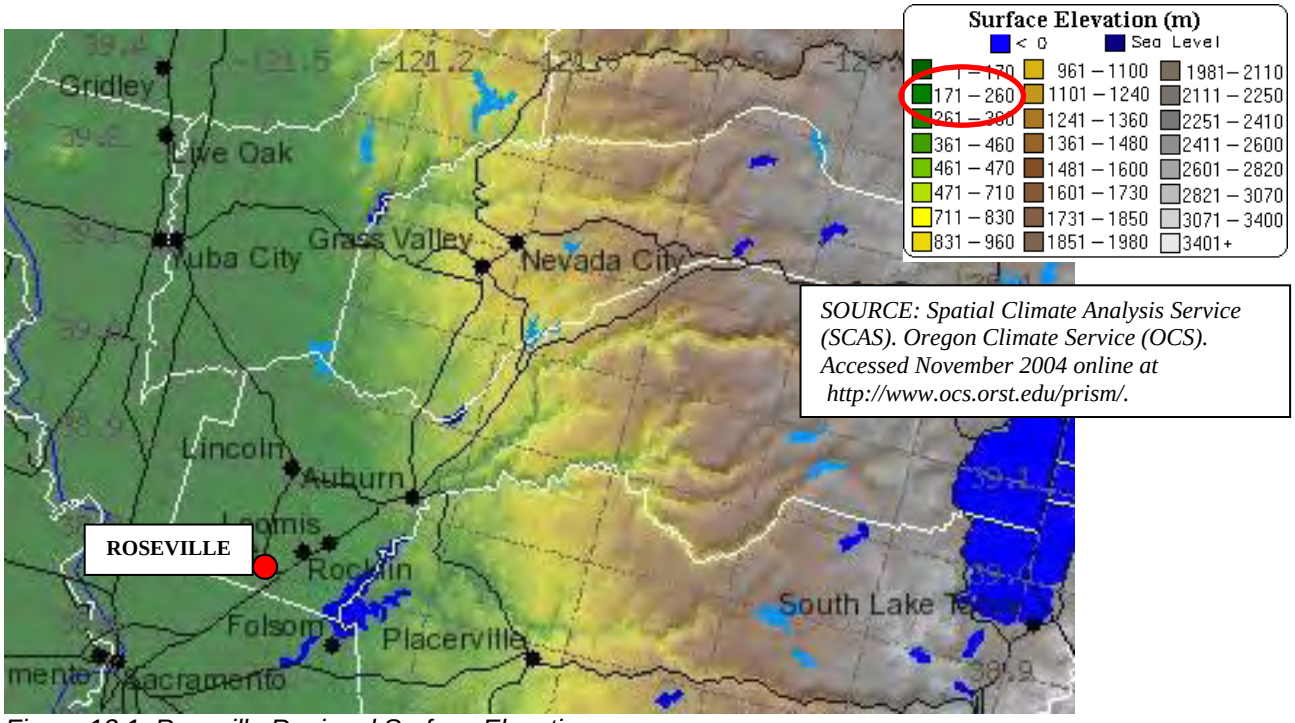


Figure 13.1. Roseville Regional Surface Elevation

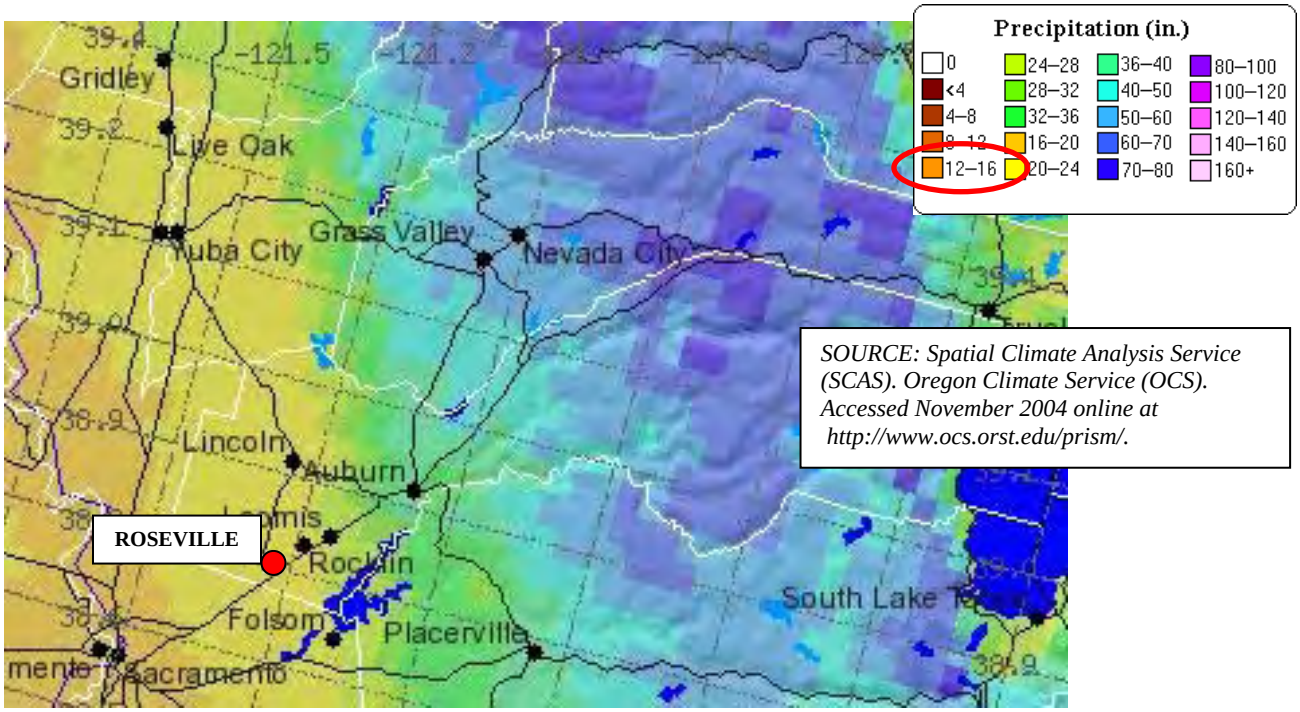


Figure 13.2. Roseville Regional Average Annual Precipitation

TABLE 13.1.
DISASTER DECLARATIONS FOR PLACER COUNTY FROM SEVERE WEATHER HAZARDS

Date	Location	Declaration Type	Description	Damages	Source
1/1957	Placer County	N/A	Thunderstorm and wind	N/A	NCDC
12/1967	Placer County	Federal	Severe winter storm	$8,621	SHELDUS
1/1969	Placer County	Federal	Storms	47 dead; 161 injured; $185M public; $115M private losses	Cal OES
4/1972	Placer County	County	Freeze and severe weather	Crop losses unknown	Cal OES
1/1973	Entire State of California	N/A	Severe thunderstorm	N/A	SHELDUS
12/1979	N/A	N/A	Severe winter storm	N/A	SHELDUS
3/1983	Placer County	Federal	Winter storms	$151M public; $159,000 private	Cal OES
3/1983	Placer County	N/A	Tornado	$250,000	NCDC
4/1990	Placer County	N/A	Tornado	$3,000	NCDC
1/1995	Placer County	Federal	Late winter storm	$191M public; $122M individual; $47M business; $79M highways; $651M agriculture	Cal OES
12/1996	Roseville	N/A	Thunderstorm and wind	N/A	NCDC
1/1998	Placer County	N/A	Heavy rain	N/A	NCDC
1/1998	Placer County	N/A	Severe storm	N/A	SHELDUS
1/2000	Roseville, Auburn, etc.	N/A	Heavy rain	N/A	NCDC
2/2000	Roseville	N/A	Heavy rain	$10,000	NCDC
8/2003	Placer County	Federal	Rain, poor winter chill and high heat	Agricultural losses	SBA #ZD6
3-5 / 2003	Entire State of California	Federal	Rain, hail, freezing temp and wheat stripe rust	Agricultural losses	SBA #9x85

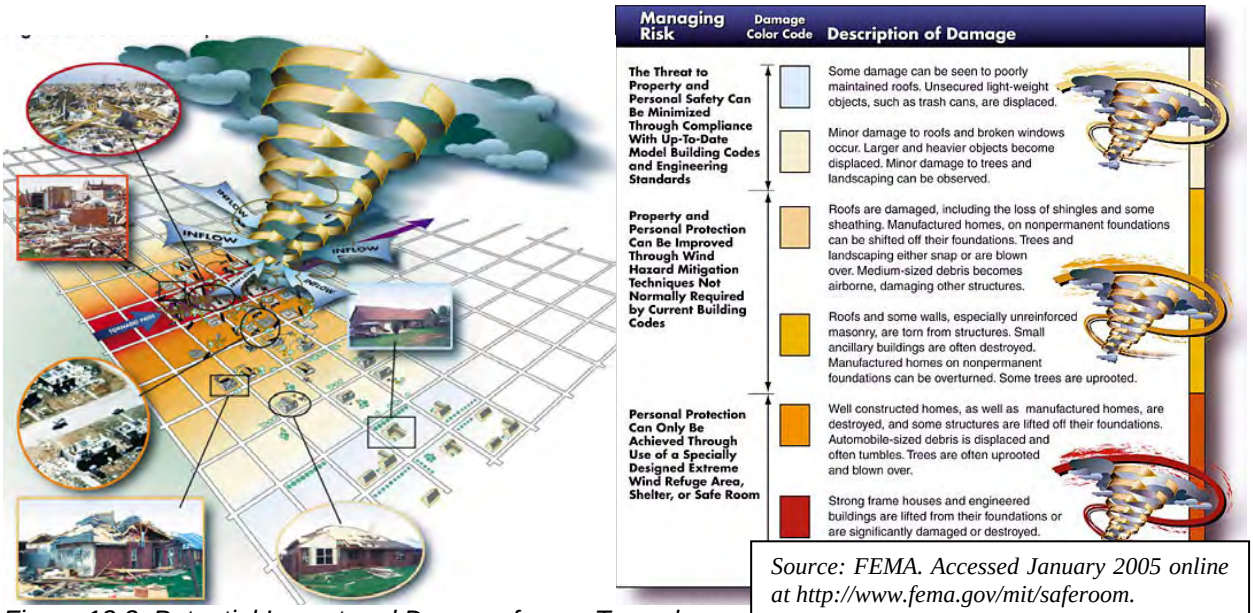
NOTES: N/A indicates Not Available. This table excludes severe weather hazards that are described in separate sections of this report, including droughts and flooding. California Office of Emergency Services (Cal OES); National Climatic Data Center (NCDC); and Spatial Hazard Events and Losses Database for the United States (SHELDUS) maintained by the University of South Carolina's Hazard Research Lab.

Source: Adopted from the Placer County Emergency Management Plan, November 2004.

13.2 SEVERE WEATHER HAZARD PROFILE

13.2.1 Tornadoes

A tornado is a violently rotating column of air extending between, and in contact with a cloud and the surface of the earth. Tornadoes are often (but not always) visible as a funnel cloud. On a local-scale, tornadoes are the most intense of all atmospheric circulations and wind can reach destructive speeds of more than 300 mph. A tornado's vortex is typically a few hundred meters in diameter, and damage paths can be up to 1 mile wide and 50 miles long. Figure 13.3, as adopted from FEMA, illustrates the potential impacts and damaged from tornadoes of different magnitude.



Source: FEMA. Accessed January 2005 online at http://www.fema.gov/mit/saferoom.

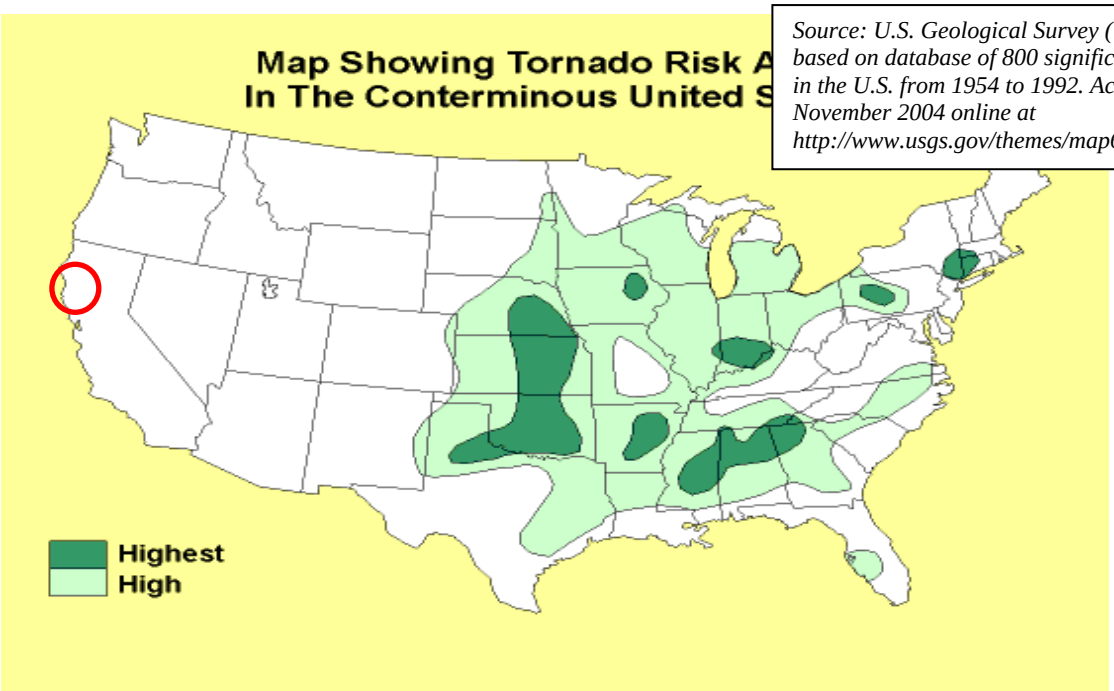
Figure 13.3. Potential Impact and Damage from a Tornado

Location and Extent

Tornadoes can occur throughout the year at any time of day but are most frequent in the spring during the late afternoon. While California does experience tornadoes, as illustrated in Figure 13.4, it has a relatively low-risk compared to states in the Midwestern (central plains) and Southern United States. The figure shows United States areas most at risk for tornadoes and shows that Roseville is not located in a high risk area for this hazard.

> ***Fujita Scale—***Tornado wind speeds are sometimes estimated on the basis of wind damage using the Fujita Scale. The measure is used to rate the intensity or severity of tornado events. It uses numeric values from F0 to F5 based on tornado wind speed and the damage sustained.
>
> An F0 (wind speed less than 73 mph) indicates minimal damage such as broken tree limbs or other signs, while an F5 (wind speeds of 261 to 318 mpg) indicates severe damage sustained.

Since 1950, 292 tornadoes have occurred in 42 counties throughout California resulting in 103 injuries. However, since 1950, no deaths caused by tornadoes have been recorded in California. The Roseville area has experienced several recorded tornado events in the past but none that have caused injury or serious property damage. A search of FEMA and ESRI's hazard mapping online tool for tornado strikes in the Roseville area show no significant observed tornadoes on record in the City (http://mapserver2.esri.com).



Source: U.S. Geological Survey (USGS). Risk based on database of 800 significant tornadoes in the U.S. from 1954 to 1992. Accessed November 2004 online at http://www.usgs.gov/themes/map6.html.

Figure 13.4. Tornado Risk Areas in the Coterminous United States

Event History

None of the tornadoes in California have been rated stronger than F2 on the Fujita Scale. Of the 292 tornadoes in California, only 8 percent reached F2, 39 percent were classified as an F1, and 53 percent were classified as an F0 (the least severe).

Since 1950 there have been four recorded tornadoes in Placer County. These events are detailed in the Table 13.2, which illustrates that there have been no recorded deaths or serious injury resulting from tornadoes.

TABLE 13.2.
TORNADOES RECORDED FOR PLACER COUNTY (1950 TO 2004)

Date	Magnitude	Deaths or Injury	Property Damage	Crop Damage
10/15/1972	F0	0	$0K	$0K
3/3/1983	F0	0	$0K	$0K
3/22/1983	F1	0	$250K	$0K
4/23/1990	F0	0	$3K	$0K

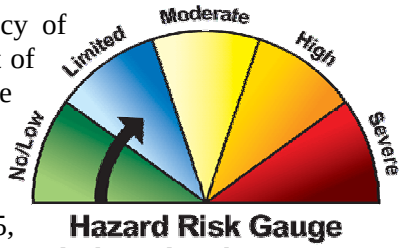
NOTE: Magnitude measured using the Fujita Scale as described above.

Source: National Oceanic and Atmospheric Administration (NOAA), NCDC, U.S. Local Storm Events Data query accessed November 2004 at http http://www4.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storms.

Probability of Occurrence

Between 1950 and 1995 tornadoes resulted in a total of $64 million in damages or a yearly average of $1.4 million (The Disaster Center, http://www.disastercenter.com/californ/tornado.html, accessed January

2005). Compared with other states, California ranks 32nd for frequency of tornadoes, none for number of deaths, 36th for injuries, and 31st for cost of damages. When these statistics are compared to other states by the frequency of tornadoes per square mile, California ranks 44th for the frequency of tornados



Based on data evaluated by the Disaster Center from 1950 to 1995, California, Placer County, and Roseville are not at severe risk from tornado hazards. The probability of occurrence or time horizon is less than every 10 years.

Tornado damages listed for Placer County in Tables 13.1 and 13.2 are not considered severe; however, tornadoes are likely to occur in the Roseville area in the future, possibly at an average rate of one every 14 years (or 4 in the 54-year period recorded by National Oceanic and Atmospheric Administration [NOAA]).

13.2.2 Windstorms

Windstorm damage

Windstorms are generally short-duration events involving straight-line winds or gusts in excess of 50 miles per hour (mph). These gusts can produce winds of sufficient strength to cause property damage. Windstorms are especially dangerous in those areas with significant tree stands, and areas with exposed property, poorly constructed buildings, mobile homes (manufactured housing units), major infrastructure, and above ground utility lines. A windstorm can topple trees and power lines, cause damage to residential, commercial, critical facilities, and leave tons of debris in its wake.

Location and Extent

Figure 13.5 shows the primary wind zone hazard areas for the United States. According to the American Society of Civil Engineers (ASCE) design wind speed Standard 7-95, California is generally classified as Zone I with maximum wind speed estimates of 130 mph. More specifically, Placer County is estimated to have wind speed gusts of up to 85 mph (in a 3-second gust wind speed for a 50-year mean recurrence interval). Roseville and western Placer County are, however adjacent to a “special wind region,” which indicates that wind storms are still a potential and real hazard. Special consideration must be given to these regions when records or experience indicate wind speeds are higher than those reflected in the ASCE figure reproduced below.

Windstorms in southeast Placer County are more probable during the fall through early spring. Because of the shape and orientation of the Sacramento Valley, prevailing winds are southerly. When atmospheric conditions are favorable, usually in conjunction with a significant storm tracking along the coast, these winds may combine and become strong enough to cause property damage and personal injury. The most significant windstorms in Northern California was the Columbus Day storm of 1962. Significant damage occurred along the coast and in the far northern part of the Sacramento Valley. Because Roseville lies far enough south in the Valley, windstorms such as those during the Columbus Day Storm of 1962, typically do not intensify to damaging levels. It is very infrequent for southwesterly winds flowing parallel to the Sierra Nevada mountains to reach sustained gusts above 60 mph in the valley floor.

Event History

Historical data on recorded windstorm events were compiled including the wind-related disaster declarations described in Table 13.1.

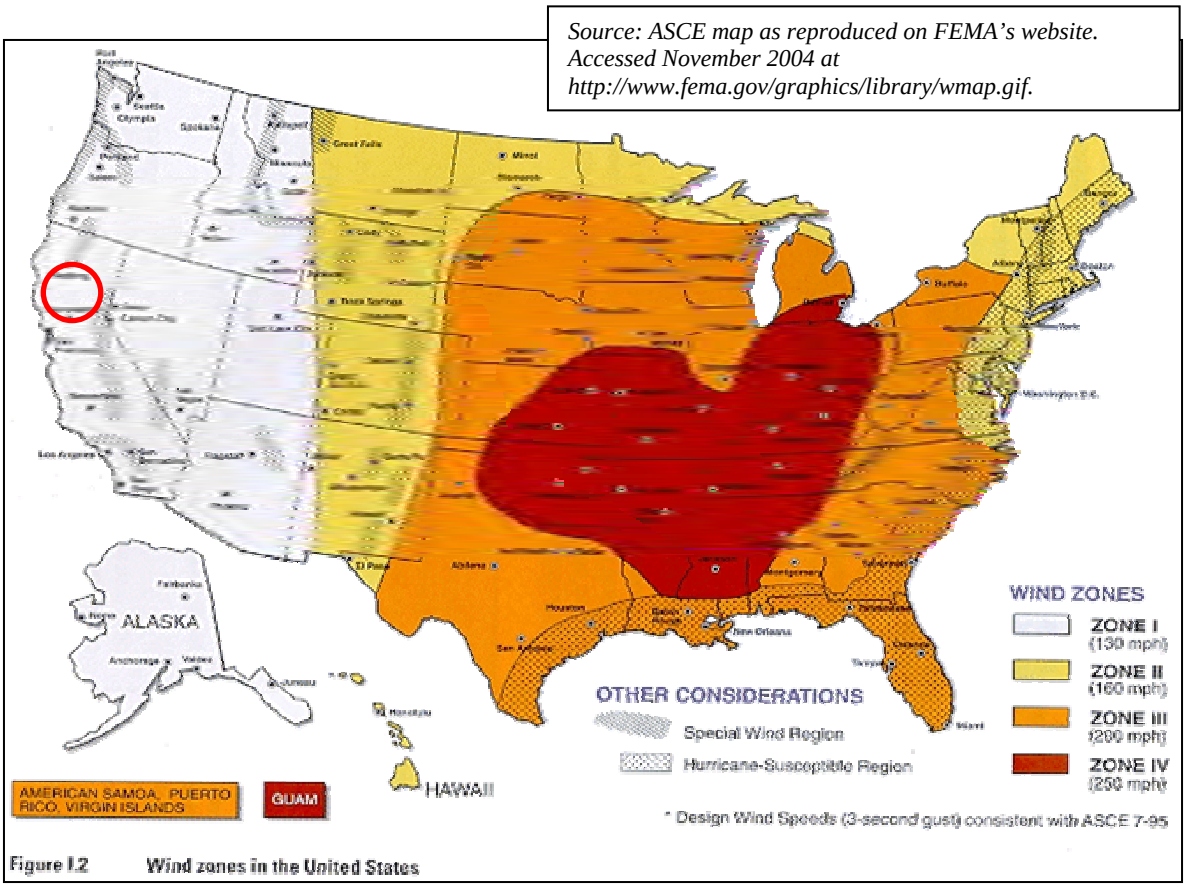


Figure 13.5. Wind Zones in the United States

Site-specific data on windstorms in Roseville are inconclusive and incomplete. Regionally there have been a few historic windstorm events which resulted in significant damage. The impacts of these events were felt to the north and east of Roseville. There have been a couple of instances of unusual wind bursts which have resulted in some property damage. December 1993 saw a downburst of wind that did significant damage to a sound wall that was under construction. Another event occurred on January 1, 1995 when a wind gust burst through northwest Roseville snapping several power poles. Table 13.3 shows monthly wind records for Sacramento.

TABLE 13.3
MONTHLY WIND RECORDS FOR SACRAMENTO, CALIFORNIA

Month	Year of Record	Fastest Wind Speed (miles per hour)	Month	Year of Record	Fastest Wind Speed (miles per hour)
January	1954	60	July	1956	36
February	1938	58	August	1954	38
March	1952	66	September	1965	42
April	1955	45	October	1950	68
May	1912	40	November	1953	70
June	1950	47	December	1952	70

Source: Masters-Bevan 2001.

Probability of Occurrence

Because of the topography and the vicinity of the ocean coupled with significant thermal factors in the area's climate, windstorms are a possible natural hazard. Based on the historical record in the region, windstorms can be expected to occur across the entire Roseville study area, but damages are expected to be minor. This hazard is of less significance than other areas in the region yet the hazard is present.

13.2.3 Fog

Fog is a cloud (or condensed water droplets) near the ground. Fog forms when air close to the ground can no longer hold all the moisture it contains. This occurs either when air is cooled to its dew point, or the amount of moisture in the air increases.

Heavy fog is particularly hazardous because it can restrict surface visibility. Severe fog incidents can close roads, cause vehicle accidents, cause airport delays, and impair the effectiveness of emergency response. Financial losses associated with transportation delays caused by fog have not been calculated in the United States, but it is known to be substantial.

Location and Extent

Fog can occur almost anywhere during any season and is classified based on how it forms, which is related to where it forms. Certain seasons are more likely to have foggy days or nights based on a number of factors including the process for fog formation and the topography.

In Placer County, heavy fog occurs mostly during the midwinter. A low-lying, early morning "tule fog" can occur anytime during the wet, cold season. Tule fog or radiation (ground) fog is common on clear nights with little or no wind and is caused by the rapid cooling of the Earth and corresponding air temperature dropping to its dew point. This type of fog is also known as "valley fog" when it persists throughout the day and is thick.

Central Valley Shrouded In Fog
Source: NOAA. Accessed January 2005 at http://rst.gsfc.nasa.gov/Sect6/Sect6_9.html.

Event History

A search of NCDC online data show no severe fog incidents recorded for Roseville or Placer County from 1950 to 2004. However, a query of the SHELDUS database indicates two major fog events in Placer County during that period. Losses for those two events total more than six injuries, at least one fatality, and almost $400,000 in property damage. The December 1997 fog event was county-wide and had substantial losses; the location of the December 1998 fog event was not specified in the database and caused less damage. In addition, in December 2004 and January 2005, during the preparation of this plan, dense fog events occurred in Roseville and the surrounding areas. As reported by the California Highway Patrol (CHP) Newcastle office, these extended fog conditions resulted in limited visibility, hazardous driving conditions, and a number of fog-related traffic accidents (Discussions between Tetra Tech and CHP Sergeant Bertola, March 2005).

Probability of Occurrence

Table 13.4 displays the pattern and frequency of dense fog events in southern Sacramento valley.

TABLE 13.4
MONTHLY DENSE FOG OCCURRENCE

Month	Year of Record	Mean Number of Days	Maximum Number of Days
January	1961	9.9	23
February	1963*	5.3	13
March	1986	1.7	6
October	1962	1.4	11
November	1982	5.3	11
December	1989*	9.5	22
Annual	1962	33.8	64

* Also occurred in previous years.
Source: Masters-Bevan 2001.

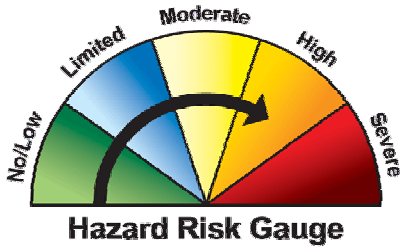
Given the nature of fog in the Roseville area and evidence of at least three fog events causing injury or property losses in the past few years, future severe or dense fog events are expected to happen on an annual basis, but are not expected to occur frequently.

13.2.4 Heavy Rains, Thunderstorms, and Lightning

Severe weather in the City of Roseville generally includes heavy rains and are periodically accompanied by strong winds, lightning, or hail. Heavy rains coupled with low temperatures or other severe weather conditions can result in increases in traffic accidents, disruptions in transportation, commerce, government, and education. Severe weather incidents can also cause utility outages due to falling trees or other debris as well as injuries.

NOAA classifies a thunderstorm as a storm with lightning and thunder produced by cumulonimbus clouds, usually producing gusty winds, heavy rain, and sometimes hail. Thunderstorms are usually short in duration (seldom more than two hours). Heavy rains associated with thunderstorms can lead to flash flooding during the wet or dry season. According to the American Meteorological Society Glossary of Meteorology, thunderstorms are reported as light, medium, or heavy according to the following characteristics:

- Nature of the lightning and thunder
- Type and intensity of the precipitation, if any
- Speed and gustiness of the wind
- Appearance of the clouds
- Effect on surface temperature



Lightning is an electrical discharge that results from the buildup of positive and negative charges within a thunderstorm. When the buildup becomes strong enough, lightning appears as a “bolt.” This flash of light usually occurs within the clouds or between the clouds and the ground. A bolt of lightning reaches temperatures approaching 50,000° Fahrenheit (F) instantaneously. The rapid heating and cooling of air

near the lightning causes thunder. Lightning is a major threat during a thunderstorm. In the United States, between 75 and 100 Americans are struck and killed by lightning each year (http://www.fema.gov/hazard/thunderstorms/thunder.shtm).

Ice and freezing rain storms are not part of the climate pattern in southern Sacramento valley. Periods have occurred where the daily minimum temperature has been at or below 32°F for several days. Yet the low temperatures reflect diurnal variations with clear skies, not part of a synoptic feature generating any precipitation. The bitterest cold snap on record, occurring December 9 to 15, 1935, was ended by the onset of a Pacific storm ushering warmer air.

Although ice storms and freezing rains are a significant natural hazard, the extremely remote possibility of their occurrence in Roseville precludes any further discussion in this analysis.

Location and Extent

The most severe storms occur during the late fall to early spring. Roseville experiences what climatologists classify as a Mediterranean type of climate. This climate regime is typified by focusing nearly 90 percent of the annual precipitation into a relatively narrow window of about 16 weeks. The climate pattern coupled with the onshore flow of warm, moist Pacific air during the winter can generate severe and prolonged periods of heavy rain. Roseville located in the southern Sacramento Valley floor will experience periods of heavy rains on an annual recurring basis.

Some of these severe winter storms may also contain embedded thunderstorms. The western part of the country is the area where the least cloud to ground lightning flashes occur (Changnon 1999). Thunderstorms are typically few in number and are more likely to appear in the spring or late fall (Masters-Bevan 2000). Table 13.5 shows the average and record occurrence of thunderstorms in Sacramento between 1948 and 2000.

TABLE 13.5
FREQUENCY OF THUNDERSTORMS IN SACRAMENTO, CALIFORNIA

Month	Year of Record	Average Number of Days with Thunderstorms	Greatest Number of Days with Thunderstorms
January	1970	0.4	3
February	1970	0.5	4
March	1992	0.8	4
April	1983	0.7	3
May	1967	0.3	3
June	1956	0.2	2
July	1989	0.2	2
August	1991*	0.2	2
September	1989*	0.5	2
October	1989*	0.3	2
November	1979*	0.3	3
December	1970	0.2	2
Annual	1970	4.7	10

* Also occurred in previous years between January 1948 and December 2000.
Source: Masters-Bevan 2001.

Event History

Review of rainfall records for Roseville maintained by the City's Department of Public Works indicate that during the last 15 years for which records are available, only three years without a heavy rainfall event of less than 0.4-inch per hour. The records show that there are three instances where rainfall exceeded 1 inch in an hour. The five incidents with the highest peak 1-hour rainfall records are listed below in Table 13.6.

TABLE 13.6
PEAK 1-HOUR RAINFALL RATES IN ROSEVILLE, CALIFORNIA

Date	Time	Peak 1-Hour Amount
April 1, 1996	1543	1.18
January 10, 1995	0751	1.10
January 26, 1997	0319	1.06
November 29, 1993	1850	0.94
January 9, 1995	2144	0.79

It is much more difficult to present historical event data for thunderstorms in Roseville. There are records for some notably severe events from nearby Sacramento. Early September in 1999 saw an outbreak of thunderstorms in the area which resulted in a few thousand cloud to ground lightning strikes from the coast to the central valley. This is extremely unusual as normally there are less than a hundred per year in the region (Changnon 1992). Heavy rainfall also accompanied the 1999 storm with totals ranging from 0.25 to 0.50 inches per hour. These are very unusual rainfall rates for that time of year.

Another severe storm struck in mid-September 2004. The significant character of this storm was not the frequency of the cloud to ground lightning flashes as in the September 1999 storm but the intense rainfall that accompanied the storm. This super cell thunderstorm generated many record rainfall rates for Sacramento with peak 1-hour rates measured as high as 1.93 inches. State climatologist put this intensity at a 1 in 51,000 year event (Matthews and Juskie 2004).

Probability of Occurrence

Figure 13.6 illustrates Roseville's average annual precipitation by year from 1970 to 2003. The figure shows that on a year-by-year comparison, rainfall totals have varied from as little as approximately 10 inches per year to as high as 36 inches per year. In combination with Figure 13.7, which shows more dramatic monthly fluctuations in precipitation totals, these figures help illustrate the occurrence and approximate frequency of severe weather in Roseville in the form of heavy rains. For example, Figure 13.7 shows several instances where approximately 10 inches (or as much as 1/2 to 1/3 of the total annual rainfall for that year) fell in a one month period.

Severe weather disaster declarations for Placer County, as shown in Table 13.1, are very often related to heavy rains, thunderstorms, and freezing temperatures. Roseville's elevation and proximity to the Sierra Nevada mountains will ensure that these types of severe weather event remain a hazard. While these types of storms can be expected to happen during the winter season, they are not expected to occur frequently nor are they predicted to be as severe as storms in eastern Placer County.

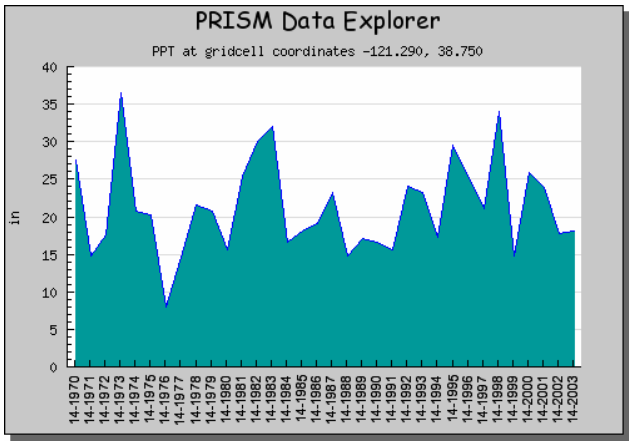


Figure 13.6. Average Annual Precipitation, 1970 to 2003 (Indicates variations between years)

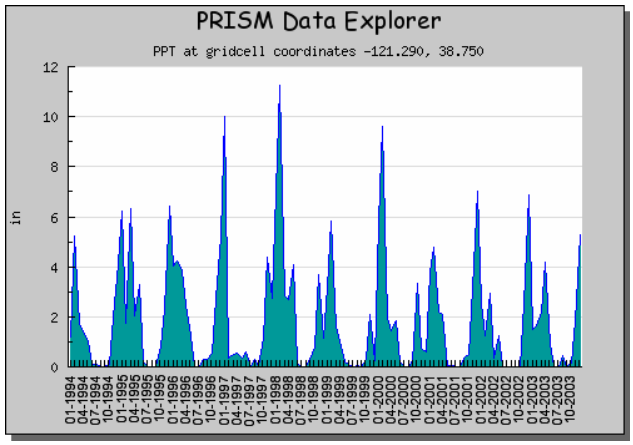


Figure 13.7. Monthly Precipitation Totals, 1994 to 2003 (Indicates variations by season)

Source: SCAS. Oregon Climate Service (OCS). Accessed November 2004 online at http://www.ocs.orst.edu/prism/)

13.3 VULNERABILITY ASSESSMENT

Under 44 CFR Section 201.6(c)(2)(ii) of DMA2K, risk assessments are required to include a description of the jurisdiction's vulnerability to the hazards and its impact on the community. This description should also describe Roseville's vulnerability in terms of the types and numbers of existing and future buildings, infrastructure, and critical facilities located in the floodplain hazard area and estimate potential dollar losses to vulnerable structures as well as analyze development trends. This sub-section presents the results of the severe weather vulnerability assessment for Roseville for each of the four categories of severe weather discussed in this plan. In many instances, the vulnerability to tornadoes and windstorms are similar and discussed together.

13.3.1 Impact on Life, Safety, and Health

Tornado and Windstorm

The impact of tornadoes can be severe. Tornadoes can cause death, injury, and major property damage. In the United States, 69 percent of all tornadoes are considered weak (wind speed less than 110 mph) and result in less than 5 percent of related deaths; 29 percent are considered strong (wind speed between 110 to 205 mph) and result in nearly 30 percent of related deaths; and 2 percent are considered violent (wind speed greater than 205 mph) and result in 70 percent of related deaths.

As described previously, there are no recorded tornadoes in Roseville stronger than an F1; therefore, severe impacts on life, safety, and health are not likely to occur.

Debris carried by extreme windstorms can directly contribute to loss of life and indirectly to the failure or protective building envelops, siding, or walls. Debris and building failures can lead to injury or loss of life; however, because Roseville is not in a high-wind hazard area nor is it directly in the "special wind region" that crosses parts of Placer County (see Figure 13.5), injuries and deaths from wind are expected to be a rare event.

Fog

Traffic accidents caused by fog-related reduced visibility can cause severe injury and even fatalities. The numbers of these types of incidents within the Roseville vicinity was not available at the time of this risk assessment. However, past experience shows that fog related traffic incidents have and will continue to occur within Roseville.

Heavy Rains, Thunderstorm, and Lightning

Historical hazard data indicate that heavy rains, thunderstorms, and lightning are annual events for Roseville and Placer County. However, historic injuries and deaths in Roseville associated with the primary effects of severe weather have been limited and can be expected to follow a similar pattern. The vulnerability of life, safety, and health from these events is predicted to be minor.

13.3.2 Impact on Critical Facilities

Tornado and Windstorm

Debris resulting from tornadoes or windstorm gusts can down power lines and telephone utilities causing blackouts or disruptions in communication.

Fog

Fog hazards are not expected to cause significant damage to critical facilities in Roseville. Losses from fog hazards are typically limited to traffic incidents.

Heavy Rains, Thunderstorm, and Lightning

The critical facilities as defined by this planning process are illustrated in Figure 5.1. Heavy rains or thunder and lightning storms could impact all of these facilities in one way or another. The degree to which they are impacted is dependent on the degree or severity of the event. Lightning could strike a critical facility render it unusable for duration due to power outage or fire. Heavy rains could cause flash flooding of a critical facility due to a stormwater management system failure.

13.3.3 Impact on Existing Structures

Tornado

The biggest risks of tornadoes in California include light to moderate damage to homes, destruction of mobile homes, slight damage to crops, and injuries caused by flying projectiles during an F2 tornado. As described previously, there are no recorded tornadoes in Roseville stronger than an F1 and tornadoes in the area rarely occur; therefore, severe impacts on existing structures are not likely to occur.

Windstorm

Windstorms do not typically cause serious impacts (property losses) to well-built structures such as those made from concrete or steel. Additionally, windstorm damages to commercial or industrial structures constructed using wood or masonry are rare because these buildings are typically well-built. The most common losses from windstorms are to residential structures constructed from wood or to mobile homes (manufactured housing commonly found in trailer parks), which are particularly at risk to significant windstorm damage.

Based on Roseville's building inventory estimates from the HAZUS-MH database, 95 percent (26,972 residential structures out of 28,338) are single or two storied residential homes constructed of wood. Only 2 percent (or 534) are mobile homes but because these structures are highly susceptible to windstorm damage estimates are provided here. Figures 13.8 and 13.9 illustrate typical loss and value ratio estimates for different peak wind speeds on wood-framed, single-storied and double-storied homes, respectively. Based on Roseville's estimated design wind speed of 85 mph, loss estimates from windstorms are predicted to be negligible. However, because of Roseville's proximity to the "special wind region," peak wind speeds could, exceed the design basis estimates and cause more significant losses.

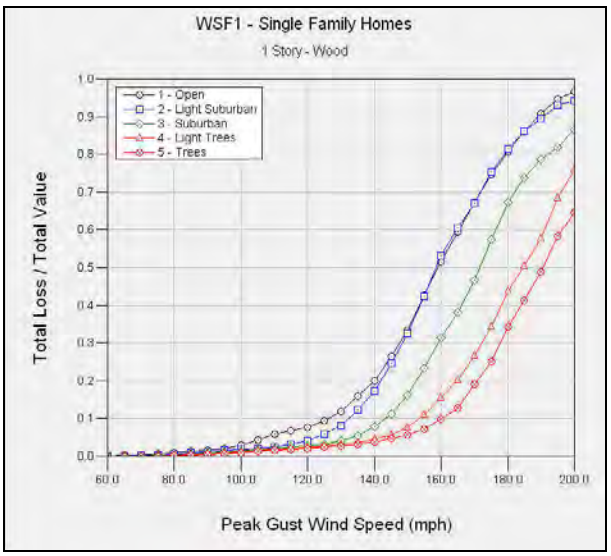


Figure 13.8. Windstorm Damage Estimates for Single Family Home Constructed of Wood (1 Story) (Based on Peak Gust Wind Speeds)

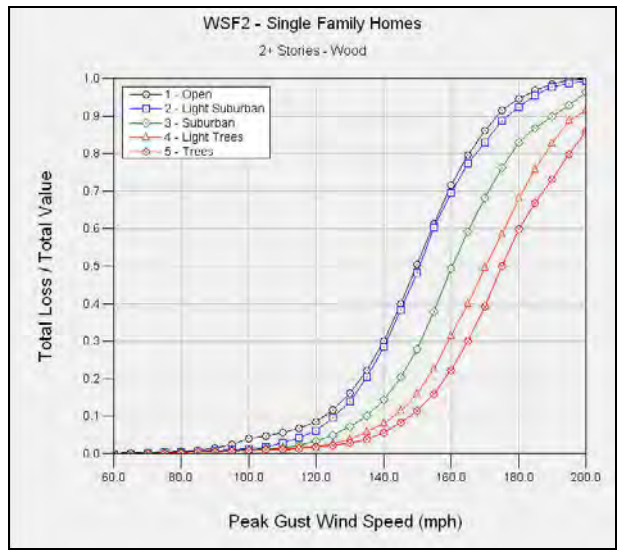


Figure 13.9. Windstorm Damage Estimates for Single Family Home Constructed of Wood (2 Story) (Based on Peak Gust Wind Speeds)

Source: SCAS. OCS. Accessed November 2004 online at http://www.ocs.orst.edu/prism/)

Figure 13.10 illustrates typical loss and value ratio estimates for different peak wind speeds manufactured homes. Based on Roseville's estimated design wind speed of 85 mph, loss estimates from windstorms are still predicted to be negligible. However, because of Roseville's proximity to the "special wind region," peak wind speeds could, exceed the design basis estimates and cause more significant losses. The damage curve for manufactured homes rises much more steeply than the curves in Figures 13.8 and 13.9 for wood-framed houses, indicating that as wind speeds increase beyond the 85 mph design speed, damage to manufactured homes will increase much more sharply.

Fog

Fog hazards are not expected to cause damage to existing structures in Roseville.

Heavy Rains, Thunderstorm, and Lightning

Heavy rains, or thunder and lightning storms could impact all structures within Roseville to a degree. Once again, the degree of impact is dependant on the severity of the event and the regional location of the event when its intensity is the highest. This is very difficult if not impossible to predict. Therefore for planning purposes, it will be considered that all structures could be impacted, however no attempt will be made to quantify this impact due to the lack of information. This impact may be quantified in future updates to this plan based on best available information.

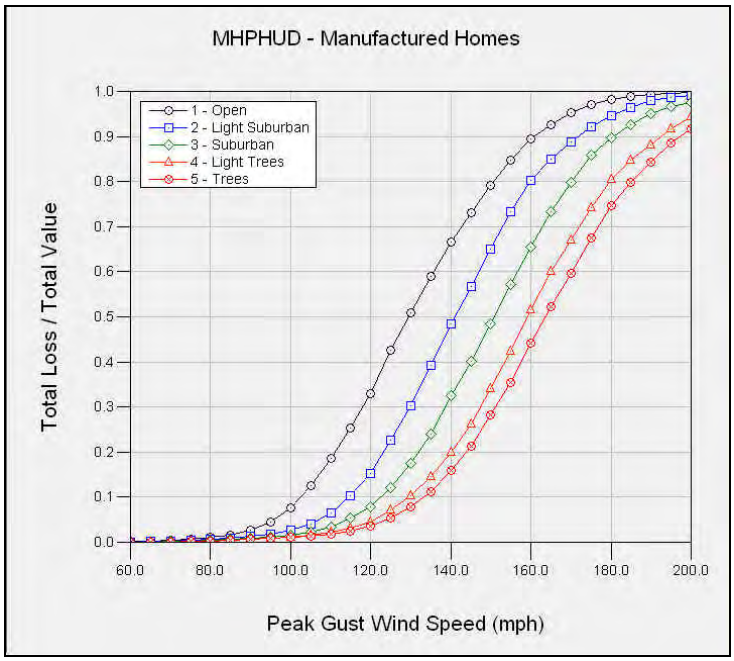


Figure 13.10. Windstorm Damage Estimates for Manufactured Homes (Based Peak Gust Wind Speeds)

13.3.4 Economic Impact

The economic impact of severe weather events within in Roseville would be considered very similar to those sited in Section 9.3.6 of this plan. Once again, the quantification of the impacts of these types of hazard events is difficult due to lack of map-based information to analyze. Therefore the impact estimates for these types of hazards are subjective based on historical occurrence and best guess estimates. For planning purposes, it is reasonable to assume that the net economic impact of severe weather events would be very similar to those identified for the flood hazard. History has shown that severe weather type events within the Roseville vicinity have led to subsequent flood events. Therefore, in the overall scheme of evaluating risk based on its possible economic impact, the planning team utilized the estimated generated for flood in ranking the risk for severe weather hazards. Roseville will attempt to update this information in future updates to this plan based on best available information and technology.

13.3.5 Impact on Development and Redevelopment Trends

Many of the impacts associated with severe weather hazards can be addressed through proactive planning and utilization of best available information in making land use decisions. Roseville has and will achieve this goal through the implementation of its General Plan. The General Plan serves as a long-term policy guide for the physical, economic, and environmental growth of the city and includes a statement of the community's vision of its ultimate physical growth. Implementation of its General Plan along with other programs such as Building Code enforcement, public information and early warning will help Roseville to manage the probable impacts of severe weather hazards on future growth areas as the City grows in the future.

13.4 REVIEW OF EXISTING ORDINANCES, PROGRAMS, AND POLICIES

Roseville implements numerous programs and policies that can impact severe whether hazards. Like most programs and policy's sited in this plan, these are tied to the city's General Plan. For the sake of avoiding unnecessary redundant discussion and review, these programs and policies are addressed in Section 13.5,

Review of Mitigation Alternatives. These existing programs are listed as an "ongoing" initiative under this review.

13.5 REVIEW OF MITIGATION ALTERNATIVES

Review of mitigation alternatives for severe weather hazards was organized around each specific hazard due to the disparate nature of the various severe weather phenomena.

13.5.1 Preventive Activities

Roseville has invested many resources in prevention activities to protect public safety and property in the event of a disaster including severe weather incidents. Prevention activities include a continuation of staff time and funding dedicated to preventive activities including the following:

- Continue ongoing monitoring of weather patterns by the Public Works Department in cooperation with various professional associations and meteorologists
- Ensure adequate maintenance of the City's storm drain system and creek-beds.

13.5.2 Property Protection Activities

- Continue on going enforcement of Building Codes to protect life and property in the event of a severe weather incident.
- Adopt the International Building Code (IBC) at the earliest possible opportunity once ratified as the State of California Building Code.

13.5.3 Resource Protection Activities

- Continue the City's ongoing Environmental Coordination efforts to preserve open space and floodplain areas, both to prevent storm damage and to preserve these environmentally sensitive areas.
- Continue the ongoing collection of impact fees to fund retention and detention basins that mitigate the impacts of a severe storm event. The basins also serve the purpose of providing open space in the urbanized area thus meeting the goal of environmental protection

13.5.4 Emergency Service Activities

Emergency service activities include warning methods and response to events. Program enhancements may include the following projects and programs.

- Continue ongoing emergency response training for every type of incident.
- Continue ongoing Geographic Information System updates to ensure that in the event of an emergency, information regarding street names and addresses, property ownership, critical facilities, infrastructure, evacuation areas, and all of the other layers are kept current.
- Work with Placer County OES and the Placer County Sheriff's Department to coordinate dispatch systems operating independently of each other. As noted in the Placer County Multi-Hazard Mitigation Plan, the systems operate independently of each other and needs to be improved, integrated, and better coordinated to provide a more comprehensive, county-wide approach to emergency response.

- The ephemeral nature and frequently quick duration of severe weather hazards dictate unusually rapid detection and dissemination of the threat. Because of this, it is recommended that a radio link to the Emergency Managers Weather Information Network (EMWIN) be established at all critical facilities in the City of Roseville. A response plan will be developed to echo the warnings on the City's Internet site. Warnings are already promulgated through cable and broadcast TV channels, commercial radio, and the City's own low wattage radio station in place to notify residents and businesses of weather conditions. Placement of these radios will greatly improve the problem of disseminating the threat. This strategy is well supported and recommended by all emergency management agencies.
- A dense fog event, while difficult to exactly predict the area covered and the timing, occurs usually over the course of several hours. The slow nature of this hazard can allow for a more deliberate response. Dissemination can be handled through existing channels used by the City's Emergency Operation Center. To mitigate for this hazard, it is recommended the City of Roseville investigate deployment of large portable programmable signs during a dense fog event. These signs would be analogous to the permanent signs in place by CalTrans on state highway locations noted for such a hazard. These signs could be located at strategic locations on major thoroughfares leading into and out of the City.

The automated flood warning system already in place can support mitigation for heavy rainfall, severe thunderstorms, and lightning events. Two additional elements if added can enhance that support. With an initial capital investment that should not exceed $75,000, annual expenditures for operations and maintenance of less than $10,000, this early warning system for floods can be enhanced to directly support mitigation plans for severe weather hazards.

- First, it is recommended that the City of Roseville link the rainfall gage network to the automated traffic signal network. With this development, when a predefined rainfall intensity level is detected the automated traffic signal network can adapt the timing to allow for more time at critical intersections. Very poor visibility and reduced tire traction on autos greatly increases the chances of vehicular accidents. The timing change will help compensate for these poor conditions and reduce the incidence of serious accidents during the storm.
- Second, the City could add to the flood warning system a lightning detection network. Installing a sensor to detect the threat of lightning and add collection of data from other lightning detection networks would incorporate this. It has been shown that this capability may improve skill at forecasting a heavy rainfall event since the two often coincide.
- The City of Roseville may purchase mobile generators to provide redundancy for electric utilities in the event of a severe weather disaster.
- Roseville Parks Maintenance will enhance and implement strategies for debris management and removal during severe weather events

13.5.5 Structural Activities

Structural alternatives in a "traditional" sense are not prevalent for severe weather type hazards. Solutions that could be considered structural have been identified that largely affect private and public property damage and have significant mitigation results in also protecting life and limb.

- Future public facilities and structures should have redundant heat and power in the event electricity to the building is temporarily unavailable.
- Structures shall be insulated to prevent property damage during a severe weather event.
- Roseville Electric will continue ongoing line clearing and weed abatement to reduce exposure to severe weather hazards
- Roseville Electric will continue with the Overhead to Underground project to place as many miles of overhead electric and telecommunications equipment as possible to reduce the likelihood of damage and outages during a severe weather event.
- Roseville Electric will continue the "Right Tree, Right Place" program, a community service program sponsored by Roseville Electric and the Roseville Urban Forest Foundation

13.5.6 Public Information Activities

Public information activities include activities that provide information to the public that will aid them in all stages of a disaster. Roseville's current ongoing program for severe weather preparedness involves data collection from a wide variety of sources over an area well outside the scope of Roseville's flood warning system.

- The National Weather Service has developed and continues to improve detection and threat dissemination for each of the severe weather hazards identified in this chapter. Roseville monitors this program through the Emergency Managers Weather Information Network (EMWIN) and engineering staff notifies City staff in all departments including emergency service personnel, public works crews, utility crews, and media to keep the public informed about potential events and to be prepared to respond should severe weather hazard occur.
- The Placer County Sheriffs Department monitors emergency management networks and notifies the Roseville Police Department's Communications Center if an event is predicted to occur. The Dispatchers can then notify the appropriate personnel to respond as well as media outlets to issue public warnings.
- Each Roseville Police patrol car radio is equipped with the capability of going to NOAA weather radio so individual patrol cars can receive up to the minute weather reports and coordinate their response to a particular part of Roseville.
- To further the recognition of the portable warning signs by motorists, it is recommended that the City conduct an awareness campaign on the hazard of driving at unsafe speeds during severe weather. Enforcement of motor vehicle laws about unsafe speeds while the signs are deployed will strongly support the awareness effort and increase the effectiveness of the warning signage.
- The City will promote 72-hour self sufficiency through the Emergency Preparedness Manager's efforts, the Roseville website, Roseville Coalition of Neighborhood Associations (RCONA), and various other media.
- Develop public-private partnerships and incentives to support public education activities, especially with retail establishments that sell goods and services needed during severe weather events. For example, local hardware retailers may support hazard models and displays on how to prevent property damage during a severe weather event.

13.5.7 Summary of Mitigation Alternatives

Each of the recommendations are discrete elements, none require the implementation of another proposal. Some (*i.e.* installation of EMWIN radio link) will support mitigation of more than one severe weather hazard. All of these recommendations will need an effective public awareness promotion effort. Most of the recommendations can use the existing City flood warning system as a backbone to implement.

CHAPTER 14.
WILDFIRE RISK ASSESSMENT

14.1 IDENTIFYING HAZARDS—DESCRIPTION OF THE WILDFIRE HAZARD

Under 44 CFR Section 201.6)(2(i) of DMA2K, local mitigation plans are required to include a risk assessment with a description of the types of natural hazards that can affect the jurisdiction. This section identifies the risks of wildfire hazard in the City of Roseville.

14.1.1 General Background—Wildfires

A wildfire or wildland fire is any uncontrolled fire occurring on undeveloped land that requires fire suppression. The potential for wildfire is A wildfire or wildland fire is any uncontrolled fire occurring on undeveloped land that requires fire suppression. The potential for wildfire is influenced by three factors: the presence of fuel, the area's topography, and air mass.

Fuel may include living and dead vegetation on the ground, along the surface as brush and small trees, and aerial fuel including tree canopies. Topography includes both slope and elevation. The air mass includes temperature, relative humidity, wind speed and direction, cloud cover, precipitation amount and duration, and the stability of the atmosphere at the time of the fire.

Wildfires can be ignited by lightning and, most frequently, by human activity including smoking, campfires, equipment use, and arson.

According to the California Department of Forestry (CDF) and Fire Protection, the potential for significant damage to life and property exists in areas designated as Wildland Urban Interface Areas, a term that defines the condition where highly flammable vegetation is adjacent to developed areas. The City of Roseville does not include any areas designated as Wildland Urban Interface Areas by the State. A significant portion of the area surrounding Roseville is developed, and according to maps prepared by the State, the city has a moderate fire threat. The city is at risk for wildfires that start in the undeveloped grasslands to the west and north of Roseville, in the ravines with steep slopes in the northeast part of Roseville, and in the open space and preserve areas dedicated in perpetuity throughout the city.

14.1.2 Roseville Fire Protection Services

The Roseville Fire Department is a fully functional agency that primarily provides fire suppression and emergency medical services for the urban environment of the city. The department operates six stations with the seventh currently under construction in north central Roseville. The department operates six paramedic engine companies, with a minimum staffing of three, one EMT-D truck company with a minimum staffing of four, and one Battalion Chief. The department also operates a Hazardous Materials Response Unit (cross-staffed by the EMT-D truck company); four Grass/Wildland units, and one Technical Rescue unit (all cross-staffed by Engine Companies). The department currently maintains three reserve engines and one reserve truck.

The Roseville Fire Department has established a Standards of Response Coverage Plan that includes a travel time standard of four minutes from the time the apparatus leaves the station to the arrival of the first engine on scene. Due to significant growth in the city, additional fire stations are needed to achieve this response time. A temporary facility near the intersection of Blue Oaks Road west of Foothills Boulevard

will serve as Fire Station No. 7 until the permanent station is constructed and opened in late 2006. Fire stations No. 8 and No. 9 are currently being planned to serve the new development anticipated in Roseville.

The City of Roseville has mutual aid agreements with local fire departments and districts in surrounding Placer County and Sacramento County. The City also maintains a mutual aid agreement for state resources in the event a disaster warrants additional staffing and equipment.

City of Roseville Fire Department Grass/Wildland Truck housed at Fire Station No. 6 shown on the Miner's Ravine bike trail in the Stoneridge Specific Plan area.

14.2 WILDFIRE HAZARD PROFILE

14.2.1 State of California

The CDF is charged with both assessing the threat of fire in California and suppressing fires on state and federal lands while providing mutual aid if needed to communities that do not include public lands.

The California Fire Plan formalizes much of the work that has been done to assess the threat of wildfire statewide including California's Wildfire Urban Interface areas. CDF's work on the State plan has also assisted in the development of a National Fire Plan.

The CDF has developed an estimate of fire risk in Wildland Urban Interface areas based a variety of factors in two categories: fire frequency and fire behavior.

The State has individually mapped the fire frequency and fire behavior potential and has combined both into a single assessment called Fire Threat. A significant fire threat is found throughout California, with 48 percent of the state's wildland area ranked as high, very high or extremely high. About 37 percent of the state has a moderate fire threat.

Fire Frequency—A broad measure of the rate of fire occurrence in a particular area. An estimate of the areas most likely to burn is based on past fire history or fire rotation in the area, fuel conditions, weather, ignition sources such as humans or lightning, fire suppression response, and other factors.

Fire Behavior—The physical characteristics of a fire and is a function of the interaction between the fuel characteristics (type of vegetation and structures that might burn), the topography in an area, and the weather. Variables that affect fire behavior include the rate of spread, the intensity of a fire, fuel consumption, and the type of fire (underbrush vs. crown fire).
Source: CDF-FRAP website, 2003

According to the map of fire threat prepared by CDF, areas of high threat are throughout the State with large zones in Southern California, the central coast, the lower elevations of the Sierra Nevada and much of the interior of northern California. Much of the fire threat is near densely populated areas and new development. Vegetation fires occur within CDF's jurisdiction on a daily basis and most are controlled and contained early with limited damages. For the fires that are not readily contained and become wildfires, extensive damage can occur.

The most devastating fire in recent California history based on acreage burned was the 2003 Cedar fire in San Diego County. The wildfire burned 273,246 acres, destroyed 2,820 structures and directly resulted in 15 deaths. The fire was caused by human ignition. Figure 14.1 illustrates the statewide fire threat.

Figure 14.1. California Fire Threat. (Source: CDF—Fire and Resource Assessment Program, 2003)

14.2.2 Regional Wildfire Hazard

Regional fire protection is provided by municipal fire departments and those assigned to specially-designated lands outside city boundaries. The Placer County Fire Department and CDF provide fire protection to much of Placer County including west of the Roseville city limits. The South Placer Fire District serves unincorporated Placer County east of Roseville. The City of Rocklin Fire Department provides services within the City of Rocklin to the north and east of Roseville. The Sacramento Metropolitan Fire District provides fire protection to the City of Citrus Heights and the unincorporated Sacramento County areas to the south of Roseville.

The Western Sierra foothills and valley fire personnel are increasingly concerned about wildfire safety as development continues to occur in rural areas while grasslands and open space border urban areas. The potential for wildfire and urban wildfire is always present, with fire conditions from a combination of hot weather, an accumulation of vegetation, and low moisture content typically present in the warm fire season within the Central Valley and Sierra Nevada foothills.

Wildfire risk in Placer County is primarily in the Wildland Urban Interface areas or those areas where development is adjacent to densely vegetated areas. Historically, Placer County has had nearly 150 significant wildfires since 1908. The 2002 Sierra Fire in Loomis and Granite Bay was the largest in recent history near Roseville. The fire charred 900 acres of grass, brush and oaks burned in the area between Interstate 80 and Cavitt-Stallman Road. The fire destroyed six structures and threatened two schools. One hundred homes were evacuated, and more than 1,000 homes in both communities were threatened.

A majority of Placer County is deemed to be a high or very high fire threat risk based on analysis by the CDF as shown on the enlargement of the State of California Fire Threat map below. These are areas with dense vegetation, increasing elevation, and steep slopes in the foothills and the mountains of the Sierra Nevada Mountain Range. Figure 14.2 illustrates the fire threat in Placer County.

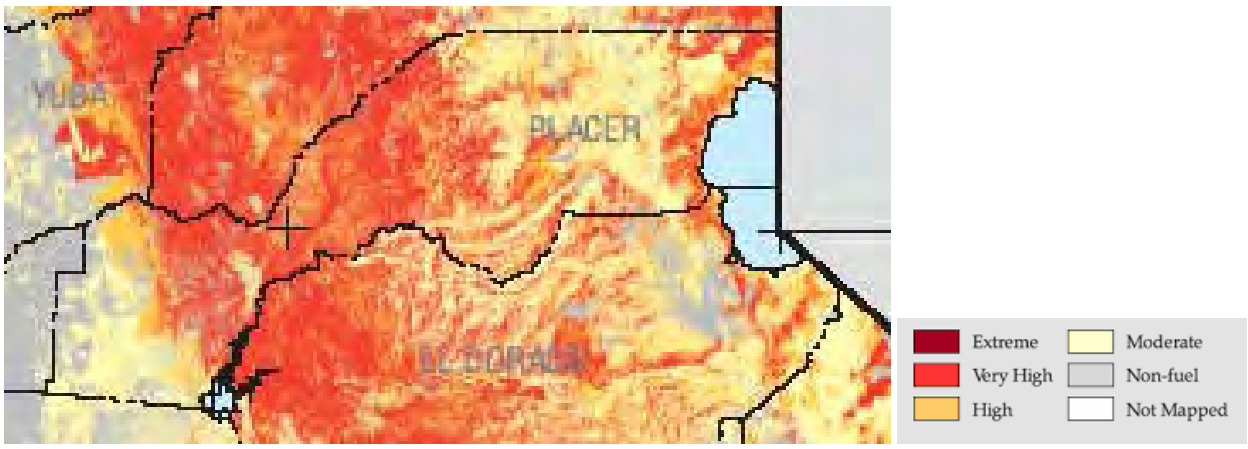


Figure 14.2. Fire Threat in Placer County (Source: CDF Fire and Resource Assessment Program, 2003)

The State CDF website located at http://frap.cdf.ca.gov/ also includes maps of the communities most at risk for wildfire that are within 1-1/2 miles of a high or very high wildfire threat on federal or non-federal lands. The threat is based on best available data as of April 2001 and the Fire and Resource Assessment Program fuels and hazard data. The map identifies seven communities within Placer County not adjacent to federal lands that are at risk for wildfire including the City of Roseville and those communities in Placer County adjacent to or within the Tahoe National Forest.

14.2.3 Local Wildfire Hazard

The City of Roseville's 35-square mile area is characterized by gently sloping terrain with areas of steep ravines in the northeast portion of the city. The city is largely urbanized with the greatest area of undeveloped property in the West Roseville Specific Plan at the northwestern border of Roseville. The City is segmented by several topographical and physical features, including streams, natural parkways, open space, Interstate 80 and Highway 65, the Southern Pacific railroad lines, and sprawling industrial facilities. Traffic is redirected around several of these topographical features by bridges and an underpass. These limitations may create traffic congestion and delay emergency response. Figure 14.3 illustrates communities at risk from wildfire in Placer County.

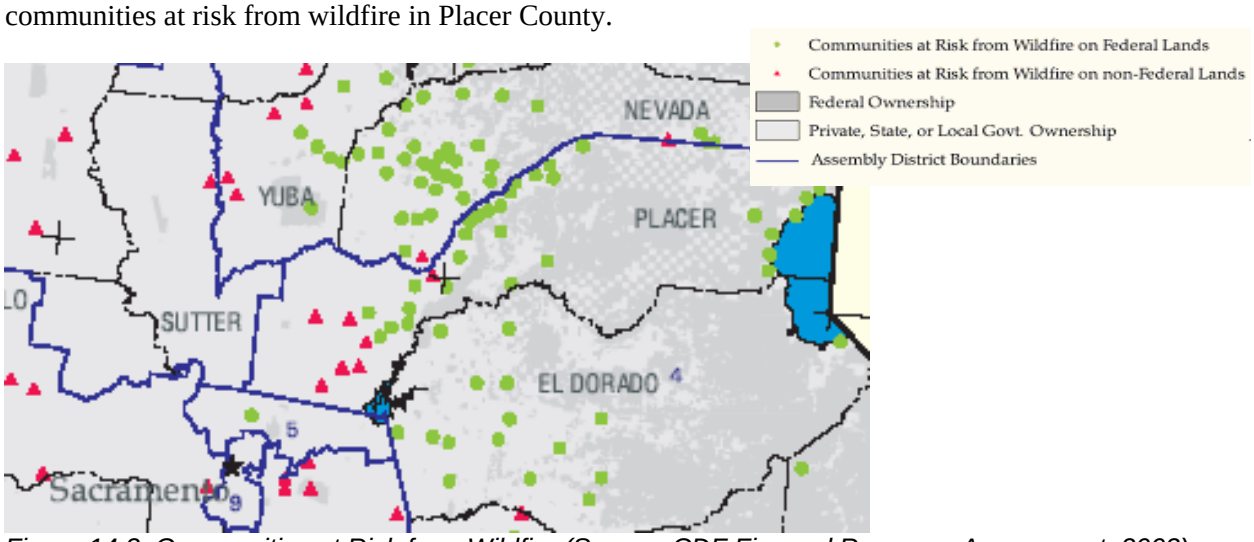


Figure 14.3. Communities at Risk from Wildfire (Source: CDF Fire and Resource Assessment, 2003)

Heavy traffic congestion at peak commute times on the city's major roadways acts as a barrier to timely response for fire equipment and emergency services. In the event of an accident or other emergency at one of the key intersections between a road and a stream, freeway, or railway, sections of the city could be isolated or have response time slowed so as to increase the risk of wildfire.

Preservation of open space areas, wetlands, natural parkways, riparian corridors along the city's watersheds, vernal pools and endangered species' habitat have added the inventory of potential vegetation susceptible to wildfire. The City of Roseville has 2,600 acres of dedicated open space within the city limits. Nearly 740 acres will be added on dedication of properties in the West Roseville Specific Plan. The City is also acquiring property in unincorporated Placer County called the Reason Farms property. This property will be the site for a retention basin projected to have water only eight days per year. The property will be preserved in perpetuity as open space with passive recreational uses planned including biking, hiking, camping, and boating on a man-made lake. The Roseville Fire Department will assume fire protection duties for this significant piece of open space at a future date.

The vegetation in Roseville can be broadly classified in three categories: annual grasslands, oak woodlands along riparian and creek areas, and seasonal wetlands.

There are still large tracts of self-sustaining grasslands that exist in the northern and western undeveloped edges of Roseville. Less extensive areas of grassland can be found in smaller, undeveloped areas scattered throughout the city. Most of the grasslands are non-native following the effects of grazing and clearing for agricultural uses.

The oak woodland, riparian and creek areas are found in close proximity to Roseville's major stream channels. The microclimates and alluvial soils provide ideal conditions for the deeper rooting shrubs and trees found in these habitats. Most woodland areas are relatively open with little shrub growth.

Seasonal wetlands in Roseville include intermittent drainages and vernal pools. Intermittent drainages are wet only in winter and dry during the summer with scattered ponds and may contain water from adjacent urban runoff. Vernal pools represent a significant seasonal wetland resource in Roseville. The U.S. Army Corps of Engineers has required developers in Roseville to preserve several areas of vernal pools that are dedicated to the City and maintained in perpetuity. These areas are to be left undisturbed and are typically open grassy areas during the hot summer months when the vernal pools are dry. Figure 14.4 illustrates the City of Roseville's wildfire threat areas.

Roseville and the northern Central Valley have a Mediterranean climate with warm, dry days and cool nights during the fire season. Daytime temperatures average 93°F in the summer and 57°F at night. Precipitation from May through October is usually rare with most of the rainfall in the Greater Sacramento area including Roseville occurring between November and April. Table 14.1 presents a summary of the annual climate conditions in the Roseville area.

TABLE 14.1.
SACRAMENTO VALLEY CLIMATE

	Average Temperature (°F)	Maximum Temperature (°F)	Minimum Temperature (°F)	Total Inches of Precipitation
January	46.6	53.4	39.8	2.86
February	51.2	59.1	43.2	4.54
March	54.4	63.8	45.0	1.46
April	59.7	72.4	47.0	0.94
May	65.5	80.8	50.1	0.08
June	72.0	88.1	55.9	0.03
July	74.7	91.4	58.0	0.00
August	79.5	103.0	56.0	0.00
September	74.3	91.0	57.6	0.00
October	66.7	82.3	51.0	0.13
November	56.4	66.6	46.1	1.75
December	48.5	60.6	36.5	0.03
Annual	62.5	76.0	48.9	11.82

Source: National Weather Service

Prevailing winds in the summer can be light to gusty from the south. In the late summer and early fall, several wind events typically occur with north/northerly winds that cause "red flag events" meaning critical fire weather conditions in the city and surrounding areas. The relative humidity during the summer months is 2 to 30 millimeters mercury, which is considered arid.

While the City of Roseville rarely has critical fire weather conditions, a combination of dry grasslands, the topography in northeast Roseville, and hot temperatures with limited rainfall could result in a risk of wildfire on occasion. The National Weather Service website issues Fire Weather forecasts for the entire country on their website (http://www.spc.noaa.gov/products/fire_wx) that are monitored by local fire departments including the City of Roseville Fire Department to assess the risk for wildfire at any given time and enhance preparedness if need be.

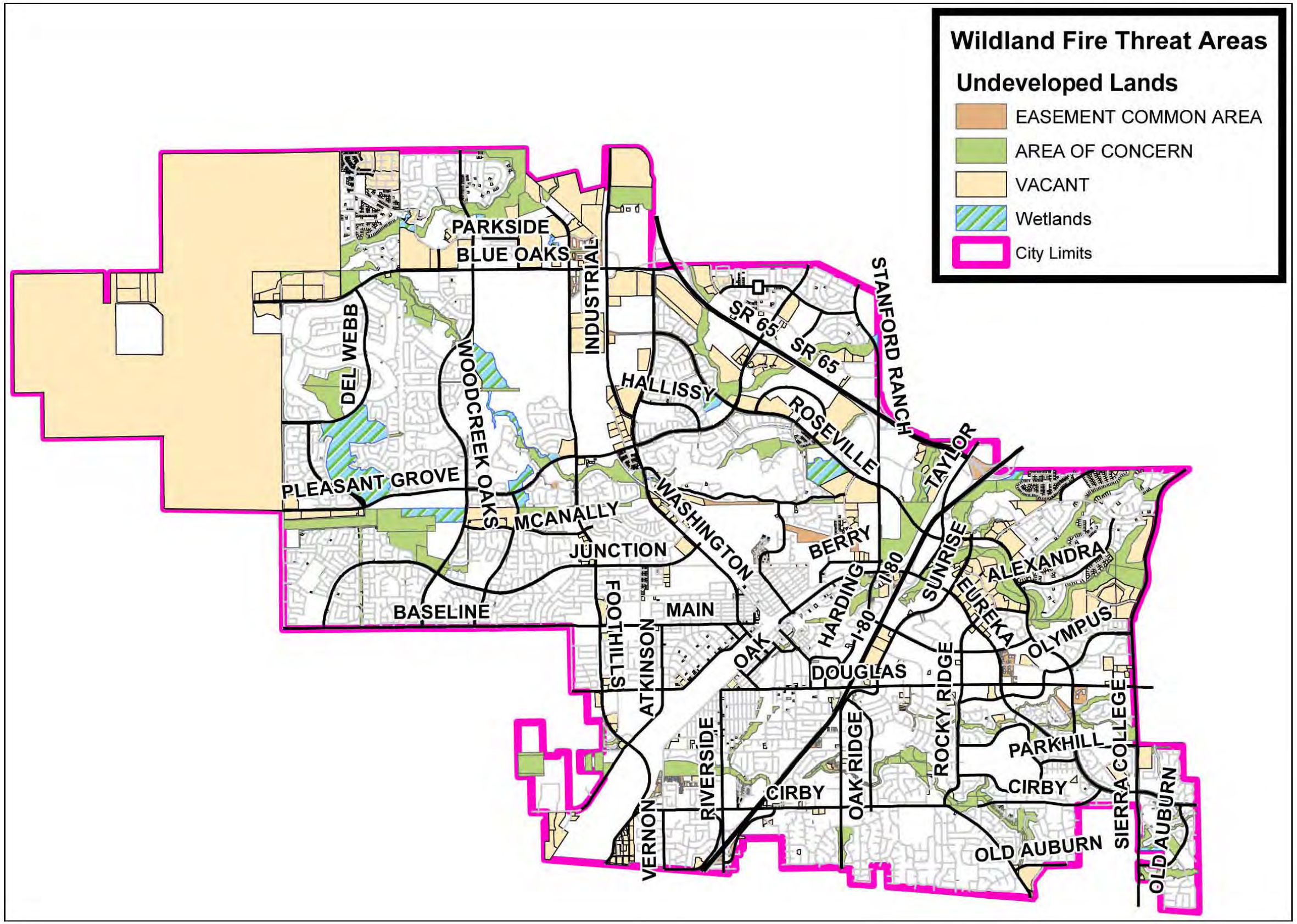


Figure 14.4. City of Roseville Wildfire Threat Areas (Source: Roseville Fire Department GIS Division)

14.2.4 Previous Occurrences

The California Fire Alliance maintains a website at http://www.cafirealliance.org/ with interactive maps that detail the fire history in California. Figure 14.5 shows the mapped fire history for the City of Roseville and surrounding areas. All fires within the City of Roseville occurred in areas that were undeveloped at the time of the fire.

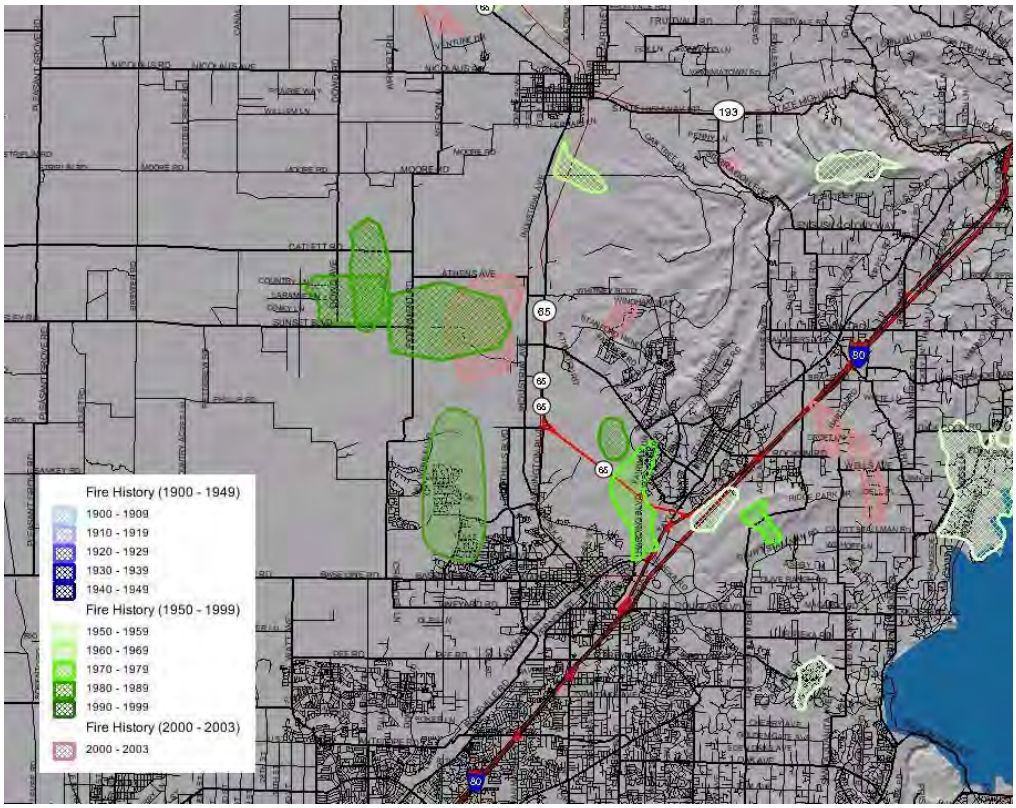


Figure 14.5. Roseville Area Fire History Map (Source: California Fire Alliance website)

The fire history for the Roseville area shows 10 wildfires have occurred in or near Roseville since the 1950s. Between 1950 and 1959, one fire occurred just east of Interstate 80 on the Roseville/Rocklin border including parts of the Stoneridge area. A second fire occurred south of Douglas Blvd where Roseville Parkway is now located. No fires are mapped from 1960 to 1969. In the 1970s, a significant fire occurred in undeveloped grasslands along what is now Galleria Boulevard and Harding Boulevard in north central Roseville. Another fire occurred just outside the city limits on both sides of Cavitt-Stallman in the Loomis area.

In the 1980s, five wildfires are mapped including one in the open grasslands of the North Central Roseville Specific Plan just north of Highway 65 where Pleasant Grove Boulevard is now located. A total of three grassland fires occurred west of Roseville, one just west of Fiddyment Road and two west of Fiddyment Road and south of Athens Road. A major fire occurred in the City of Roseville igniting where Baseline Road and Country Club Drive now intersect. The fire occurred in 1983 and scorched 1,500 acres north past the current Blue Oaks Boulevard stopping at Pleasant Grove Creek. The area is now developed with urban uses. Since the year 2000, one fire has occurred just north of Roseville near Cincinnati and Industrial Avenues in undeveloped grasslands.

The City of Roseville Fire Department maintains a database of every incident type responded to by Roseville fire personnel and apparatus. Wildfires are tracked in four categories by the Roseville Fire Department: natural or vegetation fire; forest, woods, or wildland fire; brush or brush and grass fire; and grass fire. The most recent data shows that wildfires account for approximately 1/3 of the fire suppression calls, but less than two percent of the total incidents for the Roseville Fire Department. The wildfires have never resulted in loss of life. Some property damage has resulted from the wildfire incidents in Roseville including some fences on occasion.

As a percentage of the total fire suppression calls received by the Roseville Fire Department, in recent history, these uncontrolled vegetation fires represent 1/4 to 1/3 of the calls annually. As a percentage of the total incidents receiving a response from the Roseville Fire Department, the wildfire incidents are usually less than two percent of all calls. Table 14.2 provides the number of wildfire incidents recorded from 2000 to 2004.

TABLE 14.2.
WILDFIRE INCIDENT COUNTS—2000 TO 2004

Incident Type	2000	2001	2002	2003	2004
Natural Vegetation fire, other	9	10	15	13	11
Forest, woods, or wildland fire	1	6	1	3	4
Brush, or brush and grass mixture fire	30	18	26	22	18
Grass fire	62	84	87	78	59
Subtotal – Wildfires	*102*	*118*	*129*	*117*	*92*
Total – Fires	371	396	396	399	381
% Wildfires of Total Fires	**27.49%**	**29.80%**	**32.58%**	**29.32%**	**24.15%**
Total Incidents	6,899	7,521	7,799	8,008	8,511
% Wildfires of Total Incidents	**1.48%**	**1.57%**	**1.65%**	**1.46%**	**1.08%**

Source: City of Roseville Fire Department Incident Type Count Reports 2000-2004

14.2.5 Probability of Future Wildfires

The City of Roseville wildfire hazard is rated as moderate by the CDF Fire and Resource Assessment Program. While the city is also a Community at Risk from Wildfire as designated on the State of California map, the Roseville Fire Department assessment in the General Plan concurs that wildfires in open space areas represent a moderate hazard. Most fires of this type are small and localized. The open space areas are typically easily accessible for fire suppression apparatus and the response time is such that fires are suppressed rapidly.

The probability of wildfire in Roseville is such that the hazard will most likely occur in one of three areas: grassland fires ignited on undeveloped properties in the undeveloped West Roseville Specific Plan Area or west or north of Roseville, in northeast Roseville where significant slopes are located adjacent to ravines and residential development, or in open space and preserve areas within the developed sections of Roseville.

West Roseville Specific Plan Area and Areas to the West in Unincorporated Placer County

Prior to August 2004, Roseville's northwestern city boundary was Fiddyment Road. Since the annexation of 3,200 acres in West Roseville, the city now includes a significant amount of undeveloped non-native annual grassland with some riparian and oak woodland along Pleasant Grove Creek and Kaseberg Creek.

The property to the west of Roseville along this new border is also non-native annual grassland primarily used in the past for agriculture and grazing, but is now largely fallow as speculative developers have invested in the property with interest in future urban entitlements.

The Roseville Fire Department assumed responsibility for fire protection services in the West Roseville Specific Plan area when the annexation was approved by the Placer County Local Agency Formation Commission in August 2004. Urban development is expected to begin in spring 2005 with grading of the project site and major infrastructure installation to begin for future residential and non-residential uses.

The West Roseville Specific Plan area will develop as urban uses, but will also contain within its boundaries, a total of 738 acres of preserve areas. These will include riparian/oak woodland corridors and vernal pool preserves with the dominant habitat being non-native annual grasslands.

The West Roseville Specific Plan Open Space Preserve Operations and Management Plan, prepared in October 2004, has provisions for fire hazard reduction in the event the preserve becomes a fire hazard. The Preserve Manager will works with the U.S. Army Corps of Engineers, the U.S. Fish and Wildlife Service and the Roseville Fire Department to decide on the best method to reduce the risk at the preserve. Fire breaks are allowed within the 50-foot buffer around the preserve. Fire breaks in other locations would require U.S. Army Corps of Engineers and U.S. Fish and Wildlife Service approval.

Stoneridge Specific Plan

The Stoneridge Specific Plan includes 1,089 acres of land to include 2,882 dwelling units, non-residential uses including office and commercial uses, schools, parks, and open space. Approximately 252 acres will be set aside as open space with an extensive network of bike trails. The main ingress and egress to the area is Secret Ravine Parkway that will link Sierra College Boulevard with East Roseville Parkway. The ravines also border the Northeast Roseville Specific Plan area which is largely developed with some construction continuing along the ravine edges.

The key topographic features in Stoneridge are the three ravines: Secret Ravine, False Ravine, and Miners Ravine. The creek at the base of Miner's Ravine flows year round. The elevation of the property is among the highest in the city ranging from 225 feet to 375 feet above sea level. Slopes range from a 5 percent grade to a 26 percent grade in sections of Miners Ravine.

Vegetation in the Stoneridge Specific Plan area is primarily annual grasslands, oak woodlands, and oak riparian landscapes. Annual grasses with scattered downed trees and limbs cover the ground. The overstory includes scattered oaks and a few other broad leaf trees. The riparian vegetation includes Blue Oak, Valley Oak and Interior Live Oaks along with willows, cottonwood, and ash trees. The vegetation on the plateaus between the three main ravines is primarily annual grasses. The ravines do not have a continuous fuel ladder from the ground vegetation to the overstory trees.

View of Ravine, Tree Canopy and Stoneridge Development

The Stoneridge Specific Plan Wildfire Safety Plan prepared in August 1999 as a mitigation measure for development of the plan area (illustrated on Figure 14.6) outlined several risks resulting from development of the plan area as follows.

- Fire in the grass fuels of the open space area was identified as the most serious wildfire threat for the Stoneridge Specific Plan. The extensive grass fuels in the open space areas will quickly ignite and fire will spread rapidly especially in the hot summer months. The plan cites a fire history that has demonstrated that grass and other light fuels are a threat to fire risk for other vegetation types as well as people.
- Wildfire rate of spread can increase with steep slopes. The three ravines in the project area have moderate slopes which can cause a fast rate of wildfire spread.
- Risk of fire starts will increase with development. The greatest risk from fire ignitions will be in the open space areas as use of these areas by future residents and other members of the public increase. The bike trails, for example, will make areas of the open space more accessible than when the plan area had been undeveloped.
- Long-term maintenance of fuel treatment must be maintained. Initial work by the developer to reduce the amount of fuel in the area must be maintained over the long-term to keep fire risk in check.
- Typical home design and siting often does not include adequate wildfire mitigation measures. Measures specific to development within the Plan area have been adopted by the City and are being enforced at the building permit stage. Owners will be required to maintain a clearing of flammable vegetation around the structures, use only fire resistant materials for roofs and fences, and ensure adequate water for fire suppression.

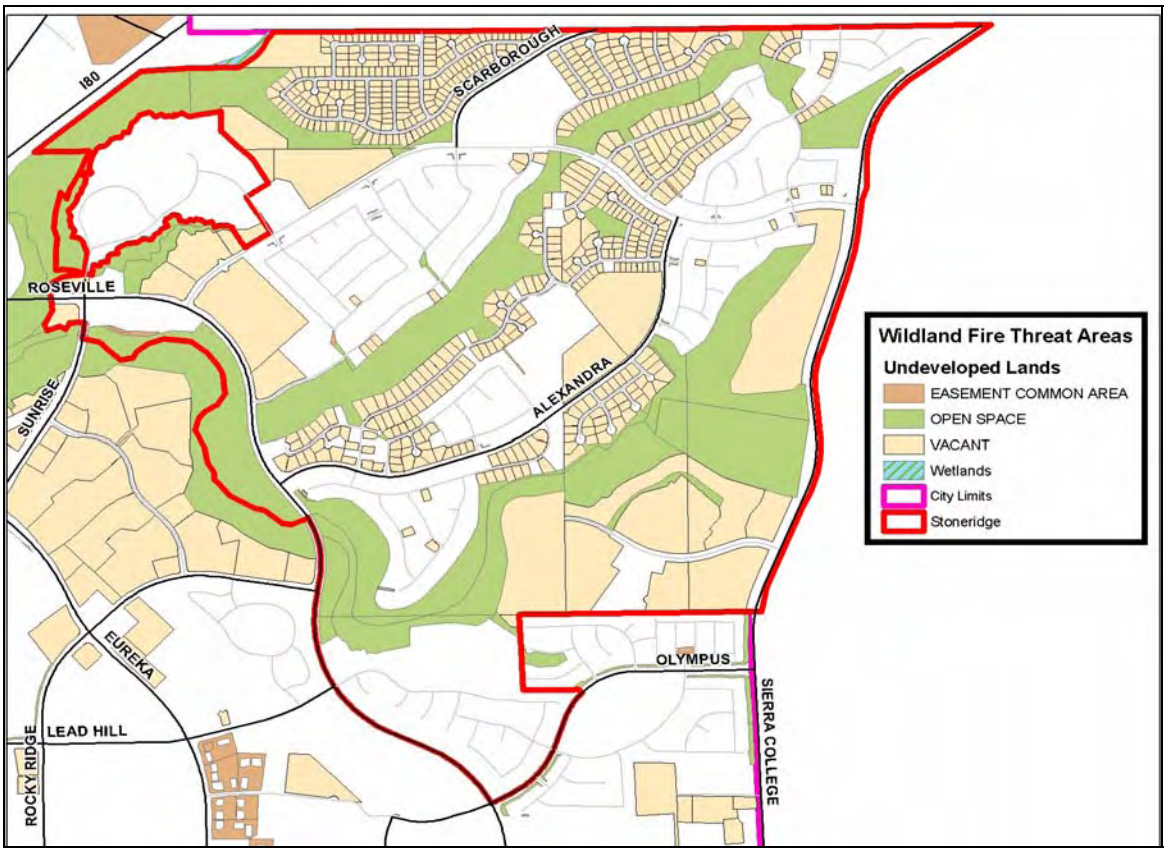


Figure 14.6. Stoneridge Specific Plan Wildfire Threat Areas

The Stoneridge Wildfire Safety Plan outlines numerous short and long-term mitigation measures to prevent or minimize the impact of wildfire in this area of Roseville. These will be included in the mitigation section of this chapter.

Open Space Areas

The City is adding new open space areas through dedication as part of the specific plan process. This process will result in construction of new developments immediately adjacent to open space areas, which does pose moderate risk to such developments. The Fire Department reviews these during the planning process and fire safety provisions are accounted for within Specific Plan design guidelines and development agreements.

14.2.6 Other Potential Factors for Wildfire Vulnerability

Other potential factors for wildfire vulnerability are related to the interface between the city's creek beds and power line easements that are located throughout the city. These areas are typically in their natural state with vegetation that is not maintained and various locations that are not easily accessible. A significant number of residential structures are located adjacent to both the creek beds and power line easements in Roseville. This adds to the vulnerability of properties in the city to wildfire.

14.3 VULNERABILITY ASSESSMENT

DMA2K requires risk assessments to include a description of the vulnerability to specific hazards and the impact on the community. The description is to include Roseville's vulnerability in terms of the types and numbers of existing and future building, critical facilities located in areas most prone to wildfire and estimate potential dollar losses to vulnerable structures.

14.3.1 Impact of Wildfire on Life, Safety and Health

Potential losses from wildfire include human life, structures, and other improvements, and natural resources. There are no recorded incidents of loss of life from wildfires in Roseville, and the risk from wildfire has been deemed moderate by both the State and the Roseville Fire Department. Given the immediate response times to reported fires, the likelihood of injuries and casualties is minimal; therefore, injuries and casualties were not estimated for the wildfire hazard.

Health hazards from the smoke caused by wildfires can include breathing difficulties and exacerbation of chronic breathing and cardiovascular disease. Smoke and air pollution from wildfires can be a severe health hazard especially for sensitive populations including children, the elderly and those with respiratory and cardiovascular diseases.

Wildfire may also threaten the health and safety of those fighting the fires. First responders are exposed to the dangers from the initial incident and after effects from smoke inhalation and heat stroke.

In addition, wildfire can lead to ancillary impacts such as landslides in the steep ravine areas and flooding due to the impacts of silt in Roseville's watersheds.

14.3.2 Impact of Wildfire on Critical Facilities

Critical facilities are public and private structures where vital community functions are conducted. If the facility is damaged or destroyed by wildfire, there could be severe consequences to public health and

safety. The City Fire Department, all first responders and mutual aid agencies would work to protect those facilities identified in areas where wildfire is a potential.

The Roseville Hazard Mitigation Plan Steering Committee has defined a critical facility as a "facility that is vital for the City's ability to provide essential services and protect life and property and/or the loss of which would have a severe economic or catastrophic impact." Table 14.3 provides a list of critical facilities that are adjacent to potential wildfire areas.

TABLE 14.3.
CRITICAL FACILITIES ADJACENT TO POTENTIAL WILDFIRE AREAS

Facility Type	Number
Fire Stations	2
Electric Substations	2
Water Storage Tank	1
Medical Center	1
Wastewater Treatment Plant	2
Community Center	1

Based on this definition and as shown in the table above, there are nine critical facilities considered to be exposed to wildfire. A detailed vulnerability analysis for all critical facilities has been created for all hazards included in the Roseville plan. This analysis is on file with City staff and will not be published for review due to security reasons.

14.3.3 Impact of Wildfires on Existing Structures at Risk

The Roseville Fire Department staff assess the risk of existing structures annually as they hire staff, purchase apparatus and conduct training to protect life and property in Roseville.

The Fire Department has prepared for the increasing potential for a wildfire as the city has grown and the number of structures adjacent to the grasslands along the city limits has increased. The City has invested in additional grassland trucks as construction in the Stoneridge area continues, the city's western boundary extends and additional open space/creek beds are dedicated to the City.

Table 14.4 summarizes impacts of wildfires on existing structures.

14.3.4 Economic Impact

Wildfire history statewide has demonstrated that fire can have a major economic impact on a community both in terms of the initial loss of structures and the subsequent loss of business revenues and tax revenues from damaged or destroyed properties.

Roseville has a total of 43,000 residential units and several thousand commercial, industrial, and business-professional structures. Nearly 2,700 structures are adjacent to the areas in Roseville where a fire may start in open grasslands, creek beds, power line easements, or steep ravines. With a median home value of $400,000 in Roseville, the loss of one or more residential properties would be a significant economic impact. Non-residential properties and the businesses within them along the areas potentially at risk are also high value structures and in some cases facilities, such as the hospital, theaters, hotels, and three story office buildings, are immensely valuable resources that are expensive to replace.

TABLE 14.4.
EXISTING STRUCTURES AT RISK FROM WILDFIRE IN ROSEVILLE (AS OF JANUARY 1, 2005)

Location	No. of Structures
Structures along Creek beds	143
Structures along Power line Easements	400
Stoneridge Specific Plan	9 non-res + 1,158 residential
Northeast Roseville Specific Plan	27 non-residential
Northwest Roseville Specific Plan	120 residential
Del Webb Specific Plan	1 non-res + 300 residential
North Roseville Specific Plan	500 residential
Total	**2,658 structures**

Source: Roseville Community Development Department GIS Division.

14.3.5 Impact of Wildfire on Future Trends in Development

Roseville is expected to grow considerably in the next 10 years. Total population in Roseville including the recently annexed West Roseville Specific Plan area is projected to exceed 138,000 people with another 8,000 housing units planned for this area alone. Significant non-residential development will occur as well with development of a high-rise hotel and office buildings likely in the near future. The moderate potential for wildfire in Roseville is not likely to lessen or prohibit development in Roseville.

14.4 REVIEW OF EXISTING PROGRAMS, PLANS AND ORDINANCES

The City of Roseville and Roseville Fire Department have adopted a number of policies, programs, plans and ordinances to meet two fire protection goals as detailed in the Roseville General Plan. The first fire protection goal is to protect against the loss of life, property, and the environment by appropriate prevention and suppression measures. The second is to provide emergency services in a well-planned, cost-effective, and professional manner through the best use of equipment, facilities and training available.

14.4.1 Fire Prevention Programs and Standards

Roseville Fire Prevention

The Roseville Fire Prevention staff key role is improving the safety and quality of life of the citizens of Roseville. The Roseville Fire Department has an extensive work program to promote and implement fire prevention in developed and undeveloped areas of Roseville. These programs promote or provide the following services:

- Regular inspection and code enforcement
- Fire-safe roofing requirements
- Adequate access to and fire breaks adjoining open space areas
- Early warning devices such as automatic detection and reporting devices and smoke detectors

- Automatic fire suppression systems such as fire sprinkler systems
- Public education and information
- Code and ordinance development and updates
- Training and planning
- Fire investigation and data analysis
- Hazardous materials process and inspection

Prevention staff includes the Fire Marshal, Assistant Fire Marshal, Plan Check Engineer, Hazardous Materials Officer, two Senior Fire Inspectors, and four Fire Inspectors.

Development Review Process

Section 16.16.050 of the Roseville Municipal Code specifies that all development plans be reviewed and approved by the Roseville Fire Department prior to construction.

The code section specifically states "complete plans, specifications, and information for new construction, remodeling, tenant improvements, or additions to buildings shall be submitted for review and approval prior to construction to the Chief or his/her designated representative having jurisdiction. Plan approval shall be required prior to the issuance of a Fire Department Inspection Record Card for those instances where such card may be required. In addition to the submittal of hard copy plan sets, a digitized copy of the approved drawings for new buildings shall be submitted to the Fire Department for pre-fire documentation purposes. Said copy shall be submitted in an approved format."

The Roseville Fire Department is an integral part of the development planning and review process with specific emphasis on the provision of access to lands for fire fighting purposes, street access to all structures, fire prevention programs, and the enforcement of building and fire codes and City ordinances. The Fire Department also evaluates water supply for fire fighting and fire suppression systems.

California Building Code

Roseville Municipal Code Title 16 has been adopted to enforce the CBC for all construction in the city of Roseville. Roofing and building materials, construction techniques, wiring standards, and fire detection/warning devices are defined and enforced to minimize the risk of structural fire damage.

California Fire Code

Chapter 16.16 of the Roseville Municipal Code includes adoption of, reference to and amendments to the Uniform Fire Code. Last amended in 2002, the code provides specifications and standards for fire safety. Early warning devices such as automatic sprinkler systems, automatic detection and reporting devices, and smoke detectors are required as preventative measures to reduce the risk of fire. The code also states the amount of water needed for fire protection.

Weed Abatement Ordinance

Chapter 9.20 of the Roseville Municipal Code, most recently updated in 2002, includes provisions for the abatement of weeds, dirt, rubbish, and rank growths. The ordinance specifies that weeds be eradicated by property owners to prevent the presence of fire fuels. Properly implemented, the ordinance ensures accessibility of firefighters to open space areas and creation of firebreaks that slow the spread of fire.

14.4.2 Adopted Service Levels for Response Time, ISO Rating and Water Volume

Specific Plans

The City of Roseville has 11 planning areas including nine specific plans and the Infill and North Industrial areas. The specific plans establish detailed policies and implementation programs for portions of the city, consistent with the goals and policies established in the Roseville General Plan. Following are the nine specific plans in order of adoption:

- Southeast Roseville Specific Plan (SERSP)
- Northeast Roseville Specific Plan (NERSP)
- Northwest Roseville Specific Plan (NWRSP)
- North Central Roseville Specific Plan (NCRSP)
- Del Webb Specific Plan (DWSP)
- Highland Reserve North Specific Plan (HRSP)
- North Roseville Specific Plan (NRSP)
- Stoneridge Specific Plan (SRSP)
- West Roseville Specific Plan (WRSP)

The specific plan process is used by the Fire Department to plan future fire station locations, response times based on the circulation systems, and to ensure that revenues from the Fire Service Construction Tax and General Fund are sufficient to provide fire protection services to the area and cumulatively city-wide. The Fire Department is involved in every specific plan process from the initial planning process to adoption, construction, and ongoing inspections.

Should there be significant fire-related concerns, the Fire Department may require supplemental analysis as a condition of the specific plan. For example, a mitigation measure for adoption of the Stoneridge Specific Plan required the preparation of the Stoneridge Plan Wildfire Safety Plan. The plan analyzes the factors contributing to the risk of wildfire in Stoneridge and mitigation measures to enhance fire prevention.

Capital Improvement Program

The City's Capital Improvement Program is a five-year plan updated annually with the City of Roseville fiscal year budget that includes all public projects under construction and planned within the five-year time frame. The Capital Improvement Program allocates funds from each of the revenue sources collected to pay for City facilities, services, and programs. Fire Department stations and apparatus are included in the Capital Improvement Program along with the current status of the Fire Service Construction Tax current and projected revenues to ensure that fire stations are built and the apparatus procured to keep pace with development.

Fire Service Construction Tax

The Fire Service Construction Tax, approved by Roseville voters in 1984, requires that 1/2 percent of the value of any new construction be collected as part of the building permit fee and designated for fire suppression and protection. The funds must be spent on capital improvements such as fire stations, fire apparatus, and other Fire Department equipment. The funds may not be allocated to expenses such as salaries or training. The Fire Service Construction Tax is scheduled to expire on December 31, 2009. The

City's newer Specific Plan areas include provisions that extend this tax collection to the build out of each plan area.

Dedications, Fees, and Exactions

The City of Roseville, through the specific plan process, and if necessary as part of individual project approvals, requires the dedication of property and payment of fees or exactions. The Fire Department reviews the project proposals and may require dedication of land or payment of appropriate fees and exactions to help off-set municipal costs for fire-related facilities and services. The City of Roseville requires the dedication of fire station sites through the specific plan process. And should revenues be deemed insufficient to fully support fire services, additional assessments may be required to ensure adequate protection in the future. For example, the West Roseville Specific Plan property owners will pay a special assessment for public safety, including fire protection, as part of their annual property tax bills.

Water System Master Plan

The City of Roseville is a full-service municipality with its own water, wastewater, solid waste and electric utilities. The Environmental Utilities Department prepares a Water System Master Plan, updated biennially to ensure adequate water sources, quantities and water pressure, along with emergency back-up systems to ensure maximum fire fighting capacity.

Interagency Agreements

The City of Roseville Fire Department participates in the statewide mutual aid agreement, whereby the Fire Department will respond to any other department or district should the need arise. In addition, the Department maintains mutual aid agreements with other agencies, including agreements through the California Office of Emergency Services (OES) Region IV, Placer County Operational Area.

14.4.3 Annual Monitoring of Fire Department Service Levels

Program Performance Measures

The Roseville Fire Department compiles program performance measures as part of the City's annual budget to monitor service levels and address deficiencies before they become serious. The annual evaluation includes establishment of goals and objectives, formulation of key indicators relating to activities and efficiencies that can be monitored throughout the year along with a line item cost for the programs and objectives. The Fire Department budget and program performance measures include a review of fire service levels and department goals.

National Fire Incident Reporting System

The National Fire Incident Reporting System (NFIRS) requires local fire departments to report fire service data. Performance indicators are routinely reviewed to evaluate capability and coverage, demand for service and trends. Key components of the system include GIS and mapping, fire incident reporting, emergency medical management, personnel and training management, inspection management, and equipment and supplies inventory management. Fire Department incident data are input into a computer database and submitted to the State Fire Marshal's Office per state standards. The data are also used by the City of Roseville to evaluate operations and track trends in fire service within the city.

14.4.4 Highly Trained Personnel

The Roseville Fire Department Training program includes dedicated staff and facilities at the Fire Training Center to ensure that the personnel are properly trained and updated as new techniques and equipment become available. The Fire Training staff provides training at the City's state of the art Training Center for all firefighters within the department. This training is the single most important ingredient to the readiness of Roseville firefighters and emergency responders to fulfill their assigned mission. The Training Center is also used by other fire departments and local agencies on a fee for use basis. The training staff consists of one Fire Training Officer.

City of Roseville Fire Training Center

14.4.5 Fire Investigation

Fires within the City of Roseville are investigated by Roseville Fire Department investigators. The Fire Department's program will ensure proper investigation of the cause, origin, and circumstances of each fire; collect and preserve evidence; coordinate with authorities in detection; apprehension and prosecution of arsonists; and pursue each investigation to conclusion. Information is reported to the State Fire Marshal for inclusion in their annual reports.

14.4.6 Provide Comprehensive Emergency Medical Services

The State requires a Multi-Hazard Function Plan that details response strategies for all types of emergencies. The plan addresses interagency cooperation, emergency functions, continuity of government, and public awareness. In addition, the plan provides for the operation of police, fire and health services, as well as transportation alternatives in the event of a multi-hazard emergency. The City's Emergency Plan conforms with the Standardized Emergency Management System (SEMS) and is approved by the City Council and the California State OES.

14.4.7 Accreditation Recommendation

The City of Roseville received a recommendation in early June 2005 from the Commission on Fire Accreditation International (CFAI) that the Roseville Fire Department receive accreditation status. Only 98 departments in the world are accredited, with just two in California (Clovis and Culver City).

The CFAI provides a comprehensive system of fire and emergency service evaluation that helps local governments determine their risks and fire safety needs, evaluate the performance of the organizations involved and provide a method for continuous improvement. The self-assessment process covers 10 categories: governance and administration; assessment and planning; goals and objectives; financial resources; programs; physical resources; human resources; training and competency; essential resources; and external systems relations. Within these categories are several related performance indicators and core competencies that the agency must address. In completing the self-assessment process, agencies must develop a strategic or master plan as well as a standard of response coverage document.

The Roseville Fire Department staff has worked over the past four years to perform the self-assessment and prepare the materials needed for the accreditation. A peer review site visit with four fire chiefs from around the country occurred two weeks ago. At the conclusion of the site visit, Chief Ken Wagner was advised that Roseville Fire will be recommended for accreditation to the Commission during its meeting on August 10, 2005 in Denver.

14.5 REVIEW OF MITIGATION ALTERNATIVES

The following alternatives are based on a review of Roseville's existing programs and services, potential future resources, capabilities, and the goals of the plan. A comprehensive review of the mitigation alternatives occurred prior to the summary of mitigation strategies. For the wildfire hazard, mitigation alternatives reviewed include initiatives in the following categories:

14.5.1 Preventive Activities

Prevention activities are those associated with regulation and land use. The focal point of the Fire Department's efforts to minimize fire loss in our community is our Fire Prevention Division. The City of Roseville has a very aggressive fire prevention program. The Fire prevention Division's key role is improving the safety and quality of life of the citizens of Roseville. Its primary activities are fire code enforcement, plan review services, hazardous materials enforcement, fire cause investigation and hazard abatement activities The Fire Prevention Division has as a program objective to reduce the fire hazard to structures caused by weeds and grass on all vacant lots within the city, and to respond to fire hazard complaints within 10 working days. Possible enhancements to this program may include the following:

- Expand the department's vegetation management activities. This would include enhancement through expansion of the target areas as well as additional resources. The department currently uses goats for vegetation control. Adding additional sites and using more goats for the control of vegetation could enhance this program. Costs associated with the enhancement of this program would be approximately $75,000.
- Consider in coordination with the City's Planning Department the requirement of Class A roofing. This could be done by ordinance and would. Class-A roofing helps prevent the spread of fire from one home to another via buildings' roofs. The higher the classification of the roofing material, the less likely a spark or burning ember will start another fire. Homeowners and contractors often oppose the class-A requirement because of the higher costs associated with class-A materials. Also, homeowners tend

to prefer the look of wood-shingle roofing over class-A materials, such as asphalt composition roofing. Thee is no associated cost to this project.

14.5.2 Property Protection Activities

Property protection is the responsibility of the Fire Operations Division. The Fire Operations Division provides emergency response to Fire, Paramedic Emergency Medical Services, Special Operations (Hazardous Materials incidents, Rescue) and other emergency incidents out of six fire stations. Also provided is response to requests for service from the public when those services are not assigned to another public agency. Possible enhancements to this program may include the following:

- Expanded certifications and qualifications for department personnel. The Department can ensure that all Firefighters are trained in Basic Wildland Fire Behavior, Basic Fire Weather, and that all Company Officer and Chief Level Officers are trained in the Wildland Command and Strike Team Leader level.

14.5.3 Resource Protection Activities

Resource protection is the responsibility of the operations division. In order to augment the protection of resources the following is recommended

- Establish contracts with California Department of Forestry and Fire Protection (CDF) and Sacramento Metropolitan Fire District (Sac Metro) for the use of heavy equipment. Use of bulldozers and aircraft by contract would improve the response capabilities and the protection of citywide resources. Cost of these contracts would approximate $100,000.
- Addition of a wildland engine as a reserve would provide additional functionality during wildland season. This resource would approximate $275,000.
- Addition of a water tender to provide additional emergency water supply to wildland areas. Cost is approximately $225,000.
- Supply of Class A Foam (500 gallons) would allow for protection of potentially affected structures. Cost is approximately $5,000.
- Gel for protection of threatened structures. This would be an upgrade from the Class A foam technology. Fire-blocking gel, a new weapon in the war on wildfires, is being hailed by firefighters one of the most important developments in fire fighting history. Fire-blocking gel’s super absorbent chemicals act like miniature sponges, absorbing and holding large amounts of water. These wet sponges layer themselves one on top of another forming a long lasting, thermal protective gel coating. In order to penetrate this coating, the heat must boil the water out of the top layer before it can be transferred to the layer beneath. This gel coating provides an amazing level of protection against radiant heat, direct flame impingement, flying brands and burning embers. The gel can be applied to structures, vehicles, fuel tanks, propane cylinders or any object exposed to the effects of a fire. Cost to implement gel technology into the Department would be approximately $35,000.

CHAPTER 15.
RISK RANKING

15.1 HAZARD RISK RATING

A risk ranking has been done for the hazards described in Part 3 of this plan for the City of Roseville. This risk ranking serves two purposes, first to describe the probability that each of these hazards will occur, and second to describe the impact each will have on the people, property, and economy of Roseville. Estimates of risk for the city were based on the methodology that the City used in preparing the risk assessment for this plan. The results of this risk ranking were determined via facilitated brain storming sessions with both the Technical and Steering Committees. Each committee was given a template to walk them through the exercise. The results of this exercise will be used by the planning to team to as a parameter in establishing mitigation priorities for the City of Roseville.

15.2 PROBABILITY OF OCCURRENCE

The probability of occurrence of a hazard event provides an estimation of how often the event occurs. This is generally based on the past hazard events that have occurred in the area and the forecast of the event occurring in the future. This is done by assigning a probability factor, which is based on yearly values of occurrence. The numerical value assigned to each category will be used to determine the risk rating of each hazard. These values were assigned by high, medium, and low occurrence:

- High—Hazard event is likely to occur within 25 years (Numerical value 3)
- Medium—Hazard event is likely to occur within 100 years (Numerical value 2)
- Low—Hazard event is not likely to occur within 100 years (Numerical value 1)

Table 15.1 provides a list of the probability of occurrence for each hazard in Roseville. This information should be identified in the risk assessment for each of the hazards.

TABLE 15.1
PROBABILITY OF HAZARDS

Hazard Event	Probability (high, medium, low)	Numerical Value
Drought	High	3
Earthquake	Medium	2
Landslide	Low	1
Flood	High	3
Human Caused	High	3
Human Health	Medium	2
Severe Weather	High	3
Wildland Fire	High	3

15.3 IMPACT

The impact of each hazard was divided into three categories: impacts on people, property, or the economy. Tables 15.2, 15.3 and 15.4 summarize the identified impacts for each hazard. These three categories were also assigned weighted values. Impact on people was given a weighted factor of 3, impact on property was given a weight of 2 and impact on the economy was given a weighted factor of 1. A categorical impact was assigned for each hazard as high, medium, or low using contained in each risk assessment such as total dollar value of structures exposed to the risk. This was a subjective exercise based on perceptions of impact illustrated in the risk assessment of this plan. For impact on property, the values represent the property loss from each hazard using the weight of the property. For the economic impact, the values represent estimates of what the loss would be from a major event of each hazard. A numerical value for impact based on the following definitions:

- High Impact (numerical value = 3)
- Medium Impact (numerical value = 2)
- Low Impact (Numerical value = 1)

TABLE 15.2
IMPACT ON PEOPLE FROM HAZARDS

Hazard Event	Impact (high, medium, low)	Numerical Value	Multiplied by weighted value of (3)
Drought	Low	1	3
Earthquake	Low	1	3
Flooding	Medium	2	6
Human Caused	High	3	9
Human Health	Low	1	3
Landslide	Low	1	3
Severe Weather	Low	1	3
Wildland Fire	Low	1	3

TABLE 15.3
IMPACT ON PROPERTY FROM HAZARDS

Hazard Event	Impact (high, medium, low)	Numerical Value	Multiplied by weighted value of (2)
Drought	Low	1	2
Earthquake	Medium	2	4
Flooding	Medium	2	4
Human Caused	High	3	6
Human Health	Low	1	2
Landslide	Low	1	2
Severe Weather	Medium	2	4
Wildland Fire	Low	1	2

TABLE 15.4.
IMPACT ON ECONOMY FOR HAZARDS

Hazard Event	Impact (high, medium, low)	Numerical Value	Multiplied by weighted value of (1)
Drought	Low	1	1
Earthquake	Medium	2	2
Flooding	Medium	2	2
Human Caused	High	3	3
Human Health	Low	1	1
Landslide	Low	1	1
Severe Weather	Low	1	1
Wildland Fire	Low	1	1

15.4 RISK RANKING

The risk ranking for each hazard was determined by adding the assigned numerical value for probability to the weighted numerical value of impact to people, property, and economy (see Table 15.5).

TABLE 15.5.
RISK RATING

Hazard Event	Probability	Impact	Total= (Probability + Impact)
Drought	3	3+2+1	9
Earthquake	2	3+4+2	11
Flooding	3	6+4+2	15
Human Caused	3	9+6+3	21
Human Health	2	3+2+1	8
Landslides	1	3+2+1	7
Severe Weather	3	3+4+1	11
Wildland Fire	3	3+2+1	9

** Table 15.2 + Table 15. 3 + Table 15.4 values.

The following equation shows the risk rating calculation:

Risk Rating = Probability + Impact (people + property + economy)

It was possible to determine which hazards pose a higher risk to the City of Roseville. These were divided into the three categories of high, medium and low. **The hazards that were ranked as being of highest concern to the City were flooding and Human-Caused hazards.** The hazards that were ranked as being of medium concern for the City were Earthquake and Severe Weather. The hazards that were ranked as being of lowest concern were Drought, Wildland Fire, Human Health, and Landslide. Table 15.6 shows the hazard risk ranking.

TABLE 15.6.
HAZARD RISK RANKING

Hazard Ranking	Hazard Event	Category
1	**Human Caused**	**High**
2	**Flooding**	**High**
3	**Earthquake**	**Medium**
3	**Severe Weather**	**Medium**
4	**Drought**	**Low**
4	**Wildland Fire**	**Low**
5	**Human Health**	**Low**
6	**Landslide**	**Low**

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June 2005

PART 4—MITIGATION STRATEGIES

CHAPTER 16.
MITIGATION GOALS AND OBJECTIVES

16.1 INTRODUCTION TO MITIGATION STRATEGY

Section 201.6.c.3 of Title 44 of the *Code of Federal Regulations* (44 CFR) requires a mitigation strategy that will provide the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment based on existing authorities, policies, programs, and resources, and based on its abilities to expand on and improve these existing tools. This chapter describes the following:

- A description of mitigation goals and objectives to reduce or avoid long-term vulnerabilities to the identified hazards (see Chapter 16)
- A section that identifies and compares a comprehensive range of specific mitigation actions and projects being considered to the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure (see Chapter 17)
- An action plan describing how the actions identified will be prioritized, implemented, and administered by the local jurisdiction; prioritization shall include special emphasis on the extent to which benefits are maximized according to a benefit/cost analysis of the proposed projects and their associated costs (see Chapter 18)

Under Part 4 of the Roseville hazard mitigation plan (RHMP), each of these elements is addressed. The following sections discuss the mitigation goals and objectives.

16.2 GOALS AND OBJECTIVES

This section presents mitigation goals and objectives identified to reduce or avoid long-term vulnerabilities to the identified hazards. The City of Roseville developed these goals and objectives through discussions, research, and meetings of the steering committee and based on input from participating stakeholders and the public.

Using information garnered from the public involvement strategy, the risk assessment, and review of the California State hazard mitigation plan and Placer County hazard mitigation plan, the steering committee went through a process to identify goals and objectives for this RHMP. Seven goals were identified by the steering committee through a facilitated exercise working from a catalog of goal statements created through review of other similar plans and Federal Emergency Management Agency (FEMA) planning guidance. Once the goals were established, objectives that met multiple goals were selected through a similar facilitated exercise. For the purposes of this plan, goals and objectives are defined as summarized below.

- **Goals** are general guidelines that explain what is to be achieved. They are usually broad-based, policy-type statements, long-term, and represent global visions. Goals help define the benefits that the plan is trying to achieve. The success of the RHMP, once implemented, should be measured by the degree to which its goals have been met (that is, by the actual benefits in terms of hazard mitigation that occurs on the ground).
- **Objectives** are defined as short-term aims which, when combined, form a strategy or course of action to meet a goal. Unlike goals, objectives are specific and measurable.

16.2.1 Goals

The goals for the RHMP include the following:

- G-1: Protect lives and reduce injury
- G-2: Promote hazard mitigation as an integrated policy.
- G-3: Protect the continuity of local government to ensure no significant disruption of services during or due to a disaster
- G-4: Improve community emergency management preparedness, collaboration, and outreach
- G-5: Minimize or reduce damage to property, including critical facilities
- G-6: Develop and implement mitigation strategies that optimize public funds in an efficient and cost-effective way
- G-7: Maintain, enhance, and restore the natural environment's capacity to deal with the impacts of disasters

16.2.2 Objectives

The steering committee selected the objectives listed in Table 16.1 to meet multiple goals. Therefore, the objectives serve as a stand-alone measurement of a mitigation action rather than as a subset of a goal. Achievement of the objectives is a measure of the effectiveness of a mitigation strategy. The objectives are also used to help establish priorities.

TABLE 16.1
ROSEVILLE HAZARD MITIGATION PLAN OBJECTIVES

Objective No.	Objective Statement	Goals to Which Objective Applies
O-1	Consider the impacts of hazards on future land uses in the City of Roseville by coordinating with other planning mechanisms such as the general plan and land-use code development	1,2,5,7
O-2	Protect and sustain reliable local emergency operations and communication facilities during and after disasters	1,3,4
O-3	Develop new or enhance existing early warning response systems and plans	1,3,4,5
O-4	Seek to enhance emergency response capabilities through improvements to infrastructure and City programs.	1,4,5
O-5	Enhance the understanding of all hazards that impact the City of Roseville and the risk they pose	1,3,4,5,7
O-6	Seek mitigation projects that provide the highest degree of hazard protection at the least cost	1,5,6
O-7	Seek to update information on natural, environmental, and human-caused hazards, vulnerabilities, and mitigation measures by coordinating planning efforts and creating partnerships with appropriate local, county, state, and federal agencies	1,2,3,4,5,7
O-8	Seek to implement codes, standards, and policies that will protect life and property, including natural habitat, from the impacts of hazards within the City of Roseville	1,2,3,5,6
O-9	Educate the public on preparedness for and mitigation of potential impacts of hazards to the City of Roseville	1,2,4
O-10	Retrofit, purchase, or relocate structures in high hazard areas, including those known to be repetitively damaged	3,5,6

CHAPTER 17.
REVIEW OF MITIGATION ALTERNATIVES

17.1 SWOO SESSIONS

The planning team used an effective planning technique to generate a comprehensive list of alternatives that met the following objectives:

- Use information obtained from the public involvement strategy
- Use information provided in the risk assessment
- Seek alternatives consistent with the goals and objectives for the RHMP
- Create catalogs of mitigation alternatives to be used as a tool by the planning team in selection of mitigation strategies for this RHMP

On March 15, 2005, two Strengths, Weaknesses, Opportunities, and Obstacles (SWOO) sessions were held with the technical subcommittee and the steering committee. The purpose of these sessions was to review information garnered from the risk assessment and the public involvement strategy to identify strengths, weaknesses, opportunities and obstacles in hazard mitigation within Roseville through a facilitated brainstorming session on risks, vulnerabilities, and capabilities within the planning area. All information shared during sessions was recorded by the planning team and used to prepare catalogs of mitigation alternatives to be used by the planning team (see Section 17.2) in preparing the mitigation strategy matrix presented in Chapter 18. It should be noted that many of the strategies (such as community outreach) identified in the catalogs discussed in Section 17.2 below could be applied to multiple hazards. This RHMP identifies strategies for multiple hazards in Chapter 18 even though a separate catalog has not been created for multiple hazards in this chapter.

17.2 CATALOGS OF MITIGATION ALTERNATIVES

Based on information garnered during the SWOO Sessions, catalogs of mitigation alternatives were created that list initiatives that could manipulate the hazard, reduce exposure to the hazard, reduce vulnerability to the hazard, and increase Roseville's capability to respond or be prepared for a hazard. These catalogs are separated by scale of implementation (in other words, who would most likely implement the initiative: personal property owners, private sector business, or government). The hazards addressed by the catalogs were deemed to be those to which the City is most vulnerable based on the risk assessment.

The catalogs are not meant to be exhaustive or site-specific but rather to inspire thought and provide each division of the Roseville City government with a role in hazard mitigation and a baseline of initiatives backed by a planning process, consistent with the goals and objectives of the planning area, and within the capabilities of the City. The City departments were not bound to these alternatives. They could have added to the catalogs if an initiative was not included. However, it should be noted that this did not occur. It should also be noted that initiatives included in the catalogs not selected by the City in the action plan were not selected based on the following:

- Initiative is currently outside the scope of capabilities (funding)
- City's jurisdiction is not vulnerable to the hazard
- Initiative is already being implemented

17.2.1 Mitigation Alternatives Catalog—Drought

Table 17.1 is the catalog of mitigation alternatives for the drought hazard.

TABLE 17.1
CATALOG OF RISK REDUCTION MEASURES—DROUGHT

Scale	Manipulate Hazard	Reduce Exposure	Reduce Vulnerability	Increase Capability
Personal Scale	None	None	1. Drought-resistant landscapes 2. Reduce water system losses 3. Modify plumbing systems (through water saving kits)	Practice active water conservation
Corporate Scale	None	None	1. Drought-resistant landscapes 2. Reduce private water system losses	Practice active water conservation
Government Scale	Groundwater recharge through stormwater management	Identify and create groundwater backup sources	1. Water use conflict regulations 2. Reduce water system losses 3. Distribute water saving kits	1. Public education on drought resistance 2. Identify alternative water supplies for times of drought; mutual aid agreements with alternative suppliers 3. Develop drought contingency plan 4. Develop criteria “triggers” for drought-related actions 5. Improve accuracy of water supply forecasts 6. Modify rate structure to influence active water conservation techniques

17.2.2 Mitigation Alternatives Catalog—Earthquake

Table 17.2 is the catalog of mitigation alternatives for the earthquake hazard.

TABLE 17.2
CATALOG OF RISK REDUCTION MEASURES—EARTHQUAKE

Scale	Manipulate Hazard	Reduce Exposure	Reduce Vulnerability	Increase Capability
Personal Scale	None	Locate outside of hazard area (off soft soils)	1. Retrofit structure (anchor house structure to foundation 2. Secure household items that can cause injury or damage (such as water heaters, bookcases, and other appliances) 3. Build to higher design	1. Practice "drop, cover, and hold" 2. Develop household mitigation plan, such as creating a retrofit savings account, communication capability with outside, 72-hour self-sufficiency during an event 3. Increase capability by having cash reserves for reconstruction
Corporate Scale	None	Locate or relocate mission-critical functions outside hazard area where possible	1. Build redundancy for critical functions and facilities 2. Retrofit critical buildings and areas housing mission-critical functions	1. Adopt higher standard for new construction; consider "performance-based design" when building new structures 2. Increase capability by having cash reserves for reconstruction
Government Scale	None	Locate critical facilities or functions outside hazard area where possible	1. Harden infrastructure 2. Provide redundancy for critical functions 3. Higher regulatory standards	1. Provide better hazard maps 2. Provide technical information and guidance 3. Enact tools to help manage development in hazard areas such as tax incentives and information 4.. Include retrofitting and replacement of critical system elements in capital improvements plan (CIP) 5. Develop strategy to take advantage of post-disaster opportunities 6. Warehouse critical infrastructure components such as pipe, power line, and road repair materials 7. Develop and adopt a Continuity of Operations Plan (COOP) 8. Initiate triggers guiding improvements (such as < 50% substantial damage or improvements)

17.2.3 Mitigation Alternatives Catalog—Flood

Table 17.3 is the catalog of mitigation alternatives for the flood hazard.

TABLE 17.3
CATALOG OF RISK REDUCTION MEASURES—FLOOD

Scale	Manipulate Hazard	Reduce Exposure	Reduce Vulnerability	Increase Capability
Personal Scale	1. Clear stormwater drains and culverts 2. Institute low-impact development techniques on property	1. Locate outside of hazard area 2. Elevate utilities above base flood elevation (BFE)	1. Retrofit structures (elevate structures above BFE) 2. Elevate items within house above BFE 3. Build new homes above BFE 4. Flood-proof existing structures	1. Enforce National Flood Insurance Program (NFIP) 2. Buy flood insurance 3. Develop household mitigation plan, such as retrofit savings, communication capability with outside, 72 hr self-sufficiency during and after an event
Corporate Scale	1. Clear stormwater drains and culverts 2. Institute low-impact development techniques on property	Locate business critical facilities or functions outside hazard area	1. Build redundancy for critical functions or retrofit critical buildings 2. Provide flood-proofing measures when new critical infrastructure must be located in floodplains	1. Increase capability by having cash reserves for reconstruction 2. Support and implement hazard disclosure for the sale/re-sale of property in identified risk zones. 3. solicit ‘cost-sharing” through partnerships with private sector stake holders o0n projects with multiple benefits.
Government Scale	1. Drainage system maintenance 2. Institute low-impact development techniques on property 3. Dredging, levee construction, and providing regional retention areas 4. Structural flood control, such as completion of Cirby/Linda/Dry Creek flood control project 5. Stormwater management regulations and master planning	1. Locate or relocate critical facilities outside of hazard area 2. Acquire or relocate identified repetitive loss properties 3. Promote open space uses in identified high hazard areas through techniques such as Planned Unit Developments (PUD), easements, setbacks, greenways, and sensitive area tracks .	1. Harden infrastructure 2. Provide redundancy for critical functions and infrastructure 3. Adopt appropriate regulatory standards, such as cumulative substantial improvement or damage and freeboard; lower substantial damage threshold; compensatory storage	1. Produce better hazard maps 2. Provide technical information and guidance 3. Enact tools to help manage development in hazard areas (stronger controls, tax incentives, and information) 4. Incorporate retrofitting or replacement of critical system elements in CIP 5. Develop strategy to take advantage of post-disaster opportunities 6. Warehouse critical infrastructure components 7. Develop and adopt a COOP 8. Improve Community Rating System (CRS) Classification 9. Maintain existing data as well as gather new data needed to define risks and vulnerability 10. Train emergency responders 11. Create a building and elevation inventory of structures in the floodplain 12. Develop and implement a public information strategy

TABLE 17.3 (continued)
CATALOG OF RISK REDUCTION MEASURES—FLOOD

Scale	Manipulate Hazard	Reduce Exposure	Reduce Vulnerability	Increase Capability
Government Scale (continued)	6. Acquire vacant land or promote open space uses in developing watersheds to control increases in runoff	4. Adopt land development criteria such as PUDs, density transfers, and clustering 5. Beaver dam management		13. Charge a hazard mitigation fee on all new permits to create a hazard mitigation funding source for initiatives or grant cost-share requirements 14. Scenario-based dam failure analysis 15. Create a dam failure element in emergency response plan

17.2.4 Mitigation Alternatives Catalog—Landslide

Table 17.4 is the catalog of mitigation alternatives for the landslide hazard.

TABLE 17.4
CATALOG OF RISK REDUCTION MEASURES—LANDSLIDE

Scale	Manipulate Hazard	Reduce Exposure	Reduce Vulnerability	Increase Capability
Personal Scale	1. Stabilize slope (de-water, armor toe, etc.) 2. Reduce weight on top of slope 3. Minimize vegetation removal and the addition of impervious surfaces	Locate structures outside of hazard area (off unstable land and away from slide-run out area)	None	1. Institute warning system and develop evacuation plan 2. Increase capability by having cash reserves for reconstruction
Corporate Scale	1. Stabilize slope (dewater, armor toe, etc.) 2. Reduce weight on top of slope	Locate structures outside of hazard area (off unstable land and away from slide-run out area)	None	1. Increase capability by having cash reserves for reconstruction 2. Institute warning system and develop evacuation plan
Government Scale	1. Stabilize slope (de-water, armor toe, etc.) 2. Reduce weight on top of slope	1. Locate structures outside of hazard area (off unstable land and away from slide-run out area) 2. Property buy-out of most exposed structures (fee simple, life estate, etc.)	None	1. Provide technical information and guidance 2. Enact tools to help manage development in hazard areas, such as better land controls, tax incentives, and information 3. Develop strategy to take advantage of post-disaster opportunities 4. Warehouse critical infrastructure components 5. Develop and adopt a COOP 6. Produce better hazard maps

17.2.5 Mitigation Alternatives Catalog—Human-Caused

Table 17.5 is the catalog of mitigation alternatives for the human-caused hazard.

TABLE 17.5
CATALOG OF RISK REDUCTION MEASURES—HUMAN-CAUSED

Scale	Manipulate Hazard	Reduce Exposure	Reduce Vulnerability	Increase Capability
Personal Scale	None	None	None	1. Increase awareness of vulnerability to threats 2. Neighborhood watch program 3. Keep informed 4. Develop an emergency response plan 5. Report suspicious activities
Corporate Scale	None	1. Incorporate anti-terrorism and security mitigation measures in site and layout design of facilities 2. Consider site security in landscape design of facilities	1. Restrict access by implementing controlled access zones 2. Increase security measures 3. Install physical barriers around critical facilities 4. Employ parking restrictions as a means to reduce vulnerability	1. Become a partner (stakeholder) in mitigation and prevention 2. Educate employees 3. Develop an emergency response plan 4. Develop a COOP 5. Use liberal signage techniques to inform and increase capability of users of facilities
Government Scale	None	1. Construct new critical facilities with Clear Zones. 2. Retrofit existing Critical Facilities	1. Restrict access by implementing controlled access zones 2. Reduce single-point vulnerabilities such as: redundancy for critical lifelines and infrastructure 3. Install physical barriers around critical facilities	1. Educate public on threats and vulnerability 2. Enhance emergency response capability by contingency planning for specific events based on identified vulnerabilities 3. Consider performance-based zoning as a land use alternative to mitigate impacts of human-caused hazards 4. Employ Crime Prevention Through Environmental Design (CPTED techniques in design of public facilities 5. Consider providing incentives for mitigation

17.2.6 Mitigation Alternatives Catalog—Human Health

Table 17.6 is the catalog of mitigation alternatives for the human health hazard.

TABLE 17.8
CATALOG OF RISK REDUCTION MEASURES—HUMAN HEALTH

Scale	Manipulate Hazard	Reduce Exposure	Reduce Vulnerability	Increase Capability
Personal Scale		Eliminate or reduce environments on private property that favor mosquito infestation	Immunization	Get informed
Corporate Scale		Eliminate or reduce environments on private property that favor mosquito infestation	Immunize employees	Inform employees on human health hazards
Government Scale	Mosquito abatement	Eliminate or reduce environments on private property that favor mosquito infestation	Immunize employees	1. Collaborate with the Placer County Health Department to ensure the health and welfare of the community 2. Public education on Mosquito Abatement and general human health issues

17.2.7 Mitigation Alternatives Catalog—Severe Weather

Table 17.7 is the catalog of mitigation alternatives for the severe weather hazard.

TABLE 17.7
CATALOG OF RISK REDUCTION MEASURES—SEVERE WEATHER

Scale	Manipulate Hazard	Reduce Exposure	Reduce Vulnerability	Increase Capability
Personal Scale	None	None	1. Insulate house 2. Provide redundant heat and power 3. Insulate structure 4. Plant appropriate trees near home and power lines (“Right tree, right place” National Arbor Day Foundation Program)	1. Trim or remove trees that could affect power lines 2. Promote 72-hour self-sufficiency
Corporate Scale	None	None	1. Relocate critical infrastructure (such as power lines) underground 2. Reinforce or relocate critical infrastructure such as power lines to meet performance expectations 3. Install tree wire	1. Trim or remove trees that could affect power lines 2. Create redundancy
Government Scale	None	None	1. Harden infrastructure such as locating utilities underground 2. Trim trees back from power lines 3. Designate snow routes and strengthen critical road sections and bridges	1. Support programs such as “Tree Watch” that proactively manage problem areas through use of selective removal of hazardous trees, tree replacement, etc. 2. Establish and enforce building codes that require all roofs to withstand snow loads 3. Increase communication alternatives 4. Modify land use and environmental regulations to support vegetation management activities that improve reliability in utility corridors

17.2.8 Mitigation Alternatives Catalog—Wildfire

Table 17.8 is the catalog of mitigation alternatives for the wildfire hazard.

TABLE 17.8
CATALOG OF RISK REDUCTION MEASURES—WILDFIRE

Scale	Manipulate Hazard	Reduce Exposure	Reduce Vulnerability	Increase Capability
Personal Scale	Clear potential fuels on property such as dry overgrown underbrush and diseased trees	1. Create and maintain defensible space around structures 2. Locate outside of hazard area 3. Mow regularly	1. Create and maintain defensible space around structures and provide water on site 2. Use fire-retardant building materials 3. Create defensible spaces around home	Employ "Firewise" techniques to safeguard home
Corporate Scale	Clear potential fuels on property such as dry underbrush and diseased trees	1. Create and maintain defensible space around structures and infrastructure 2. Locate outside of hazard area	1. Create and maintain defensible space around structures and infrastructure and provide water on site 2. Use fire-retardant building materials	Support "Firewise" community initiatives.
Government Scale	1. Clear potential fuels on property such as dry underbrush and diseased trees 2. Implement best management practices on public lands 3. Goat grazing in City of Roseville open space and preserve areas for fire management, invasive plant species management, and native plant restoration	1. Create and maintain defensible space around structures and infrastructure 2. Locate outside of hazard area	1. Create and maintain defensible space around structures and infrastructure 2. Use fire-retardant building materials 3. Consider higher regulatory standards (such as class A roofing)	1. More public outreach and education efforts, including an active "Firewise" program 2. Possible weapons of mass destruction funds available to enhance fire capability in high-risk areas 3. Identify fire response and alternative evacuation routes 4. Seek alternative water supplies 5. Become a "Firewise" community 6. Purchase new equipment

CHAPTER 18.
HAZARD MITIGATION ACTION PLAN

18.1 INTRODUCTION

After assessing the risk, setting goals and objectives, and reviewing possible mitigation alternatives, the City of Roseville planning team, aided by guidance from the steering committee, developed an action plan to mitigate the hazards identified. The mitigation activities developed for this plan are grouped by hazard and presented in a series of tables in Section 18.5. Each alternative mitigation activity was evaluated qualitatively using several evaluation criteria, including social, technical, administrative, political, legal, economic, and environmental opportunities and implementation constraints. Each evaluation criterion was defined by input from the public, the steering committee, and a capability assessment performed by city staff. The evaluation criteria are described 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. These social criteria were defined through the public involvement strategy of the planning process.
- **Technical criteria**—Factors such 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.

In addition to the criteria above, a capability assessment was performed, the mitigation actions were prioritized, a benefit/cost analysis was performed, and implementation timeframes were evaluated. Particular attention was given to mitigation activities that addressed existing and new buildings and infrastructure. All mitigation activities presented in the tables in Section 18.5 include, to the extent that information was available, implementation timelines, funding sources, and the jurisdictions responsible for carrying out the actions.

18.2 CAPABILITY ASSESSMENT

Section 201.6.c.(3) of 44 CFR requires a mitigation strategy that provides a blueprint for reducing the potential losses identified in the risk assessment based on existing authorities and capabilities and its abilities to expand on and improve these existing tools.

To accomplish this, the planning team performed an inventory and analysis of these existing tools called a "capability assessment." A capability assessment has two components: an inventory of an agency's

mission, programs, and policies, and an analysis of its capacity to carry them out. A capability assessment is an integral part of the planning process in which a community's actions to reduce losses are identified, reviewed, and analyzed and the framework for implementation is identified. The following capabilities were reviewed under this assessment.

- Legal and regulatory capability
- Administrative and technical capability
- Fiscal capability

The sections below discuss each type of capability.

18.2.1 Legal and Regulatory Capability

Table 18.1 summarizes the legal and regulatory capability of the City of Roseville.

TABLE 18.1
LEGAL AND REGULATORY CAPABILITY

Regulatory Tools (Codes, Ordinances, Plans)	Local Authority (Y or N)	Prohibitions (State or Federal)	Other Jurisdictional Authority (Y or N)	State Mandated (Y or N)	Comments
1. Building Code	Y	NA	N	Y	Roseville Municipal Code (RMC) 16.04.100 adopts 2001 California Building Standards Code by reference.
2. Zoning Ordinance	Y	NA	N	N	RMC Title 19 (Zoning)
3. Subdivision Ordinance	Y	NA	N	N	RMC Title 18 (Subdivisions)
4. Special Purpose Ordinances (floodplain management and critical or sensitive areas)	Y	N/A	Y	N	Zoning Ordinance (RMC Title 19) incorporates combining or overlay of districts to regulate floodplain development, open space preservation, and other sensitive habitat. Outside agencies with jurisdiction over sensitive habitats include the U.S. Army Corps of Engineers and California Department of Fish and Game. RMC 9.80 (Flood Damage Prevention) regulates development in special flood hazard areas.
5. Growth Management	Y	NA	N	N	Growth management strategies are incorporated into the land- use element of the 2020 general plan.
6. Floodplain Management or Basin Plan	Y	NA	N	N	RMC 9.80 and Safety Element of the 2020 general plan

TABLE 18.1 (continued)
LEGAL AND REGULATORY CAPABILITY

Regulatory Tools (Codes, Ordinances, Plans)	Local Authority (Y or N)	Prohibitions (State or Federal)	Other Jurisdictional Authority (Y or N)	State Mandated (Y or N)	Comments
7. Storm Water Management Plan/Ordinance	Y	NA	Y	Y	City of Roseville has a storm water management plan for 2004. The plan is required by the State of California as part of the U.S. Environmental Protection Agency (EPA) National Pollution Discharge Elimination System (NPDES) program. Outside jurisdictional authority is through the State Water Resources Control Board and Regional Water Quality Control Board (Central Valley Region).
8. General Plan or Comprehensive Plan	Y	NA	N	Y	Technical update to the 2010 general plan was completed in 2004 and is now the 2020 general plan, which is implemented through nine specific plans (SERSP, NERSP, NWRSP, NCRSP, NRSP, HRNSP, SRSP, DWSP, and WRSP) and one other planning area (NIPA).
9. CIP	Y	NA	N	N	The 2002 CIP (update) was adopted by the RCC in June 2002 (Resolution #02-407). An update to the CIP is anticipated to be approved during Summer 2005 (2004 CIP).
10. Site Plan Review Requirements	Y	NA	N	N	The Zoning Ordinance (RMC 19.74.010.C) requires a design review permit (DRP) for all new construction (except single-family and two-family residences). Site design, building architecture, landscape design, and lighting are reviewed through the DRP. DRPs are reviewed and approved by the City's Design Committee or Planning Commission.
11. Habitat Conservation Plan	N	NA	N	N	There are no Habitat Conservation Plans within the City. However, preserve areas have been established throughout the City as a condition of Section 404 (Clean Water Act) permits and biological opinions of the U.S. Fish and Wildlife Service. The City's open space and conservation element of the general plan also contains policies relative to habitat conservation.
12. Economic Development Plan	Y	NA	N	N	Current (1993) economic development strategy was adopted by the RCC on June 2, 1993. An update to the 1993 economic development strategy is currently underway, with completion anticipated in Summer 2005.
13. Emergency Response Plan	Y	NA	N	Y	The City of Roseville emergency operations plan was adopted by the RCC on July 21, 2004 (Resolution #04-301). The plan is mandated by the California Office of Emergency Services (OES).

TABLE 18.1 (continued)
LEGAL AND REGULATORY CAPABILITY

Regulatory Tools (Codes, Ordinances, Plans)	Local Authority (Y or N)	Prohibitions (State or Federal)	Other Jurisdictional Authority (Y or N)	State Mandated (Y or N)	Comments
14. Shoreline Management Plan	NA	NA	N	N	This is not applicable to Roseville. Shoreline management plans are applicable to coastal communities and are incorporated into local coastal plans reviewed and approved by the California Coastal Commission.
15. Post-Disaster Recovery Plan	N	NA	N	N	A post-disaster recovery plan is a recommendation of this plan.
16. Post-Disaster Recovery Ordinance	N	NA	N	N	None at this time.
17. Real Estate Disclosure Requirements	N	NA	Y	N	California Civil Code 1102 governs real estate and various disclosure laws and does not mandate disclosure at the local government level but does require local governments to make known information on natural hazards available to the real estate community.
18. Other	N	N	N	N	

18.2.2 Administrative and Technical Capability

Table 18.2 summarizes the administrative and technical capability of the City of Roseville.

TABLE 18.2
ADMINISTRATIVE AND TECHNICAL CAPABILITY

Staff/ Personnel Resources	Available (Y or N)	Department or Agency (Positions)
1. Planner(s) or engineer(s) with knowledge of land development and land management practices	Y	Planning and Redevelopment Department (13 Planners)
2. Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	Y	Public Works, Engineering Division (7 Engineering Inspectors); Building Inspection Division (15 Building Inspectors); Environmental Utilities Department (5 Engineering Inspectors for Water/Sewer/Storm water)
3. Planners or engineers with an understanding of natural hazards	Y	Planning and Redevelopment Department (13 Planners); Public Works (22 Engineers)
4. Floodplain manager	Y	Public Works, Floodplain Management Division (Associate Engineer)
5. Surveyor(s)	N	No licensed Surveyors on City Staff. City can and has contracted for survey work on as needed basis.
6. Personnel skilled or trained in Geographic Information System (GIS) Applications	Y	Planning and Redevelopment Department (Planning Technicians); Public Works (Engineering Assistants); Fire Department (GIS Analysts); Environmental Utilities Department (Mapping Manager); Community Development Department (GIS Analyst); Information Technology Division (GIS Analyst)
7. Scientist familiar with natural hazards in Roseville	N	
8. Emergency manager	Y	Fire Department (Emergency Preparedness Manager)
9. Grant writer(s)	Y	City Manager's Office (Government Relations Manager)
10. Staff with expertise or training in benefit/cost analysis		Finance Department (8 – administration and budget); City Manager's Office (Deputy City Manager, Economic Development Team); Community Development Department; Public Works; Environmental Utilities Department; Electric Department

18.2.3 Fiscal Capability

Table 18.3 summarizes the fiscal capability of the City of Roseville.

TABLE 18.3
FISCAL CAPABILITY

Financial Resources	Accessible or Eligible to Use (Y/N/Unknown)
1. Community Development Block Grants	Y
2. Capital Improvements Project Funding	Y
3. Authority to Levy Taxes for Specific Purposes	Y
4. User Fees For Water, Sewer, Gas or Electric Service	Y
5. Impact Fees for Homebuyers or Developers of New Development/Homes	Y
6. Incur Debt through General Obligation Bonds	Y
7. Incur Debt through Special Tax Bonds	Y
8. Incur Debt through Private Activity Bonds	N
9. Could Withhold Public Expenditures in Hazard-Prone Areas	N
10. State-Sponsored Grant Programs	Y
11. Other	NA

18.3 PRIORITIZATION

As stated earlier, Section 201.c.3.iii of 44 CFR requires an action plan describing how the actions identified will be prioritized. The City of Roseville planning team and steering committee have developed a prioritization methodology for the action plan that meets the needs of the City while at the same time meeting the requirements of Section 201.6 of 44 CFR. The mitigation strategies identified in the Section 18.5 were prioritized according to the criteria defined below.

- **High Priority:** A project that meets multiple plan objectives, benefits exceed cost, has funding secured under existing programs or authorizations, or is grant-eligible, and can be completed in 1 to 5 years (short-term project) once project is funded
- **Medium Priority:** A project that meets at least one plan objective, benefits exceed costs, funding has not been secured and would require a special funding authorization under existing programs, grant eligibility is questionable, and can be completed in 1 to 5 years once project is funded
- **Low Priority:** A project that will mitigate the risk of a hazard, benefits exceed costs, funding has not been secured, and project is not grant-eligible and/or timeline for completion is considered long-term (5 to 10 years)

It should be noted that these priority definitions are considered to be dynamic and can change from one category to another based on changes to a parameter such as availability of funding. For example, a project might be assigned a medium priority because of the uncertainty of a funding source. This priority could be changed to high once a funding source has been identified such as a grant. The prioritization schedule for this plan will be reviewed and updated as needed annually through the plan maintenance strategy described in Part 5 of this plan.

18.4 BENEFIT/COST ANALYSIS

Section 201.6.c.3iii of 44 CFR requires the prioritization of the action plan to include special emphasis on the extent to which benefits are maximized according to a benefit/cost analysis of the proposed projects and their associated costs. As stated in Section 18.3, the benefits of a proposed project were weighed against its estimated costs as a parameter in the prioritization of that project. This benefit/cost analysis was anecdotal and was not of the detailed variety required by FEMA for project grant eligibility under the Hazard Mitigation Grant Program (HMGP) and Pre-Disaster Mitigation (PDM) grant program. This anecdotal approach was used because it made little or no sense to perform a detailed and expensive benefit/cost analysis for a project that may not be implemented for up to 10 years. The associated costs and benefits could change dramatically in that time frame. Therefore, a review of the apparent benefits versus the apparent cost of each project was performed. Parameters were established for assigning subjective ratings (high, medium, and low) to the costs and benefits of these projects. Cost ratings are defined below.

- **High:** Existing funding levels are not adequate to cover the costs of the proposed project and would require an increase in revenue through an alternative source (for example, bonds, grants, and fee increases) to implement.
- **Medium:** The project could be implemented with existing funding but would require a re-apportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.
- **Low:** The project could be funded under the existing budget. The project is part of or can be part of an existing, ongoing program.

Benefit ratings were defined as follows:

- **High:** Project will have an immediate impact on the reduction of risk exposure to life and property
- **Medium:** Project will have a long-term impact on the reduction of risk exposure to life and property or project will provide an immediate reduction in the risk exposure to property
- **Low:** Long-term benefits of the project are difficult to quantify in the short term

Using this approach, projects with positive benefit versus cost ratios (such as high over high, high over medium, medium over low, etc.) are considered cost-beneficial and are prioritized accordingly.

It should be noted that for many of the strategies identified in this action plan, the City of Roseville may seek financial assistance under FEMA's HMGP or PDM programs. Both of these programs require detailed benefit/cost analysis as part of the application process. These analyses will be performed on projects at the time of application preparation. The FEMA model process will utilized by the City to perform this review. The City is committed to implementing a mitigation strategy with benefits that exceeds costs. For projects not seeking financial assistance from grant programs that require this sort of analysis, the City reserves the right to define "benefits" according to parameters that meet its needs and the goals and objectives of this plan.

18.5 MITIGATION STRATEGY MATRIX

The following sections illustrate the hazard mitigation action plan identified by the planning team and steering committee. This action plan is presented in a mitigation strategy matrix that includes two parts. The first part identifies the following:

- Initiative number and summary description of the initiative
- Goals met by the initiative
- Objectives met by the initiative
- Lead agency for implementation of the initiative
- Estimated cost (if available)
- Possible sources of funding
- Timeline for completion

Under timeline for completion, the City has identified the following parameters:

- **Ongoing:** Initiative is currently being implemented under existing programs and budgets
- **Short-term:** Initiative can be completed within 1 to 5 years once funding has been secured
- **Long-term:** Initiative will take 5 or more years to complete once funding has been secured

The second part of the matrix prioritizes the initiative according to the parameters discussed in Sections 18.3 and 18.4. This priority matrix illustrates the following:

- Number of objectives met by the initiative
- Benefits of the project (high, medium, or low)
- Cost of the project (high, medium, or low)
- Do the benefits equal or exceed the costs?
- Is the project grant-eligible?
- Can the project be funded under existing programs and budgets?
- Priority (high, medium, or low)

18.5.1 Mitigation Strategy Matrix—Drought

TABLE 18.4
MITIGATION STRATEGY MATRIX – DROUGHT

Mitigation Initiative	Goals Met	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
D-1—Perform a groundwater recharge feasibility study to determine the most cost-effective way to replenish groundwater resources within Roseville.	2, 6	5, 6	Environmental Utilities District (EUD) Public Works	Medium	Water utility funds, general fund Developer-based funding under specific plan requirements Possible grant funding under PDM program	Long-Term
D-2—Implement aquifer storage and recovery program that uses direct injection technique in areas identified as appropriate.	6, 7	6, 8	EUD	High	Water Construction Fund	Short-term, ongoing
D-3—Continue to implement EUD's recycled water program and seek all opportunities to expand its coverage, focusing first on the Sunset Industrial area. The City pumps recycled water through a system of purple pipes completely separate from potable (drinking water) pipes. The City pumps the recycled water to customers such as golf courses and parks, where it irrigates turf and shrubs. Using recycled water for uses such as landscape irrigation reduces demand on the potable water system, creating a more reliable water supply for the entire City. Recycled water is not subject to the effects of drought.	2, 6	6, 8	EUD	Medium	Water utility rates, developer-based fees under specific plan requirements	Ongoing
D-4—Promote active water conservation techniques and strategies to private property owners through Roseville-sponsored outreach projects such as printed media and the City's website.	2, 7	5, 9	Roseville Public Information Office	Low	Currently funded by General Fund allocation	Short-term, ongoing

TABLE 18.5
DROUGHT STRATEGY PRIORITIZATION

Initiative No.	No. of Objectives Met	Benefits	Costs	Benefits Equal or Exceed Costs (Y or N)	Grant-Eligible (Y or N)	Can Be Funded Under Existing Programs or Budgets (Y or N)	Priority
D-1	2	Medium	Medium	Y	Y	N	Medium
D-2	2	High	High	Y	Y	N	Medium
D-3	2	High	Medium	Y	Y	Y	High
D-4	2	Low	Low	Y	Y	Y	High

18.5.2 Mitigation Strategy Matrix—Earthquake

TABLE 18.6
MITIGATION STRATEGY MATRIX - EARTHQUAKE

Mitigation Initiative	Goals Met	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
EQ-1—Perform building-specific, structural seismic vulnerability assessment of City-owned critical facilities constructed prior to 1980 (including infrastructure). Included in this assessment will be recommended mitigation alternatives that meet goals and objectives of this plan.	1, 5	5, 10	Public Works	High	General Fund Possible grant funding under PDM program	Long-term
EQ-2—Incorporate earthquake mitigation measures for private property into existing City-sponsored outreach programs such as printed media and the City's website.	2, 7	5, 9	Roseville Public Information Office	Low	Currently funded by General Fund allocation	Short–term, ongoing
EQ-3—Reassess the overall vulnerability to the earthquake hazard using the best available science and technology as it becomes available. State-sponsored programs, Seismic Hazards Mapping Act, and future FEMA-sponsored initiatives are anticipated to create a wealth of knowledge regarding this hazard that did not exist during the preparation of this plan.	1, 2, 3, 4, 5	1, 5, 7, 9	Planning and Public Works	Medium	General Fund Possible grant funding under PDM program	Short-term
EQ-4—Implement seismic construction standards under the International Building Code (IBC) as an "alternative means" code until the IBC is formally adopted as the California State Building Code.	1, 2, 5	1, 6, 8	Community Development	Low	Currently funded by General Fund allocation	Short-term, ongoing

TABLE 18.7
EARTHQUAKE STRATEGY PRIORITIZATION

Initiative No.	No. of Objectives Met	Benefits	Costs	Benefits Equal or Exceed Costs (Y or N)	Grant-Eligible (Y or N)	Can Be Funded Under Existing Programs or Budgets (Y or N)	Priority
EQ-1	2	High	High	Y	Y	N	Medium
EQ-2	2	Low	Low	Y	Y	Y	High
EQ-3	4	Medium	Medium	Y	Y	N	Medium
EQ-4	3	High	Low	Y	Y	Y	High

18.5.3 Mitigation Strategy Matrix—Flood

TABLE 18.8
MITIGATION STRATEGY MATRIX - FLOOD

Mitigation Initiative	Goals Met	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
F-1—The City shall designate all areas identified as the 100-year floodplain. The boundaries of the 100-year floodplain shall be as specified in the floodplain designations section of this component of the city's general plan. Floodplain areas shall be preserved as specified in the open space and conservation element. Such preservation may include required dedication to the City. If needed, modify the City's ordinances to include floodplain use regulations consistent with the goals, policies, and implementation measures of the safety, land use, open space and conservation, and parks and recreation elements of the City's general plan.	1, 6, 7	1, 6, 7,	Planning	Low	Currently funded by General Fund allocation	Ongoing
F-2—Refer any development proposal that has a direct or indirect impact on flood protection to Public Works for comment. In addition, forward such proposals to other agencies as applicable, including the U.S. Army Corps of Engineers, California Reclamation Board, FEMA, California Department of Fish and Game, Placer County Resource Conservation District, and Placer County Flood Control District (PCFCD). Consider the comments of the agencies during the development review process.	2, 6, 7	1, 5, 7,	Public Works Planning	Low	Currently funded by General Fund allocation	Ongoing
F-3—Continue City participation in the NFIP and the CRS. Seek CRS classification improvements within capabilities of City programs, including adoption and administration of FEMA-approved ordinances and flood insurance rate maps (FIRM).	1, 2, 4,	1, 5, 9	Public Works	Low	Currently funded by General Fund allocation	Ongoing
F-4—Continue the City's outreach program to flood-prone property owners and the citizens of Roseville to program is to help make them aware of the flood threat and how best to deal with them.	1, 3, 4,	5, 9	Public Works	Low ($5000/year)	Currently funded by General Fund allocation	Ongoing

TABLE 18.8 (continued)
MITIGATION STRATEGY MATRIX - FLOOD

Mitigation Initiative	Goals Met	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
F-5—Continue to pursue a regional approach to flood issues by remaining actively involved in the PCFCD. This involvement includes cooperation in the development of a comprehensive regional database. Encourage regional drainage planning and design for all individual developments in the PCFCD to address cumulative flooding impacts. Continue to participate in regional flooding studies, including the Auburn Creek/Coon Creek/Pleasant Grove Creek flood mitigation plan and the Dry Creek watershed flood control plan.	1, 2, 3	1, 5, 7	Public Works	Low ($90,000/year for membership to PCFCD)	Currently funded by General Fund allocation	Ongoing
F-6—Continue City coordination with other agencies on issues of flood control. Coordination between the City and adjacent jurisdictions occurs through several mechanisms, including distribution of development proposals for review and comment. Continue City cooperation with federal, state, and local agencies, including the U.S. Army Corps of Engineers, California Reclamation Board, FEMA, California Department of Fish and Game, Placer County Resource Conservation District, and PCFCD.	2, 3, 7	1, 5, 7	Planning Public Works	Low	Currently funded by General Fund allocation	Ongoing
F-7—Continue to develop, implement, and expand the Flood Alert and Early Warning Program systems and integrate the systems with other local jurisdictions to form a regional warning program.	1, 2, 3, 4	2, 3	Public Works	Low	General Fund Possible grant funding (PDM, HMGP, and FMA)	Short-Term

TABLE 18.8 (continued)
MITIGATION STRATEGY MATRIX - FLOOD

Mitigation Initiative	Goals Met	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
F-8—Ensure that future specific plans and specific plan amendments are consistent with the goals and policies of the general plan. The specific plans shall include the designation and preservation of floodplain areas and adjacent habitat. Provisions shall be incorporated to ensure that public infrastructure, utilities, and emergency services remain functional during flood conditions. Such infrastructure and facilities include water, sewer and gas mains, telephone and electric lines, streets and bridges, hospitals, and fire and police stations. Financing mechanisms shall be explored to fund necessary flood protection improvements and maintenance. Development agreements may be used to secure implementation and funding provisions. (Specific plans have 100% cost recovery by developers).	1, 2, 6	1, 6, 7, 8	Planning Public Works	Low	Specific plans have 100% cost recovery by developers	Short - term
F-9— Monitor and regularly update City flood studies, modeling, and associated land use, zoning, and other development regulations at a minimum of every 5 years or whenever information becomes available that would significantly modify previous data. New information could include new studies, change in City policy, consideration of a major development project or specific plan, or implementation of a flood control project.	2, 4	1, 5, 7	Public Works	Medium ($15,000/ year)	General Fund FEMA map modernization Developer-based funding and specific plan requirements	Short-Term
F-10—Require a master drainage plan as part of the approval process for all specific plans and large development projects as determined by the Public Works director. The master drainage plan should consider cumulative regional drainage and flooding mitigation. The plan's intent is to ensure that the overall rate of runoff from a project does not exceed predevelopment levels. If necessary, this objective shall be achieved by incorporating run-off control measures to minimize peak flows and/or assistance in financing or otherwise implementing comprehensive drainage plans.	1, 2, 6	1, 6, 8	Planning Public Works	Low	General Fund Developer-based funding under specific plan requirements	Short-term

TABLE 18.8 (continued)
MITIGATION STRATEGY MATRIX - FLOOD

Mitigation Initiative	Goals Met	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
F-11—Continue the Parks and Recreation Department's regular creek maintenance program within the City's creeks and floodplain areas. This program clears and removes debris that could contribute to blockage and flooding and may include the removal of silt. This is only done in areas of high risk to flood damage.	1, 2, 5, 7	8	Parks and Recreation	Low ($100,000/ year)	Currently funded by General Fund allocation	Ongoing
F-12—Continue annual inspection and maintenance program of City storm drain systems. Review after every major storm system function and performance. This program removes debris that could contribute to blockage of the storm drain system.	1, 5	8	Street Department	Low ($400,000/ year)	Currently funded by General Fund allocation and gas tax	Ongoing
F-13—Complete the final two phases of the Cirby/Linda/Dry Creek flood control project (Phase 1 and 2). Five of the seven phases of this project have been completed at a cost of about $18,000,000. The basis for determining viability of this project will be a benefit /cost analysis to determine if project meets federal grant eligibility requirements.	1, 5, 7	6, 8, 10	Public Works	High ($3,000,000)	General Fund Impact fees Grant funding (PDM and HMGP) based on benefits exceeding costs	Long-term
F-14—Analyze alternative improvements to the Cirby/Linda/Dry Creek flood control project that may be cost effective in the flood-prone areas of Roseville: • Dry Creek from Darling Way to Riverside Avenue • Area on Dry Creek upstream of Folsom Road in the Columbia Avenue/Marilyn Avenue/Bonita Street area • Linda Creek near Champion Oaks Drive/Samoa Way/Hurst Way area • Cirby Creek in the Trimble Way/Zien Court area	1, 5, 7	6, 8, 10	Public Works	High ($30,000 to $100,000 per study)	General Funds Developer-based funds, grant funding (PDM, HMGP, and FEMA) based on benefits exceeding costs	Long - term

TABLE 18.8 (continued)
MITIGATION STRATEGY MATRIX - FLOOD

Mitigation Initiative	Goals Met	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
F-15— Replace the Huntington Drive/Cirby Creek culvert with a bridge to protect Queens Court/Huntington Drive area. This project is overseen by Public Works department.	1, 5, 6	6, 10	Public Works	Medium ($100,000)	General Fund CIP, developer-based funds, grant funding (PDM, HMGP, and FEMA) based on benefits exceeding costs	Short-term
F-16—Divert the main drainage storm drain system down Crestmont Avenue to Cirby Way and then into Dry Creek so that the existing system will not exceed capacity. If system capacity is exceeded, the intersection on Cirby Way and Crestmont Avenue and nearby homes will flood during major flood events.	1, 5, 6	6, 10	Public Works	Medium ($150,000)	General Fund, CIP, developer-based funds, grant funding (PDM, HMGP, and FEMA) based on benefits exceeding costs	Short-term
F-17—Continue to promote and sponsor programs to buy out, relocate, and flood-proof existing flood-prone structures within Roseville.	1, 5, 6	6, 10	Public Works	High ($100,000 per structure for acquisition or relocation). ($50,000 per structure for retrofitting)	Grant funding (PDM, HMGP, and FEMA) based on benefits exceeding costs	Short-term
F-18—Set back and raise the sewer ponds levees at the Dry Creek Sewer Plant so raw sewage will not enter Dry Creek.	1, 5, 6	6, 10	Public Works EUD	High ($5,000,000)	SPWA Grant funding (PDM, HMGP, and FEMA) based on benefits exceeding costs	Short-term, ongoing
F-19— Replace existing wood flood wall along Dry Creek that protects the City's Main Library and Public Safety Building because wood wall allows flood water to leak through, and constant pumping is required.	1, 5, 6	6, 10	Public Works	High ($300,000)	Grant funding (PDM, HMGP, and FEMA) based on benefits exceeding costs	Long-term

TABLE 18.8 (continued)
MITIGATION STRATEGY MATRIX - FLOOD

Mitigation Initiative	Goals Met	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
F-20—Manage beaver dam sites for flood control protection and habitat restoration after dam removal. One primary issue is impacts to floodwater capacity of creeks. Part of the desired comprehensive approach to beaver management includes establishment of quantitative and qualitative "carrying capacity," including acre-feet of flood capacity lost. Implement a standard monitoring and reporting process to track beaver dam locations, population, and impacts. Gain regulatory approval for beaver management techniques such as biological control and habitat manipulation using the most benign options first.	2, 7	8	Parks and Recreation	Medium	General Fund	Short-term
F-21—Perform a scenario-based dam failure analysis to determine the probable impact of flooding within Roseville if western levees on Folsom Reservoir fail. These levees are considered a part of the entire dam system that creates Folsom Reservoir and are an integral part of a dam failure analysis. This study would generate an inundation area map.	2, 4	1, 5, 7	Public Works	Medium	General Fund Developer-based funding under specific plans Possible grant funding under FEMA or Department of Homeland Security (DHS) programs	Long-term
F-22—Once dam failure analysis is complete, create a dam failure element for the City's emergency response plan.	1, 2, 3	2, 3, 4, 9	Police and Fire Departments	Medium	General Fund DHS grant funding	Long-term
F-23—Develop a comprehensive interpretive sign program, including trial and open space preserve signage, at road crossings. Create creek corridor trail maps and coordinate with local schools and public stewardship events to increase public awareness of the need to preserve, restore, and proactively manage open space corridors and provide a sense of civic identity and pride. Interpretive signs are particularly important along the many trails adjacent to or that provide access to the City's open space resources, which are habitat for endangered species.	1, 2, 7	1, 5, 7, 9	Community Development	Medium	General Fund PDM grant funding	Short-term

TABLE 18.9
FLOOD STRATEGY PRIORITIZATION

Initiative No.	No. of Objectives Met	Benefits	Costs	Benefits Equal or Exceed Costs (Y or N)	Grant-Eligible (Y or N)	Can Be Funded Under Existing Programs or Budgets (Y or N)	Priority
F-1	3	High	Low	Y	N	Y	High
F-2	3	Medium	Low	Y	N	Y	High
F-3	3	Medium	Low	Y	N	Y	High
F-4	2	Medium	Low	Y	Y	Y	High
F-5	3	Medium	Low	Y	N	Y	High
F-6	3	Low	Low	Y	N	Y	High
F-7	2	Medium	Low	Y	N	Y	High
F-8	4	Medium	Low	Y	N	Y	High
F-9	3	Medium	Medium	Y	N	N	Medium
F-10	3	Medium	Low	Y	N	Y	High
F-11	1	Medium	Low	Y	N	Y	Medium
F-12	1	Medium	Low	Y	N	Y	Medium
F-13	3	Medium	High	N	Y	N	Low
F-14	3	Medium	High	N	N	N	Low
F-15	2	High	Medium	Y	Y	N	High
F-16	2	High	Medium	Y	Y	N	High
F-17	2	High	High	Y	Y	N	High
F-18	2	High	High	Y	Y	N	High
F-19	2	High	High	Y	Y	N	High
F-20	1	Medium	Medium	Y	N	Y	Medium
F-21	3	Low	Medium	N	Y	Y	Low
F-22	4	Low	Medium	N	Y	Y	Low
F-23	4	Medium	Medium	Y	Y	Y	High

18.5.4 Mitigation Strategy Matrix—Landslide

TABLE 18.10
MITIGATION STRATEGY MATRIX - LANDSLIDE

Mitigation Initiative	Goals Met	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
LS-1—Once California Geological Survey (CAGS) completes soils mapping for the Roseville vicinity under the Seismic Hazards Mapping Act, reassess landslide hazard using best available data to gauge the true vulnerability to this hazard.	2, 4	1, 5, 7	Public Works	Medium	General Fund Developer-based funding and specific plan requirements Possible grant funding under PDM program	Long-term
LS-2— Implement soil testing standards under IBC as an "alternative means" code until the IBC is formally adopted as California State Building Code.	1, 2, 5	1, 6, 8	Community Development	Low	Currently funded by General Fund allocation	Short-term, ongoing
LS-3— Continue to implement policies adopted by the general plan that promote open space land uses within identified steep slope areas of Roseville.	1, 2, 5	1, 6, 8	Planning	Low	General Fund Developer-based funding and specific plan requirements	Ongoing

TABLE 18.11
LANDSLIDE STRATEGY PRIORITIZATION

Initiative No.	No. of Objectives Met	Benefits	Costs	Benefits Equal or Exceed Costs (Y or N)	Grant-Eligible (Y or N)	Can Be Funded Under Existing Programs or Budgets (Y or N)	Priority
LS-1	3		Medium	Medium	Y	N	Low
LS-2	3		Low	High	N	Y	High
LS-3	3		Low	High	N	Y	High

18.5.5 Mitigation Strategy Matrix—Human-Caused

TABLE 18.12
MITIGATION STRATEGY MATRIX – HUMAN-CAUSED

Mitigation Initiative	Goals Met	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
HC-1— Incorporate Crime Prevention Through Environmental Design strategies into future enhancements and revisions to community design guidelines.	1, 2, 5	1, 5, 8	Planning	Low	General Fund	Short-term
HC-2— Commit support to Sacramento Urban Area Security Initiative in the form of staff support from City of Roseville public safety departments.	1, 2, 3	2, 7	Police/Fire	Medium	General Fund DHS funding under Sacramento Urban Area Security Initiative	Short-term
HC-3— Enhance emergency response capability of City by contingency planning for specific events based on identified vulnerabilities.	1, 2, 3	2, 3, 4, 9	Police and Fire Departments	Low	General Fund DHS grant funding	Short-term, ongoing
HC-4— Seek to establish appropriate staffing levels of public safety personnel to address vulnerabilities identified.	1, 2, 3, 4,	2, 4,	City Council	High	General Fund	Short Term
HC-5— Prepare a site-specific vulnerability assessment of City- owned critical facilities that use the best available science and technology with regards human-caused hazards.	1, 3, 4.5	2, 5, 7	Police, Fire, and Planning Departments	Medium	General Fund DHS grant funding	Long-term
HC-6— Develop and enhance a COOP specific to human-caused hazards.	2, 3, 4	2, 3	Police and Fire Departments	Low	General Fund DHS grant funding	Short-term, ongoing
HC-7— Enhance camera surveillance program to improve security at electrical substations, receiving stations, and energy park.	2, 3	2, 4	Roseville Electric	Medium	Roseville Electric CIP	Short-term
HC-8— Address vulnerabilities identified in vulnerability assessment of water facilities performed by EUD in response to EPA initiative.	1, 5	5, 7	EUD	High	EUD CIP, and EPA grant funding	Long-term

TABLE 18.13
HUMAN-CAUSED STRATEGY PRIORITIZATION

Initiative No.	No. of Objectives Met	Benefits	Costs	Benefits Equal or Exceed Costs (Y or N)	Grant-Eligible (Y or N)	Can Be Funded Under Existing Programs or Budgets (Y or N)	Priority
HC-1	3	Medium	Low	Y	Y*	Y	High
HC-2	2	High	Medium	Y	Y*	N	High
HC-3	4	Medium	Low	Y	Y*	Y	High
HC-4	2	High	High	Y	Y*	N	High
HC-5	3	Medium	Medium	Y	Y*	N	Medium
HC-6	2	Medium	Low	Y	Y*	Y	Medium
HC-7	2	Medium	Medium	Y	N	Y	High
HC-8	2	High	High	Y	Y*	N	Medium

* Projects that mitigate the impacts of human-caused hazards are not grant-eligible under FEMA programs such as the HMGP or PDM program. The “Y” entries indicated in this column refer to grant programs sponsored by the DHS that can be applied to human-caused hazards.

18.5.6 Mitigation Strategy Matrix—Human Health

TABLE 18.14
MITIGATION STRATEGY MATRIX - HUMAN HEALTH

Mitigation Initiative	Goals Met	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
HH-1— Continue to collaborate with the Placer County Health Department to ensure the health and welfare of the community	1,2	5,6,7,9	Fire Department, Public Information Office	Low	Currently budgeted for under the General Fund	Ongoing
HH-2— Support the public education efforts of the Placer County Health Department and the Placer Mosquito Abatement District	1,2	5,6,7,9	Public Information Office, Fire Department,	Low	Currently budgeted for under the General Fun	Ongoing
HH-3— Collaborate with the Placer County Mosquito Abatement District to review resource protection policies that conflict with human health protection in the City of Roseville and work to resolve these policy issues	1,2	5,6,7,9	Community Development Departments	Low	Currently budgeted for under the General Fun	Short-term

TABLE 18.15
HUMAN HEALTH STRATEGY PRIORITIZATION

Initiative No.	No. of Objectives Met	Benefits	Costs	Benefits Equal or Exceed Costs (Y or N)	Grant-Eligible (Y or N)	Can Be Funded Under Existing Programs or Budgets (Y or N)	Priority
HH-1	4	Low	Low	Y	N	Y	High
HH-2	4	Low	Low	Y	N	Y	High
HH-3	4	High	Low	Y	N	Y	High

18.5.7 Mitigation Strategy Matrix—Severe Weather

TABLE 18.16
MITIGATION STRATEGY MATRIX - SEVERE WEATHER

Mitigation Initiative	Goals Met	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
SW-1—Continue ongoing program of conversion of overhead utilities to underground service.	2, 3, 5	2, 10	Roseville Electric	Medium ($2 million /year)	CIP	Ongoing
SW-2—Purchase mobile generators to provide redundancy for electrical utilities.	3, 5	2, 4	Roseville Electric	Medium	CIP General Fund	Short-term
SW-3— Continue "Right Tree, Right Place" program, a community service sponsored by Roseville Electric and Roseville Urban Forest Foundation.	2, 3	7, 9	Roseville Electric	Low	Roseville Electric operational budget	Ongoing
SW-4— Continue ongoing line clearing and weed abatement of electrical utilities to reduce exposure to severe weather hazards.	3, 5	2	Roseville Electric	Low ($460,000/ year)	CIP	Ongoing
SW-5— Continue education/outreach programs to improve winter preparedness and minimize loss of life or injury.	1, 4, 6	6, 9	Fire Department	Low	General Fund	Short-term, ongoing
SW-6— Enhance and implement strategies for debris management and removal during severe weather events.	1, 3	6, 8	Public Works Roseville Electric	Low	General Fund	Ongoing

TABLE 18.17
SEVERE WEATHER STRATEGY PRIORITIZATION

Initiative No.	No. of Objectives Met	Benefits	Costs	Benefits Equal or Exceed Costs (Y or N)	Grant-Eligible (Y or N)	Can Be Funded Under Existing Programs or Budgets (Y or N)	Priority
SW-1	2	Medium	Medium	Y	N	Y	High
SW-2	2	Medium	Medium	Y	N	N	Low
SW-3	2	Medium	Low	Y	N	Y	High
SW-4	1	Medium	Low	Y	N	Y	High
SW-5	2	High	Low	Y	Y	Y	High
SW-6	2	Medium	Low	Y	N	N	Medium

18.5.8 Mitigation Strategy Matrix—Wildfire

TABLE 18.18
MITIGATION STRATEGY MATRIX – WILDFIRE

Mitigation Initiative	Goals Met	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
WF-1— Continue ongoing line clearing and weed abatement of electrical utilities to reduce exposure to fire and severe weather hazards.	3, 5	2	Roseville Electric	Low ($460,000/ year)	CIP	Ongoing
WF-2— Continue "Goat Grazing" program for removal of grassland in areas of Roseville potentially vulnerable to wildfire. Implement goat grazing in City open space and preserve areas for fire and invasive plant species management and native plant restoration.	1, 5, 6	6, 9	Community Development	Low	General Fund PDM grant funding	Ongoing
WF-3—Enhance existing City public outreach programs to include information on fire safety, defensible spaces, and areas of concern.	1, 4, 6	6, 9	Fire Department	Low	General Fund Grant funding under PDM program and HMGP	Short-term Ongoing
WF-4—Purchase a minimum 4,000-gallon water tender with wildfire fighting capability.	1, 3, 4, 5	2, 4, 6	Fire Department	High ($225,000)	General Fund Bond issue	Long-term
WF-5—Consider adopting building code regulations that would allow only class "A" roofing on new or substantially improved structures.	1, 2, 5	1, 6, 8	Community Development	Low	General Fund	Short-term
WF-6—Enhance wildfire-fighting capabilities of the Fire Department through approaches that include • Use of gel for fire protection of threatened structures, • Equipment with adequate supplies of class A foam, • Expanded vegetation management areas, • Enhanced wildfire training for response personnel, and • Establishment of a reserve supply of wildfire-fighting land equipment.	1, 3, 4, 5	2, 4, 6	Fire Department	Medium	General Fund	Short-term

TABLE 18.19
WILDFIRE STRATEGY PRIORITIZATION

Initiative No.	No. of Objectives Met	Benefits	Costs	Benefits Equal or Exceed Costs (Y or N)	Grant-Eligible (Y or N)	Can Be Funded Under Existing Programs or Budgets (Y or N)	Priority
WF-1	1	Medium	Low	Y	N	Y	High
WF-2	2	Medium	Low	Y	Y	Y	High
WF-3	3	Low	Low	Y	Y	Y	High
WF-4	3	High	High	Y	N	N	Medium
WF-5	3	Medium	Medium	Y	N	N	Medium
WF-6	3	High	Medium	Y	N	Y	High

18.5.9 Mitigation Strategy Matrix—Multiple Hazards

TABLE 18.20
MITIGATION STRATEGY MATRIX - MULTIPLE HAZARDS

Mitigation Initiative	Hazards Addressed	Goals Met	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
MH-1—Adopt IBC as amended once approved as the California State Building Code.	All	1, 2, 5, 6	1, 8	Community Development	Low	General Fund	Short-term
MH-2— Continue to seek OES certification of all City inspectors for post-disaster damage assessment.	All	2, 3, 4	2, 7	Community Development	Low	General Fund	Ongoing
MH-3—Establish hazard mitigation page on City website that provides following types of information: • RHMP and its progress report(s) • Hazard-specific information • Mitigation information by hazard, with specific emphasis on private property • Emergency response and warning information • Links to county, state, and federal related agencies	All	1, 2, 3, 4, 5, 6, 7	2, 3, 5, 6, 9	Public Information Office	Medium	General Fund PDM grant funding	Short-term
MH-4— Review existing automatic/mutual aid agreements with outside public safety agencies to identify opportunities for enhancement.	All	1, 2, 3, 4, 5, 6	2, 4, 7	Police and Fire Departments	Medium	General Fund	Short-term
MH-5—Establish post-disaster action plan to be part of the City COOP that will include following elements: • Procedures for public information • Post-disaster damage assessment • Grant writing • Code enforcement • Redundant operations	All	1, 2, 3, 4,	2, 3, 4, 7	Police, Fire, and Planning Departments	Medium	General Fund PDM Grant Funding	Short-term
MH-6—Relocate City Emergency Operations Center out of the floodplain, and construct new facility to current seismic standards; this project would mitigate impacts of flood, earthquake, and human-caused hazards.	F, EQ, HC	2, 3, 5	2, 10	Police and Fire Departments	High (estimated $4 million)	Bond issues PDM grant funding CIP	Short-term

TABLE 18.20 (continued).
MITIGATION STRATEGY MATRIX - MULTIPLE HAZARDS

Mitigation Initiative	Hazards Addressed	Goals Met	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
MH-7—Implement an "Adopt an Open Space" program in coordination with the open space management program. Develop "adoption contracts" with neighborhoods, organizations, businesses, etc., describing the level of stewardship and the terms of the "adoption." Publicize these activities through online resource directory and other media to encourage participation.	F, EQ, WF, LS, SW	1, 2, 7	1, 5, 7, 9	Community Development	Medium	General Fund PDM grant funding	Short--term
MH-8—Develop and disseminate best practices information to private property owners whose land is adjacent to open space areas describing stewardship opportunities and owners' role in preserving beneficial uses of open space areas (including vernal pool grassland and creek or riparian uses). Offer classes to provide in-depth information, such as demonstration projects, techniques for ecologically friendly weed abatement and vegetation control, and creating a backyard habitat compatible with open space areas.	F, EQ, WF, LS, SW	1, 2, 7	1, 5, 7, 9	Community Development	Medium	General Fund PDM grant funding	Short-term
MH-9—Work with the Roseville City School District, local high school districts, and non-profit organizations to promote ecology-oriented curricula and stewardship activities. Identify resource and administrative barriers that may be limiting schools' abilities to more actively participate in stewardship, and work collaboratively to identify solutions.	F, EQ, WF, LS, SW	1, 2, 7	1, 5, 7, 9	Community Development	Medium	General Fund PDM grant funding	Short-term

TABLE 18.20 (continued).
MITIGATION STRATEGY MATRIX - MULTIPLE HAZARDS

Mitigation Initiative	Hazards Addressed	Goals Met	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
MH-10—Institute a city program requiring a "Resale Property Report" for all sale of developed real property for a fee. The report would disclose information on hazards to be provided to a prospective buyer. This disclosure would be consistent with the requirements of California Civil Code #1102. Revenue generated would fund services provided and could be used to fund minor mitigation projects within the City identified in this plan.	All	1, 2, 5	1, 5, 7, 9	Community Development	Low (Would actually generate revenue)	General Fund	Short-term

TABLE 18.21
MULTIPLE-HAZARD STRATEGY PRIORITIZATION

Initiative No.	No. of Objectives Met	Benefits	Costs	Benefits Equal or Exceed Costs (Y or N)	Grant-Eligible (Y or N)	Can Be Funded Under Existing Programs or Budgets (Y or N)	Priority
MH-1	2	Medium	Low	Y	N	Y	High
MH-2	2	Low	Low	Y	N	Y	High
MH-3	5	Medium	Medium	Y	Y	Y	High
MH-4	3	Medium	Medium	Y	N	Y	High
MH-5	4	Medium	Medium,	Y	Y	Y	High
MH-6	2	High	High	Y	Y	N	High
MH-7	4	Medium	Medium	Y	N	Y	Medium
MH-8	4	Medium	Medium	Y	Y	Y	High
MH-9	4	Medium	Medium	Y	N	Y	Medium
MH-10	4	Medium	Low	Y	N	Y	High

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PART 5—PLAN IMPLEMENTATION AND MAINTENANCE

CHAPTER 19.
PLAN MAINTENANCE

19.1 OVERVIEW

Title 44 of the *Code of Federal Regulations* (CFR) Section 201.6.c.4 requires a hazard mitigation plan to include a plan maintenance process that includes the following:

- A section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a 5-year cycle.
- A process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate
- A discussion on how the community will continue public participation in the plan maintenance process

The plan maintenance section of this document details the formal process that will that ensure that the City of Roseville hazard mitigation plan (RHMP) remains an active and relevant document. The RHMP maintenance process includes a schedule for monitoring and evaluating the plan annually and producing an updated plan every 5 years. This chapter also describes how the City will integrate public participation throughout the plan maintenance and implementation process. Finally, this chapter explains how the City intends to incorporate the mitigation strategies outlined in this RHMP into existing planning mechanisms and programs, such as the City comprehensive land-use planning process, capital improvement planning process, and building code enforcement and implementation. The RHMP's format allows the City to review and update sections when new data become available. New data can be easily incorporated, resulting in a plan that will remain current and relevant to the City of Roseville.

19.2 RHMP IMPLEMENTATION

The effectiveness of the City's non-regulatory RHMP depends on the implementation of the plan and incorporation of the outlined action items into existing City plans, policies, and programs. The RHMP includes a range of action items that, if implemented, would reduce loss from hazard events in the City of Roseville. Together, the action items in the RHMP provide the framework for activities that the City can choose to implement over the next 5 years. The planning team and RHMP steering committee have prioritized the plan's goals and identified actions that will be implemented (resources permitting) through existing plans, policies, and programs.

The Roseville City Manager's Office and the Planning and Redevelopment Department will be jointly responsible for overseeing the plan's implementation and maintenance through the City's existing programs. The Deputy City Manager or designated appointee will assume lead responsibility for facilitating RHMP implementation and maintenance meetings. Although the City Manager's Office will have primary department responsibility for review, coordination, and promotion, plan implementation and evaluation will be a shared responsibility among all departments and agencies identified as lead agencies in the mitigation action plan (see Chapter 18).

19.3 RHMP STEERING COMMITTEE

The RHMP steering committee as a body was formally recognized by Roseville City Council on July 21, 2004. The RHMP steering committee was a total volunteer body that contributed greatly to the development of the plan. The purpose of this committee was to oversee the development of the RHMP

and make recommendations on key elements of the plan, including a maintenance strategy. It was the steering committee's position that an oversight committee with representation similar to the initial RHMP steering committee should have an active role in the maintenance strategy for the RHMP. Therefore, the RHMP recommends that an RHMP steering committee remain a viable body involved in key elements of the RHMP maintenance strategy proposed in this chapter. The steering committee should include representation from the City, the citizens of Roseville, and other stakeholders.

A steering committee of not more than 14 members as determined by the Roseville City Manager's Office will convene annually at a place and time to be determined to implement RHMP annual review procedures outlined in Section 19.4. The make-up of this steering committee will strive for no less than 50 percent representation from citizens, citizen groups, and stakeholders within the planning area. Individuals involved in the initial RHMP will be contacted and given the option to remain involved in the process.

A technical subcommittee with a make-up similar to the subcommittee used for initial RHMP development is an option that could be utilized in this plan maintenance strategy at the discretion of the planning team and the steering committee.

19.4 RHMP ANNUAL PROGRESS REPORT

The minimum task of the ongoing annual steering committee meeting will be the evaluation of the progress of the RHMP. This review will include the following:

- Summary of any hazard events that occurred during the prior year and their impact on the planning area
- Review of successful mitigation initiatives identified in the RHMP
- Brief discussion about why targeted strategies were not completed
- Re-evaluation of the action plan to determine if the timeline for identified projects needs to be amended (such as changing a long-term project to a short-term project because of funding availability)
- Recommendations for new projects
- Changes in or potential for new funding options (grant opportunities)
- Impact of any other planning programs or initiatives within the City that involve hazard mitigation

The planning team will create a template to guide the steering committee in preparing a progress report. The steering committee will provide feedback to the planning team on items included in the template. The planning team will then prepare a formal annual report on the progress of the RHMP. This report will be used as follows:

- Posted on the City website on the page dedicated to the RHMP
- Provided to the local media through a press release
- Presented in the form of a council report to the Roseville City Council.
- Provided as part of the Community Rating System (CRS) annual re-certification package

The CRS program requires an annual recertification to be submitted by October 1 of every calendar year for which the community has not received a formal audit. To meet this recertification timeline, the

planning team will strive to complete this progress report process between the months of June and September of every year.

19.5 RHMP UPDATE

Section 201.6.d.3 of 44 CFR requires that local hazard mitigation plans be reviewed, revised if appropriate, and resubmitted for approval in order to remain eligible for benefits awarded under the Disaster Mitigation Act (DMA). The City of Roseville intends to update the RHMP on a 5-year cycle from the date of initial plan adoption. This cycle may be accelerated to less than 5 years based on the following triggers:

- A Presidential Disaster Declaration that impacts the City of Roseville
- A hazard event that causes loss of life
- A comprehensive update of the City of Roseville general plan

It will not be the intent of this update process to start from scratch and develop a new complete hazard mitigation plan for the City of Roseville. Based on needs identified by the planning team, this update will, at a minimum, include the elements below.

- The update process will be convened through a steering committee as described under Section 19.4.
- The hazard risk assessment will be reviewed and updated using best available information and technologies.
- The action plan will be reviewed and revised to account for any initiatives completed, dropped, or changed and to account for changes in the risk assessment or new City policies identified under other planning mechanisms, as appropriate (such as the general plan).
- The draft update will be sent to appropriate agencies and organizations for comment.
- The public will be given an opportunity to comment on the update prior to adoption.
- The Roseville City Council will adopt the updated plan.

19.6 CONTINUING PUBLIC INVOLVEMENT

The public will continue to be apprised of RHMP actions through the City website and by providing copies of the annual progress reports to the media. Copies of the RHMP will be distributed to the Roseville City Library System. Upon initiation of the RHMP update process, a new public involvement strategy will be initiated based on guidance from the steering committee. This strategy will be based on the needs and capabilities of the City at the time of the update. At a minimum, this strategy will include the use of local media outlets within the planning area.

19.7 INCORPORATION INTO OTHER PLANNING MECHANISMS

The information on hazard, risk, vulnerability, and mitigation contained in this plan is based on the best science and technology available at the time the RHMP was prepared. As stated in Section 2.5 of the RHMP, the City's general plan is considered to be an integral part of this plan. The City, through adoption of its 1992 general plan (safety element), has planned for the impact of natural hazards. The RHMP process provided the City with the opportunity to review and expand on policies contained within the general plan. The City views the general plan and the RHMP as complementary planning documents that work together to achieve the ultimate goal of the reduction of risk exposure to the citizens of

Roseville. As stated in Section 19.5, a comprehensive update to the general plan will trigger an update to the RHMP. Many of the ongoing recommendations identified in Chapter 18 of the RHMP are programs recommended by the general plan. Capital improvement programs and specific plan development dictated by the general plan will be coordinated with the RHMP recommendations. Other planning processes and programs the City will coordinate with the recommendations of the RHMP include the following:

- City emergency response plan
- Capital Improvement Programs
- Roseville municipal code
- Community design guidelines
- Water-efficient landscape design guidelines
- Storm water management program
- Water system vulnerability assessment
- Sacramento Urban Area Security Initiative

Some action items do not need to be implemented through regulation. Instead, these items can be implemented through the creation of new educational programs, continued interagency coordination, or improved public participation.

CHAPTER 20.
PLAN ADOPTION

20.1 PRE-ADOPTION REVIEW

Section 201.6.c.5 of 44 CFR requires documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting federal approval of the plan. This RHMP will be submitted to the California Office of Emergency Services (OES) and the Insurance Service Office (ISO) prior to adoption for a pre-adoption review. Once the RHMP has been determined to be compliant with the criteria specified under the Disaster Mitigation Act (DMA) of 2000. OES will then forward the plan to Federal Emergency Management Agency (FEMA) Region IX for review and approval.

ISO, which administers the CRS program for FEMA, is responsible for determining program compliance for the CRS program. Since this plan will be a key element in the City meeting the prescribed prerequisites for CRS class 1, ISO will be asked to review the RHMP CRS activity 510 compliance and compliance for compliance with all classification prerequisites. Once pre-adoption approval has been granted by both OES and ISO, the City will initiate its process to formally adopt the RHMP.

Simultaneous with the process described above, the draft action plan of the RHMP was sent to the following agencies with a request for review and comment:

- Placer County Office of Emergency Services
- City of Rocklin
- Sacramento County Department of Water Resources
- California Department of Water Resources
- City of Citrus Heights
- Placer County Flood Control District

20.2 ADOPTION

Pre-adoption approval of the RHMP was granted by the OES on _____, and ISO on _____. The Roseville City Council adopted the RHMP through Resolution #_____ on _____. A copy of the resolution is provided in below. Final FEMA approval was granted on _____, subsequent to the formal City Council adoption.

(Insert copy of Resolution as figure 20-1)

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REFERENCES AND APPENDICES

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APPENDIX A.
ROSEVILLE CITY COUNCIL RESOLUTION RECOGNIZING PLANNING TEAM AND PLAN DEVELOPMENT PROCESS

Resolution Recoginizing Steering Committee/Process

RESOLUTION NO. 04-309

ESTABLISHMENT OF CITY OF ROSEVILLE
MULTI-HAZARD MITIGATION PLAN STEERING COMMITTEE

WHEREAS, the City of Roseville has exposure to natural and human-caused hazards that increase the vulnerability of life, property, environment and the City's economy; and

WHEREAS, The Disaster Mitigation Act of 2000 (Public Law 106-390) established new requirements for pre- and post disaster hazard mitigation programs; and,

WHEREAS, representatives from the Federal Emergency Management Agency have previously commended the City for its excellent floodplain management efforts including the identification of hazards and the implementation of mitigation measures to avoid future flooding in Roseville; and

WHEREAS, the City achieved a Class 5 rating (on a scale of 1 to 10) in October 2002 allowing those 700 property owners within the flood areas to receive an additional twenty-five percent reduction in flood insurance; and

WHEREAS, a flood hazard mitigation plan with prescriptive requirements is a prerequisite to receiving the Community Rating System (CRS) Classifications of 4 or better; and,

WHEREAS, if the City completes a Multi-Hazard Mitigation Plan in accordance with federal law and follows Federal Emergency Management Agency's Community Rating System (CRS) guidelines within the flood hazard section, the City of Roseville may be eligible to become the only Class 1 rated city in the United States, further reducing flood insurance premiums in Roseville and bringing national recognition to the City; and

WHEREAS, the City of Roseville must coordinate its planning efforts with local, regional, state and federal entities with interest or impacts in this planning effort; and,

WHEREAS, the Roseville City Council appointed a Technical Committee in April 2003 comprised of City staff from various departments to provide data and mapping resources, prioritize goals, actions and mitigation measures edit the draft plan, advise the Steering Committee, and review the final plan; and

WHEREAS, the Federal Emergency Management Agency has secured a consultant for the City of Roseville to assist with the flood, seismic, and human-caused hazard sections of the plan and the City has contracted for additional resources to complete the plan and community outreach requirements; and,

WHEREAS, per federal requirements, a Steering Committee must be established to oversee the development of the Multi-Hazard Mitigation Plan including identifying goals for the plan, encouraging and soliciting public involvement, providing guidance to City staff and contract personnel, and providing a forum to keep the public involved on all deliberations and

recommendations. The Steering Committee will meet as needed until the plan is completed and forwarded to the City Council for action.

NOW THEREFORE BE IT RESOLVED, the Roseville City Council hereby establishes the Multi-Hazard Mitigation Plan Steering Committee and does fully support the efforts of the City to prepare a Multi-Hazard Mitigation Plan in accordance with federal law.

NOW, THEREFORE, BE IT RESOLVED by the City Council of the City of Roseville

PASSED AND ADOPTED by the Council of the City of Roseville this 21st day of July, 2004, by the following vote on roll call:

AYES COUNCILMEMBERS: John Allard, Richard Roccucci, Jim Gray, Gina Garbolino, Rocky Rockholm

NOES COUNCILMEMBERS: None

ABSENT COUNCILMEMBERS: None

MAYOR

ATTEST:

City Clerk

APPENDIX B.
GLOSSARY

ACRONYMS AND ABBREVIATIONS

ASCE	American Society of Civil Engineers
AST	Aboveground storage tank
BFE	Base flood elevation
CAGS	California Geological Survey
CBC	California Building Code
CCR	California Code of Regulations
CDF	California Department of Forestry
CERT	Community Emergency Response Team
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CFS	Cubic feet per second
CIP	Capital improvement plan
COOP	Continuity of operations plan
CPTED	Crime prevention through environmental design
CRCV	Coast Range Central Valley
CRS	Community Rating System
CUPA	Certified Unified Program Agency
CVPIA	Central Valley Project Improvement Act
D	Drought hazard
DHS	U.S. Department of Homeland Security
DMA	Disaster Mitigation Act (Public Law 106-390)
DOF	Depth of flooding
DRP	Design review permit
EIR	Environmental impact report
EMT-D	Emergency medical technician (with defibrillator)
EOC	Emergency Operations Center
EPA	U.S. Environmental Protection Agency
EQ	Earthquake hazard
EUD	Environmental Utilities District
FH	Flood hazard
F	Fahrenheit
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Maps
FIS	Flood Insurance Study
ft	Feet

g	Gravitational acceleration
G	Goals
GIS	Geographical information system
G&O	Greenhorn and O'mara
HAZUS-MH	Hazards U.S. Multi-Hazard
HC	Human-caused hazard
HH	Human health hazard
HMGP	Hazard Mitigation Grant Program
IBC	International Building Code
ICS	Incident command system
ISO	Insurance Service Office
km	Kilometer
LS	Landslide hazard
M	Magnitude
MCE	Maximum credible earthquake
MCI	Mass casualty incident
MH	Multi-hazard
ML	Local magnitude
mph	Miles per hour
NA	Not applicable
NCDC	National Climatic Data Center
NFIP	National Flood Insurance Program
NFIRS	National Fire Incident Reporting System
NGVD	National Geodetic Vertical Datum
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
O	Objectives
OCAP	On-line citizens advisory panel
OCS	Oregon Climate Service
OES	California Governor's Office of Emergency Services
PCFCD	Placer County Flood Control District
PCWA	Placer County Water Agency
PDM	Pre-Disaster Mitigation Grant Program
PGA	Peak ground acceleration
PRISM	Parameter-elevation Regression on Independent Slopes Model
PUD	Planned unit developments
RCONA	Roseville Coalition of Neighborhood Associations
RCRA	Resource Conservation and Recovery Act
RFE	Regulatory flood elevation
RHMP	Roseville Hazard Mitigation Plan

RMC	Roseville Municipal Code
SARS	Severe acute respiratory syndrome
SCAS	Spatial Climate Analysis Service
sec	Second
SEMS	Standardized Emergency Management System
SFHA	Special flood hazard area
SHELDUS	Spatial Hazard Events and Losses Database for the U.S.
SJWD	San Juan Water District
SPCC	Spill Prevention, Control, and Countermeasure Plan
SW	Severe weather hazard
SWOO	Strengths, weaknesses, opportunities, and obstacles
Tetra Tech	Tetra Tech, Inc.
UASI	Urban Area Security Initiative
UBC	Uniform Building Code
USC	University of South Carolina
USGS	United States Geological Survey
UST	Underground storage tank
WF	Wildfire hazard
WMD	Weapons of mass destruction
WNV	West Nile virus

GLOSSARY OF TERMS

100-Year Flood: The term "100-year flood" can be misleading. The 100-year flood does not necessarily occur once every 100 years. Rather, it is the flood that has a 1 percent chance of being equaled or exceeded in any given year.. Thus, the 100-year flood could occur more than once in a relatively short period of time. The Federal Emergency Management Agency (FEMA) defines it as the 1 percent annual chance flood, which is now the standard definition used by most federal and state agencies and by the National Flood Insurance Program (NFIP).

Acre-Foot: An acre-foot is the amount of water it takes to cover 1 acre to a depth of 1 foot. This measure is used to describe the quantity of storage in a water reservoir. An acre-foot is a unit of volume. One acre foot equals 7,758 barrels; 325,829 gallons; or 43,560 cubic feet. An average household of four will use approximately 1 acre-foot of water per year.

Act of Terrorism: According to the Federal Bureau of Investigation (FBI), an act of terrorism is "a violent act or an act dangerous to human life, in violation of the criminal laws of the United States or of any state, to intimidate or coerce a government, the civilian population, or any segment thereof, in furtherance of political or social goals." Acts of terrorism are intentional, criminal, and malicious and can be foreign or domestic, depending on the origin, base, and objectives of the terrorist or organization. Acts of terrorism can involve the use of weapons of mass destruction, arson, and incendiary, explosive, and armed attacks; industrial sabotage and intentional hazardous materials releases; agro-terrorism; and cyber-terrorism.

Asset: An asset is any man-made or natural feature that has value, including, but not limited to, people; buildings; infrastructure, such as bridges, roads, sewers, and water systems; lifelines, such as electricity and communication resources; and environmental, cultural, or recreational features such as parks, wetlands, and landmarks.

Base Flood Elevation (BFE): The BFE is the water surface elevation of a 100-year flood event (a flood that has a 1 percent chance of occurring in any given year as defined by the NFIP). The base flood is a statistical concept used to ensure that all properties subject to NFIP are protected to the same degree against flooding.

Basin: A basin is the area within which all surface water – whether from rainfall, snowmelt, springs, or other sources – flows to a single water body or watercourse. The boundary of a river basin is defined by natural topography, such as hills, mountains, and ridges. Basins are also referred to as "watersheds" and "drainage basins."

Benefit: A benefit is a net project outcome and is usually defined in monetary terms. Benefits may include direct and indirect effects. For the purposes of benefit-cost analysis of proposed mitigation measures, benefits are limited to specific, measurable, risk reduction factors, including reduction in expected property losses (buildings, contents, and functions) and protection of human life.

Benefit/Cost Analysis: A benefit/cost analysis is a systematic, quantitative method of comparing projected benefits to projected costs of a project or policy. It is used as a measure of cost effectiveness.

Building: A building is defined as a structure that is walled and roofed, principally aboveground, and permanently fixed to a site. The term includes manufactured homes on permanent foundations on which the wheels and axles carry no weight.

Capability Assessment: A capability assessment provides a description and analysis of a community's current capacity to address threats associated with hazards. The assessment includes two components: an inventory of an agency's mission, programs, and policies, and an analysis of its capacity to carry them out. A capability assessment is an integral part of the planning process in which a community's actions to reduce losses are identified, reviewed, and analyzed, and the framework for implementation is identified. The following capabilities were reviewed under this assessment:

- Legal and regulatory capability
- Administrative and technical capability
- Fiscal capability

Certified Unified Program Agency (CUPA): The City of Roseville is a State of California- designated CUPA certified to act as a licensing agency for six hazardous materials-related programs. The CUPA enables the City of Roseville to implement its own hazardous materials emergency response program. Mutual aid agreements are also in place for incident response. Each business that deals with hazardous materials generally must submit a Unified Program Consolidated Form with facility information to the Roseville Fire Department.

Civil Disorder: Civil disorder results from incidents intended to disrupt a community to the degree that law enforcement intervention is required to maintain public safety. Civil disorder is generally associated with controversial political, judicial, or economic issues and events and may occur at any time, although statistics indicate that civil disorder is more frequent during the summer months. Although the City of Roseville does not have a history of civil disorder or rioting, large public gatherings, often associated with concerts or sports events, have overburdened local law enforcement and fire protection resources in the past. The effects of civil disorder and riots vary and depend on the type of event and its severity, scope, and duration. Essential services (such as electricity, water, public transportation, and communications) may be disrupted, and property damage, injuries, and loss of life may occur.

Communicable Disease: For the purposes of this plan, communicable diseases include severe acute respiratory syndrome (SARS), flu, small pox, and diseases carried by insects. Diseases carried by insects include plague (fleas), encephalitis, malaria, West Nile virus (WNV) (mosquitoes), and Lyme disease (ticks).

Community Rating System (CRS): The CRS is a voluntary program under the NFIP that rewards participating communities (provides incentives) for exceeding the minimum requirements of the NFIP and completing activities that reduce flood hazard risk by providing flood insurance premium discounts.

Critical Facility: A critical facility is vital to the City's ability to provide essential services and protect life and property. Loss of a critical facility would result in a severe economic or catastrophic impact. Under the Roseville hazard mitigation plan (RHMP) definition, critical facilities include the following:

- Police stations, fire stations, vehicle and equipment storage facilities, and emergency operations centers needed for disaster response before, during, and after hazard events
- Public and private utilities and infrastructure vital to maintaining or restoring normal services to areas damaged by hazard events
- Hospitals, nursing homes, and housing likely to contain occupants who may not be sufficiently mobile to avoid death or injury during a hazard event
- Structures or facilities that produce, use, or store highly volatile, flammable, explosive, toxic, and/or water-reactive materials

Cubic Feet per Second (cfs): A cubic foot can be visualized as a box measuring 1 by 1 by 1 foot. The U.S. Geological Services (USGS) defines a cfs as "the flow rate or discharge equal to one cubic foot of water per second or about 7.5 gallons per second." The rate of flow of a creek, river, or flood is measured by quantity over time and is often refered to as "discharge," or the rate at which a volume of water passes a given point in a given amount of time. Discharge and river flow are often measured in terms of cfs.

Dam: A dam is any artificial barrier or controlling mechanism that can or does impound 10 acre-feet or more of water.

Dam Failure: Dam failure refers to a partial or complete breach in a dam (or levee) that impacts its integrity. Dam failures occur for a number of reasons, such as flash flooding, inadequate spillway size, mechanical failure of valves or other equipment, freezing and thawing cycles, earthquakes, and intentional destruction.

Debris: Debris refers to the scattered remains of assets broken or destroyed during the occurrence of a hazard. Debris caused by wind or water hazards can cause additional damage to other assets.

Debris Flow: Debris flow occurs when dense mixtures of water-saturated debris move down-valley. Debris flows look and behave much like flowing concrete and form when loose masses of unconsolidated materials are saturated, become unstable, and move down slope. The source of water varies and can include rainfall, melting snow or ice, and glacial outburst floods.

Depth of Flooding (DOF): The DOF is difference between regulatory flood elevation (RFE) and the elevation of the lowest grade adjacent to a structure.

Disaster Mitigation Act of 2000 (DMA); The DMA is Public Law 106-390 and is the latest federal legislation enacted to encourage and promote proactive, pre-disaster planning as a condition of receiving financial assistance under the Robert T. Stafford Act. The DMA emphasizes planning for disasters before they occur. Under the DMA, a pre-disaster hazard mitigation program and new requirements for the national post-disaster hazard mitigation grant program (HMGP) were established.

Drainage Basin: A basin is the area within which all surface water (whether from rainfall, snowmelt, springs, or other sources) flows to a single water body or watercourse. The boundary of a river basin is defined by natural topography, such as hills, mountains, and ridges. Drainage basins are also referred to as "watersheds" and "basins." The City of Roseville is located within portions of two major drainage basins: the Pleasant Grove Creek Basin and the Dry Creek Basin. Pleasant Grove Creek and its tributaries drain most of the western and central areas of the City, and the Dry Creek Basin and its tributaries drain the remainder of the City. The Dry Creek system has year-round flows in its major watercourses, and the Pleasant Grove Creek system is intermittent, with only seasonal flows. As a result, portions of the City lie within a flood hazard area. However, since 1950, there have been no reports of structural flood damage along Pleasant Grove Creek and there are presently no structures subject to flooding within the Pleasant Grove Creek Basin.

Drought: Drought is a period of time without substantial rainfall or snowfall from one year to the next. Drought can also be defined as the cumulative impacts of several dry years or a deficiency of precipitation over an extended period of time, which in turn results in water shortages for some activity, group, or environmental function. A hydrological drought is caused by deficiencies in surface and subsurface water supplies. A socioeconomic drought impacts the health, well being, and quality of life or starts to have an adverse impact on a region. Drought is a normal, recurrent feature of climate and occurs almost everywhere.

Duration: For the purposes of this plan, duration is defined as the length of time that a hazard occurs. For example, the duration of a tornado can be minutes, but release of a chemical warfare agent such as mustard gas can persist for hours or weeks if unremediated.

Earthquake: An earthquake is defined as a sudden slip on a fault, volcanic or magmatic activity, and sudden stress changes in the earth that result in ground shaking and radiated seismic energy. Earthquakes can last from a few seconds to over 5 minutes, and have been known to occur as a series of tremors over a period of several days. The actual movement of the ground in an earthquake is seldom the direct cause of injury or death. Casualties may result from falling objects and debris as shocks shake, damage, or demolish buildings and other structures.

Exposure: Exposure is defined as the number and dollar value of assets considered to be at risk during the occurrence of a specific hazard.

Extent: The extent is the size of an area affected by a hazard.

Federal Emergency Management Agency (FEMA): FEMA is an independent agency (now part of the Department of Homeland Security) created in 1978 to provide a single point of accountability for all federal activities related to disaster mitigation and emergency preparedness, response, and recovery.

Fire Behavior: Fire behavior refers to the physical characteristics of a fire and is a function of the interaction between the fuel characteristics (such as type of vegetation and structures that could burn), topography, and weather. Variables that affect fire behavior include the rate of spread, intensity, fuel consumption, and fire type (such as underbrush versus crown fire).

Fire Frequency: Fire frequency is the broad measure of the rate of fire occurrence in a particular area. An estimate of the areas most likely to burn is based on past fire history or fire rotation in the area, fuel conditions, weather, ignition sources (such as human or lightning), fire suppression response, and other factors.

Flash Flood: A flash flood occurs with little or no warning when water levels rise at an extremely fast rate.

Flooding: Flooding is a general and temporary condition of rising and overflowing water resulting in partial or complete inundation of normally dry land areas. Floods result from (1) the overflow of inland or tidal waters, (2) the unusual and rapid accumulation of runoff of surface water from any source, and (3) mudflows or the sudden collapse of shoreline land.

Flood Depth: Flood depth is the height of the flood water surface above the ground surface.

Flood Elevation: Flood elevation is the height of water surface above an established datum (for example, the National Geodetic Vertical Datum of 1929 [NGVD], North American Vertical Datum of 1988, or mean sea level).

Flood Insurance Rate Map (FIRM): FIRM is the official map of a community for which FEMA has delineated the special flood hazard area (SFHA) and the risk premium zones applicable to the community.

Flood Insurance Study: A flood insurance study is published for a community by the Federal Insurance and Mitigation Administration in conjunction with the community's FIRM. The study contains background data such as base flood discharges and water surface elevations that were used to prepare the

FIRM. In most cases, a community with a detailed FIRM will have a corresponding flood insurance study.

Floodplain: A floodplain is any land area that becomes inundated with water during a flood or from any other source. Floodplain can be defined in different ways but is commonly defined as the area that is also called the 100-year floodplain.

Floodway: A floodway is an area within a floodplain reserved for the purpose of conveying flood discharge without increasing the BFE by more that 1 foot. Generally speaking, no development is allowed in floodways because any structures there would block the flow of floodwater.

Floodway Fringe: Floodway fringe areas are located in the floodplain but outside of the floodway. Some development is generally allowed in these areas, with a variety of restrictions. On maps that have identified and delineated a floodway, this would be the area beyond the floodway boundary that can be subject to different regulations.

Fog: Fog refers to a cloud (or condensed water droplets) near the ground. Fog forms when air close to the ground can no longer hold all the moisture it contains. Fog occurs either when air is cooled to its dew point or the amount of moisture in the air increases. Heavy fog is particularly hazardous because it can restrict surface visibility. Severe fog incidents can close roads, cause vehicle accidents, cause airport delays, and impair the effectiveness of emergency response. Financial losses associated with transportation delays caused by fog have not been calculated in the United States but are known to be substantial.

Freeboard: Freeboard is the margin of safety added to the BFE.

Frequency: For the purposes of this plan, frequency refers to how often a hazard of specific magnitude, duration, and/or extent is expected to occur on average. Statistically, a hazard with a 100-year frequency is expected to occur about once every 100 years on average and has a 1 percent chance of occurring any given year. Frequency reliability varies depending on the type of hazard considered.

Fujita Scale of Tornado Intensity: Tornado wind speeds are sometimes estimated on the basis of wind speed and damage sustained using the Fujita Scale. The scale rates the intensity or severity of tornado events using numeric values from F0 to F5 based on tornado wind speed and damage. An F0 tornado (wind speed less than 73 miles per hour [mph]) indicates minimal damage (such as broken tree limbs), and an F5 tornado (wind speeds of 261 to 318 mph) indicates severe damage.

General Plan: California state law requires that every county and city prepare and adopt a comprehensive long-range plan to serve as a guide for community development. The plan must consist of an integrated and internally consistent set of goals, policies, and implementation measures. In addition, the plan must focus on issues of the greatest concern to the community and be written in a clear and concise manner. City actions, such as those relating to land-use allocation, annexations, zoning, subdivision and design review, redevelopment, and capital improvements, must be consistent with such a plan. The City of Roseville's general plan serves these purposes. As the principle planning document that directs the City's growth and land use, the general plan is as an integral part of the RHMP. A technical update to Roseville's general plan was completed in January 2003.

Goal: A goal is a general guideline that explains what is to be achieved. Goals are usually broad-based, long-term, policy-type statements and represent global visions. Goals help define the benefits that a plan is trying to achieve. The success of the RHMP, once implemented, should be measured by the degree to which its goals have been met (that is, by the actual benefits in terms of actual hazard mitigation).

Geographic Information System (GIS): GIS is a computer software application that relates data regarding physical and other features on the earth to a database for mapping and analysis.

Hazard: A hazard is a source of potential danger or adverse condition that could harm people and/or cause property damage. Natural hazards include floods, winds, and earthquakes. Man-made hazards include acts of terrorism and hazardous material spills.

Hazard Mitigation: Hazard mitigation refers to reduction or alleviation of the loss of life, personal injury, and property damage that could result from a disaster through long- and short-term strategies. Hazard mitigation involves strategies such as planning, policy changes, programs, projects, and other activities that could mitigate the impacts of hazards.

Hazard Mitigation Grant Program (HMGP): Authorized under Section 202 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, the HMGP is administered by FEMA and provides grants to states, tribes, and local governments to implement hazard mitigation actions after a major disaster declaration. The purpose of the program is to reduce the loss of life and property due to disasters and to enable mitigation activities to be implemented as a community recovers from a disaster.

Hazard Mitigation Plan: A hazard mitigation plan is a collaborative document that identifies hazards that could affect a community, assesses vulnerability to hazards, and represents consensus decisions reached on how to minimize or eliminate the effects of hazards.

Hazard Mitigation Survey Questionnaire: This questionnaire was developed by the Roseville planning team to gauge household preparedness for hazards that could impact the City of Roseville and the level of knowledge about tools and techniques to assist in reducing risks and losses from hazards. The questionnaire asked 25 quantifiable questions about perception of risk, knowledge of mitigation, and support of City programs. The questionnaire also asked several demographic questions in order to help analyze trends. Survey results were used by the steering committee as a guide for establishing the RHMP's goals, objectives, and mitigation strategies.

Hazardous Material: A hazardous material is a substance or combination of substances that (1) can cause or contribute to an increase in mortality or serious irreversible or incapacitating reversible illnesses, or (2) pose a present or potential hazard to human life, property, or the environment. Hazardous materials could cause these effects because of their quantity, concentration, or physical, chemical, or infectious characteristics. Hazardous waste is included in the City's working definition of hazardous material.

Hazardous Material Incident: This type of incident involves the accidental or intentional release of hazardous materials to the environment. Such incidents typically occur as fixed facility incidents or transportation incidents. It is possible to identify and prepare for a fixed facility incident because federal and state laws require facilities to notify state and local authorities about hazardous materials used or produced at the facility. Transportation incidents are more difficult to prepare for because there is little (if any) notice about the materials involved. Except for severe weather and flooding, hazardous materials incidents are the most likely hazards to affect the City of Roseville.

Hazards U.S. Multi-Hazard (HAZUS-MH) Loss Estimation Program: HAZUS-MH is a GIS-based program used to support the development of risk assessments as required under the DMA. The HAZUS-MH software program assesses risk in a quantitative manner to estimate damages and losses associated with natural hazards. HAZUS-MH is FEMA's nationally applicable, standardized methodology and software program and contains modules for estimating potential losses from earthquakes, floods, and wind hazards. HAZUS-MH has also been used to assess vulnerability (exposure) for other hazards facing Roseville.

Hydraulics: Hydraulics is the branch of science or engineering that addresses fluids (especially water) in motion in rivers or canals, works and machinery for conducting or raising water, the use of water as a prime mover, and other fluid-related areas.

Hydrology: Hydrology is the analysis of waters of the earth. For example, a flood discharge estimate is developed by conducting a hydrologic study.

Intensity: For the purposes of this plan, intensity refers to the measure of the effects of a hazard.

Inventory: The assets identified in a study region comprise an inventory. Inventories include assets that could be lost when a disaster occurs and community resources are at risk. Assets include people, buildings, transportation, and other valued community resources.

Landslide: A landslide refers to the sliding movement of masses of loosened rock and soil down a hillside or slope under the force of gravity. Fundamentally, slope failure occurs when the strength of soils forming the slope is exceeded by pressure acting upon the soils (caused by factors such as weight or saturation).

Large Gathering Places: For the purposes of this plan, such places are defined as follows:

- Any facility listed as a Type A-2.1 in the California Uniform Building Code (UBC) because it has an assembly room with an occupant load of 300 or more without a stage (34 locations in Roseville)
- Any buildings listed as E-1 used for educational purposes through the 12th grade by 50 or more persons for more than 12 hours per week or 4 hours any 1 day (29 buildings in Roseville)
- Any facility likely to have an occupancy of greater than 300, such as a large employment centers, retail centers, cultural centers, and places of worship

Lightning: Lightning is an electrical discharge resulting from the buildup of positive and negative charges within a thunderstorm. When the buildup becomes strong enough, lightning appears as a "bolt," usually within or between clouds and the ground. A bolt of lightning instantaneously reaches temperatures approaching 50,000 ^{o}F. The rapid heating and cooling of air near lightning causes thunder. Lightning is a major threat during thunderstorms. In the United States, 75 to 100 Americans are struck and killed by lightning each year (see http://www.fema.gov/hazard/thunderstorms/thunder.shtm).

Liquefaction: Liquefaction is the complete failure of soils when soils lose shear strength and flow horizontally during earthquakes. Liquefaction is most likely to occur in fine-grained sands and silts with high water content. These materials behave like viscous fluids when liquefaction occurs. Liquefaction undermines the ground's ability to solidly support building structures. Foundations on liquefiable soils can lose their ability to support load and can experience settlement on the order of several inches or more. This situation is extremely hazardous and generally results in extreme property damage and threats to life and safety. Differential settlement can cause significant damage to buildings, lifelines, and transportation structures with partial or total collapse.

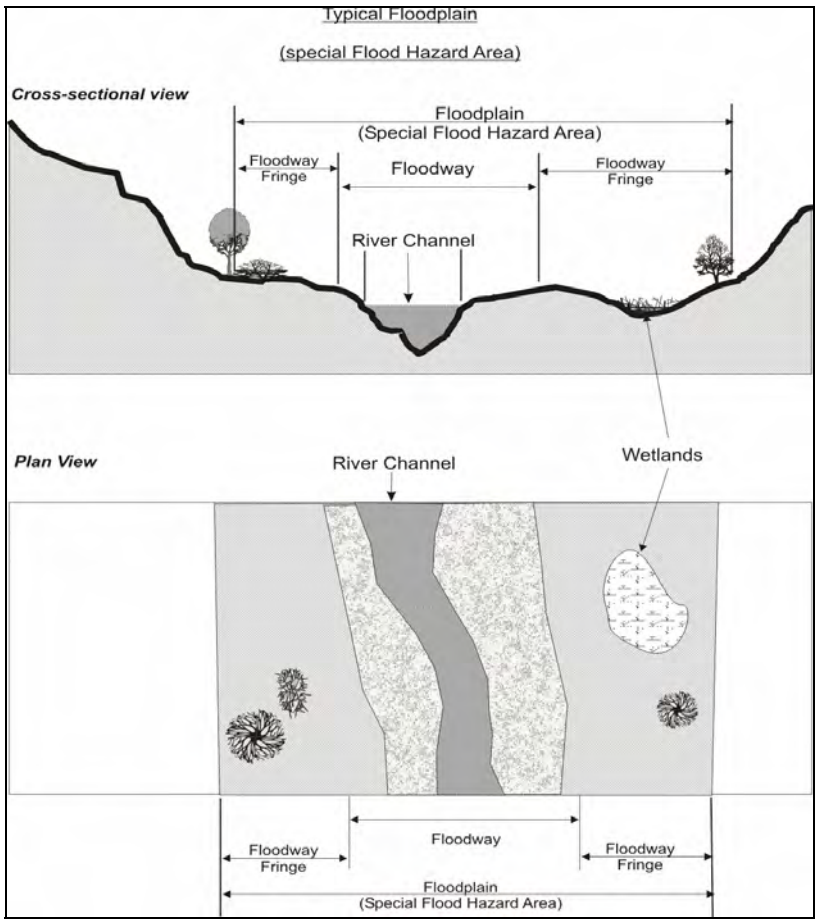
Local Government: Local government includes any county, municipality, city, town, township, public authority, school district, special district, intrastate district, council of government (regardless of incorporation as a nonprofit corporation under state law), regional or interstate government entity, agency or instrumentality of a local government, Indian tribe or authorized tribal organization, Alaska Native village or organization, rural community, unincorporated town or village, and other public entities.

Magnitude: Magnitude is the measure of the strength of an earthquake, typically measured by the Richter scale. Magnitude is most commonly measured by local magnitude (ML) used by the Richter Scale or by Mercalli Intensity. In the Richter Scale, each whole number step in the magnitude scale corresponds to the release of about 31 times more energy than the amount associated with the preceding whole number value.

Mitigation Actions: Mitigation actions are specific actions to achieve goals and objectives that minimize the effects from a disaster and reduce the loss of life and property.

National Flood Insurance Program (NFIP): In 1968, Congress created the NFIP in response to the rising cost of taxpayer-funded disaster relief for flood victims and the increasing amount of damage caused by floods. The Mitigation Division is the FEMA section that manages the NFIP and oversees the floodplain management and mapping components of the program. Nearly 20,000 communities across the United States and its territories participate in NFIP by adopting and enforcing floodplain management ordinances to reduce future flood damage. In exchange, NFIP makes federally backed flood insurance available to homeowners, renters, and business owners in these communities. FEMA contracted the U.S. Army Corps of Engineers to map the floodplains, floodways, and floodway fringes. The figure below depicts the relationship between these three designations.

Floodway Schematic



Nolte Future Floodplain: The Nolte Future Floodplain is the portion of the regulatory floodplain based on the Roseville City of Roseville Floodplain Analysis published by Nolte and Associates in August 1986. This analysis used hydrologic parameters that better represented the observed flooding scenarios

that caused flooding in Roseville. The study also used hydrologic parameters based on projected growth for the region assuming total development of the watershed instead of existing conditions used by FEMA. This approach generated a floodplain area greater than that reflected of on the FIRM for portions of Roseville. Although this study was never formally adopted, it is used by the City as the best available information for regulatory and land- use programs such as the specific plan program and improvement standards.

Objective: For the purposes of this plan, an objective is defined as a short-term aim that, when combined with other objectives, forms a strategy or course of action to meet a goal. Unlike goals, objectives are specific and measurable.

Peak Ground Acceleration: Peak ground acceleration is a measure of the highest amplitude of ground shaking that accompanies an earthquake based on a percentage of the force of gravity.

Pre- and Post-FIRM Rates: These categories of rates are published in the NFIP manual and apply to buildings in a community qualifying for the regular flood program. Post-FIRM rates are used for buildings whose construction started after December 31, 1974, or after the community's initial FIRM was published, whichever is later. Post-FIRM rates are lower than pre-FIRM rates.

Preparedness: Preparedness refers to actions that strengthen the capability of government, citizens, and communities to respond to disasters.

Presidential Disaster Declaration: These declarations are typically made for events that cause more damage than state and local governments and resources can handle without federal government assistance. Generally, no specific dollar loss threshold has been established for such declarations. A Presidential Disaster Declaration puts into motion long-term federal recovery programs, some of which are matched by state programs, designed to help disaster victims, businesses, and public entities.

Probability of Occurrence: The probability of occurrence is a statistical measure or estimate of the likelihood that a hazard will occur. This probability is generally based on past hazard events in the area and a forecast of events that could occur in the future. A probability factor based on yearly values of occurrence is used to estimate probability of occurrence.

Recovery: Recovery refers to actions taken by an individual or community after a catastrophic event to restore order and community lifelines.

Regulatory Floodplain: This term refers to an area regulated by the City of Roseville as floodplain through its land-use regulations and improvement standards. It includes areas identified by FEMA and published on FIRMs and additional areas identified by Roseville as being susceptible to flooding. These areas are delineated based on detailed hydrologic and hydraulic floodplain modeling that meets or exceeds FEMA criteria for mapping and modeling floodplains. The flood event used to delineate these boundaries is referred to as "the regulatory flood" in this plan to differentiate it from the "base flood" used by FEMA. The City of Roseville designates the 100-year floodplain area on its land-use map in accordance with best available floodplain information as determined by the Public Works Director. In many portions of the City, the Nolte Future Floodplain (May 1987) has been used to designate floodplain boundaries. When Nolte Future Floodplain information does not exist or does not represent the best available information, new floodplain information is generated by the project proponent. New floodplain information is generally developed (1) consistent with build-out development assumptions used by the Nolte Future Floodplain analysis, and (2) in compliance with the most recent Placer County floodplain manual. Floodplain boundaries can normally be terminated where the 100-year floodplain narrows to a

width of 200 feet or less and where the associated drainage area is less than 300 acres. Precise termination of boundaries must be approved by the Public Works Director.

Repetitive Loss Property: A repetitive loss property is any NFIP-insured property that, since 1978 and regardless of any change(s) of ownership during that period, has experienced any of the following:

- Four or more paid flood losses exceeding $1,000 each
- Two paid flood losses exceeding $1,000 each within any 10-year period since 1978
- Three or more paid losses that equal or exceed the current value of the insured property

Return Period (or Mean Return Period): This term refers to the average period of time in years between occurrences of a particular hazard (equal to the inverse of the annual frequency of occurrence).

Risk: Risk is the estimated impact that a hazard would have on people, services, facilities, and structures in a community. Risk measures the likelihood of a hazard occurring and 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 occurrence of a specific type of hazard. Risk also can be expressed in terms of potential monetary losses associated with the intensity of the hazard.

Risk Assessment: Risk assessment is the process of measuring potential loss of life, personal injury, economic injury, and property damage resulting from hazards. This process assesses the vulnerability of people, buildings, and infrastructure to hazards and focuses on (1) hazard identification; (2) impacts of hazards on physical, social, and economic assets; (3) vulnerability identification; and (4) estimates of the cost of damage or costs that could be avoided through mitigation.

Risk Ranking: This ranking serves two purposes, first to describe the probability that a hazard will occur, and second to describe the impact a hazard will have on the people, property, and economy of Roseville. Risk estimates for the City are based on the methodology that the City used to prepare the risk assessment for this plan. The following equation shows the risk ranking calculation:

Risk Ranking = Probability + Impact (people + property + economy)

Riverine: Riverine refers to anything of or produced by a river. Riverine floodplains have readily identifiable channels. Floodway maps can only be prepared for riverine floodplains.

Sinkhole: A sinkhole is a collapse depression in the ground with no visible outlet. Its drainage is subterranean; its size is typically measured in meters or tens of meters, and it is commonly vertical-sided or funnel-shaped.

Special Flood Hazard Area (SFHA): The SFHA is the base floodplain delineated on a FIRM. The SFHA is mapped as Zone A in riverine situations and Zone V in coastal situations. The SFHA may or may not encompass all of a community's flood problems.

Stafford Act: The Robert T. Stafford Disaster Relief and Emergency Assistance Act, Public Law 100-107, was signed into law on November 23, 1988. This law amended the Disaster Relief Act of 1974, Public Law 93-288. The Stafford Act is the statutory authority for most federal disaster response activities, especially as they pertain to FEMA and its programs.

Stakeholder: Stakeholders are individuals or groups that could be affected in any way by an action or policy and include business leaders, civic groups, academia, non-profit organizations, major employers, managers of critical facilities, farmers, developers, special purpose districts, and others.

Steering Committee: The steering committee is the Roseville City Council-approved group that oversaw all phases of the RHMP's development. The members of this committee included key city personnel, citizens, and other stakeholders from within the planning area. Thirteen of the fifteen people involved on the steering committee represented either citizens of Roseville or identified stakeholders within the planning area.

Technical Subcommittee: This City of Roseville group convened to provide guidance, support, and feedback to the planning team during all phases of RHMP development. The technical subcommittee consisted of key staff from City departments integral to implementing City programs pertinent to hazard mitigation.

Technological Hazard: A technological hazard arises from human activities such as the manufacture, transportation, storage, and use of hazardous materials. Technological hazards are assumed to be accidental in nature, with unintended consequences.

Thunderstorm: A thunderstorm is a storm with lightning and thunder produced by cumulonimbus clouds. Thunderstorms usually produce gusty winds, heavy rains, and sometimes hail. Thunderstorms are usually short in duration (seldom more than 2 hours). Heavy rains associated with thunderstorms can lead to flash flooding during the wet or dry seasons.

Tornado: A tornado is a violently rotating column of air extending between and in contact with a cloud and the surface of the earth. Tornadoes are often (but not always) visible as funnel clouds. On a local scale, tornadoes are the most intense of all atmospheric circulations, and winds can reach destructive speeds of more than 300 mph. A tornado's vortex is typically a few hundred meters in diameter, and damage paths can be up to 1 mile wide and 50 miles long.

Vulnerability: Vulnerability describes how exposed or susceptible an asset is to damage. 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. Flooding of an electric substation would affect not only the substation itself but businesses as well. Often, indirect effects can be much more widespread and damaging than direct effects.

Water Supply Strategy: A water supply strategy is a comprehensive approach to ensure water reliability for Roseville's customers. The City has a diverse set of water supply options, including surface water contracts, recycled water, and groundwater wells to ensure that even after a period of dry years, a combination of available water supplies and water conservation measures will ensure that the community has adequate water. The City has contracts for surface water with three agencies

Watershed: A watershed is an area that drains downgradient from areas of higher land to areas of lower land to the lowest point, a common drainage basin.

Weapon of Mass Destruction (WMD): WMDs include chemical, biological, radiological, nuclear, and explosive weapons associated with terrorism.

West Nile Virus (WNV): WNV is a recent natural hazard affecting California. Mosquitoes transmit this potentially deadly disease to livestock and humans alike. WNV first struck the northern hemisphere in

Queens, New York, in 1999 and killed four people. In 2003, all 50 states warned of an outbreak from any of the 30 mosquito species known to carry it. From 62 severe cases in 1999, confirmed human cases of the virus spread to 39 states in 2002 and killed 284 people. Less than 1 percent of those infected develop severe illness. People over 50 years of age appear to be at high risk for the severe aspects of the disease.

Wildfire or Wildland Fire: These terms refer to any uncontrolled fire occurring on undeveloped land that requires fire suppression. The potential for wildfire is influenced by three factors: the presence of fuel, topography, and air mass. Fuel can include living and dead vegetation on the ground, along the surface as brush and small trees, and in the air such as tree canopies. Topography includes both slope and elevation. Air mass includes temperature, relative humidity, wind speed and direction, cloud cover, precipitation amount, duration, and the stability of the atmosphere at the time of the fire. Wildfires can be ignited by lightning and, most frequently, by human activity including smoking, campfires, equipment use, and arson.

Windstorm: Windstorms are generally short-duration events involving straight-line winds or gusts exceeding 50 mph. These gusts can produce winds of sufficient strength to cause property damage. Windstorms are especially dangerous in areas with significant tree stands, exposed property, poorly constructed buildings, mobile homes (manufactured housing units), major infrastructure, and aboveground utility lines. A windstorm can topple trees and power lines; cause damage to residential, commercial, critical facilities; and leave tons of debris in its wake.

Zoning Ordinance: The zoning ordinance designates allowable land use and intensities for a local jurisdiction. Zoning ordinances consist of two components: a zoning text and a zoning map.

APPENDIX C.
ROSEVILLE HAZARD MITIGATION SURVEY AND QUESTIONNAIRE SUMMARY

CITY OF ROSEVILLE

Hazard Mitigation Survey - OCAP - September 16, 2004 - 437 participants

Where do you seek information about hazard mitigation?

Please rate the degree to which you use - or would use - each information source below to help you keep your family and home safe from natural and human-caused disasters.

USE THIS 1-5 SCALE FOR EACH SERVICE:
1 = DEFINITELY WOULD NOT USE
5 = DEFINITELY WOULD USE
N/A = NOT APPLICABLE OR DON'T KNOW

1 < **Definitely Would NOT Use** **Definitely Would Use** > 5

Media:

TV news

Choose One	Responses	
1	16	4%
2	11	2%
3	42	9%
4	76	17%
5	295	66%
N/A	4	1%
Participants responding: **444**, Excluded from scoring: **4**, Average score: **4.4**		

TV advertisements

Choose One	Responses	
1	92	21%
2	68	16%
3	118	27%
4	72	17%
5	74	17%
N/A	11	3%
Participants responding: **435**, Excluded from scoring: **11**, Average score: **2.9**		

Radio news

Choose One	Responses	
1	22	5%
2	19	4%
3	60	14%
4	101	23%
5	235	53%
N/A	6	1%
Participants responding: **443**, Excluded from scoring: **6**, Average score: **4.2**		

Radio advertisements

Choose One	Responses	
1	106	25%

2	69	16%
3	132	31%
4	62	14%
5	50	12%
N/A	13	3%
Participants responding: **432**, Excluded from scoring: **13**, Average score: **2.7**		

Outdoor billboards

Choose One	Responses	
1	84	19%
2	110	25%
3	142	33%
4	61	14%
5	28	6%
N/A	10	2%
Participants responding: **435**, Excluded from scoring: **10**, Average score: **2.6**		

Newspaper/magazine articles

Choose One	Responses	
1	36	8%
2	39	9%
3	98	22%
4	131	30%
5	128	29%
N/A	8	2%
Participants responding: **440**, Excluded from scoring: **8**, Average score: **3.6**		

Direct mail

Choose One	Responses	
1	64	15%
2	45	10%
3	88	20%
4	104	24%
5	133	30%
N/A	5	1%
Participants responding: **439**, Excluded from scoring: **5**, Average score: **3.5**		

Internet

Choose One	Responses	
1	28	6%
2	35	8%
3	73	17%
4	111	25%
5	193	44%
N/A	1	0%
Participants responding: **441**, Excluded from scoring: **1**, Average score: **3.9**		

Telephone book

Choose One	Responses	
1	134	30%
2	111	25%
3	101	23%

4	57	13%
5	29	7%
N/A	9	2%
Participants responding: **441**, Excluded from scoring: **9**, Average score: **2.4**		

Books

Choose One	Responses	
1	114	26%
2	104	24%
3	113	26%
4	69	16%
5	26	6%
N/A	13	3%
Participants responding: **439**, Excluded from scoring: **13**, Average score: **2.5**		

City resources /Public Forums / Workshops:

Roseville government access TV channel 14/73

Choose One	Responses	
1	108	25%
2	78	18%
3	71	16%
4	67	15%
5	73	17%
N/A	43	10%
Participants responding: **440**, Excluded from scoring: **43**, Average score: **2.8**		

City of Roseville website

Choose One	Responses	
1	43	10%
2	75	17%
3	96	22%
4	109	24%
5	118	27%
N/A	4	1%
Participants responding: **445**, Excluded from scoring: **4**, Average score: **3.4**		

Email notifications / Electronic newsletters

Choose One	Responses	
1	30	7%
2	25	6%
3	65	15%
4	120	27%
5	200	45%
N/A	1	0%
Participants responding: **441**, Excluded from scoring: **1**, Average score: **4.0**		

Neighborhood association meetings

Choose One	Responses	
1	86	20%
2	89	20%
3	130	30%

4	70	16%
5	47	11%
N/A	15	3%
Participants responding: **437**, Excluded from scoring: **15**, Average score: **2.8**		

Neighborhood association newsletters/bulletins

Choose One	Responses	
1	21	11%
2	20	11%
3	51	27%
4	50	27%
5	36	19%
N/A	8	4%
Participants responding: **186**, Excluded from scoring: **8**, Average score: **3.3**		

School-based public meetings

Choose One	Responses	
1	115	26%
2	107	25%
3	96	22%
4	63	14%
5	19	4%
N/A	35	8%
Participants responding: **435**, Excluded from scoring: **35**, Average score: **2.4**		

City-sponsored community workshops

Choose One	Responses	
1	94	22%
2	115	26%
3	135	31%
4	66	15%
5	20	5%
N/A	7	2%
Participants responding: **437**, Excluded from scoring: **7**, Average score: **2.5**		

Presentations at workplace

Choose One	Responses	
1	52	28%
2	18	10%
3	38	20%
4	27	14%
5	20	11%
N/A	32	17%
Participants responding: **187**, Excluded from scoring: **32**, Average score: **2.6**		

Awareness events (e.g. Flood Awareness Week)

Choose One	Responses	
1	100	23%
2	106	24%
3	128	29%
4	74	17%
5	23	5%

N/A	5	1%
Participants responding: **436**, Excluded from scoring: **5**, Average score: **2.6**		

Information distributed through Roseville schools

Choose One	Responses	
1	143	33%
2	54	12%
3	56	13%
4	48	11%
5	60	14%
N/A	75	17%
Participants responding: **436**, Excluded from scoring: **75**, Average score: **2.5**		

Information distributed through Roseville Fire/Police

Choose One	Responses	
1	48	11%
2	71	16%
3	112	26%
4	96	22%
5	105	24%
N/A	7	2%
Participants responding: **439**, Excluded from scoring: **7**, Average score: **3.3**		

Information distributed through utility bills

Choose One	Responses	
1	32	7%
2	35	8%
3	89	20%
4	133	30%
5	150	34%
N/A	1	0%
Participants responding: **440**, Excluded from scoring: **1**, Average score: **3.8**		

Neighbors / word-of-mouth

Choose One	Responses	
1	62	14%
2	72	17%
3	124	29%
4	98	23%
5	72	17%
N/A	7	2%
Participants responding: **435**, Excluded from scoring: **7**, Average score: **3.1**		

Other source

Choose One	Responses	
1	46	16%
2	7	2%
3	16	5%
4	5	2%
5	14	5%
N/A	203	70%
Participants responding: **291**, Excluded from scoring: **203**, Average score: **2.3**		

If you chose "Other source", please describe here:

Submitted By	Date	Type	Responses
Anonymous Participant	08/31/04	Survey	Signs in parks, walkways, etc
Anonymous Participant	08/31/04	Survey	Railroad Hazmat Team
Anonymous Participant	08/31/04	Survey	my LDS church
Anonymous Participant	08/31/04	Survey	need source if electric down
Anonymous Participant	08/31/04	Survey	e-mail broadcasts distributed through my place of employment.
Anonymous Participant	08/31/04	Survey	a few would use all the time as they do on Council Meetings
Anonymous Participant	08/31/04	Survey	internet
Anonymous Participant	08/31/04	Survey	Presentations at workplace
Anonymous Participant	08/31/04	Survey	RACES/ARES (Amateur Radio)
Anonymous Participant	08/31/04	Survey	Neighborhood association newsletter
Anonymous Participant	09/01/04	Survey	displays/brochures at community events
Anonymous Participant	09/02/04	Survey	My Ham Radio Station
Anonymous Participant	09/03/04	Survey	placer county health dept
Anonymous Participant	09/06/04	Survey	unknown
Anonymous Participant	09/07/04	Survey	Union Pacific siren & sound systems
Anonymous Participant	09/07/04	Survey	anything possible
Anonymous Participant	09/07/04	Survey	FEMA; Red Cross
Anonymous Participant	09/09/04	Survey	I only really trust my own research
Anonymous Participant	09/13/04	Survey	grocery cart advertisements
Anonymous Participant	09/14/04	Survey	Local grocery store hand outs at the check-out counter
Anonymous Participant	09/14/04	Survey	Television: Specials/Features
Anonymous Participant	09/16/04	Survey	Info at retail counters
Participants responding: **22**			

Disaster planning and your household...

Which of the following natural or human-caused disasters have impacted any members of your household during the time you've been a Roseville resident: (CHECK ANY THAT APPLY.)

Multiple Choices Allowed	Selections	
Household fire	25	11%
Drought	52	24%
Hazardous materials incident	7	3%
Office/business fire	1	0%
Flood	78	35%
Winter storm	98	45%
School fire	1	0%
Windstorm	108	49%
Earthquake	9	4%
Wildfire	9	4%
Act of Terrorism	6	3%
Building/land explosion	9	4%
Train derailment	17	8%
Other disaster	14	6%
Total # of selections: **434**, Participants responding: **220**		

If you chose "Other disaster", please describe it here:

Submitted By	Date	Type	Responses
Anonymous Participant	08/31/04	Survey	railyard bombs
Anonymous Participant	08/31/04	Survey	Tornado
Anonymous Participant	08/31/04	Survey	Economic..lost job
Anonymous Participant	08/31/04	Survey	1973 SP Railroad LPG/Bomb explosions
Anonymous Participant	08/31/04	Survey	NONE
Anonymous Participant	08/31/04	Survey	bombs at Train Depot
Anonymous Participant	08/31/04	Survey	Request for permit to remove a total of 318 trees plus previous request for lesser numbers.
Anonymous Participant	08/31/04	Survey	Chemical Contamination
Anonymous Participant	08/31/04	Survey	racial hurrassment
Anonymous Participant	09/01/04	Survey	High Winds
Anonymous Participant	09/03/04	Survey	broken gas line
Anonymous Participant	09/05/04	Survey	2 incidents of public disturbances, both involved guns and 1 involved a death.
Anonymous Participant	09/07/04	Survey	Munitions explosionson Southern Pacifc rail cars in Antelope in 1970's
Anonymous Participant	09/07/04	Survey	Train explosion
Anonymous Participant	09/08/04	Survey	Roseville railroad switching yard disaster
Anonymous Participant	09/09/04	Survey	All the LOW life Mexican rif raff that run the streets here at nite! Why don't you spend your time and OUR money on fixing that!
Anonymous Participant	09/13/04	Survey	insect infestation - ants and fleas
Anonymous Participant	09/14/04	Survey	none
Total # of selections: **18**, Participants responding: **0**			

Which of these risk 'zones' or potential hazards involve your current residence? (CHECK ANY THAT APPLY.)

Multiple Choices Allowed	Selections		
Flood zone / potential flooding (dam failure)	40	22%	
Proximity to power lines	71	39%	
Earthquake fault / seismic hazard zone	17	9%	
Proximity to rail yard	60	33%	
Wildland / high fire zone	33	18%	
Proximity to hazardous materials	15	8%	
Other hazard	25	14%	
Total # of selections: **261**, Participants responding: **182**			

If you chose "Other hazard", please describe it here:

Submitted By	Date	Type	Responses
Anonymous Participant	08/31/04	Survey	Traffic.. on culdesac directly at the end of a street
Anonymous Participant	08/31/04	Survey	Dog fecal bacteria contamination of greenbelt waterway
Anonymous Participant	08/31/04	Survey	NEC emergency
Anonymous Participant	08/31/04	Survey	NONE
Anonymous Participant	08/31/04	Survey	fire hazard vacant lot (10+ acres)
Anonymous Participant	08/31/04	Survey	Recycle Center
Anonymous Participant	08/31/04	Survey	Proximity to proposed power plant
Anonymous Participant	08/31/04	Survey	chemical spill on I-80 at Douglas
Anonymous Participant	08/31/04	Survey	Removal of native oaks
Anonymous Participant	08/31/04	Survey	close to railroad tracks/not yard
Anonymous Participant	08/31/04	Survey	Unruly Neighbors!
Anonymous Participant	08/31/04	Survey	adjacent to city golf course

Anonymous Participant	09/01/04	Survey	People not slowing down, not adhering to posted speed limit, despite the MANY numerous attempts of police radar kiosk placed on the street.
Anonymous Participant	09/02/04	Survey	High speed autos driving down my street.
Anonymous Participant	09/02/04	Survey	excess traffic on residential street
Anonymous Participant	09/02/04	Survey	NOISE FROM TRAINS AT ENGINE REPAIR YARD
Anonymous Participant	09/03/04	Survey	Proximity to natural gas pipeline
Anonymous Participant	09/05/04	Survey	poss. hazard with storage unit business located behind neighborhood housing.
Anonymous Participant	09/06/04	Survey	high wind
Anonymous Participant	09/07/04	Survey	Highway traffic hazards
Anonymous Participant	09/07/04	Survey	New Energy Plant
Anonymous Participant	09/09/04	Survey	Under ground gas line next to our house
Anonymous Participant	09/09/04	Survey	creek - storm safety
Anonymous Participant	09/13/04	Survey	proximity to mall and large church
Anonymous Participant	09/14/04	Survey	Empty fields (rodents – Haunta Virus) and still water pools & creeks (pesky mosquitoes, bugs, flies - West Nile Virus)
Anonymous Participant	09/14/04	Survey	none
Anonymous Participant	09/15/04	Survey	hazard material transportation on highways
Total # of selections: **27**, Participants responding: **0**			

How important a factor was the potential of natural hazards in deciding to purchase or rent your current residence?

Choose One	Responses	
Extremely important	100	25%
Somewhat important	127	31%
A minor concern	83	21%
Not at all important	56	14%
I don't remember	16	4%
Not applicable	22	5%
Participants responding: **404**, Excluded from scoring: **38**, Average score: **2.7**		

Were all known hazards disclosed to you by your real estate agent when you purchased your home?

Choose One	Responses	
There were NO known hazards.	155	39%
Some, but not all were disclosed.	34	8%
All hazards were disclosed.	79	20%
I'm not sure.	96	24%
Not Applicable	37	9%
Participants responding: **401**		

Which of the following are **already installed** at your current residence? (CHECK ANY THAT APPLY.)

Multiple Choices Allowed	Selections	
ABC-class fire extinguishers	263	59%
Breathing apparatus	11	2%
Home emergency plan	97	22%
Top floor/attic AC/furnace/heater	214	48%
Food/water rations	147	33%
Roof gutters/downspouts	394	88%
AC/furnace/water heater straps	356	80%

Emergency lighting	144	32%
Roof structural supports	122	27%
Backup generator	8	2%
Exterior drainage system	250	56%
Sheer wall(s)	65	15%
Battery operated radio or TV	258	58%
Fire escape ladder	17	4%
Smoke detectors	430	96%
Bolted foundation	159	36%
Fire retardant flooring/walls	61	14%
Sump Pump	9	2%
Wireless phone/CB/ham radio	317	71%
Fire retardant roof/exterior	183	41%
Tempered glass windows/doors	117	26%
Chimney supports	57	13%
Fire sprinkler system	3	1%
Tree/shrub removal or thinning	138	31%
Double thermal pane windows/doors	355	80%
First aid kit and medicines	322	72%
Waterproof/fireproof safe storage	105	24%
Drip irrigation system	301	67%
Flood wall(s)	2	0%
Xeriscape landscaping	8	2%
Other item	7	2%
Total # of selections: **4,920**, Participants responding: **446**		

If you chose "Other item":

List Item #1 here:

Submitted By	Date	Type	Responses
Anonymous Participant	08/31/04	Survey	CO detector
Anonymous Participant	09/02/04	Survey	Massive Batteries For Ham Radio
Anonymous Participant	09/02/04	Survey	fire extinguisher
Anonymous Participant	09/09/04	Survey	low flow toilets
Anonymous Participant	09/09/04	Survey	carbon monoxide detector
Anonymous Participant	09/09/04	Survey	Home Intrusion Alarm
Anonymous Participant	09/09/04	Survey	water heater has straps
Anonymous Participant	09/14/04	Survey	Burglar alarm
Total # of selections: **8**, Participants responding: **0**			

List Item #2 here:

Submitted By	Date	Type	Responses
Anonymous Participant	09/02/04	Survey	Solar panels to charge batteries for Ham Radio
Anonymous Participant	09/09/04	Survey	AC furnace do not have straps
Total # of selections: **2**, Participants responding: **0**			

Do you have flood insurance?

Choose One	Responses	
I am not sure if I have flood insurance.	48	11%
Yes, I have a flood insurance policy.	17	4%
Yes, my homeowner's insurance covers flooding.	23	5%

No, flood insurance is not available to me.	17	4%
No, I don't need it: flood risk is too small.	280	64%
No, premiums are too high to justify the cost.	21	5%
No, deductibles are too high to justify the cost.	6	1%
No, it is too expensive for my budget.	7	2%
No, I rent my residence - not my responsibility.	12	3%
No, I'm not familiar with flood insurance.	3	1%
No, other reason (not listed here).	5	1%
Participants responding: **439**		

If you chose "other reason", please describe here:

Submitted By	Date	Type	Responses
Anonymous Participant	08/31/04	Survey	I'm above flood plain
Anonymous Participant	08/31/04	Survey	unsure of flood risk
Anonymous Participant	08/31/04	Survey	At purchase, we were told we were in a guaranteed flood-free zone.
Anonymous Participant	09/07/04	Survey	don't feel a need
Participants responding: **4**			

Do you have earthquake insurance?

Choose One	Responses	
I am not sure if I have earthquake insurance.	28	6%
Yes, I have an earthquake insurance policy.	13	3%
Yes, my homeowner's insurance covers earthquakes.	14	3%
No, earthquake insurance is not available to me.	13	3%
No, I don't need it: earthquake risk is too small.	224	51%
No, premiums are too high to justify the cost.	66	15%
No, deductibles are too high to justify the cost.	37	8%
No, it is too expensive for my budget.	24	5%
No, I rent my residence - not my responsibility.	9	2%
No, I'm not familiar with earthquake insurance.	5	1%
No, other reason (not listed here).	6	1%
Participants responding: **439**		

If you chose "other reason", please describe here:

Submitted By	Date	Type	Responses
Anonymous Participant	08/31/04	Survey	unsure of fault lines in town
Anonymous Participant	09/09/04	Survey	insurance company does not offer it
Participants responding: **2**			

Are you planning to retrofit your home to lessen the impact of potential hazards?
(e.g. bolting foundation, adding sheer wall, installing fire retardant materials, etc.)

Choose One	Responses	
My residence meets all recommended standards.	178	47%
I have already made hazard mitigation improvements.	11	3%
I am currently making these improvements.	9	2%
I will be making improvements in the next 24 months.	7	2%
I am seriously considering it, but have no set plans.	28	7%
I think about this issue now and then.	64	17%

Hazard mitigation is not an important issue to me.	39	10%
I rent my residence, so this is not my responsibility.	20	5%
Other	22	6%
Participants responding: **378**		

Overall, to what degree is your household prepared for each of the following potential hazards?
1 = NOT AT ALL PREPARED
5 = COMPLETELY PREPARED
N/A = NOT APPLICABLE OR DON'T KNOW

1 < **Not at all Prepared** **Completely Prepared** > 5

Drought

Choose One	Responses	
1	56	13%
2	80	18%
3	139	31%
4	109	25%
5	45	10%
N/A	14	3%
Participants responding: **443**, Excluded from scoring: **14**, Average score: **3.0**		

Earthquake

Choose One	Responses	
1	69	16%
2	80	18%
3	167	38%
4	89	20%
5	20	5%
N/A	18	4%
Participants responding: **443**, Excluded from scoring: **18**, Average score: **2.8**		

Flood

Choose One	Responses	
1	81	18%
2	95	21%
3	127	29%
4	70	16%
5	29	7%
N/A	40	9%
Participants responding: **442**, Excluded from scoring: **40**, Average score: **2.7**		

Haz-Mat incident

Choose One	Responses	
1	143	33%
2	119	27%
3	106	24%
4	34	8%
5	11	3%
N/A	22	5%
Participants responding: **435**, Excluded from scoring: **22**, Average score: **2.2**		

Home fire

Choose One	Responses	
1	16	4%
2	44	10%
3	143	32%
4	183	41%
5	56	13%
N/A	1	0%
Participants responding: **443**, Excluded from scoring: **1**, Average score: **3.5**		

Winter Storm

Choose One	Responses	
1	25	6%
2	31	7%
3	134	30%
4	180	41%
5	63	14%
N/A	9	2%
Participants responding: **442**, Excluded from scoring: **9**, Average score: **3.5**		

Windstorm

Choose One	Responses	
1	30	7%
2	50	11%
3	150	34%
4	154	35%
5	49	11%
N/A	6	1%
Participants responding: **439**, Excluded from scoring: **6**, Average score: **3.3**		

About retrofitting your home and financial incentives...

In the next 24 months, what is the maximum you might be willing to spend - **in addition to any incentives** - to make hazard-mitigation improvements on your home?

Choose One	Responses	
$10000 or more	8	2%
$7500 - $9999	4	1%
$5000 - $7499	10	2%
$2500 - $4999	34	8%
$1000 - $2499	48	11%
$500 - $999	50	12%
$100 - $499	52	12%
Less than $100	25	6%
Nothing	65	15%
I don't know	117	27%
Not Applicable	16	4%
Participants responding: **429**, Excluded from scoring: **133**, Average score: **1,493.6**		

Which one of these incentives would most likely motivate you to make hazard-mitigation improvements on your home?

Choose One	Responses	
I would make improvements without incentives.	30	8%
Financial incentives would not motivate me.	24	6%
An insurance premium discount.	83	22%
A building permit fee waiver/reduction.	9	2%
Mortgage discount (for portion of retrofit cost).	17	4%
A property tax break (for portion of retrofit cost).	129	34%
Low interest rate loan (to cover improvements).	16	4%
Grant funding (for portion of retrofit cost).	71	18%
Other incentive	6	2%
Participants responding: **385**		

What percentage of the total improvement cost **would you expect** this incentive to cover?

Choose One	Responses	
None of the cost	29	7%
10% of the cost	27	7%
20% of the cost	40	10%
30% of the cost	60	15%
40% of the cost	12	3%
50% of the cost	97	25%
60% of the cost	7	2%
70% of the cost	14	4%
80% of the cost	15	4%
90% of the cost	7	2%
100% of the cost	44	11%
Not applicable	36	9%
Participants responding: **388**, Excluded from scoring: **65**, Average score: **49.0**		
Unselected answers are not shown		

...How likely would you be to start these improvements within the next 24 months if the incentive you chose were offered?

Choose One	Responses	
I definitely would	42	11%
I probably would	126	34%
I might or might not	84	23%
I probably would not	24	6%
I definitely would not	8	2%
I'm not sure	50	13%
Not applicable	38	10%
Participants responding: **372**, Excluded from scoring: **88**, Average score: **3.6**		

Disaster planning and the City of Roseville...

Overall, to what degree do you feel Roseville is prepared for each of the following potential hazards?

1 = NOT AT ALL PREPARED
5 = COMPLETELY PREPARED
N/A = NOT APPLICABLE OR DON'T KNOW

1 < **Not at all Prepared** **Completely Prepared** > 5

Act of Terrorism

Choose One	Responses	
1	53	12%
2	80	19%
3	122	29%
4	80	19%
5	9	2%
N/A	84	20%
Participants responding: **428**, Excluded from scoring: **84**, Average score: **2.7**		

Drought

Choose One	Responses	
1	19	4%
2	54	13%
3	146	34%
4	114	26%
5	24	6%
N/A	74	17%
Participants responding: **431**, Excluded from scoring: **74**, Average score: **3.2**		

Earthquake

Choose One	Responses	
1	25	6%
2	74	17%
3	145	34%
4	95	22%
5	16	4%
N/A	72	17%
Participants responding: **427**, Excluded from scoring: **72**, Average score: **3.0**		

Flood

Choose One	Responses	
1	12	3%
2	34	8%
3	111	26%
4	148	34%
5	65	15%
N/A	61	14%
Participants responding: **431**, Excluded from scoring: **61**, Average score: **3.6**		

Haz-Mat incident

Choose One	Responses	
1	14	3%
2	38	9%
3	98	23%
4	134	31%
5	68	16%
N/A	77	18%
Participants responding: **429**, Excluded from scoring: **77**, Average score: **3.6**		

Structural fire

Choose One	Responses	

1	8	2%
2	10	2%
3	38	9%
4	133	31%
5	207	48%
N/A	36	8%
Participants responding: **432**, Excluded from scoring: **36**, Average score: **4.3**		

Wildfire

Choose One	Responses	
1	12	3%
2	17	4%
3	79	18%
4	154	36%
5	115	27%
N/A	54	13%
Participants responding: **431**, Excluded from scoring: **54**, Average score: **3.9**		

Winter Storm

Choose One	Responses	
1	13	3%
2	26	6%
3	79	18%
4	184	43%
5	73	17%
N/A	55	13%
Participants responding: **430**, Excluded from scoring: **55**, Average score: **3.7**		

Windstorm

Choose One	Responses	
1	16	4%
2	25	6%
3	111	26%
4	162	38%
5	63	15%
N/A	53	12%
Participants responding: **430**, Excluded from scoring: **53**, Average score: **3.6**		

Would you voluntarily evacuate your residence during a declared disaster event if requested by local authorities?

Choose One	Responses	
Yes, no questions asked.	248	56%
Only if I felt danger was imminent.	151	34%
Only if I could actually see the danger.	8	2%
Only if not disruptive to my household.	3	1%
No, I'd stay in my home.	6	1%
I do not know what I'd do.	25	6%
Not applicable.	1	0%
Participants responding: **442**		

Do you support policies to restrict development in designated hazard zones?
(e.g. flood zone, wildland area, seismic zone, etc.)

Choose One	Responses	
It should be prohibited in these zones.	202	46%
It should be restricted in these zones.	168	38%
It should be restricted only where 'severe risk' exists.	48	11%
It should NOT be restricted in hazard zones.	4	1%
I do not know.	20	5%
Participants responding: **442**		

To tabulate responses, please update your information...

What is your gender?

Choose One	Responses	
Male	241	54%
Female	204	46%
Participants responding: **445**		

In which age bracket are you?

Choose One	Responses	
Under 18	0	0%
18 - 24	4	1%
25 - 34	36	8%
35 - 49	168	38%
50 - 65	159	36%
66 - 75	59	13%
Over 75	19	4%
Participants responding: **445**, Excluded from scoring: **0**, Average score: **51.7**		

How long have you lived in Roseville?

Choose One	Responses	
Less than a year	3	1%
1 - 2 years	40	9%
3 - 5 years	92	21%
6 - 10 years	135	30%
11 - 15 years	52	12%
16 - 20 years	43	10%
More than 20 years	77	17%
I don't live in Roseville	2	0%
Participants responding: **444**, Excluded from scoring: **2**, Average score: **11.1**		

How long have you lived at your current residence?

Choose One	Responses	
Less than one year	20	4%
1 - 2 years	66	15%
3 - 5 years	119	27%
6 - 10 years	127	29%
11 - 15 years	43	10%
16 - 20 years	37	8%
More than 20 years	33	7%

Participants responding: **445**, Excluded from scoring: **0**, Average score: **8.3**

Do you own or rent your residence?

Choose One	Responses	
I own my residence	424	95%
I rent my residence	19	4%
Other	2	0%
Participants responding: **445**		

What is the approximate age of your residence?

Choose One	Responses	
New last 12 months	8	2%
1 - 2 years old	38	9%
3 - 5 years old	60	13%
6 - 10 years old	122	27%
11 - 15 years old	65	15%
16 - 20 years old	49	11%
21 - 30 years old	49	11%
31 - 50 years old	31	7%
More than 50 years old	20	4%
I'm not sure	3	1%
Participants responding: **445**, Excluded from scoring: **3**, Average score: **15.1**		

Are there school-age children in your household?

Choose One	Responses	
None	281	63%
One	67	15%
Two	70	16%
Three	19	4%
Four	5	1%
More than four	3	1%
Participants responding: **445**, Excluded from scoring: **0**, Average score: **0.7**		

In which zip code do you live?

Choose One	Responses	
95746	13	3%
95747	185	42%
95661	114	26%
95678	130	29%
Other zip	2	0%
Participants responding: **444**		

In which Roseville neighborhood do you live?

Choose One	Responses	
Blue Oaks - 95747	20	5%
Cherry Glen - 95678	2	0%
Cirby Ranch - 95661	16	4%
Cirby Side - 95661	14	3%
Cresthaven - 95678	9	2%
Diamond Oaks - 95678	26	6%
Enwood - 95678	3	1%
Folsom Road - 95678	4	1%

Foothills Junction - 95747	18	4%
Highland Reserve - 95678	35	8%
Hillcrest - 95678	7	2%
Johnson Ranch - 95661 / 95746	37	8%
Junction West - 95747	13	3%
Kaseberg - 95678	11	2%
Los Cerritos - 95678	4	1%
Maidu - 95661	8	2%
Meadow Oaks - 95661	8	2%
Olympus Pointe - 95661	9	2%
Pleasant Grove - 95747	12	3%
Quail Glen - 95747	4	1%
Roseville Heights - 95678	1	0%
Sierra Gardens - 95661	12	3%
Sierra Vista - 95678	1	0%
South Cirby - 95661	6	1%
Stanford - 95678	1	0%
Sun City - 95747	50	11%
Theiles Manor - 95678	2	0%
Vineyard - 95678 & 95747	7	2%
Woodcreek Oaks - 95747	52	12%
Other neighborhood	29	7%
I do not know	18	4%
I don't live in Roseville	4	1%
Participants responding: **443**		

That's it! Thank you once again for your feedback. Combined responses will be available on the City website in about 3 weeks. Please click ONCE on the 'Submit Responses' button below, and wait until you see the 'Thank You' page, to finish.

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CITY OF ROSEVILLE

Hazard Mitigation Survey - OCAP - Interim Data - 9-15-04 - 443 responses

Use this space for an idea about how the City of Roseville can help you or others with disaster planning and hazard mitigation:

Submitted By	Date	Type	Responses
Anonymous Participant	08/31/04	Survey	1) Make a link to disaster planning and hazard mitigation off the Roseville website. Offer downloadable survey forms, ideas, contact phone numbers, etc. 2) Put more disaster preparation material in the Roseville phone books and advertise that it is there in utility bills, on Channel 11, etc. 3) Offer training meetings on how families can prepare for disasters at Maidu center, libraries, the sports center, etc. and advertise them in utility bill flyers, Roseville magazine, etc. 3) Coordinate family and city disaster preparation with school districts, local Boy Scout and Girl Scout units, youth sports organizations, etc. I remember getting fire drills, tornadoe drills, and stranger avoidance training at elementary and junior high school when I was growing up. 4) Declare certain months to be 'Home Fire Preparedness month' or 'Drowning avoidance month' or 'Neighborhood Association month' etc and then coordinate advertising, utility bill notices, Channel 11 programming, school training, Police and Fire dept demos, etc to really focus everyones attention on getting prepared for that particular hazard. 5) We should really focus on having every family in every neighborhood know who their neighborhood association contact is, and promote support of neighborhood associations. They should link up with local schools, clubs, and businesses in their neighborhoods. Really activity and leadership in neighborhood associations with local retired people, parents organizations like PTA and sports booster groups, etc. 6) In the wake of the 9-11 disaster, economic slowdowns, traffic accidents, grass fires, floods, etc, really build a case on why every family should prepare for hazards, and get the citizens informed and focussed on this. Everybody should be vigilant every day.
Anonymous Participant	08/31/04	Survey	Send mailing to residents about the hazards we are exposed to and safeguards needed.
Anonymous Participant	08/31/04	Survey	Community emergency response team like the Sacramento Metro Fire department offers, would make people more aware of the hazards and how to deal with them. I went through the training and it was great.
Anonymous Participant	08/31/04	Survey	Flyers with utility bills; coupons or discounts for the contractor who would do the work; or discounts to bills/taxes etc.
Anonymous Participant	08/31/04	Survey	notify us of the potential hazard
Anonymous Participant	08/31/04	Survey	Install dog feces collection bags at the greenbelt walkway entrances on Eastridge Dr, and the walkway's access points elsewhere in the Eastridge neighborhood, as well as at Hazel Ave and in the TreeLake neighborhood. People die from waterway exposure to fecal contamination in the Bay Area nearly every year. Not addressing the incredible volume of hazardous dog feces being left along Roaseville's waterways and greenbelts must create a huge potential legal liability for the city, as well as endanger its residents.
			Let me know what the real risks are for our area. Should I really have flood or earthquake insurance in Roseville based on the past history? Where can we get some of the hazard mitigation items at a reduced or more affordable price? Can the city of Roseville offer fire

Anonymous Participant	08/31/04	Survey	extinguishers for a reduce rate (substantially lower than Lowe's or Home Depot or ???) and have announcements mailed in the electric bills. Will the city of Roseville solicit bids from contractors on behalf of Roseville residents for hazards upgrades? The residents would pay, but the city of Roseville would say 'Such and Such contractor has agreed to do ABC job for $$$ versus $$$ dollars that it generally cost.'
Anonymous Participant	08/31/04	Survey	Am not sure. Will leave it to the experts.
Anonymous Participant	08/31/04	Survey	INFORM SUN CITY MANAGEMENT AND THEY WILL GET THE INFORMATION TO THE HOMEOWNERS
Anonymous Participant	08/31/04	Survey	Our 143 single unit complex (Courtside)has wood shake roofs (15 years old). These are very volatile especially in dry season with high winds. Our Johnson Ranch HO Assn mandates that present roofs be replaced with wood shake (or metal or tile with no variance in appearance allowed). Unlikely ANY homes here are stressed to support metal and or tile. Composite, fireproof roofs are not allowed by HOA. I suggest that wood shake roofs be prohibited in future construction in Roseville AND that present wood shake roofs must be replaced with fireproof materials when replacement is needed due to age, damage, etc(be it composition, tile, metal)
Anonymous Participant	08/31/04	Survey	Make more people aware of the government access channel.
Anonymous Participant	08/31/04	Survey	Disaster plan kit/checklist sent out through schools and or utility bills. 10 steps to preparedness, etc. Like the State does for earthquake preparedness. This helped us greatly and have followed through with most on the check list. Do you have..... Thanks for your hard work.
Anonymous Participant	08/31/04	Survey	educate me, utility bill inserts are a place to do so. We already replaced our shingle roof with concrete shake, and put in concrete patios front and back when our pool went in 3 years ago. Drainage was well thought through. House is only about 18 years old, so meets most current codes. So I think we're OK.
Anonymous Participant	08/31/04	Survey	Provide incentives through telephone and electrical incentives; provide information via the Internet.
Anonymous Participant	08/31/04	Survey	I beleive in being prepared. I would support the creation of a city sponsored home inspection (like Roseville Electric for energy conservation)to assist homeowners by providing recommendation and check off lists and/or education.
Anonymous Participant	08/31/04	Survey	It would be nice to receive information on how to prevent and/or cope with disaster. This could be done in the form of including a 'tips' flyer in utility bills or by placing flyers at the City office counters for the public to view.
Anonymous Participant	08/31/04	Survey	Meet with Association Boards/Homeowners Groups
Anonymous Participant	08/31/04	Survey	have a backup plan to tv. from having family in so. cal. during wild fires and in florida during hurricane, the internet sites were not current with info and you were dependent on local tv coverage. if the electricity is down (as it was in florida), people don't know where to go to info on status of evacuations, etc.
Anonymous Participant	08/31/04	Survey	It would help if the Fire and Police departments kept track of which residents are disabled and would be very dependent on others during an emergency situation such as a flood.
Anonymous Participant	08/31/04	Survey	Make information readily available
Anonymous Participant	08/31/04	Survey	Establish an emergency information hotline folks can check as needed
Anonymous Participant	08/31/04	Survey	Provide hazard mitigation updates from our local fire stations; use the stations as a central point of focus for the neighborhoods.
Anonymous Participant	08/31/04	Survey	I do read the info contained in my utility bill. whether it be water conservation, shade trees, wood burning fireplace or stoves, if there are tips in there, i'll pay atention.
Anonymous Participant	08/31/04	Survey	I have no idea what I need to do or what I really should do at all. I am being very honest about it as I am totally oblivious to this whole thing!

Anonymous Participant	08/31/04	Survey	Provide alternate methods of mitigation: A) adequate, B) good, C) Best
Anonymous Participant	08/31/04	Survey	neighborhood workshops conducted by experts
Anonymous Participant	08/31/04	Survey	Annual dumpster program helped rid the city of vermin sites and reduced possible household fire hazards. Program should be reinstated.
Anonymous Participant	08/31/04	Survey	Flyer describing HazMat threats and possible deterrents or protections.
Anonymous Participant	08/31/04	Survey	Perhaps just advising us what disasters are likely in Roseville -- and what each of the preventative measures you've listed above would do to mitigate those disasters.
Anonymous Participant	08/31/04	Survey	stop light at Zinnia Way and Woodcreek Oaks intersection as there is only two ways out of this sub division and traffic on Woodcreek oaks has increased dramatically
Anonymous Participant	08/31/04	Survey	provide someone to do an assessment evaluation so homeowners would have an idea of just what is needed.
Anonymous Participant	08/31/04	Survey	I am not sure my house needs any retrofitting! How could I tell? I live in Sun City.
Anonymous Participant	08/31/04	Survey	I just don't feel threatened. We're in a seismically stable area and we have a modern (1993) home built to modern building codes, not in any historic flood plain, and Roseville is not a major terrorist target. I guess the City would have to more convincingly educate me if there are any realistic risks.
Anonymous Participant	08/31/04	Survey	Publish exit plans for a citywide evacuation...due to the size of our population, we would not be able to leave town on the major highways without a catastrophic traffic jam. We would all be doomed!
Anonymous Participant	08/31/04	Survey	certified contractor lists, recommended contractors, suggestions of what can be done to mitigate
Anonymous Participant	08/31/04	Survey	dont spend money on stupid surveys
Anonymous Participant	09/01/04	Survey	Need to be informed on what is 'the expectation' for hazard-mitigation, I think my house is pretty much prepared, our house is 9 years old, did the builder have to build hazard-mitigation items into the house? I am not sure what are the standards??
Anonymous Participant	09/01/04	Survey	Our home is fairly new but we would be interested in things we can do/learn about floods and coping without electricity/heat.
Anonymous Participant	09/01/04	Survey	I'm sorry, but I'm really not too concerned about it.
Anonymous Participant	09/02/04	Survey	Mailers w/ Info Public Serive Annoncements on radio & tv Info sent home from schools
Anonymous Participant	09/02/04	Survey	The city could provide inspecters that could tell me what I need to do and how to go about getting safe and cost effect methods of doing the work. I really don't know what needs to be done to my house although I do know a few items that are or have been done.
Anonymous Participant	09/02/04	Survey	It would be helpful if the city could provide homeowners with an annual checklist, organized seasonally, of preventative measures that should be addressed in order to prepare for any disaster type situation.
Anonymous Participant	09/02/04	Survey	Perhaps a neighborhood disaster response teams may be appropriate
Anonymous Participant	09/02/04	Survey	BUILD A SOUND WALL AROUND THE RAIL YARDWHERE THE ENGINE SHOPS ARE TO REDUCE NOISE LEVELS FOR ALL RESEDENTS WHO LIVE CLOSE TO YARD OR AT LEAST PROHIBIT RUNNING OF ENGINES FROM 10 PM TO 8 AM 7 DAYS A WEEK
Anonymous Participant	09/03/04	Survey	identify the probability of each of the possible events and to what degree the damage is likely to extend
Anonymous Participant	09/03/04	Survey	Newsletter with utility bill would get my attention. I have little awareness of hazards that affect my location.
Anonymous Participant	09/05/04	Survey	Education and knowledge on disasters and hazards. I don't think the community understands the risks because the valley area seems

			like such a low risk area.
Anonymous Participant	09/07/04	Survey	Information on my City billing is very informative, and feel disaster and hazard planning, along with other info. would be very helpful. Many people over 60 do not rely on their computer, if they have one, for information. We rely on the old fashioned t.v., radio, or printed matter.
Anonymous Participant	09/07/04	Survey	Our Biggest Hazard, in the new areas, is the winter WINDS. I would like to see an acuarte forecast, on the Roseville TV station, when you show the creek water levels during the winter. Our spring repairs have consisted of 95% damage from High winds!!!
Anonymous Participant	09/07/04	Survey	Without giving too much information that would assit anyone in overcoming City preparedness, providing information to the citizens about what city management has done or is doing should be distributed within the City in a maner which is mostlikely to be received and actually reviewed in homes and businesses.
Anonymous Participant	09/07/04	Survey	If Roseville has a plan, they need to get it out to the people to consider. I know of no disaster plans in my area...
Anonymous Participant	09/07/04	Survey	help with funding and better enforcement of the rental laws
Anonymous Participant	09/07/04	Survey	I experienced drought, earthquake and medfly hazards in the Bay area when I lived there. I expect drought in Roseville would be the most likely hazard and the next overpopulation.
Anonymous Participant	09/07/04	Survey	Need greater awareness of the kinds of hazards and disasters that might strike with the question asked, 'Are you prepared?'
Anonymous Participant	09/07/04	Survey	Distributing a different phamplet for each type of disaster with the utility bill would be a great way to ensure that a majority of residents received the information.
Anonymous Participant	09/07/04	Survey	Hold town-hall meetings to explain the need for disaster planning and hazard mitigation. In San Jose where I came from, we had homeowners meeting and asked for participants who would train to become active disaster-prepared members in our block.
Anonymous Participant	09/07/04	Survey	Keep surveying and asking the questions. That alone reminds people to be aware.
Anonymous Participant	09/07/04	Survey	explain which hazards apply to which neighborhoods and likelihood (every 100 years? every 2 years?) that these hazards occur.
Anonymous Participant	09/07/04	Survey	iNFO THROUGH UTILITY BILLS IS BEST WAY TO EDUCATE ME.
Anonymous Participant	09/07/04	Survey	I would like to know where the nearest bomb shelter is. How are to handle gas spills from the rail yard? Do you think we should own filters or dust masks or gas masks as a safety precaution? Water is my biggest concern. I'm told the pipe coming from Folsom Lake to Roseville is already leaking. If it blows, where are we going to get water? If terroists strike out water, or electricity goes out will our water still make it to the house? Realistically, how much water should we have on hand? We're a family of 6. Space is at a premium.How long can bottled water stay on the shelf? Thanks for your input! Lynda
Anonymous Participant	09/08/04	Survey	Haven't the slightest idea what improvements I need.
Anonymous Participant	09/08/04	Survey	informational enclosures with city utility bill
Anonymous Participant	09/09/04	Survey	An periodic email newsletter describing various hazards and hazard mitigation steps that can be taken would be very helpful. (It's hard to know what you don't know when you don't know much about something.)
Anonymous Participant	09/09/04	Survey	Come up with some warning system to let people know that a disaster is happening, as with when I lived in the midwest we had tornado sirens, a simple way to let anyone know, because I am so busy with college and work I never watch TV or listen to the radio, I just fall asleep as soon as I get home.
Anonymous Participant	09/09/04	Survey	Nothing: The State of California covers that.
Anonymous Participant	09/09/04	Survey	Disaster planning information in the utility bills
			To create specific and clear guides (and send them to each

Anonymous Participant	09/10/04	Survey	household) with the adopted procedures for the residents that could apply before, during and after a disaster happens
Anonymous Participant	09/13/04	Survey	Our residence is 8 years old. We assume that the residence meets all requirements as provided by the building department. We are in the Del Webb Sun City Roseville subdivision.
Anonymous Participant	09/13/04	Survey	You would first have to convince me there is a real need for me to make changes to our home for disaster preparedness.
Anonymous Participant	09/13/04	Survey	Provide literature with examples of what one might expect to have for each type of occurrence.
Anonymous Participant	09/13/04	Survey	Help identify needed improvements, disaster/emergency preparedness checklist/information, media available for information in case of a disaster/emergency, information regarding local risk factors for earthquakes, flooding, windstorms, etc.
Anonymous Participant	09/13/04	Survey	I think grocery stores are a good place to distribute information. Unless a disaster has already occurred, I don't always have the TV or radio on. I try to look at the paper, but I do miss things there. I always read what is on my doorstep, or in the mail. Everyone goes to the grocery store.
Anonymous Participant	09/14/04	Survey	Identify exactly the disaster or hazard city experts see or anticipate in my immediate area.
Anonymous Participant	09/14/04	Survey	Would like to see information available or website links to on the city website about earthquake hazards in and around Roseville. Are there any active/inactive faults located in and around the city. What are the flood dangers associated with with a dam break/natural flood in and around the city.
Anonymous Participant	09/14/04	Survey	Check-off / mail in list for Safe Hazard Mitigation Tips(Utility Bills)
Anonymous Participant	09/14/04	Survey	Pass out information and supplies at the fair or other local events. I received free gun locks at the Sacramento Sports and Boat show.

Participants responding: **76**

Use this space to offer any advice to the authors of the new Roseville Hazard Mitigation Plan:

Submitted By	Date	Type	Responses
Anonymous Participant	08/31/04	Survey	Roseville hasn't dealt with traffic, why would I trust the city planners to deal with natural hazards?
Anonymous Participant	08/31/04	Survey	You should consider the traffic problems at intersections that have a hign accident rate. These intersections need to be mitigated so that there is better visibility and so that traffic approaches these intersections at a slower rate of speed.
Anonymous Participant	08/31/04	Survey	I believe the best defense is a planned, coordinated, multi-facted approach where as many people and organizations as possible are directly involved. Define the risks, plan the mitigation or avoidance efforts that need to be done, train and advertise the dickens out of it, and then keep reminding people to stay prepared. Don't focus on fear..focus on if you are prepared then the overcomes fear. Focus on practical actual things that people can, and should do. Then check up on people via school form surveys (do you have a fire escape plan? Do your children know what to do if they encounter a stranger who is trying to lure them to them? etc) Put the word out on things like cutting back brush from around homes, etc, by a specific date, and then start giving warning tickets for those who have not done so. ABSOLUTELY STOP issuing permits to build in flood zones, or on earthquake fault lines..that is the height of bureucratic hypocracy. Really focus on making Neighborhood associations meaningful, active, and positive. Get businesses, and organizations within a neighborhood active in their neighborhood association. Get police and fire units within a given neighborhood area active in their neighborhood associations. Make them really count and have a voice that is listened to and acted upon.
			I want more input, like this, to local government. I object to many of the city's land use policies, such as the rampant commercial growth and the way that Roseville's natural areas are being fenced

Anonymous Participant	08/31/04	Survey	in with small-aperture fences that exclude the animals that should be able to live there (turkeys, coyotes, etc). I'd like to see Roseville get in touch with 'average' residents, not just the special interests that have the time, knowledge and incentive to make noise at City Council and similar meetings!
Anonymous Participant	08/31/04	Survey	You should let local residents know the risks NEC & HP. I complained of bad odors years ago & was totally ignored by the City & County.
Anonymous Participant	08/31/04	Survey	Information is power. Make sure you use the most efficient way possible to get information to as many Roseville residents as possible. I regularly read everything sent in my electric bills and water bills. Explain terms for me: How can a 'sheer wall' (whatever it is) help me in a disaster? It doesn't sound very secure to me. What is a bolted foundation? I don't have a desire to fix it if I don't know what it is.
Anonymous Participant	08/31/04	Survey	KEEP NEW HOME BUILDING OUT OF 'RISK' AREAS/ZONES DEVELOPERS BUILD THERE AND THEN THE TAX PAYER HAS TO PICK UP THE BILL
Anonymous Participant	08/31/04	Survey	The city really needs to deal with the traffic problems. If the city had to conduct an evacuation, the roads within the city couldn't handle the number of people.
Anonymous Participant	08/31/04	Survey	Some recommendations could be put to a vote of residents - this might encourage support for the final plan.
Anonymous Participant	08/31/04	Survey	tighter enforcement re: weed abatement to keep fire hazard down and have a plan to get traffic moving if evacuation necessary. it is very scary to see our traffic so bad on 80 and to think if an area needed to evacuate. it seems like we couldnt leave the area (which happened in parts on florida- no more traffic to go over bridge)
Anonymous Participant	08/31/04	Survey	Some geographic areas carry a greater degree of risk, others less. For the less, consider restrictions; for the greater degree, require a much greater justification before developmet.
Anonymous Participant	08/31/04	Survey	Be direct yet take into account human nature. Do not plan to put firefighters or police personnel in harm's way if residents refuce to leave after having ben warned. take into account city-wide exit routes if necessary to evacuate.
Anonymous Participant	08/31/04	Survey	I think the health of our people is very important and should be put on the line to consider us.
Anonymous Participant	08/31/04	Survey	Make sure you use independant experts, not those who have a pre-determined result in mind.
Anonymous Participant	08/31/04	Survey	I would like to see additional fire stations built as soon as possible. Also, I would like to see an Emergency Operations Center built as soon as possible.
Anonymous Participant	08/31/04	Survey	My answers agove to the degree that Roseville is prepared for disasters is merely a guess. My guesses are based on amount of experience with type of disaster. We are generally more prepared for that which we have more experience.
Anonymous Participant	08/31/04	Survey	Evacuation orders need to be carefully determined to prevent future thoughts of 'crying wolf'
Anonymous Participant	08/31/04	Survey	Be prudent and realistic but not ridiculous.
Anonymous Participant	08/31/04	Survey	Use good judgement, listen to the experts, and ignore the developers and others who benefit from high population numbers.
Anonymous Participant	09/01/04	Survey	For the good of the many, the few should agree to restrict development, and not litigate against the city of the Roseville.
Anonymous Participant	09/01/04	Survey	My home is near the miner's ravine hike/bike trial so I'm not sure if it is in a wildfire hazrad zone or not.
Anonymous Participant	09/01/04	Survey	I feel there should be practice drills for acts of terrorism, just as you would for earthquake preparedness or other disasters.
Anonymous Participant	09/01/04	Survey	My only concern would be how you define a 'hazard' area.
Anonymous Participant	09/01/04	Survey	These type of plans are not usually worth the paper they are written

			on.
Anonymous Participant	09/01/04	Survey	If people chose to live in a hazard zone, the city should not bail them out, if there is a flood, etc.
Anonymous Participant	09/01/04	Survey	(1) I'm not really sure how well prepared Roseville is for some types of emergencies, but made my best guess. (2) People who have chosen to build in hazard zones such as floodways should perhaps have some assistance, but should also be responsible for their choices and should not be entirely bailed out by government.
Anonymous Participant	09/02/04	Survey	Don't spend excess amounts of my tax dollars on this. The city should help with awareness but not get carried away. Most of these issues are the resposibility of the citizen.
Anonymous Participant	09/02/04	Survey	All hazarads should be made public with recomendations of what each of us can/should do in case an event occors. We need to be aware of what passes through the city on the railroad.
Anonymous Participant	09/02/04	Survey	Where can I find this Roseville Hazard Mitigation Plan and what does it mean to me?
Anonymous Participant	09/02/04	Survey	A map of various hazards zones within the city would help me greatly.
Anonymous Participant	09/03/04	Survey	Awareness of hazards affecting our area is first step.
Anonymous Participant	09/05/04	Survey	Use the three main media sources to articulate the how the City is prepared top handle the Hazards mentioned in this survey.
Anonymous Participant	09/06/04	Survey	Possible use of a phone system to call residents in the event of an emergency, especially, haz-mat emergency.
Anonymous Participant	09/07/04	Survey	I know we're probably working with the UP for Hazard mitigation. However, there dosen't seem to be much talk of Hazard drills, as if Roseville is not a significant risk for rail diasters. (I hope the WW2 bombs are all gone!) How about news of the nuclear waste that UP ships during the night to Nevada or is it Utah. Or did they cancel those shipments ?
Anonymous Participant	09/07/04	Survey	If there is a plan, let us know. Flyers in bills would help, if they are seperate from the bills.
Anonymous Participant	09/07/04	Survey	Hazards usually occur immediately, like Earthquakes, and by that time it's too late, unless everybody was required to retrofit their houses before the quake, similarly pre-planning for most other hazards. But, don't base your pre-planning on my fatalism. Keep up the good work and no doubt I'll support those who think ahead.
Anonymous Participant	09/07/04	Survey	Building in hazardous zones, particularly fire, should be mitigated including codes to require retardant materials on roofs and when replacing using those same fire retardant roofing materials.
Anonymous Participant	09/07/04	Survey	If offering tips to owners of newer homes, maybe point out what some of the common problems are. Not sure how many home improvements need to be made to homes that are less than 5 years old.
Anonymous Participant	09/07/04	Survey	Just, let us know the possible hazzards and what we should always have on hand to prepare.
Anonymous Participant	09/08/04	Survey	I don't believe people know which hazards apply to them and to what degree. Example; How many people know that they are in a flood area and their probility factor. Do we know if our homes are strapped for wind or earthquake? I believe we must first identify our potential hazards before we will take any preventive actions.
Anonymous Participant	09/09/04	Survey	To reach more people, use a program like Pets & hazzards.
Anonymous Participant	09/09/04	Survey	I don't think that we should be putting people's homes and jobs in places that we weren't meant to be. If it is a flood zone, it WILL flood someday, if not the first few years or decades it was built, it is called a flood zone for a reason. Same with Earthquake zones, etc. I also don't believe in building over wildnerness areas, we need to keep some of our land wild. Enviornmentalism is extremely important to my family and I.
Anonymous Participant	09/09/04	Survey	Can not offer advice because I am unfamiliar with specific plans in Roseville.

Anonymous Participant	09/10/04	Survey	Communication with the residents is a key factor to succeed on with this plan. It has to be spread among the people to acknowledge it and if possible, print it out in different languages to assure that most people get the information and learn and act from it.
Anonymous Participant	09/10/04	Survey	We were ordered to evacuate during the 1973 bomb explosions. It proved to be unnecessary and very disruptive. We weren't close enough for it to have affected us.
Anonymous Participant	09/10/04	Survey	Its appropriate that the City address this issue. I feel that the City does an excellent job of being proactive in addressing the City's needs. As someone is has worked as a risk management professional for over 25 years, its important the plan focus on the areas of highest risk, i.e., highest consequence and highest likelihood of occurrence. Thanks for your efforts.
Anonymous Participant	09/13/04	Survey	Not sure how I'm supposed to know if the City is prepared or not for such events as listed above. Offer a comments section to your survey!
Anonymous Participant	09/13/04	Survey	If the city truly wants to mitigate hazards, it needs to up staff the fire department to 4 man engine companies and 5 man truck companies plus adding more stations. Because the 9-1-1 system will be severely overtaxed when such situations happen. The fire and police will be the first responders as they do everyday but will be called on first to mitigate the problem. Also if the city takes the approach that mutual aid is going to be the savor to the problem they are gravely mistaken. The resources in placer county are already understaffed on a day to day basis and in a major disaster as in years past with flooding and wildfires the help will not be available due to other agencies having their own issues.
Anonymous Participant	09/13/04	Survey	Dissemination of information all important. I always look at my City of Roseville bill insert (every resident gets a utility bill right?). Email is good for those with access.
Anonymous Participant	09/13/04	Survey	Good luck!
Anonymous Participant	09/14/04	Survey	Since drought is being considered a potential hazard in the Roseville area, I would stop issuing new building permits immediately.
Participants responding: **51**			

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CITY OF ROSEVILLE

City of Roseville - Hazard Preparedness Study

In which age bracket are you?								
Which of the following are already installed at your current residence?	**Overall Percentage**	**Unknown**	**Over 75**	**66 - 75**	**35 - 49**	**50 - 65**	**25 - 34**	**18 - 24**
Smoke detectors	96%	100%	94%	95%	95%	97%	100%	100%
Roof gutters/downspouts	89%	100%	94%	90%	88%	89%	84%	100%
AC/furnace/water heater straps	80%	100%	94%	81%	85%	71%	84%	50%
Double thermal pane windows/doors	79%	100%	89%	80%	81%	81%	65%	25%
First aid kit and medicines	72%	100%	56%	66%	79%	71%	65%	50%
Wireless phone/CB/ham radio	72%	100%	72%	69%	73%	72%	70%	25%
Drip irrigation system	68%	100%	83%	69%	74%	62%	59%	25%
ABC-class fire extinguishers	59%	100%	50%	53%	66%	56%	57%	25%
Battery operated radio or TV	58%	100%	78%	71%	46%	65%	59%	0%
Exterior drainage system	56%	100%	67%	61%	60%	51%	46%	25%
Top floor/attic AC/furnace/heater	49%	100%	39%	24%	62%	46%	49%	0%
Fire retardant roof/exterior	41%	100%	56%	53%	41%	40%	27%	0%
Bolted foundation	36%	100%	50%	37%	29%	41%	32%	25%
Food/water rations	32%	0%	44%	42%	31%	34%	14%	0%
Emergency lighting	32%	100%	28%	46%	27%	35%	24%	0%
Tree/shrub removal or thinning	31%	100%	39%	36%	29%	34%	19%	0%
Roof structural supports	28%	100%	56%	32%	23%	27%	27%	50%
Tempered glass windows/doors	27%	0%	28%	25%	31%	25%	19%	0%
Waterproof/fireproof safe storage	23%	0%	28%	19%	23%	24%	30%	0%
Home emergency plan	22%	100%	33%	24%	20%	21%	16%	50%
Sheer wall(s)	15%	0%	17%	22%	14%	13%	14%	0%
Fire retardant flooring/walls	14%	0%	28%	17%	13%	13%	11%	0%
Chimney supports	13%	0%	11%	8%	13%	14%	14%	0%
Fire escape ladder	4%	0%	0%	0%	9%	1%	3%	0%
Breathing apparatus	3%	0%	6%	0%	2%	3%	5%	0%
Sump Pump	2%	0%	0%	3%	2%	2%	0%	0%
Backup generator	2%	0%	0%	2%	2%	3%	0%	0%
Xeriscape landscaping	2%	0%	0%	3%	2%	2%	0%	0%
Other item	2%	0%	0%	0%	0%	3%	5%	25%
Fire sprinkler system	1%	0%	0%	2%	1%	0%	3%	0%
Flood wall(s)	0%	0%	0%	2%	0%	1%	0%	0%
None of these	0%	0%	0%	0%	1%	0%	0%	0%
# of Respondents: * Respondents reflect number of individuals who participated in survey.	437	1	18	59	164	154	37	4

Enter a threshold rating for this table: 50%

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APPENDIX D.
DOCUMENTATION OF PUBLIC MEETINGS

Summary of Public Meetings

City of Roseville Hazard Mitigation Plan

January 18-19, 2005

January 18, 2005: Terrorism and technological Hazards, Public Meeting

Roseville Civic Center, 311 Vernon Street, Roseville, CA; 6:300 to 8:30 PM

Attendance: Total = 43

27 Members of the public

16 Steering Committee Members, Speakers, or Staff

Summary of presentation: This was a traditional format public meeting where representatives of the Planning team, Roseville Police and Fire departments provided the public information on the following topics:

- The Disaster Mitigation Act
- Purposes for Planning
- The concepts of risk and exposure
- Terrorism and technological hazards
- Brief overview of mitigation alternatives

The media utilized by the multiple presenters during this session was a Power Point type format. Public was given an opportunity to ask questions and provide comment at the end of the presentation. This presentation was advertised via multiple media including a press release, e-mail and the City's "Auto-dialer" system.

January 19, 2005: Natural Hazards Open House

City of Roseville Fire Training Center; 6:00 to 8:00 PM

2030 Hilltop Circle, Roseville CA

Attendance: Total = 41

30 Members of the Public

11 Steering Committee Members, Speakers, or Staff

Meeting summary: This was an open house formatted meeting designed to present the information on natural hazards within the City of Roseville to the public. Tables were set up specific to the following hazards:

- Earthquake
- Flood
- Severe Weather
- Wild Fire
- West Nile Virus and other human health hazards

Members of the planning team, city staff and members of the Steering Committee staffed each table to be able to discuss with the members of the public the information that has been developed specific to each hazard along with a catalog of mitigation possibilities specific to each hazard. There were also representatives from the Red Cross, FEMA and CERT available to talk with the public. Each attendee was given a handout that include information on the purpose for the open house and a questionnaire that asked the specific questions about risk, vulnerability and mitigation opportunities. Six comment forms were submitted by the attendees.

A G E N D A
ROSEVILLE CITY COUNCIL
PUBLIC MEETING – MULTI-HAZARD MITIGATION PLAN
City Council Chambers
311 VERNON STREET
MAY 31, 2005
4:00 P.M. – 6:00 P.M.

1. CALL TO ORDER

2. ROLL CALL

Councilmember:	**Jim Gray**
Councilmember:	*John Allard*
Councilmember:	**Richard Roccucci**
Mayor Pro Tempore:	**Rocky Rockholm**
Mayor:	**Gina Garbolino**

3. PLEDGE OF ALLEGIANCE

4. MEETING PROCEDURES

5. PUBLIC COMMENTS

NOTICE TO THE PUBLIC

All items on the agenda will be open for public comment before final action is taken. Speakers are requested to restrict comments to the item as it appears on the agenda and stay within a five (5) - minute time limit. The Mayor has the discretion of limiting the total discussion time for an item.

6. MULTI-HAZARD MITIGATION PLAN PUBLIC MEETING

The federal Disaster Mitigation Act of 2000 (DMA 2000) requires all local agencies to submit and receive approval of a Multi-Hazard Mitigation Plan (MHMP) by the Federal

Emergency Management Agency in order to receive post-disaster mitigation funds. Communities without a MHMP in place will not be eligible to receive disaster assistance under the Stafford Act, the federal law governing disaster recovery funds.

The purpose of the public meeting is to:

1. Present an overview of the City's Multi-Hazard Mitigation Plan including:
    a. Goals and Objectives of Roseville's planning effort
    b. Natural and Human-caused Hazards identified in Roseville
    c. Proposed Mitigation Measures included in the Plan
2. Facilitate a discussion by the Council and the public regarding preparedness in Roseville
3. Provide an opportunity for public comment
4. Acknowledge the members of the Multi-Hazard Steering Committee

Following the public meeting, staff will incorporate the comments received, complete the draft of the Roseville Multi-Hazard Mitigation Plan, and forward to the appropriate agencies for review and comment. The City Council is tentatively scheduled to adopt the Multi-Hazard Mitigation Plan at its regularly scheduled meeting of Wednesday, July 20, 2005.

7. COUNCIL DISCUSSION

8. ADJOURNMENT

SYNOPSIS - ROSEVILLE CITY COUNCIL
City Council Chambers, 311 Vernon Street

May 31, 2005

1. CALL TO ORDER (04:00 PM)

Mayor Garbolino called the workshop to order.

2. ROLL CALL (04:00 PM)

Roll Call
Present: Councilmember John Allard; Councilmember Jim Gray; Councilmember Richard Roccucci; Mayor Pro Tempore Rocky Rockholm; Mayor Gina Garbolino

3. PLEDGE OF ALLEGIANCE (04:00 PM)

Multi-Hazard Mitigation Steering Committee Chair Grace Keller led the Pledge of Allegiance.

4. MEETING PROCEDURES (04:01 PM)

City Clerk Sonia Orozco announced the procedures for addressing Council.

5. PUBLIC COMMENTS (04:02 PM)

No public comment received.

6. MULTI-HAZARD MITIGATION PLAN PUBLIC MEETING (04:02 PM)

The Federal Disaster Mitigation Act of 2000 (DMA 2000) requires all local agencies to submit and receive approval of a Multi-Hazard Mitigation Plan (MHMP) by the Federal Emergency Management Agency in order to receive post-disaster mitigation funds. Communities without a MHMP in place will not be eligible to receive disaster assistance under the Stafford Act, the federal law governing disaster recovery funds. Following the public meeting, staff will incorporate the comments received, complete the draft of the Roseville Multi-Hazard Mitigation Plan, and forward to the appropriate agencies for review and comment. The City Council is tentatively scheduled to adopt the Multi-Hazard Mitigation Plan at its regularly scheduled meeting of Wednesday, July 20, 2005.

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B. Natural and Human-caused Hazards identified in Roseville
C. Proposed Mitigation Measures included in the Plan
2. Facilitate a discussion by the Council and the public regarding preparedness in Roseville.
3. Provide an opportunity for public comment.
4. Acknowledge the memebers of the Multi-Hazard Steering committee.

053105 - Workshop Staff Report

Deputy City Manager Julia Burrows introduced Grace Keller - Chair of the Multi-Hazard Mitigation Steering Committee, Rob Flaner - Tetra Tech Project Manager, Garth Gaylord - City of Roseville Associate Engineer, Sandie Bumpus - City of Roseville Senior Dispatcher, Don Shingara - City of Roseville Police Sergeant, Jeff Carman - City of Roseville Battalion Chief, and Mike Isom - City of Roseville Project Planner.

Deputy City Manager Julia Burrows made the introduction presentation to Council.

Rob Flaner, Tetra Tech Project Manager made the Community Rating System presentation to Council.

Grace Keller, Chair of the Multi-Hazard Mitigation Steering Committee made the Roseville Plan Methodology presentation to Council.

Deputy City Manager Julia Burrows made the Plan Content presentation to Council.

Associate Engineer Garth Gaylord made the Flood Hazard presentation to Council and announced the City of Roseville as the recipiant of the Operational Excellence Award for the Flood Alert Program.

Rob Flaner, Tetra Tech Project Manager made the Roseville and Community Rating System presentation to Council.

Police Sergeant Don Shingara and Battalion Chief Jeff Carman made the Human-Caused Hazards

presentation to Council.

Senior Dispatcher Sandie Bumpus made the Public Safety Communications presentation to Council.

Deputy City Manager Julia Burrows made the summary presentation to Council.

No public comment received.

Mayor Garbolino recognized those Multi-Hazard Mitigation Steering Committee members in attendance: Grace Keller, Jerry Erickson, Mike Isom, and Jim Williams.

Deputy City Manager Julia Burrows recognized those Multi-Hazard Mitigation Steering Committee members not in attendance: Kim Kelley, Claire Alway, Dave Benedetti, Steve Pease, Dan Dimick, Alan Colombo, Don Snow, Sue Webb, and George Booth.

7. COUNCIL DISCUSSION (05:21 PM)

Council made comments regarding the Multi-Hazard Mitigation Steering Committees presentation.

8. ADJOURNMENT (05:33 PM)

Motion: Adjourn the workshop at 5:35 p.m. to Wednesday, June 1, 1005 at 4:00 p.m. in the City Council Chambers.
Moved by Mayor Pro Tempore Rocky Rockholm, seconded by Councilmember Jim Gray.

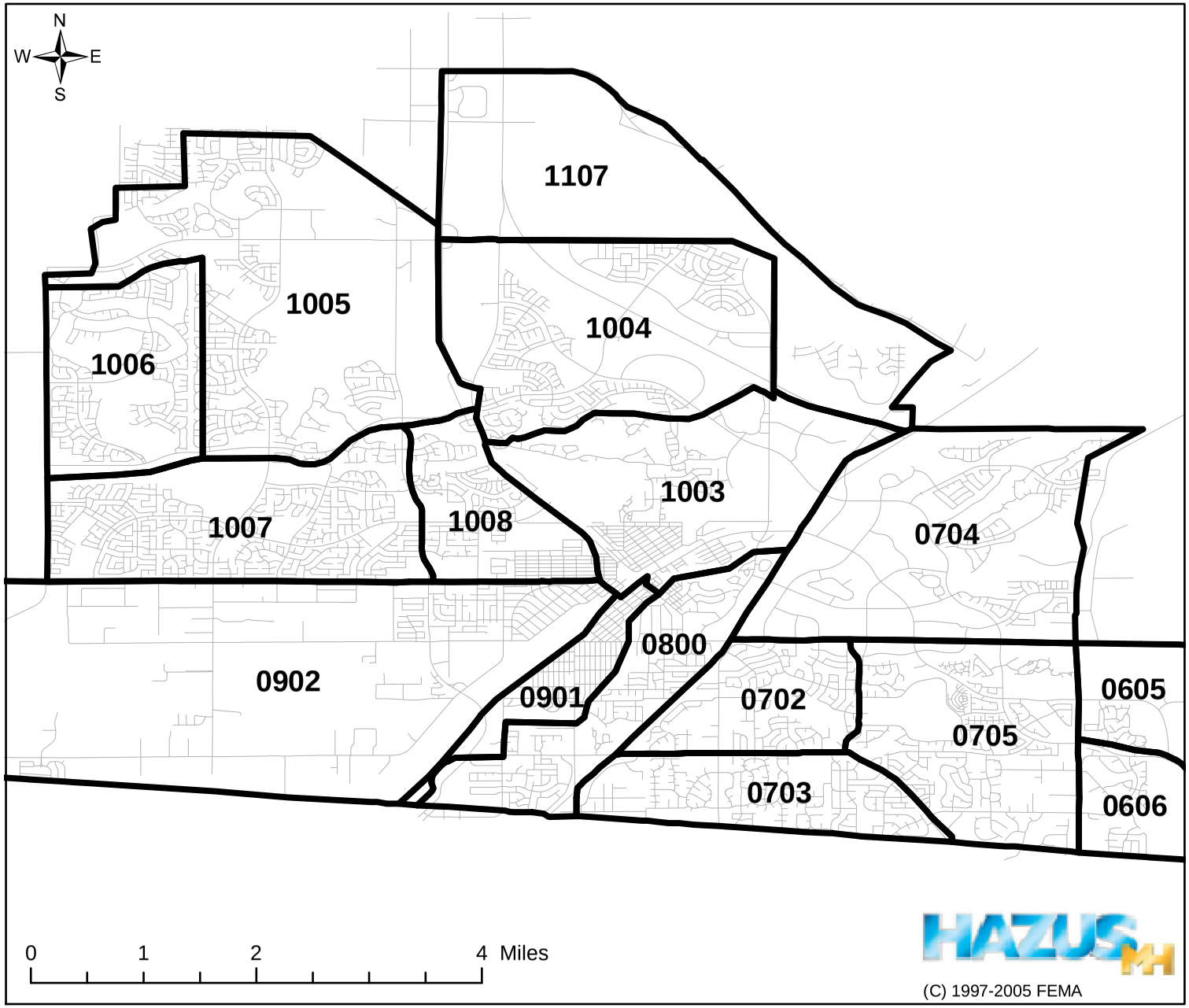
Vote: Motion carried 5-0.
Yes: Councilmember John Allard; Councilmember Jim Gray; Councilmember Richard Roccucci; Mayor Pro Tempore Rocky Rockholm; Mayor Gina Garbolino

Gina Garbolino, Mayor

Sonia Orozco, CMC City Clerk

APPENDIX E.
MAPS

Study Region: Roseville, California
Census Tracts

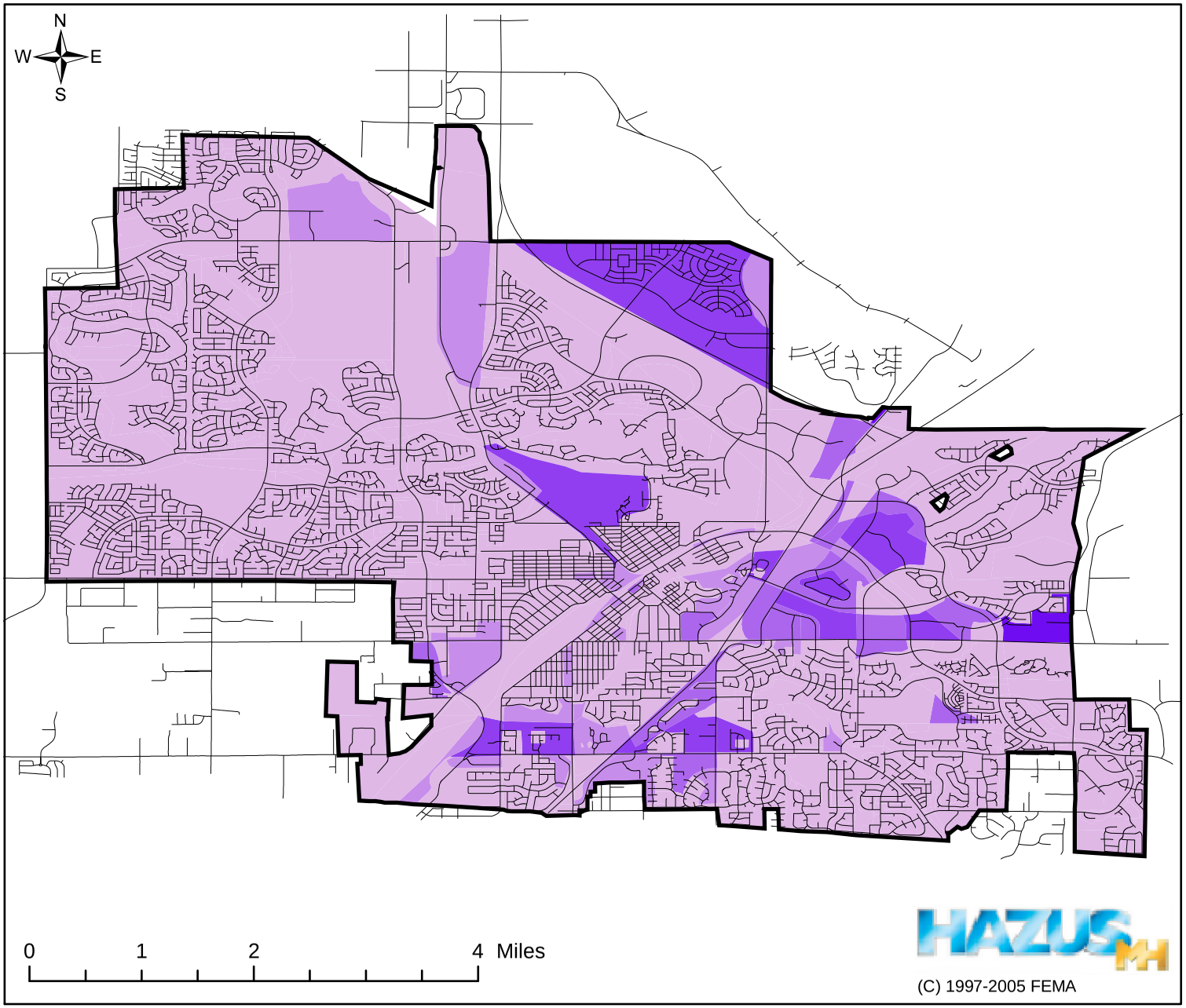


Legend

Roads

Census Tracts

Study Region: Roseville, California
Total Commercial Building Values



Legend

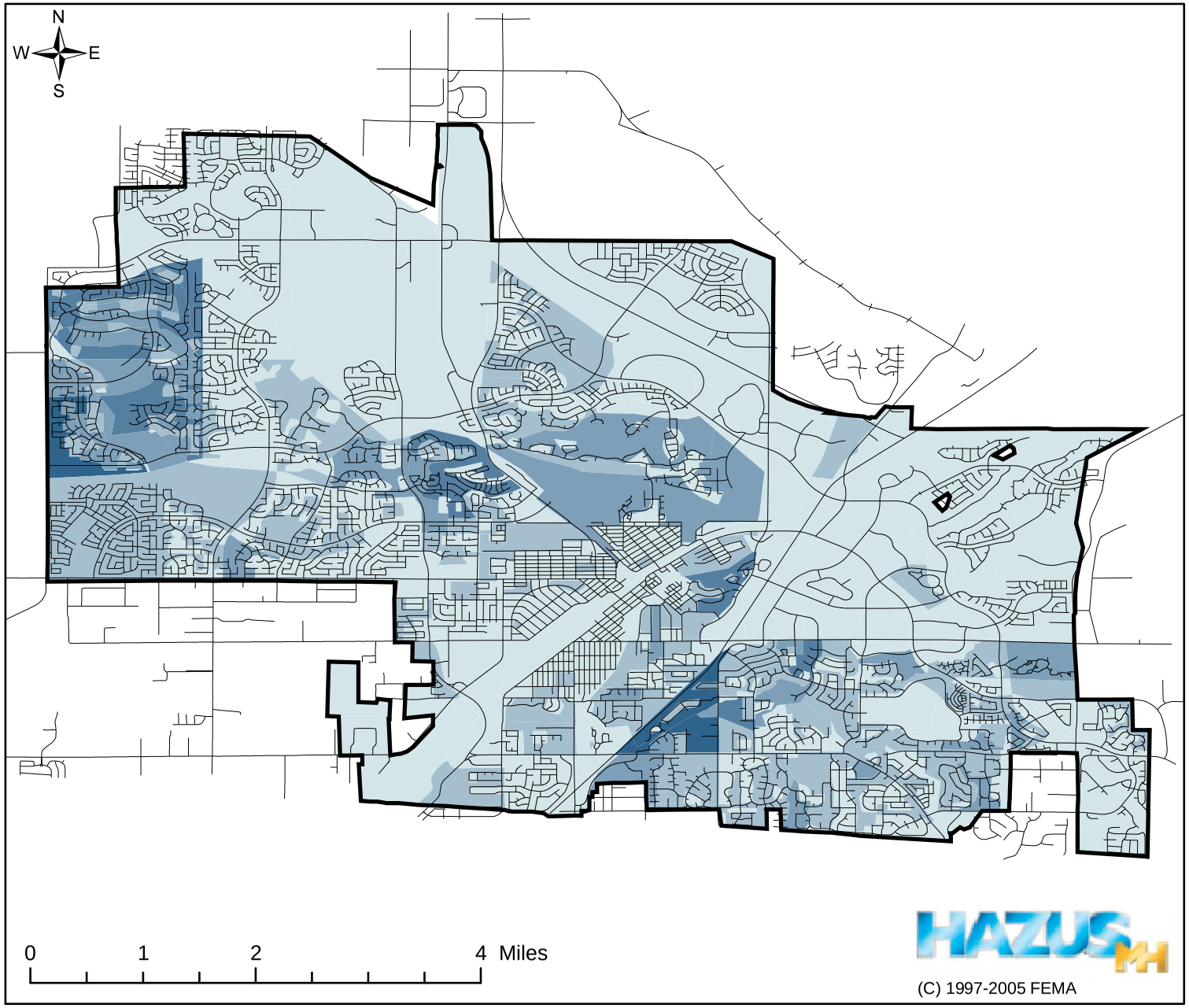
Roads

StudyRegion

Commercial Value (x$1000)

- 0 - 1825
- 1826 - 6505
- 6506 - 14319
- 14320 - 34480
- 34481 - 62503

Study Region: Roseville, California
Elderly Population Distribution



Legend

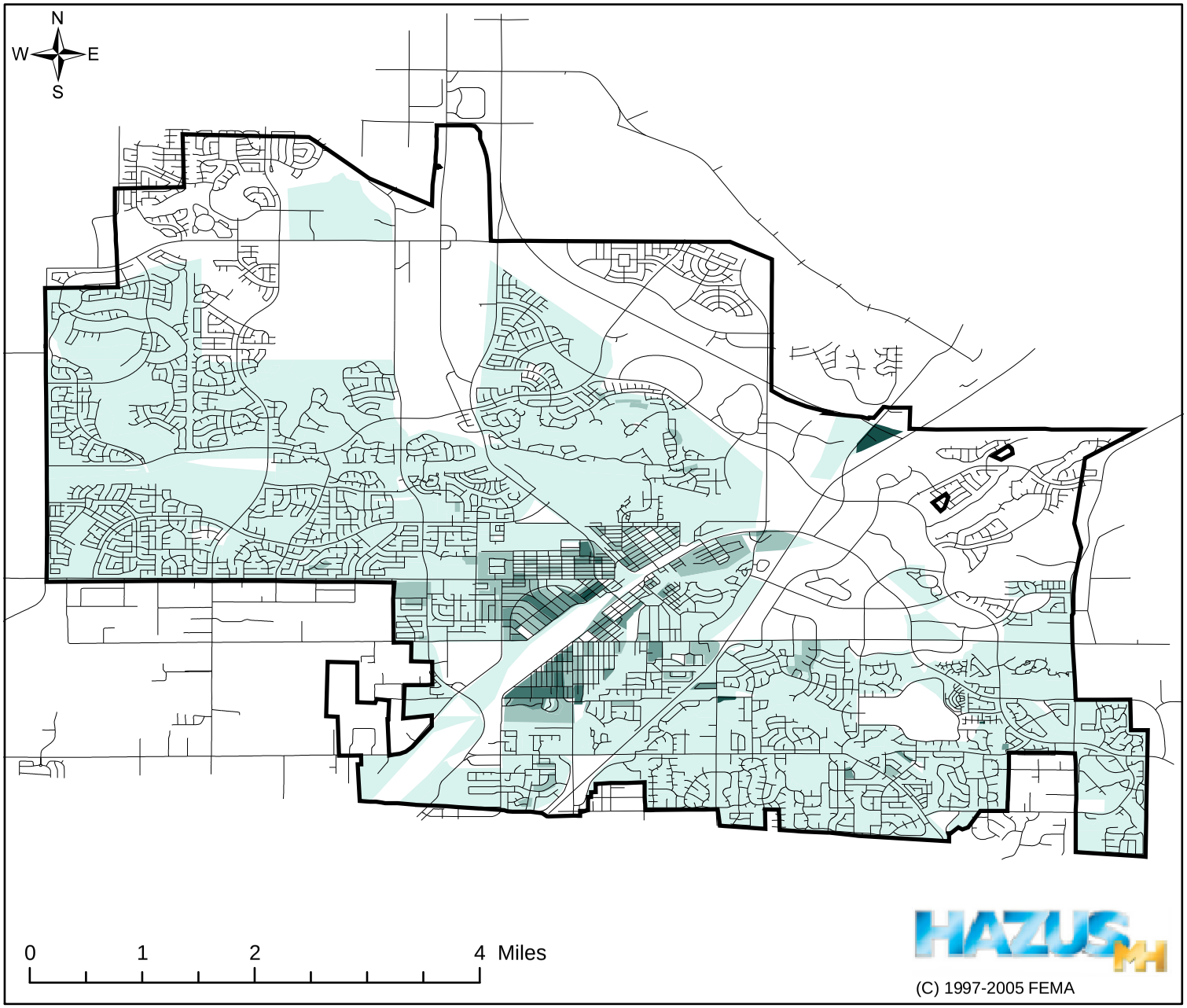
Roads

StudyRegion

Residents 65 and Older

- 0 - 11
- 12 - 35
- 36 - 92
- 93 - 199
- 200 - 312

Study Region: Roseville, California
Hispanic Population



Legend

Roads

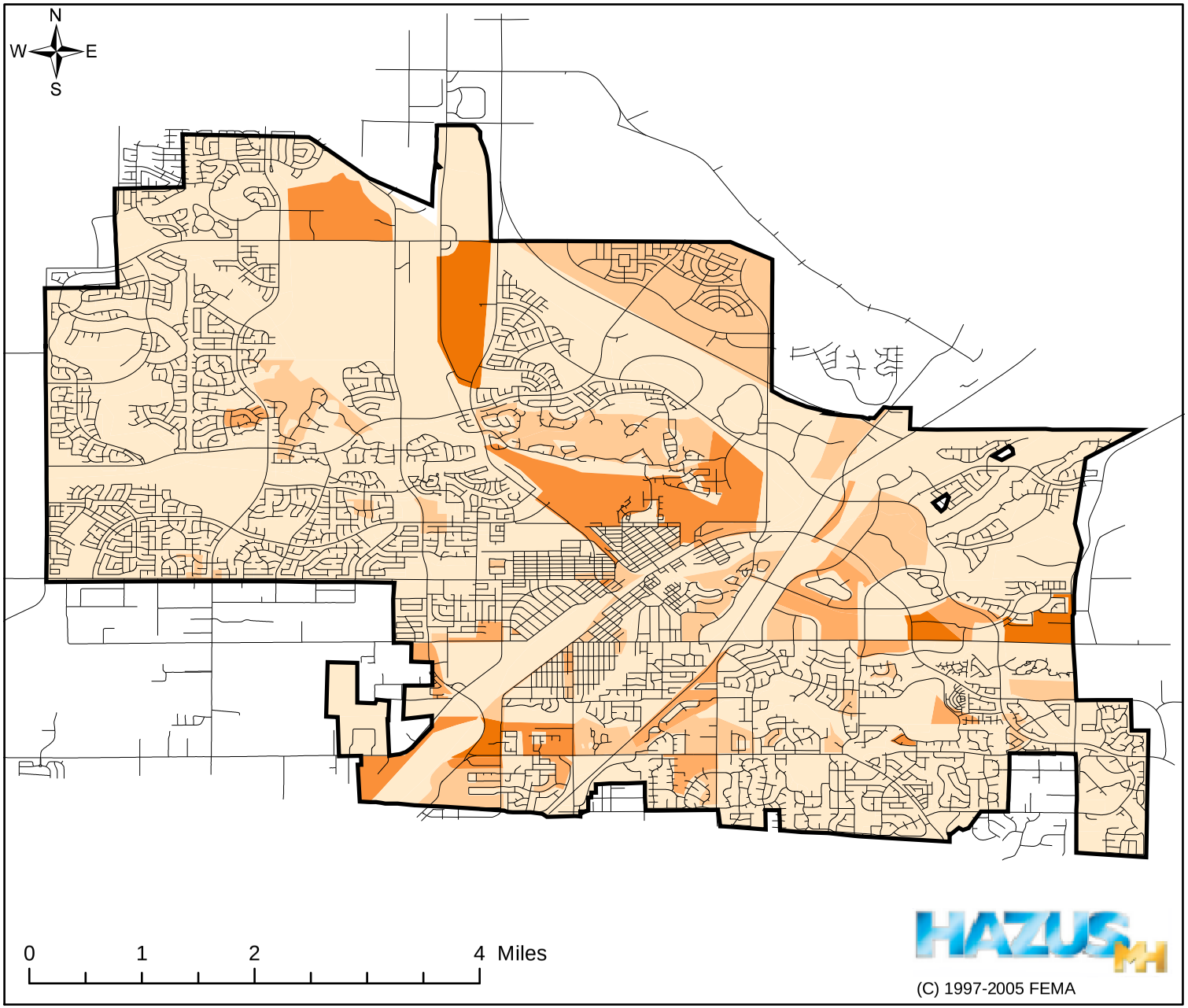
StudyRegion

Population

Hispanic Population (%)

- 0 - 20
- 21 - 40
- 41 - 60
- 61 - 80
- 81 - 100

Study Region: Roseville, California
Total Industrial Building Values



Legend

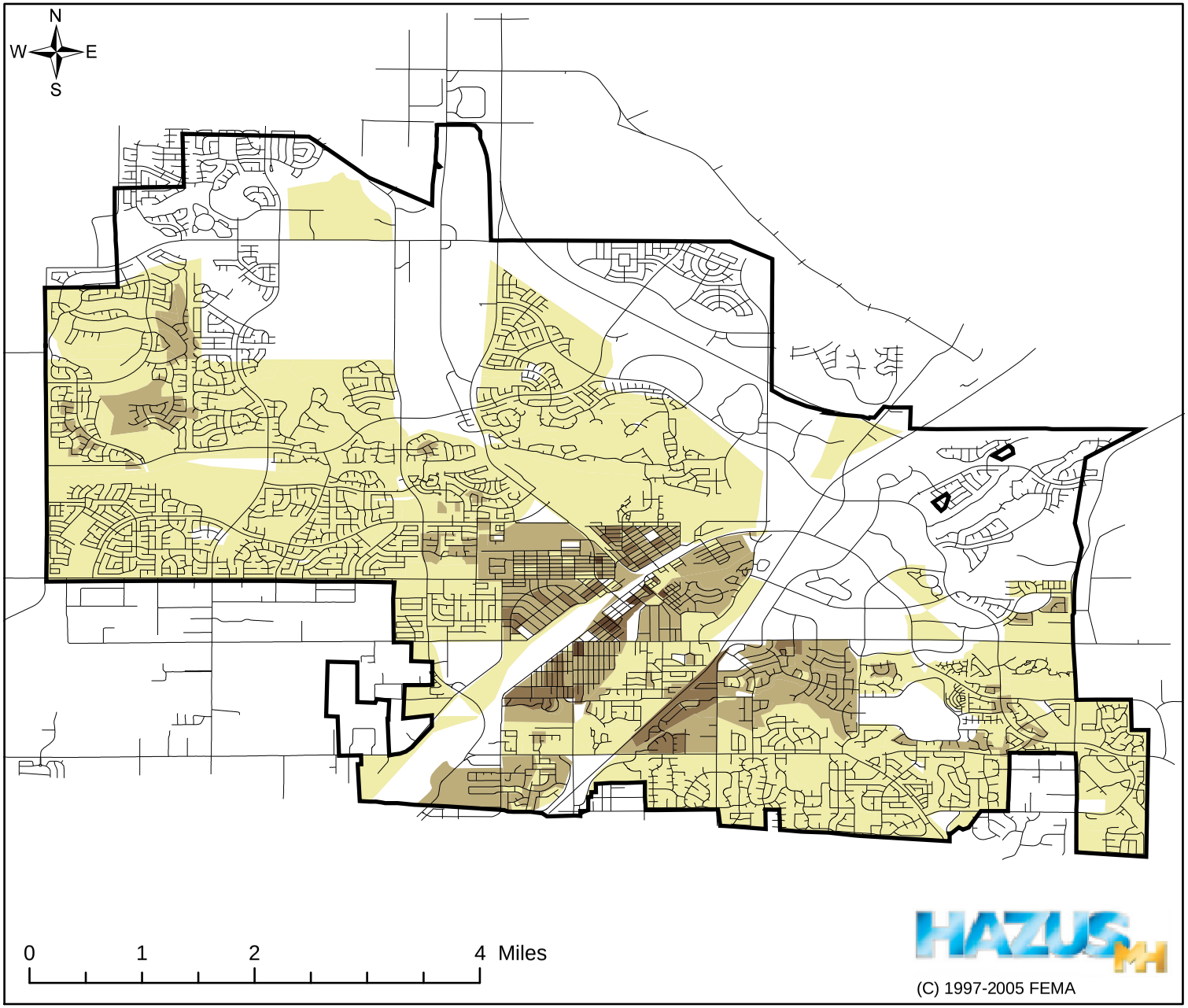
Roads

StudyRegion

Industrial Value (x$1000)

- 0 - 80
- 81 - 452
- 453 - 1461
- 1462 - 3667
- 3668 - 8194

Study Region: Roseville, California
Low Income (<$30,000 Annually) Population



Legend

Roads

StudyRegion

Low Income Pop. (%)

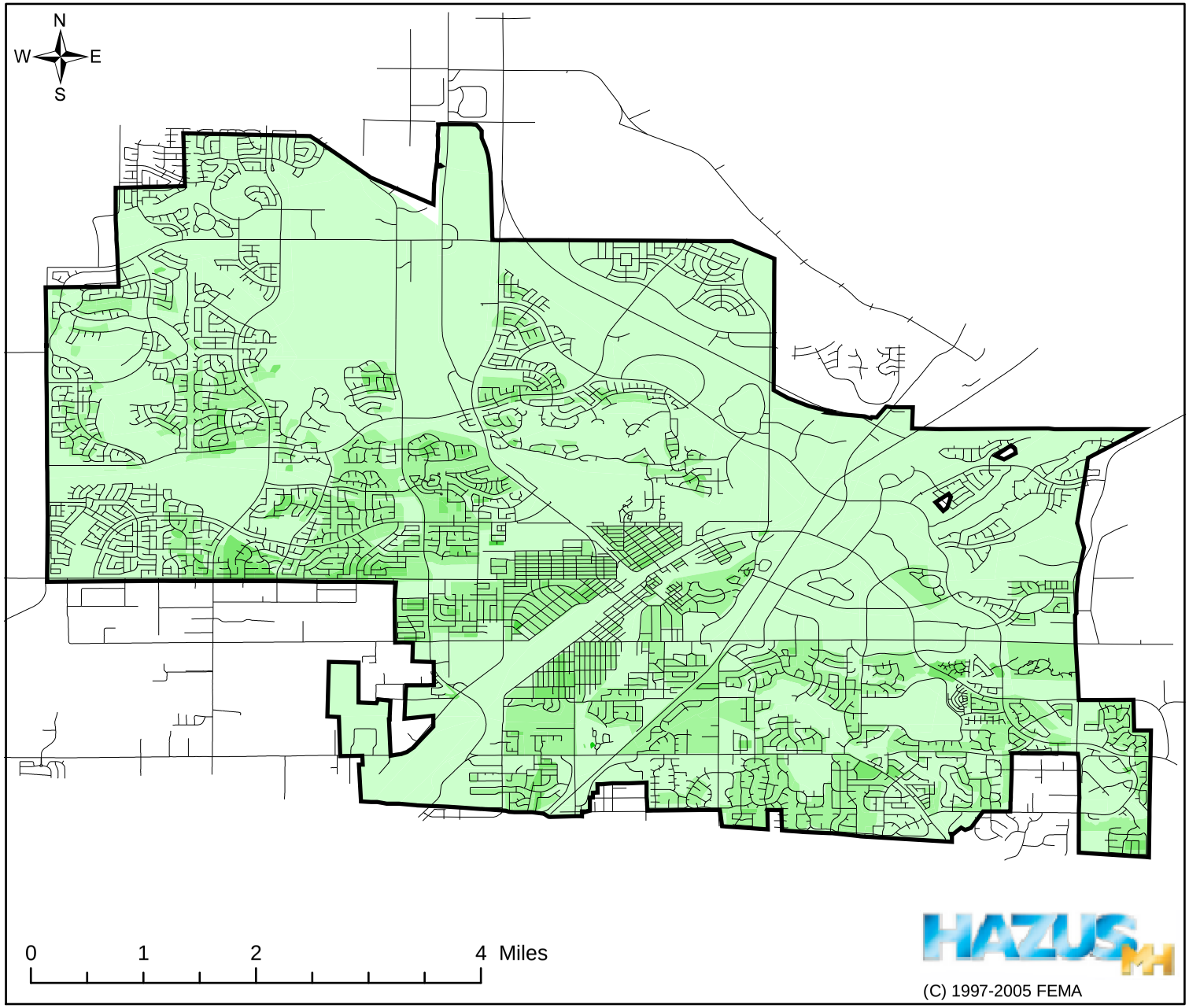
0 - 25

26 - 50

51 - 75

76 - 100

Study Region: Roseville, California
Population Distribution



Legend

Roads

StudyRegion

Population

People/Acre

0 - 5

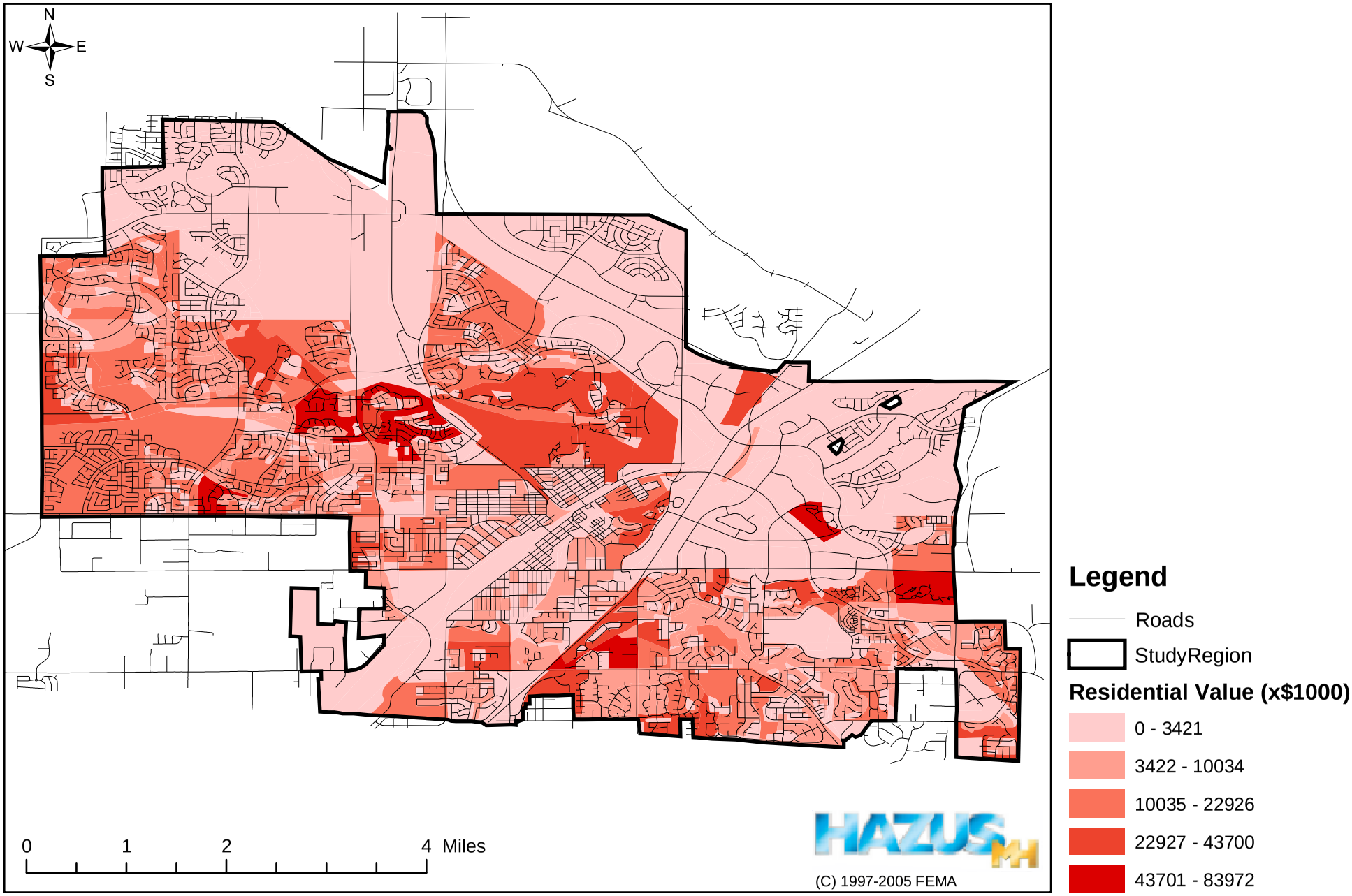
6 - 15

16 - 38

39 - 132

133 - 260

Study Region: Roseville, California
Total Residential Building Values



CITY OF ROSEVILLE
TRADITION•PRIDE•PROGRESS

FILE COPY

COMMUNITY DEVELOPMENT DEPARTMENT
311 Vernon Street, Roseville, CA 95678 (916) 774-5334

NOTICE OF MITIGATED NEGATIVE DECLARATION

PROJECT TITLE:	City of Roseville Multi-Hazard Mitigation Plan
PROJECT LOCATION:	City of Roseville, CA.
DATE:	May 11, 2005
PROJECT APPLICANT:	City of Roseville, Office of the City Manager
LEAD AGENCY:	City of Roseville
CONTACT PERSON:	Michael Isom, Project Planner

PROJECT DESCRIPTION: The federal Disaster Mitigation Act of 2000 (DMA2000) requires all local agencies to submit and receive approval of a Multi-Hazard Mitigation Plan (MHMP) by the Federal Emergency Management Agency in order to receive post-disaster mitigation funds. Communities without a MHMP in place will not be eligible to receive disaster assistance under the Stafford Act, which is the federal law governing disaster recovery funds. The purpose of the federal mandate is to encourage local agencies to plan in advance for any type of hazards or disasters for which the community is at risk and to have programs and projects in place to mitigate the disaster should one ever occur. As required, the City of Roseville MHMP includes the following components: (1) Plan Preparation and Community Outreach; (2) Risk Assessment, which provides the basis for activities proposed to reduce losses from identified hazards; Description of natural hazards in Roseville, including historical information on previous hazard events and probability of future events; Assessment of Roseville's vulnerability to hazard. (3) Mitigation Strategy Mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards; A section that lists and analyzes various options for mitigation with an emphasis on buildings and infrastructure; An action plan describing implementation of mitigation measures (4) Long-Term Plan Maintenance Plan.

DECLARATION

The City of Roseville Environmental Coordinator has determined that the above project will have no significant effect on the environment and is therefore exempt from the requirement of an environmental impact report (EIR). The determination is based on the attached initial study and the following findings:

a) *The project will not degrade environmental quality, substantially reduce habitat, cause a wildlife population to drop below self-sustaining levels, reduce the number or restrict the range of special-status species, or eliminate important examples of California history or prehistory.*
b) *The project does not have the potential to achieve short-term, to the disadvantage of long-term, environmental goals.*
c) *The project will not have impacts that are individually limited, but cumulatively considerable.*
d) *The project will not have environmental effects that will cause substantial adverse effects on human beings, either directly or indirectly.*
e) *No substantial evidence exists that the project will have a negative or adverse effect on the environment.*
f) *The project incorporates all applicable mitigation measures identified in the initial study.*
g) *This mitigated negative declaration reflects the independent judgment of the lead agency.*

Written comments shall be submitted no later than 20 days from the posting date. City Council determination on this Mitigated Negative Declaration is final.

Submit comments to:
Michael Isom, Project Planner
Roseville Planning & Redevelopment Dept.
311 Vernon Street
Roseville, CA 95678

Posting Period: May 11 to May 31, 2005

Initial Study prepared by:

Michael Isom, Project Planner
City of Roseville Department of Planning & Redevelopment

Plan Requirements

The Federal Register of February 26, 2002 provides the detail regarding the Multi-Hazard Mitigation Plan contents and planning process. In summary, the plan must include:

1. Plan Preparation and Community Outreach. *Documentation of the planning process* including how the plan was prepared, who was involved, and how the public was involved.

2. Risk Assessment. A *Risk assessment that* provides the basis for the activities proposed to reduce losses from identified hazards including:

   a. Description of the type, location, and extent of natural hazards in Roseville. The plan needs to include historical information on previous hazard events and probability of future events. When the law was written, the authors did not include technological or man-made hazards. Since September 11, 2001, FEMA recommends that all local governments also include technological or man-made disasters such as terrorism in their Multi-Hazard Mitigation Plans.
   b. A description of Roseville's vulnerability to the hazards described in the plan and its impact on the community including the types of existing and future facilities that would be affected and the total dollar impact. The land uses and development trends need to be identified as well.

3. Mitigation Strategy. A *mitigation strategy* or blueprint for reducing potential losses is also required including:

   a. Mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.

   b. A section that lists and analyzes various options for mitigation with an emphasis on buildings and infrastructure.

   c. An action plan describing how the mitigation measures identified will be prioritized, implemented and administered by the City of Roseville, and

4. Long-Term Plan Maintenance. A *plan maintenance process* to review and update the mitigation plan at least every five years.

5. City Council Approval. *Documentation* that the City Council has formally adopted the mitigation plan. Plans are submitted to the State Hazard Mitigation Officer for initial review and then on to the FEMA office for final approval.

The proposed Multi-Hazard Mitigation Plan reflects the requirements posted in the Federal Register.

This initial study checklist evaluates potential environmental effects of the proposed mitigation strategy in the Plan. The MHMP assesses risk at a citywide level. As such, the mitigation strategies discussed within the plan are necessarily general in nature. Therefore, future individual mitigation projects may need individual CEQA analysis to evaluate more specific project-level environmental effects.

- Following approval of the plan by the City Council, the plan will be submitted to the California Office of Emergency Services (OES), and ultimately the Federal Emergency Management Agency (FEMA).

V. ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages.

☐ Aesthetics	☐ Agriculture Resources	☐ Air Quality
☐ Biological Resources	☒ Cultural Resources	☐ Geology/Soils
☐ Hazards & Hazardous Materials	☐ Hydrology/Water Quality	☐ Land Use/Planning
☐ Mineral Resources	☐ Noise	☐ Population/Housing
☐ Public Services	☐ Recreation	☐ Transportation/Traffic
☐ Utilities/Service Systems		
☐ Mandatory Findings of Significance		

VI. DETERMINATION

On the basis of this initial evaluation:

□ I find that the Proposed Project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

■ I find that although the Proposed Project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the applicant. A MITIGATED NEGATIVE DECLARATION will be prepared.

□ I find that the Proposed Project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

□ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

□ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

Issues				
1. AESTHETICS. *Would the project:*				
a. Have a substantial adverse effect on a scenic vista?	☐	☐	☐	☒
b. Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a State scenic highway?	☐	☐	☐	☒
c. Substantially degrade the existing visual character or quality of the site and its surroundings?	☐	☐	☐	☒
d. Create a new source of substantial light or glare that would adversely affect day or nighttime views in the area?	☐	☐	☐	☒

Discussion:

a-c. The MHMP does not include proposals for new development, or physical modification to existing development, beyond a general recommendation for retrofit of existing structures and infrastructure. Therefore, no aesthetic impacts will occur as a result of the proposed MHMP. Globally, the strategies incorporated in the plan propose consideration of elements of broad scale land development criteria that would be incorporated into the design of future planned unit developments, housing density transfers, and promotion of open space land use in high risk areas. However, policy-level changes would be consistent with the General Plan, and other applicable City standards in the Subdivision Ordinance (RMC Title 18), Community Design Guidelines (Resolution 95-347), and Specific Plan Design Guidelines. Any changes to these policy documents or ordinances would require additional environmental review at the time such changes are proposed.

d. The plan does not propose any actions that would introduce a new source of light or glare.

Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less-Than-Significant Impact	No Impact
3. AIR QUALITY. *Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations: Would the project:*				
a. Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☐	☒
b. Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☐	☐	☐	☒
c. Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	☐	☐	☐	☒
d. Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☐	☒
e. Create objectionable odors affecting a substantial number of people?	☐	☐	☐	☒

Discussion

California Clean Air Act Requirements

Under the California Clean Air Act, Placer County has been designated a "serious non-attainment" area for ozone and a "non-attainment" area for PM10 (particulate matter less than 10 microns in diameter). The Placer County Air Pollution Control District (PCAPCD) is responsible for administration of state and federal air quality standards. In 1991, the PCAPCD adopted its first Air Quality Attainment Plan (AQAP). The AQAP is required by the California Clean Air Act (CCAA), and is designed to bring Placer County into compliance with state ozone standards, which are generally more stringent than current federal ambient standards.

Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less-Than-Significant Impact	No Impact
4. BIOLOGICAL RESOURCES. *Would the project:*				
a. Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☐	☐	☒
b. Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☐	☐	☒
c. Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☐	☐	☒
d. Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of wildlife nursery sites?	☐	☐	☐	☒

Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less-Than-Significant Impact	No Impact
5. CULTURAL RESOURCES. *Would the project:*				
a. Cause a substantial adverse change in the significance of a historical resource as defined in '15064.5?	☐	☒	☐	☐
b. Cause a substantial adverse change in the significance of an archaeological resource pursuant to '15064.5?	☐	☒	☐	☐
c. Directly or indirectly destroy a unique paleontological resource or unique geologic feature?	☐	☒	☐	☐
d. Disturb any human remains, including those interred outside of formal cemeteries.	☐	☒	☐	☐

Discussion

a-b. The mitigation strategy does not include proposals for new development, or physical modification to existing development, beyond a general recommendation for retrofit of existing structures and infrastructure to reduce risks associated with seismic activity (earthquake). The Plan does not identify specific retrofit projects that would require groundbreaking or construction activities. However because the potential exists that older buildings could be considered historically or archaeologically significant structures, or contain historically significant resources, the following mitigation measure would reduce this potential impact to a less than significant level:

M-1: *Prior to seismic retrofit of older buildings, the building will be evaluated by a qualified expert in the field of Cultural Resources, to identify potentially historically or archeologically valuable resources. Should such resources be present, impacts will be mitigated to the extent feasible.*

c-d. The proposed Plan recommends retrofit of structures built prior to UBC requirements for seismic safety. Such structures would be located in existing developed, urbanized areas, and therefore does not include the potential for disturbance of areas identified as having paleontological resources or unique geologic features.

Discussion

a,b. The mitigation strategies do not include proposals for new development, or physical modification to existing development, beyond a general recommendation for retrofit of existing structures and infrastructure. The proposed mitigation strategies within the MHMP are intended to reduce the risks associated with an earthquake or other seismic activity. The strategies include measures intended to educate residents and reduce risks associated with seismic activity, and would likely result in the beneficial impact of retrofitting existing facilities to increase safety, and increasing public awareness regarding appropriate actions to take in the event of an earthquake. No impact will occur.

c,d,e. The mitigation strategies do not include proposals for new development, or physical modification to existing development, beyond a general recommendation for retrofit of existing structures and infrastructure. Therefore, no impact will occur as a result of implementation of the MHMP. When such projects are implemented, compliance with the City of Roseville Grading Ordinance (specifically the City of Roseville Construction Standards and Improvement Standards) during project construction will ensure that any project impacts are less than significant.

Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less-Than-Significant Impact	No Impact
g. Impair implementation of, or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☒
h. Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☐	☐	☐	☒

Discussion

a,b,c,d. The purpose of the Multi-Hazard Mitigation Plan, and the associated mitigation strategies, is to identify, assess, and mitigate the potential for hazards and hazardous materials. Therefore, no adverse impact would occur.

e, f. The City of Roseville is not located within an airport land use plan or within two miles of a public airport or public use airport.

g. The purpose of the MHMP, and the associated mitigation strategies, is to increase preparedness and reduce risks associated with emergency response and evacuation procedures. Therefore, no adverse impact would occur.

h. The MHMP, and the associated mitigation strategies, identify measures to reduce the risks and potential losses associated with wildland fires. Therefore, no adverse impact would occur.

	Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less-Than-Significant Impact	No Impact
g.	Place housing within a 100-year flood hazard area, as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	☐	☐	☐	☒
h.	Place within a 100-year floodplain structures that would impede or redirect flood flows?	☐	☐	☐	☒
i.	Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	☐	☐	☐	☒
j.	Inundation by seiche, tsunami, or mudflow?	☐	☐	☐	☒

Discussion

a,e,f. The MHMP, and associated mitigation strategies, identify measures to reduce the risks and potential losses associated with flooding. The mitigation strategies propose rehabilitation and retrofit programs to reduce local flooding, and would reduce the potential for uncontrolled runoff that could result in violations of water quality standards during severe storm events. Flood control projects generally necessitate permits from state and federal agencies with jurisdiction over creeks and other waterways (i.e., the California Department of Fish and Game, U.S. Army Corps of Engineers, and National Marine Fisheries Service). Mitigation is typically required as conditions of permits issued by those agencies. No adverse impacts would be anticipated from implementation of the proposed Plan. Future projects would be subject to further environmental review and applicable regulatory permits.

b. The proposed mitigation strategy does not include proposals for new development, or physical modification to existing development, beyond general recommendations for retrofit/hardening of infrastructure and older structures. No impacts associated with groundwater depletion would occur.

c,d,g,h. The MHMP, and associated mitigation strategies, identify measures to reduce the risks and potential losses associated with flooding. The mitigation strategies propose rehabilitation and retrofit programs to facilitate proper drainage, reduce local flooding, and would reduce the potential for uncontrolled runoff that could result in violations of water quality standards during severe storm events. Flood control projects generally necessitate permits from state and federal agencies with jurisdiction over creeks and other waterways (i.e., the California Department of Fish and Game, U.S. Army Corps of Engineers, and National Marine Fisheries Service). Mitigation is typically required as

Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less-Than-Significant Impact	No Impact
9. LAND USE AND PLANNING *Would the project:*				
a. Physically divide an established community?	☐	☐	☐	☒
b. Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating on environmental effect?	☐	☐	☐	☒
c. Conflict with any applicable habitat conservation plan or natural community conservation plan?	☐	☐	☐	☒

Discussion

a. The proposed Plan does not include any components that would divide an existing community.

b. The proposed Plan has been prepared consistent with the elements of the City's General Plan.

c. No habitat conservation plans or natural community conservation plans have been adopted by the City of Roseville that could affect the proposed project site. Therefore, the proposed project would not conflict with any habitat conservation plans and no impact would occur.

Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less-Than-Significant Impact	No Impact
11. NOISE. *Would the project result in:*				
a. Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☐	☒	☐
b. Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	☐	☒
c. A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☐	☒
d. A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☒	☐
e. For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒
f. For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒

Discussion

a-d. The mitigation strategy includes proposals for retrofitting existing structures and infrastructure. This work would be subject to the requirements of the City of Roseville Noise Ordinance (RMC Chapter 9.24). The City's Findings for Mitigating Policies and Standards find that projects constructed or operated in compliance with the City of Roseville Noise Ordinance would prevent exposure of persons to, or generation of, noise

Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less-Than-Significant Impact	No Impact
12. POPULATION AND HOUSING. *Would the project:*				
a. Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (e.g., through extension of roads or other infrastructure)?	☐	☐	☐	☒
b. Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☒	☐
c. Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☒	☐

Discussion

a. The MHMP does not propose construction of additional homes or businesses; or expansion of infrastructure that would accommodate population growth. Therefore, no impact will occur.

b, c. The MHMP does not propose removal of existing housing or require relocation of people, other than repetitive loss structures within the designated 100-year floodplain. There are only three identified repetitive loss structures within the City, which would be acquired on a "willing-seller" basis as funds become available. The potential removal of these three structures is insignificant in comparison to the 42,000 dwelling units constructed citywide, and will result in less than significant impacts to population and housing.

Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less-Than-Significant Impact	No Impact
14. RECREATION.				
a. Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	☒
b. Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☐	☐	☐	☒

Discussion

a, b. The purpose of the Multi-Hazard Mitigation Plan, and the associated mitigation strategies, is to identify, assess, and mitigate the potential for natural and technological hazards. The proposed Plan does not include components that would affect the use or demand for recreational facilities.

Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less-Than-Significant Impact	No Impact
turnouts, bicycle racks)?				

Discussion

a-b. The proposed Plan does not include measures that would generate additional vehicle trips or otherwise create adverse effects to traffic. No impact would occur.

c. The proposed project would not introduce air traffic to the area or in any way alter existing air traffic patterns. No impact on air traffic patterns would occur.

d. The proposed Plan does not include measures that would increase hazards. No impact would occur.

e. The proposed Plan is intended to facilitate and improve emergency access and response. No impact would occur.

f. The proposed Plan does not include measures that would impact parking capacity. No impact would occur.

g. The proposed Plan does not include any measures that would affect alternative transportation programs. No impact would occur.

Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less-Than-Significant Impact	No Impact
solid waste disposal needs?				
g. Comply with federal, state, and local statutes, and regulations related to solid waste?	☐	☐	☐	☒

Discussion

a, c-e. The proposed Plan includes measures intended to upgrade existing drainage facilities, which would result in a beneficial impact to stormwater drainage and water quality. Construction impacts would be subject to environmental review to identify and mitigate potential project-specific impacts. No adverse impacts would occur as a result of MHMP implementation.

b. Mitigation strategy F-18 recommends modifications to the City's Dry Creek Wastewater Treatment Plant to raise the secondary settling pond levees above the 100-year flood elevation. Any future project would be subject to environmental review at the time such a project is proposed. No impact will occur as a result of MHMP implementation.

f, g. The proposed MHMP does not include any measures that would affect the generation of solid waste.

potential to adversely affect the identified aspects of the environment will be mitigated to less than significant levels. Adoption of the MHMP will not have any direct or indirect substantial adverse effects on human beings.

EXECUTIVE SUMMARY

INTRODUCTION

The Disaster Mitigation Act (DMA; Public Law 106-390) is the latest federal legislation enacted to encourage and promote proactive, pre-disaster planning as a condition of receiving financial assistance under the Robert T. Stafford Act. The DMA emphasizes planning for disasters before they occur. It established a pre-disaster hazard mitigation program and new requirements for the national post-disaster hazard mitigation grant program (HMGP).

The DMA encourages state and local authorities to work together on pre-disaster planning, and it promotes sustainability as a strategy for disaster resistance. "***Sustainable hazard mitigation***" includes the sound management of natural resources, local economic and social resiliency, and the recognition that hazards and mitigation must be understood in the largest possible social and economic context. The enhanced planning network called for by the DMA helps local governments' articulate accurate needs for mitigation, resulting in faster allocation of funding and more cost-effective risk reduction projects.

Using this initiative as a foundation for proactive planning, the City of Roseville developed this Hazard Mitigation plan in an effort to reduce future loss of life and property resulting from disasters. It is impossible to predict exactly when and where these disasters will occur, or the extent to which they will impact the City. However, with careful planning and collaboration among public agencies, stakeholders and its citizens, it is possible to minimize the losses that can occur from disasters.

Hazard Mitigation is defined as a method that reduces or alleviates the loss of life, personal injury and property damage that can result from a disaster through long and short-term strategies. Strategies such as planning, policy changes, programs, projects and other activities that can mitigate the impacts of hazards on the City of Roseville. The responsibility for hazard mitigation lies with many including: private property owners, business and industry, and local, state and federal government.

PLAN PURPOSE

Building on a tradition of progressive planning and past mitigation successes, The Roseville planning team set out to develop a plan that would meet multiple objectives. These objectives are as follows:

- To develop a plan that would meet or exceed program requirements specified under the Disaster Mitigation Act.
- To develop a plan that not only met state and federal requirements, but also would meet the needs of the City. Therefore it was determined that this plan would include Human Caused hazards, which are not required under the DMA.
- The Plan development would follow a script prescribed by the Community Rating System so that Roseville could meet CRS classification Prerequisites, clearing the way for it to become the very first CRS Class 1 community in the nation.
- Coordinate existing, on going plans and programs such that high priority initiatives and projects that will mitigate the possible impacts of disasters will be funded and implemented.

Phase 3—Develop the Mitigation Plan

Using the information garnered under phases 1 and 2, the Steering Committee and the Planning Team assembled a planning document to meet the requirements of the DMA and CRS programs. The first task was to develop a set of goals and objectives for the plan. Once these planning elements were established, the steering committee with support from the technical subcommittee performed a series of facilitated exercises with the intent to generate the following parameters of this plan:

- Rank the relative risk according to the exposure to the City.
- Identify capabilities.

  Identify strengths, weaknesses, obstacles and opportunities.
- Create a catalog of mitigation alternatives.
- Select mitigation initiatives and prioritize these initiatives, emphasizing benefits vs. costs when appropriate.

Phase 4—Implement, Evaluate and Revise the Plan

This plan includes a plan maintenance section that details the formal process that will ensure the City of Roseville's Hazard Mitigation Plan remains and active and relevant document. The plan maintenance process includes a schedule for monitoring and evaluating the plan's progress annually and producing a plan revision every five years. This process seeks to keep a steering body that meets the criteria of the original steering committee intact to perform this annual review. This phase includes strategies for continued public involvement and incorporation of the recommendations of this plan into other planning mechanisms of the City such as the General Plan, Capital Improvement Plan, Building Code, and Development Design Guidelines.

HOW THE PLAN IS ORGANIZED

The City of Roseville Hazard mitigation Plan is organized into 5 basic parts that highlight the phases of the plans development. Part I contains preceding documents such as the table of contents, executive Summary, plan point of contact and acknowledgements. Part 2 of the plan contains a detailed description of the plan development process including: purposes for planning, scope of work, organization of resources, an overview of public involvement and a chronology of plan develo0pment milestones. Part 3 contains the risk assessment for the plan including: a profile of the city, identification of hazards, and inventory of assets, a vulnerability assessment and a ranking of risk. Part 4 contains the mitigation strategy for the plan that includes: goals and objectives, a review of alternatives and an action plan. Part 5 contains a strategy for plan maintenance, implementation and coordination with other planning mechanisms within the city.

MITIGATION GOALS AND OBJECTIVES

The following are the goals and objectives identified by the steering committee for this plan:

- **Goals**
  - G-1: Protect lives and reduce injury.
  - G-2: Promote hazard mitigation as an integrated policy.

- The initiative by hazard addressed
- Goals and objectives addressed
- Lead agency (s) for implementation
- Estimated benefits
- Estimated costs
- Timeline for implementation
- Sources of funding
- Prioritization

For the purposes of this document, mitigation initiatives are defined as activities designed to reduce or eliminate losses resulting from disasters.

Although one of the driving influences for preparing this plan was grant funding eligibility, this is not just a "how to get money from FEMA" plan. It was very important to the City and the Steering Committee to look at initiatives that will work through all phases of emergency management. Some of the initiatives outlined in this plan and the mitigation catalog that guided their selection are not grant eligible—grant eligibility was not the focus of the selection. Rather, the focus was the initiatives' effectiveness in achieving the goals of the plan and whether they are within the city's capabilities. A summary of the hazard mitigation initiatives identified by this plan can be found in table ES-1.

TABLE ES.1:SUMMARY OF HAZARD MITIGATION INITIATIVES

Initiative #	Hazard	Mitigation Initiative	Lead Agency	Time line	Priority
D-1	Drought	Perform a groundwater recharge feasibility study to determine the most cost-effective way to replenish groundwater resources within Roseville.	Environmental Utilities District (EUD)/Public Wks	Long Term	Medium
D-2	Drought	Implement aquifer storage and recovery program that utilizes direct injection technique in areas identified as appropriate for this technique	EUD	Short term, on-going	Medium
D-3	Drought	Continue to implement EUD's recycled water program and seek all opportunities to expand its coverage focusing first on the Sunset Industrial area. T	EUD	On-going	High
D-4	Drought	Promote active water conservation techniques and strategies to private property owners through Roseville sponsored outreach projects such as printed media and the City's website.	Roseville Public Information Office	Short term on-going	High
EQ-1	Earthquake	Perform building specific, structural seismic vulnerability assessment of City owned critical facilities, including infrastructure, which were constructed prior to 1980.	Public Works	Long Term	Medium

TABLE ES.1:SUMMARY OF HAZARD MITIGATION INITIATIVES					
Initiative #	Hazard	Mitigation Initiative	Lead Agency	Time line	Priority
F-4	Flood	Continue the City's outreach program to the flood-prone property owners and the citizens of Roseville. This program is to help make them aware of the flood threat and how best to deal with it.	Public works	On-going	High
F-5	Flood	Continue to pursue a regional approach to flood issues by remaining actively involved in the Placer County Flood Control District (PCFCD).	Public Works	On-going	High
F-6	Flood	Continue City coordination with other agencies on issues of flood control. Coordination between the City and adjacent jurisdictions occurs through several mechanisms including the distribution of development proposals for review and comment.	Planning, Public Works	On-going	High
F-7	Flood	Continue to develop, implement, and expand the Flood Alert and Early Warning Program systems and integrate the systems with other local jurisdictions to form a regional warning program.	Public Works	Short Term	High
F-8	Flood	Ensure that future specific plans and specific plan amendments are consistent with the goals and policies of the General Plan. The specific plans shall include the designation and preservation of floodplain areas and adjacent habitat.	Planning, Public Works	Short Term	High
F-9	Flood	Monitor and regularly update City flood studies, modeling and associated land use, zoning, and other development regulations. Update the City's flood studies, modeling, and regulations at a minimum of every five (5) years, or whenever information becomes available that would significantly modify previous data.	Public Works	Short Term	Medium
F-10	Flood	Require a master drainage plan as part of the approval process for all specific plans and large development projects as determined by the Public Works Director.	Planning, Public Works	Short Term	High
F-11	Flood	Continue the Parks and Recreation Department's regular Creek maintenance program within the City's creeks and floodplain areas.	Parks and Recreation	On-going	Medium
F-12	Flood	Continue the annual inspection and maintenance of the City's storm drain systems. Review after every major storm on how the system functioned and performed. This program removes debris that could contribute to blockage of the storm drain system.	Street Department	On-going	Medium

TABLE ES.1:SUMMARY OF HAZARD MITIGATION INITIATIVES					
Initiative #	Hazard	Mitigation Initiative	Lead Agency	Time line	Priority
		this hazard using the best available date to gage the true vulnerability to this hazard.			
LS-2	Landslide	Implement soil testing standards under the International Building Code (IBC) as an "alternative means" code until the IBC is formally adopted as the California State Building Code	Community Development	On-going Short Term	High
LS-3	Landslide	Continue to implement policies adopted by the General Plan that promote open space land uses within identified steep slope areas of Roseville.	Planning	On-going	High
HC-1	Human Caused	Incorporate Crime Prevention Through Environmental Design (CPTED) strategies into future enhancements/revisions to the Community Design Guidelines.	Planning	Short term	High
HC-2	Human Caused	Commit support to the Sacramento Urban Area Security Initiative (SUASI) in the form of staff support from the City of Roseville Public safety departments.	Police/Fire	Short term	High
HC-3	Human Caused	Enhance emergency response capability of the City by contingency planning for specific events based on identified vulnerabilities.	Police/Fire	Short Term On-going	High
HC-4	Human Caused	Seek to establish appropriate staffing levels of public safety personnel to address vulnerabilities identified.	City Council	Short Term	High
HC-5	Human Caused	Prepare a site specific vulnerability assessment of City owned Critical Facilities that utilize the best available science and technology with regards to this hazard.	Police/Fire/Planning	Long Term	Medium
HC-6	Human Caused	Develop and enhance a Continuity Of Operations Plan (COOP) specific to this hazard.	Police/Fire	Short Term, on-going	Medium
HC-7	Human Caused	Enhance camera surveillance program to improve security at electrical substations, receiving stations and energy park.	Roseville Electric	Short Term	High
HC-8	Human Caused	Address vulnerabilities identified in the vulnerability assessment of water facilities performed by EUD in response to EPA initiative.	EUD	Long Term	Medium
HH-1	Human Health	Continue on-going program of conversion of overhead utilities to underground service.			

TABLE ES.1:SUMMARY OF HAZARD MITIGATION INITIATIVES					
Initiative #	Hazard	Mitigation Initiative	Lead Agency	Time line	Priority
MH-4	Multiple Hazards	Review existing automatic/mutual aid agreements with outside public safety agencies to identify opportunities for enhancement.	Police/Fire	Short Term	High
MH-5	Multiple Hazards	Establish a post-disaster action plan to be part of the City Continuity of Operations Plan (COOP) that will include the following elements: • Procedures for public information • Post disaster damage assessment • Grant writing • Code enforcement • Redundant operations	Police/Fire, Planning	Short Term	High
MH-6	Multiple Hazards	Relocate City Emergency Operations Center out of the floodplain, and construct new facility to current seismic standards. This project will mitigate the impacts of 3 hazards: Flood, Earthquake and Human Caused hazards.	Police/Fire	Short Term	High

IMPLEMENTATION

Full implementation of the recommendations of this plan will take time and resources. This plan reflects an adaptive management approach in that specific recommendations and plan review protocol are provided to evaluate changes in vulnerability and action plan prioritization after the plan's adoption. The true measure of the plan's success will be its ability to adapt to the ever changing climate in hazard mitigation. Funding resources will come and go with great irregularity as will programmatic changes based on new state or federal mandates. Roseville has a long standing tradition of progressive, proactive response to issues that may impact its citizens. This tradition was carried over into the development of this plan. The Roseville City Council will assume the responsibility of adopting the recommendations of this plan and committing city resources towards its implementation. Roseville's track record in the mitigation of hazards impacting its citizens is exemplary. The framework established by this plan will help maintain this tradition in that it identifies a strategy that maximizes the potential for implementation based on available and potential resources. It makes a commitment for the city to pursue initiatives where the benefits of a project exceed the costs of the project. And most importantly, it developed this plan with extensive public input. These are all parameters that have proven successful for the City of Roseville in its past planning efforts and will set the stage for successful implementation of the recommendations of this plan.