

City of Rancho Cucamonga Local Hazard Mitigation Plan 2021



Photo: Leo Jarzomb



Cal OES/FEMA Review Draft

May 2021

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Chapter 1 – Introduction

Plan Purpose and Authority

Hazard events can lead to injuries or death, affect the overall health and safety of a community, damage or destroy public and private property, harm ecosystems, and disrupt key services. Although the hazard event itself often gets the most attention, it is only one part of a larger emergency management cycle.

Emergency planners and responders can take steps during the response, recovery, mitigation, and preparedness phases of the cycle to minimize the harm caused by a disaster. This Local Hazard Mitigation Plan (LHMP) focuses on optimizing the mitigation phase of the cycle. Mitigation involves making a community more resilient so that when hazard events do ultimately occur, the community suffers less damage and can recover more quickly and effectively. It differs from preparedness, which involves advanced planning for how best to respond when a disaster occurs or is imminent. For example, a policy to make homes structurally stronger so they suffer less damage during an earthquake is a mitigation action, while fully equipping emergency shelters to accommodate people who lose their homes in an earthquake is a preparedness action. Some activities may qualify as both.

The City of Rancho Cucamonga (City), like other communities, could potentially suffer severe harm from hazard events, and although large disasters may cause widespread devastation, even smaller disasters can have substantial effects. The City cannot make itself completely immune to hazard events, but this LHMP can help make the community a safer place to live, work, and visit. This LHMP provides a comprehensive assessment of the threats that the City faces from natural and human-caused hazard events and a coordinated strategy to reduce these threats. It identifies resources and information that can help community members, City staff, and local officials understand local threats and make informed decisions. The LHMP can also support increased coordination and collaboration between the City, other



KEY TERMS

HAZARD EVENT: AN EMERGENCY DUE TO A NATURAL OR HUMAN-CAUSED EVENT THAT HAS THE POTENTIAL TO CAUSE HARM.

HAZARD MITIGATION: ANY SUSTAINED ACTION OR SET OF ACTIONS TAKEN TO REDUCE OR ELIMINATE IMPACTS TO PEOPLE AND PROPERTY FROM EVENTS ASSOCIATED WITH NATURALLY EXISTING OR HUMAN-CREATED HAZARDS.

RESILIENCE: THE "CAPACITY OF ANY ENTITY—AN INDIVIDUAL, A COMMUNITY, AN ORGANIZATION, OR A NATURAL SYSTEM—TO PREPARE FOR DISRUPTIONS, TO RECOVER FROM SHOCKS AND STRESSES, AND TO ADAPT AND GROW FROM A DISRUPTIVE EXPERIENCE."¹

¹ Rodin, J. 2014. The Resilience Dividend: Managing Disruption, Avoiding Disaster, and Growing Stronger in an Unpredictable World. New York: Public Affairs.

public agencies, local employers, service providers, community members, and other key stakeholders.

Federal Authority

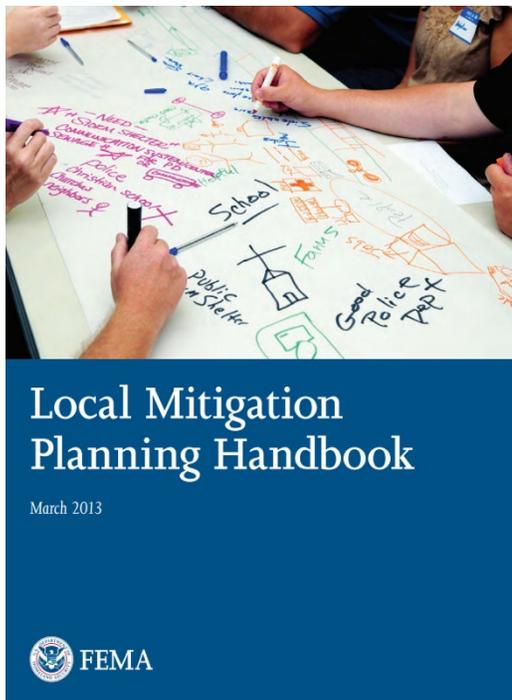
The City is not required to prepare an LHMP, but state and federal regulations encourage it. The federal Robert T. Stafford Disaster Relief and Emergency Act, amended by the Disaster Management Act of 2000, creates a federal framework for local hazard mitigation planning. It states that jurisdictions that wish to be eligible for federal hazard mitigation grant funding must prepare a hazard mitigation plan that meets a specific set of guidelines and submit this plan to the Federal Emergency Management Agency (FEMA) for review and approval. These guidelines are outlined in the Code of Federal Regulations, Title 44, Part 201, and discussed in greater detail in FEMA's Local Mitigation Plan Review Tool.

State Authority

CALIFORNIA GOVERNMENT CODE SECTIONS 8685.9 AND 65302.6

California Government Code Section 8685.9² limits the State of California's share of disaster relief funds paid out to local governments to 75% of the funds not paid for by federal disaster relief efforts except when the jurisdiction has adopted a valid hazard mitigation plan consistent with the Disaster Management Act of 2000. This plan must be incorporated into the hazard mitigation plan in the jurisdiction's general plan. In these cases, the State may cover more than 75% of the remaining disaster relief costs.

All cities and counties in California must prepare a general plan, which must include a safety element that addresses various hazard conditions and other public safety issues. The safety element may be a stand-alone chapter or incorporated into another section, as the community wishes. California Government Code Section 65302.6 indicates that a community may adopt an LHMP into its safety element if the LHMP meets applicable state requirements. This adoption allows communities to use the LHMP to satisfy state requirements for safety elements. As the General Plan is an overarching long-term plan for community growth and development, incorporating the LHMP into it creates a stronger mechanism for implementing the LHMP. This LHMP and future updates will be integrated into the City's General Plan Safety Element.



FEMA's Local Mitigation Planning Handbook, last updated in 2013, is one of the key guidance documents for local communities in preparing hazard mitigation plans.

² also known as Assembly Bill 2140

CALIFORNIA GOVERNMENT CODE SECTION 65302 (G)(4)

California Government Code Section 65302 (g)(4)³ requires that the safety element of a community's general plan address the hazards created or exacerbated by climate change. The safety element must identify how climate change is expected to affect the community's hazard conditions and include measures to adapt and be more resilient to these anticipated changes.

Because the LHMP can be incorporated into the safety element, including these items in the LHMP can satisfy the state requirement. SB 379 requires that climate change be addressed in the safety element when the LHMP is updated after January 1, 2017, for communities that already have an LHMP, or by January 1, 2022, for communities without one. This LHMP is consistent with current standards and regulations, as outlined by the California Office of Emergency Services (Cal OES) and FEMA. It uses the best available science, and its mitigation actions/strategies reflect best practices and community values. It meets the requirements of the current state and federal guidelines and makes the City eligible for all appropriate benefits under state and federal law and practices. Note that while FEMA is responsible for reviewing and certifying this LHMP, and Cal OES is responsible for conducting a preliminary review, it does not grant FEMA or Cal OES any increased role in the governance of the City, nor authorize either agency to take any specific action in the community.

Plan Organization and Use

The Rancho Cucamonga LHMP is both a reference document and an action plan. It has information and resources to educate readers and decision-makers about hazard events and related issues and a comprehensive strategy that the City and community members can follow to improve resilience in the City. It is divided into the following chapters:

- Chapter 1: Introduction. This chapter describes the Plan's background, its goals and objectives, and the process used in its development.
- Chapter 2: Community Profile. This chapter discusses Rancho Cucamonga's history, its physical setting and land use, its demographics, and other important community characteristics.
- Chapter 3: Hazard Assessment. This chapter identifies and describes the hazards that pose a threat to Rancho Cucamonga and discusses past and future events and the effects of climate change.
- Chapter 4: Vulnerability Assessment. This chapter describes each hazard's threat to Rancho Cucamonga's key facilities and community members, including socially vulnerable individuals.
- Chapter 5: Mitigation Strategy. This chapter lists the mitigation actions to reduce Rancho Cucamonga's vulnerability to hazard events and provides an overview of the community's existing capabilities to improve hazard resilience.
- Chapter 6: Plan Maintenance. This chapter summarizes implementing, monitoring, and updating the LHMP and opportunities for continued public involvement.

³ also known as Senate Bill (SB) 379

Previous Rancho Cucamonga LHMP

On March 5, 2014, City Council adopted the City of Rancho Cucamonga Local Hazard Mitigation Plan. The City received FEMA approval for the plan in 2013, allowing the City to become eligible for FEMA hazard mitigation grant-funding sources. This plan expired on March 5, 2019.

Since the City had a previous plan, this LHMP is considered an update. As required, this update provides new data and updated information that builds on the previous plan. The following key areas will ensure an accessible review of the Plan:

Plan Goals – The City updated the Plan Goals to reflect an updated and expanded understanding of the key hazards of concern. These goals address future issues the City hopes to address during the plan implementation period.

Community Profile – The City updated the Community Profile to include updated information regarding City characteristics, development trends, and other relevant information about development and growth.

Hazard Assessment – The City updated the Hazard Assessment to include cyber threats, extreme heat, dam inundation, drought, hazardous materials release, and aircraft incident.

Mitigation Strategies and Actions – The City updated the mitigation strategies and actions and provided status updates on prior mitigation activities within the City.

Plan Integration – the previous LHMP was not integrated into other planning mechanisms at the time it was prepared. As part of this update, the City intends to integrate this into other planning mechanisms like the General Plan, Emergency Operations Plan, and Capital Improvements Program. For further details see Chapter 6, Plan Maintenance.

Plan Goals

This Plan was developed to broadly increase resilience in Rancho Cucamonga. The following new key goals were developed for the City's 2021 LHMP:

- Protect against threats from natural hazards to life, injury, and property damage for Rancho Cucamonga residents and visitors.
- Increase public awareness of potential hazard events.
- Preserve critical services and functions by protecting key facilities and infrastructure.
- Protect natural systems from current and future hazard conditions.
- Coordinate mitigation activities among City departments, neighboring jurisdictions, and with federal agencies, and
- Prepare for long-term changes in our climate.

These goals reflect a change in the community's priorities since the last LHMP update and anticipated new development in areas of the City experiencing growth and change. These goals also ensure greater consistency with the City's General Plan Safety Element and priorities over the next five years. Below are the 2013 LHMP Goals, which are provided as a comparison of how the City's priorities have changed since the last update.

2013 LHMP Goals

- Mitigate the severity of earthquake incidents through better continuity of government.
- Mitigate the severity of earthquake incidents through better preparedness.
- Reduce risks of flooding through improved drainage.
- Reduce susceptibility/occurrences of downed power lines.
- Reduce risks of wildfires through fuel reduction.
- Reduce risks of wildfires for vulnerable properties and ensure fire-resistive construction of buildings.
- Reduce the occurrence and severity of wildfires through improved access to the Wild Land Urban Interface (WUI).

Planning Process

State and federal guidance for LHMPs does not require that jurisdictions follow a standardized planning process. FEMA encourages communities to create their planning process that reflects local values, goals, and characteristics. FEMA does suggest a general planning process that follows the steps identified below:



For the City of Rancho Cucamonga, the planning process used to create this plan is described below.

Hazard Mitigation Planning Committee

The City established a Hazard Mitigation Planning Committee (hereafter referred to as the Committee). The Committee comprises representatives from key City departments and stakeholder members that include representatives from local and regional agencies

and companies that are key to hazard mitigation activities. **Table 1-1** identifies the members that were invited and/or attended Committee meetings.

Table 1-1: Rancho Cucamonga Hazard Mitigation Planning Committee

Name	Title	Department
Joseph Ramos	Emergency Management Coordinator	Rancho Cucamonga Fire Protection District
Albert Espinoza	Deputy Director	Public Works Services
Anne McIntosh	Planning Director	Planning
Art Yero	GIS Analyst	DoIT – GIS
Baldwin Ngai	Associate Engineer	Engineering Services
Beth Zuppardi	Emergency Management Specialist	Rancho Cucamonga Fire Protection District
Brian Sandona	Senior Civil Engineer	Engineering Services
Casey Jiles	Lieutenant	San Bernardino County Sheriff's Department
Elisa Cox	Deputy City Manager	City Manager's Office
Eric Noreen	Deputy Fire Operations Chief	Rancho Cucamonga Fire Protection District
Fabian Villenas	Principal Management Analyst	City Manager's Office
Fred Lyn	Deputy Director of Engineering	Engineering Services
Gabrielle Costello	Public Information Officer	Rancho Cucamonga Fire Protection District
Greg Haynes	Sergeant	San Bernardino County Sheriff's Department
Jason Pack	Plan RC Update Traffic Consultant	Fehr & Peers
Jason Welday	Director of Engineering Services/City Engineer	Engineering Services
Jean Ward	Plan RC Update Project Manager	Planning (Civic Solutions)
Jeff Benson	Park Planner	Community Services
JoAnn Gwynn	CSD Superintendent	Community Services
John Thompson	Plans Examiner	Building and Safety
Mena Abdul Ahad	Assistant Planner	Planning
Michael Frasure	Building and Safety Services Manager	Building and Safety
Michael Smith	Principal Planner	Planning
Richard Favela	Street Maintenance Supervisor	Engineering Services
Robert Ball	Fire Marshal	RC Fire Protection District
Saima Musharrat	Plan RC Traffic Consultant	Fehr & Peers
Steve Lawdis	GIS Supervisor	DoIT

Veronica Fincher	Director	Animal Care and Services
William Wittkopf	Director of Public Works	Public Works Services
Zack Neighbors	Supervisor	Building and Safety
James Moore*	Superintendent	Alta Loma School District
Robert Anderson	Disaster Program Manager	American Red Cross
Ron Janssen	Division Chief	Cal Fire
Lori Isom	Assistant Superintendent	Central School District
Alisha Rosas	Interim Vice President of Student Services/Executive Director of Equity, Outreach and Communications	Chaffey College
Troy Ament	Executive Director	Facilities and Construction, Chaffey College
Mathew Holton	Superintendent	Chaffey Joint High School District
Raymond Cheung*	Emergency Manager	City of Ontario
Aminah Mears	Emergency Services Officer	County of San Bernardino (OES)
Klasha Ray	Emergency Services Officer	County of San Bernardino (OES)
Michael Ramirez	Supervising Emergency Services Officer	County of San Bernardino (OES)
Miles Wagner	Emergency Services Officer	County of San Bernardino (OES)
Robbie Victorino	Safety Analyst	Cucamonga Valley Water District
Laura Rowland	Director of Personnel	Etiwanda School District
Doug Claffin	Assistant Superintendent of Business	Etiwanda School District
Robert Visconti	Regional Affairs Manager	Southern California Gas
Mark Cloud	Government Affairs	Southern California Edison
Sonia Brown	Senior ESC	California Office of Emergency Services
Richard Dahlin*	Superintendent	Cucamonga School District

* Denotes invitees that did not attend meetings.

The Committee held three meetings throughout the plan development process to lay out the methods and approach for the Plan, draft and review content, make revisions, and engage members of the public.

Committee Meeting #1 (February 26, 2020February 26, 2020): The Committee members confirmed the Committee members' project goals and responsibilities. They revised the community engagement and outreach strategy, confirmed, prioritized the hazards to be included in the Plan, and identified critical threat assessment facilities.

Committee Meeting #2 (June 30, 2020): Members held a detailed discussion about the hazard prioritization, results of the hazards assessment and mapping, and the risk assessment that showed the areas, populations, and assets facing elevated risk and vulnerability.

Committee Meeting #3 (July 21, 2020): The Committee discussed and reviewed mitigation actions and strategies, made revisions, and assigned priorities.

Invitation to Committee meetings, and agendas/materials, were provided via email. **Appendix A** contains copies of invitations, meeting agendas, and sign-in sheets, and other relevant materials distributed for these meetings.

Public Engagement

Under FEMA guidelines, local hazard mitigation planning processes should create opportunities for the public to be involved in plan development—at a minimum, during the initial drafting stage and plan approval. In 2020, the City embarked on a comprehensive General Plan Update called 'PlanRC.' As part of this update process, the City conducted various public engagement activities. Due to the COVID-19 pandemic in-person, public workshops and meetings were replaced with virtual workshops, meetings, and discussion groups for health and safety reasons. Several key activities pertaining to the LHMP include the following:

PLAN RC COMMUNITY VISIONING SURVEY

In place of a community visioning workshop, the City conducted an online community visioning survey. This survey resulted in over 500 responses throughout the community, providing insight on the participants' views of the City, the reasons they believe the community is special, issues and challenges facing the City, and how they envision the City in the future. Distribution of survey information was shared with 127,000 residents/business owners, including eNews subscribers and social media followers.

Results of the City's community visioning process can be accessed at:

<https://www.cityofrc.us/sites/default/files/2020-06/Visioning%20Survey%20Results.pdf>

ONLINE ENGAGEMENT

The City recognized that not all community members could attend public meetings, nor could the City hold meetings as initially planned due to COVID-19. Therefore, the City set up a project website (<https://www.cityofrc.us/GeneralPlan>) as an easy way for community members to learn about the LHMP and the City's General Plan. The website included information about what an LHMP is and why the City prepared one, and it also included a link to the survey. It had links to materials and Plan documents as they became available and allowed public members to receive notifications about upcoming events.



Forum on Our Future (June 29-July 1, 2020 and July 27-30, 2020) – These included multi-day virtual workshops discussing the various components of the General Plan Update, including focused one and a half-hour sessions on natural hazards and climate adaptation.

PlanRC Video Series – Included a three-minute video focused on resiliency and updating the LHMP, General Plan Safety Element, and Community Wildfire Protection Plan.

Online Hazards Survey – This survey was focused on key questions regarding hazards of concern within the community. The City received 292 responses to the survey, which identified the following responses from participants:

- Approximately 87% of respondents have not been impacted by a natural disaster.
- The top three hazards identified by respondents include wildfire, severe wind, and seismic hazards.
- Localized hazards identified by respondents include flooding, roadways, and fire.
- Approximately 72% of respondents identified reducing wildfire hazards as very important.
- Over 80% of respondents are very concerned or somewhat concerned about a wildfire event.

The City also promoted the planning process through a variety of social media platforms. Based on this outreach effort, tracking analytics indicate that the City reached an average of 530,000 impressions.

Appendix B contains copies of all materials used for public outreach, including the full results of the community surveys.

Public Review Draft

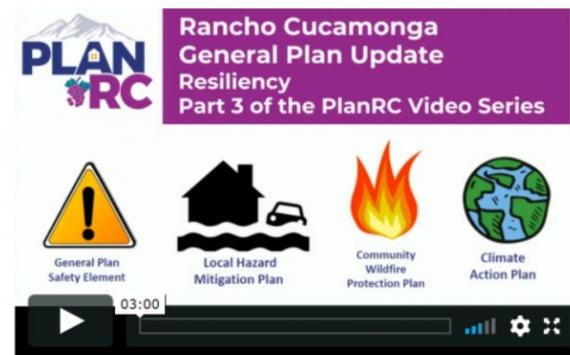
On March 15, 2021, the City released a draft copy of the LHMP for public review and comment. The document was posted electronically on the City's PlanRC website. The City distributed notifications about the public review draft through social media accounts and other online sources. The Public Review Draft period extended from March 15, 2021 through April 15, 2021.

Plan Revision and Adoption

During the public review period, the City received two public comments through the City's social media platforms; however, the comments identified elements of the plan that were already addressed. Following public comment, the City submitted the plan to Cal OES and FEMA, initiating their review process. Upon completing this review process, City staff transmitted the final plan to the City Council for final adoption. The Rancho Cucamonga City Council adopted the final LHMP on [Month, Day, 2021]. **Appendix C** contains a copy of the adoption resolution.

Part 3: Resiliency

After you watch this video be sure to take the local hazards survey!



Plan Resources

The City used several different plans, studies, technical reports, datasets, and other resources to prepare the hazard assessment, mapping, threat assessment, and other components of this Plan. **Table 1-2** provides some of the primary resources the Committee used to prepare this Plan.

Table 1-2: Key Resources for Plan Development

Section	Key Resources Reviewed	Data Incorporated from Resource
Multiple	<ul style="list-style-type: none"> • Cal-Adapt • California Department of Conservation • California Geological Survey • California Office of Emergency Services • California State Hazard Mitigation Plan • City of Rancho Cucamonga General Plan • FEMA Local Hazard Mitigation Plan Guidance • National Oceanic and Atmospheric Administration • National Weather Service • US Geological Survey • US Census Bureau 2013-2017 American Community Survey • SB County Vulnerability Assessment 	<ul style="list-style-type: none"> • Science and background information on different hazard conditions • Records of past disaster events in and around Rancho Cucamonga • Current and anticipated climate conditions in and around Rancho Cucamonga • Projections of future seismic conditions and events
Community Profile	<ul style="list-style-type: none"> • US Census Bureau 2013-2017 American Community Survey • City of Rancho Cucamonga Existing Condition Reports: • Noise and Vibration Existing Conditions Report • Air Quality Existing Conditions Report • Economic and Market Trends Existing Condition Report • Greenhouse Gas Emissions and Climate Change Vulnerability Assessment Existing Conditions Report • Community Mobility Existing Condition Report • California Energy Commission 	<ul style="list-style-type: none"> • Demographic information for Rancho Cucamonga and San Bernardino County • History of the region • Economic trends in Rancho Cucamonga • Commute patterns in Rancho Cucamonga • Local land-use patterns • Background information on utilities serving Rancho Cucamonga • Current Climate information in Rancho Cucamonga

Hazard Assessment (Aircraft Incidents)	<ul style="list-style-type: none"> Federal Aviation Administration 	<ul style="list-style-type: none"> Data on aircraft incidents in and around Rancho Cucamonga
Hazard Assessment (Flood Hazards, includes Dam Failure)	<ul style="list-style-type: none"> FEMA Map Service Center San Bernardino County Flood Control District Cucamonga Valley Water District US Army Corps of Engineers California Department of Water Resources 	<ul style="list-style-type: none"> Records of past flood events in and around Rancho Cucamonga Locations of flood-prone areas in Rancho Cucamonga Mapping of dam failure inundation areas Profiles and conditions of dams in and around Rancho Cucamonga
Hazard Assessment (Human-Caused Hazards)	<ul style="list-style-type: none"> Global Terrorism Database 	<ul style="list-style-type: none"> Historical records of terrorism
Hazard Assessment (Hazardous Materials Release)	<ul style="list-style-type: none"> Department of Toxic Substances and Control Environmental Protection Agency 	<ul style="list-style-type: none"> Location and dates of past hazardous materials release Effects of hazardous materials release
Hazard Assessment (Seismic Hazards)	<ul style="list-style-type: none"> Southern California Earthquake Data Center The Third California Earthquake Rupture Forecast (UCERF3) California Geological Survey 	<ul style="list-style-type: none"> Location of fault zones Records of past earthquakes
Hazard Assessment (Severe Weather Hazards)	<ul style="list-style-type: none"> Cal Adapt California Department of Water Resources US Drought Monitor Western Regional Climate Center 	<ul style="list-style-type: none"> Historic drought information Current drought conditions Science and background information on extreme weather events Historical record of extreme weather events in and around Rancho Cucamonga
Hazard Assessment (Wildfire Hazards)	<ul style="list-style-type: none"> California Department of Forestry and Fire Prevention Fire and Resource Assessment Program 	<ul style="list-style-type: none"> Records of past fire events

		<ul style="list-style-type: none">• Location of fire hazard zones in and around Rancho Cucamonga
<p>Note: Sections that are not individually called out in this table relied primarily on sources identified in multiple sections.</p>		

Chapter 2 – Community Profile

The Community Profile section of the LHMP describes Rancho Cucamonga, including information about the community's physical setting, history, economy and demographics, current and future land uses, and key infrastructure. The Community Profile helps establish the baseline conditions in Rancho Cucamonga, which inform the development of the hazard mitigation strategies and actions in **Chapter 5**.

Setting and Location

Rancho Cucamonga is located just south of the foothills of the San Gabriel Mountains and the San Bernardino National Forest in San Bernardino County, California, approximately 37 miles east of downtown Los Angeles. It is located within the Inland Empire and is bordered by Ontario, Upland, and Fontana; north of the City is U.S. Forest Service land. Rancho Cucamonga is the 26th most populous city in California, with a population of 177,603 residents.⁴ The City's seal, which centers on a cluster of grapes, alludes to its agricultural history, including winemaking. The City's proximity to major transportation hubs, airports, and highways has attracted several large corporations, such as Coca-Cola, Frito-Lay, Southern California Edison, and Amphastar Pharmaceuticals.⁵



Money Magazine ranked Rancho Cucamonga 42nd on its "Best Places to Live" list in 2006.

The City experiences an average of 287 sunny days per year, compared to a national average of 205 days. There is rarely any recorded snowfall in Rancho Cucamonga, ranking it as one of the least snowy places in California.⁶

The City's favorable location and host of public amenities have earned it numerous distinctions, such as All-America City and Tree City. In addition to earning a place on Money magazine's "Best Places to Live" list, a Rancho Cucamonga neighborhood was featured in Insider Magazine as the 13th most affluent neighborhood in Southern

⁴ United States Census Bureau. 2019. "QuickFacts: Rancho Cucamonga City, California."

<https://www.census.gov/quickfacts/ranchocucamongacitycalifornia>

⁵ City of Rancho Cucamonga. 2018. "Top 25 Companies by Number of Employees."

https://www.cityofrc.us/cityhall/ed/demographics/top_25_companies_by_number_of_employees.asp

⁶ Best Places. n.d. "Climate in Rancho Cucamonga."

https://www.bestplaces.net/climate/city/california/rancho_cucamonga

California.^{7,8} The four public high schools—Alta Loma, Etiwanda, Los Osos, and Rancho Cucamonga—earned the Silver distinction in a 2015 ranking of the nation's high schools.⁹ In 2017, all four high schools were named California Gold Ribbon Schools.

History

Southern California's Native American cultures had stabilized approximately three thousand years ago, and over twenty linguistic families with close to one hundred thirty-five different languages characterized this culture. The area, originally inhabited by the Tongva (or Gabrielino) Indians (the city's name is derived from the Indian word *kukamonga*, meaning "sandy place").¹⁰



John Rains' house listed on the National Historic Register

<https://gocvb.org/discover/play/arts-culture/john-rain%27s-house>

The 19th century brought profound change—by 1833, the amount of control held by Spain diminished. As Mexico won its independence from the Crown, all land in southern and Baja California opened for grants from Mexico's new governor. Tubercio Tapia was granted 13,000 acres of land around the area called Cucamonga in 1839. Tapia raised large herds of cattle and began a successful winery, portions of which stand today known as the Thomas Winery. It is the oldest in the state and the second oldest in the U.S.).^{11,12} After the Mexican American War, the U.S. annexed California in 1848, and it became a state in 1850. In 1858, John Rains and his wife purchased the Rancho de Cucamonga. Before his murder in

1862, Rains greatly expanded the vineyards Tapia had planted and imported brick masons from Ohio to construct the family home which is now listed on the National Register of Historic Places. In years to come, water would become a key struggle for the city and its surroundings until the Chaffey's begin developing the area a few decades later.

⁷ CNNMoney. 2006. "Best Places to Live."

<https://web.archive.org/web/20111201225120/http://money.cnn.com/magazines/moneymag/bplive/2006/snapshots/PL0659451.html>

⁸ Cooperstein, P. 2014. "The 27 Richest Neighborhoods in Southern California." *Business Insider*.

<https://www.businessinsider.com/richest-neighborhoods-in-southern-california-2014-4?op=1>

⁹ U.S. News & World Report. 2015. "Best U.S. High Schools." <https://www.usnews.com/education/best-high-schools/national-rankings>

¹⁰ The Editors of Encyclopedia Britannica. 2017. "Rancho Cucamonga."

<https://www.britannica.com/place/Rancho-Cucamonga>

¹¹ Ibid.

¹² Allen, D. 2015. "'Tangled Vines' explores wine, the pride of Cucamonga." *Daily Bulletin*.

<https://www.dailybulletin.com/2015/11/24/tangled-vines-explores-wine-the-pride-of-cucamonga/>

Cucamonga's history stretches back further than most of the other communities within the region. President Abraham Lincoln signed into existence a post office located at the base of Red Hill in 1864, the first in the western portion of San Bernardino County. After John Rains' death in 1862, Rancho de Cucamonga went into foreclosure, and in 1870, was sold to Isaias Hellman, who later formed the Cucamonga Company. In 1887, irrigation tunnels were dug into Cucamonga Canyon, and the Santa Fe Railroad extended track through the area. Vineyards and winemaking characterized the Cucamonga agriculture community.

Alta Loma was carved from the original Rancho de Cucamonga. The City's eastern community of Etiwanda has the distinction of being the first town planned by William & George Chaffey, who purchased the land in 1881. The innovations in city planning, subdividing, promotion, beautification and, most significantly, irrigation for which the Chaffey's would become famous were first tested in the Etiwanda colony. George Chaffey, an experienced engineer, created a mutual water company and pipe system of irrigation that became the standard for water system management in Southern California. Chaffey also harnessed hydro-electric power, and in 1882, the first electric light glowed from Etiwanda. Four months earlier, the first long-distance call in Southern California was completed between San Bernardino and Etiwanda. By 1913, the community boasted paved streets, rock curbs, and streetlights.

During the 1970s, Alta Loma, Etiwanda, and Cucamonga experienced growth from families from Los Angeles and Orange Counties seeking affordable housing. In 1975, the Tri-Community Incorporation Committee was created to propose the formation of a new city. Once incorporated in 1977, Rancho Cucamonga became the third-largest city in San Bernardino County. The booming economy of the 1980s gave Rancho Cucamonga the financial resources to realize its vision and goals, which included innovative community design and growth management strategies.

The "City with a Plan" concept became the cornerstone of the City's first General Plan in 1981, ensuring that Rancho Cucamonga would remain a unique and balanced community in the face of unprecedented growth. The Plan concentrated on public safety, balanced development and sustainability, and good quality of life. During the 1990s, major investments in City infrastructure and services occurred. By the turn of the century, the City had undertaken complex projects like Central Park, Victoria Gardens Cultural Center/Lewis Family Playhouse, and another library.

The three historic towns of Alta Loma, Etiwanda, and Cucamonga became part of the larger Rancho Cucamonga, providing growth and improvement opportunities while preserving each community's unique character. As a result, the City continues to

recognize each community's historical roots while planning for the City's overall benefit at-large.^{13,14}

Demographics

Race/Ethnicity/Age

The data used in this section comes from the most comprehensive American Community Survey (ACS), administered by the United States Census Bureau (U.S. Census) completed in 2018 and the California Department of Finance (DOF). According to the DOF, the City's 2019 population was estimated to be 179,412, with a median age of 35.5. This median age is two years older than the Inland Empire's median age of 33.5. **Table 2-1** identifies the race/ethnicity and age demographics for both the City and the Inland Empire, which indicates that the percentage of senior residents (aged 65 and older) in the City is slightly less than the rest of the Inland Empire. Additionally, a similar proportion of Rancho Cucamonga's residents rent their housing (37%) compared to Inland Empire residents (38%).

Rancho Cucamonga, like most surrounding communities, is predominantly a family community. In both Rancho Cucamonga and the Inland Empire, about three-quarters of households are families.¹⁵ At 3.1 persons per household, the average household size in Rancho Cucamonga is higher than the national average (2.6) but slightly lower than the Inland Empire's average household size (3.3). Both Rancho Cucamonga and the wider region have a similar mix of age groups (**Table 2-1**).

In terms of its racial and ethnic composition, Rancho Cucamonga's primary race as a population is a split between Hispanic or Latino (38%) and White-non-Hispanic at (37%). The third-largest population is Asian or Pacific Islander, with 13% of all residents. As an ethnically diverse community, Hispanic or Latino residents make up the largest ethnic group, followed by White-non-Hispanic, White, Asian, and Black residents (**Table 2-1**).

Table 2-1: Race/Ethnicity and Age in Rancho Cucamonga and Inland Empire, 2014-2018

	Rancho Cucamonga		Inland Empire	
	Number	Share	Number	Share
Race and Ethnicity				
White, non-Hispanic	67,732	37%	1,479,730	33%
Black or African American, non-Hispanic	15,621	9%	313,367	7%

¹³ CitiVU. 2017. "The Cucamonga Rancho." <http://www.citivu.com/rc/hist1.html>

¹⁴ City of Rancho Cucamonga History. 2020. "City of Rancho Cucamonga History." <https://storymaps.arcgis.com/stories/8446a917d02145f48ed8c9eca30c7d5d>

¹⁵ City of Rancho Cucamonga General Plan Update. 2020. "Economic Profile and Market Conditions: Existing Conditions Report." https://www.cityofrc.us/sites/default/files/2020-06/PlanRC_ExistingConditionsReport_Economics_May2020.pdf

Asian or Pacific Islander, non-Hispanic	22,527	13%	305,241	7%
Hispanic or Latino	66,540	38%	2,282,330	51%
All other races, non-Hispanic	6,259	4%	138,031	3%
Total		100%		100%
Age				
Under 18	41,961	24%	1,186,660	26%
18 to 24	17,185	10%	470,058	10%
24 to 44	49,542	28%	1,225,673	27%
45 to 64	47,577	27%	1,074,356	24%
65 and over	19,414	11%	561,952	12%
Total		100%		100%
Note: Percentage values are rounded to the nearest tenth decimal.				
Sources: American Community Survey, 2014-2018; Strategic Economics, 2020				

Language

The City has a range of different non-English languages spoken at home among its residents, with varying proficiency levels. Generally, Spanish and Asian-languages are the second most-spoken languages in Rancho Cucamonga. **Table 2-2** shows the most widely spoken languages in the home other than English and in what percentage.

Table 2-2: Languages Other than English Spoken at Home

Language	Percentage of Limited-English Population
Spanish	49.7%
Chinese (to include Mandarin and Cantonese)	17.7%
Other Indo-European Languages	9.0%
Total Limited-English Population	17,530

Source: <https://census.ca.gov/wp-content/uploads/sites/4/2019/06/Rancho-Cucamonga.pdf>

*Note: This is a snapshot of those who speak a non-English language, therefore these percentages will not add up to 100%.

Education

Rancho Cucamonga's residents have higher levels of educational attainment and higher incomes compared to the Inland Empire. One-third of Rancho Cucamonga residents have bachelor's degrees or above, compared with only 22% in the Inland Empire (**Figure 2-1**). Having a higher educated workforce translates to overall higher incomes in comparison to surrounding communities. The City's median household income is approximately \$24,000 higher than incomes throughout the Inland Empire (**Figure 2-2**).

Figure 2-1. Educational Attainment for Population over 25 Years of Age in Rancho Cucamonga and the Inland Empire, 2014-2018

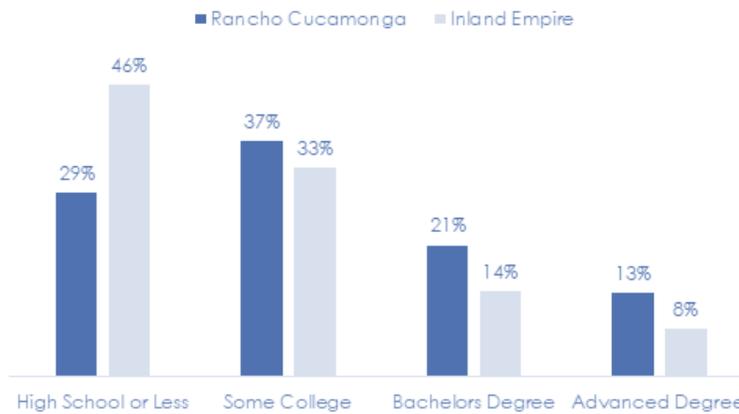
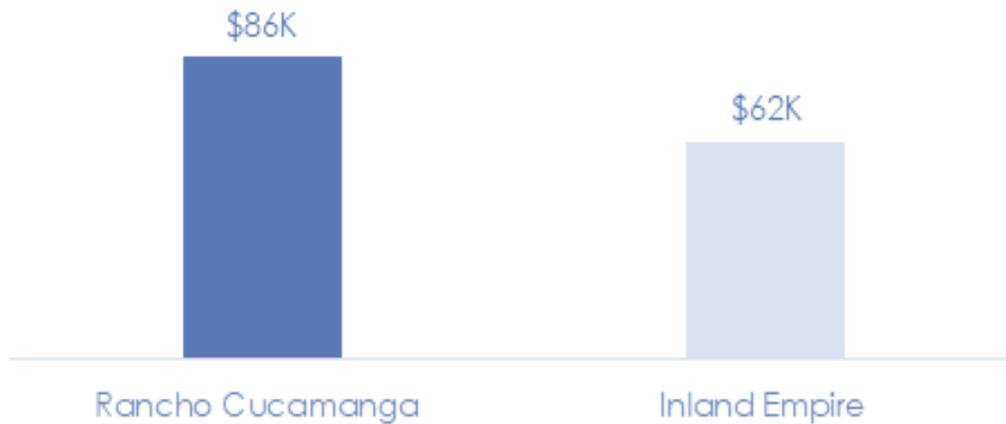


Figure 2-2. Median Household Income in Rancho Cucamonga and the Inland Empire, 2014-2018



Sources: U.S. Census American Community Survey, 2014-2018; Strategic Economics, 2020.

Economy and Commute Patterns

Employment and commute patterns of Rancho Cucamonga residents and employees within the City focus on where jobs are located and where employees travel to and from for work. Commute patterns are reliant on the match between residents' jobs and skill-levels and the job opportunities currently found in Rancho Cucamonga. Prior to the COVID-19 pandemic, Rancho Cucamonga had approximately 82,000 jobs and 76,000 employed residents. As illustrated in **Table 2-3**, the City had a ratio of 1.08 jobs per employed resident (prior to COVID-19), which means the City is supplying jobs to employees outside of the City. However, the share of residents who work in the City is approximately 15%, meaning many residents commute outside of the City to their jobs.

Table 2-3: Rancho Cucamonga Employment Overview, 2017 (Pre-COVID-19)

Jobs located in Rancho Cucamonga	81,718*
Employed Residents in Rancho Cucamonga	75,951
Jobs / Employed Resident	1.08
Share of Residents also Working in Rancho Cucamonga	15%
*Note: Number is based on pre-pandemic statistics. The population is based on 180,000 residents. ¹⁶ Sources: U.S. Census Longitudinal Employer-Household Dynamics, 2017; Strategic Economics, 2020.	



Etiwanda School District

The five largest employers within the City are the Etiwanda School District, Chaffey Community College, the Inland Empire Health Plan, Mission Foods, and the Alta Loma School District (**Table 2-4**). These employers account for approximately 9% of the total jobs located within the City.

Before the stay-at-home measures, the remaining 85% of resident workers commuted to nearby communities or employment centers in Downtown Los Angeles, San Bernardino, or Orange County (**Figure 2-3**). **Figure 2-4** identifies the commute patterns of employees that work in

the City. Many of these employees come from the Inland Empire (San Bernardino and Riverside counties), Los Angeles County, and Orange County. While these commute patterns identify the past commute trends, the effects of COVID-19 have reduced commute volumes; however, it is not clear if these changes are temporary or a more lasting shift as remote working continues¹⁷.

Table 2-4: Largest Employers in Rancho Cucamonga as of 2020

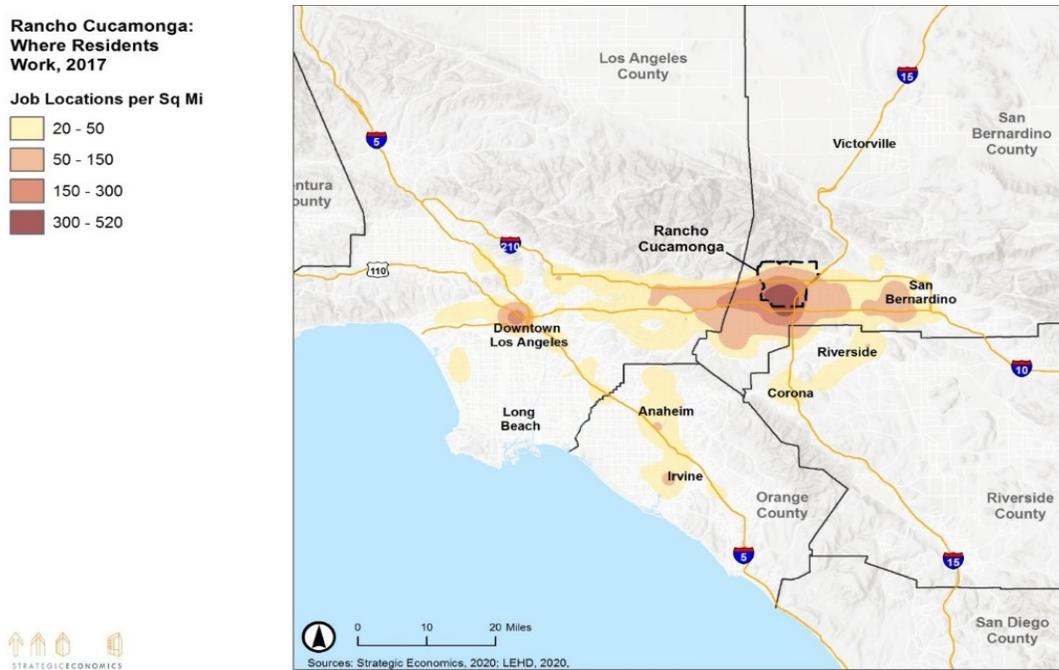
Employer	Number of Employees	Percentage of Total City Employment
Etiwanda School District	2,387	2.55%
Chaffey Community College	2,120	2.27%
Inland Empire Health Plan	2,078	2.22%
Mission Foods	950	1.02%
Alta Loma School District	940	1.01%

Source: City of Rancho Cucamonga, Comprehensive Annual Financial Report for FY Ending 2019.

¹⁶ Rancho Cucamonga, California population. 2020. <https://worldpopulationreview.com/us-cities/rancho-cucamonga-ca-population>

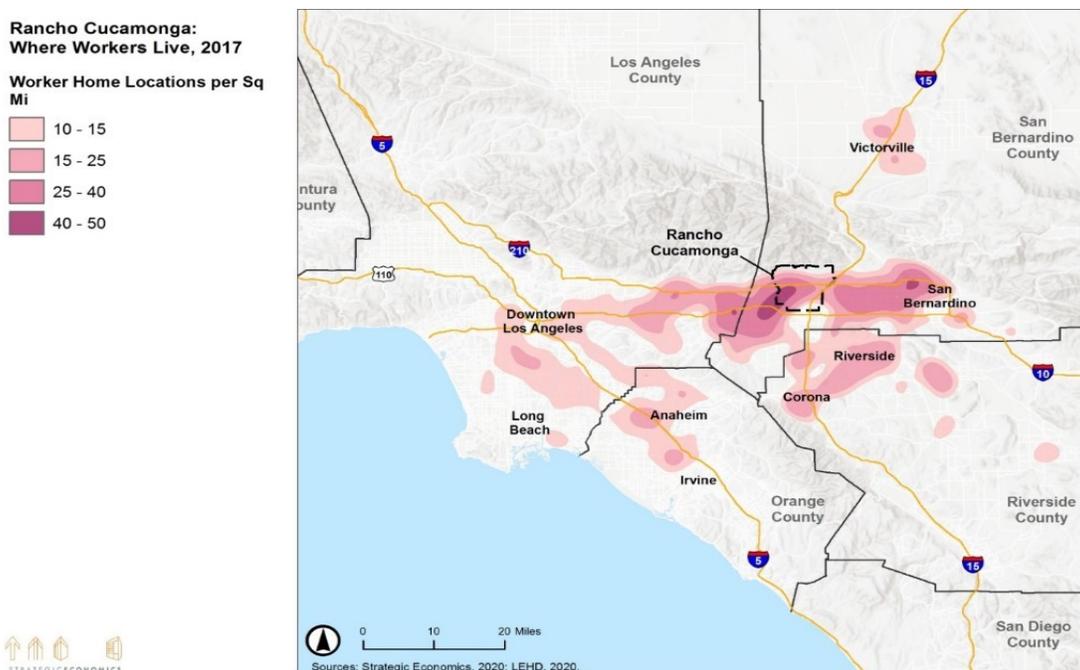
¹⁷ City of Rancho Cucamonga General Plan Update. 2020. "Economic Profile and Market Conditions: Existing Conditions Report." https://www.cityofrc.us/sites/default/files/2020-06/PlanRC_ExistingConditionsReport_Economics_May2020.pdf

Figure 2-3. Outbound Commutes: Where Rancho Cucamonga Residents Work, 2017



Sources: U.S. Census Longitudinal Employer-Household Dynamics, 2017; Strategic Economics, 2020

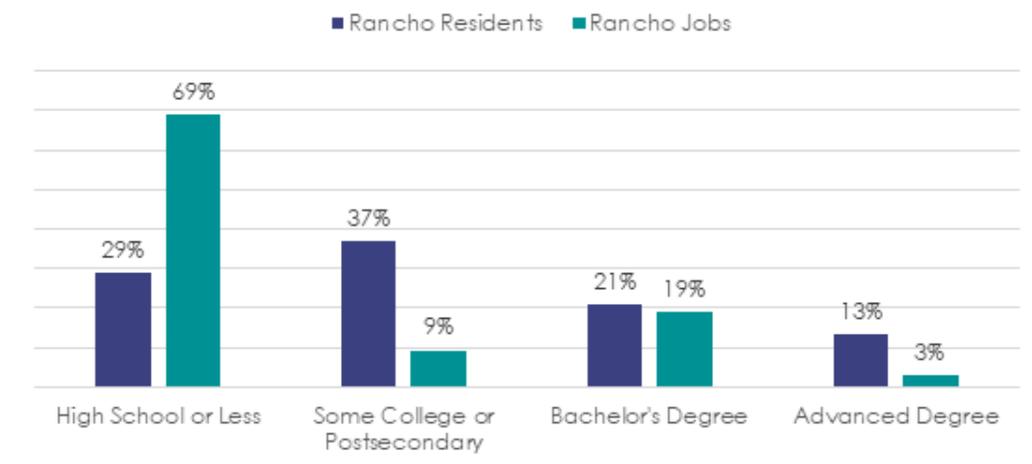
Figure 2-4: Inbound Commutes: Where Rancho Cucamonga Workers Live, 2017



Sources: U.S. Census Longitudinal Employer-Household Dynamics, 2017; Strategic Economics, 2020

To understand the work force within the City, **Figure 2-5** compares the skill levels required for jobs in the City compared to resident's educational attainment levels. Based on this survey, most of the highly educated residents commute out of the City as many of the jobs available do not require a degree beyond high school.¹⁸

Figure 2-5. Educational Attainment of Rancho Residents and the Minimum Educational Requirements of Rancho Jobs, 2017



*Rancho Residents shown are ages 25 and older.
 Sources: American Community Survey, 2014-2018; Longitudinal Employment Household Dynamics, 2017; U.S. Bureau of Labor Statistics, 2018; Strategic Economics, 2020.

Development Trends

Rancho Cucamonga is located within a dense part of southern San Bernardino County that has experienced significant growth and development over the past 30 years. During this period, population growth has accounted for nearly 80,000 new residents, with 14,000 residents in the past ten years. **Figures 2-6** shows population growth for the City between 1990 and 2019.¹⁹

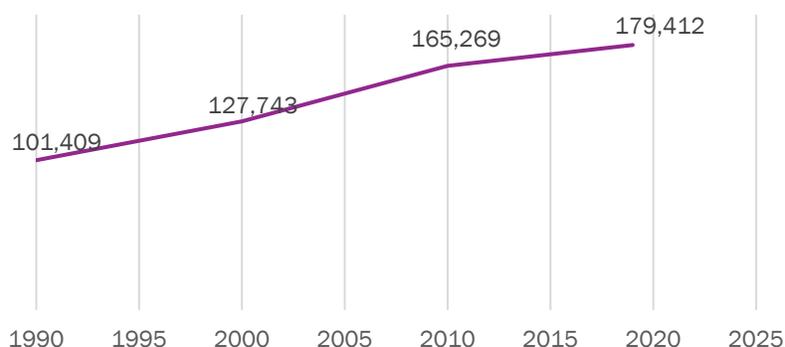
Development activity in the City has continued to increase since the previous 2013 LHMP was completed. Several major developments have been planned and constructed, while additional development is currently in the process of getting entitled and constructed. **Table 2-5** identifies the current development activity tracked by the Planning Department. In addition to this development activity, several large projects are

¹⁸ City of Rancho Cucamonga General Plan Update. 2020. "Economic Profile and Market Conditions: Existing Conditions Report." https://www.cityofrc.us/sites/default/files/2020-06/PlanRC_ExistingConditionsReport_Economics_May2020.pdf

¹⁹ City of Rancho Cucamonga General Plan Update. 2020. "Economic Profile and Market Conditions: Existing Conditions Report." https://www.cityofrc.us/sites/default/files/2020-06/PlanRC_ExistingConditionsReport_Economics_May2020.pdf

also being entitled and constructed within the City. These developments are expected to add nearly 4,000 additional dwelling units within portions of the City north of 4th Street between Milliken and Haven Avenues. The areas being developed for these projects were previously developed with lower intensity uses and are now helping the City meet current housing demands.

Figure 2-6. Population of Rancho Cucamonga, 1990 to 2019



Source: Strategic Economics, 2020

In 2019, the City approved the Etiwanda Heights Neighborhood and Conservation Plan. This specific plan proposes a mix of 3,000 detached and attached single-family homes in the northern portion of the City. Since the project is located within the City's Wildland Urban Interface Area (WUIFA), this new development will be required to comply with the City's fire safe requirements to ensure the development is resilient against wildfire hazards.

Table 2-5: Rancho Cucamonga Development Activity

Development Type	Quantity	Units
Residential Development	3,126	Dwelling Units
Commercial Development	291,941	Square Feet
Industrial Development	5,052,625	Square Feet
Hospitality	71	Hotel Rooms

Source: City of Rancho Cucamonga, 2020.

Infrastructure Assessment

Infrastructure plays a vital role in mitigating the effects of hazard events. When infrastructure fails, it can exacerbate the effects of a hazard event or create complications for rescue workers trying to reach victims. For example, fallen utility poles resulting from strong winds or seismic activity can obstruct roadways and prevent emergency vehicles from reaching affected areas. The following are electrical, gas, water and wastewater, and infrastructure transportation networks in Rancho Cucamonga.

Electricity

Rancho Cucamonga receives its electrical supply from Southern California Edison (SCE) and Rancho Cucamonga Municipal Utility (RCMU). There are multiple substations located within the City connecting 220kV and 66kV powerlines that run east to west and north to south. These lines bring power to Rancho Cucamonga, the surrounding cities and connect to other regional power sources.²⁰ These connections help Rancho Cucamonga access auxiliary electricity sources should any of its immediate infrastructure fail. However, the power grid's substantial and more regional failure would likely disrupt power transmission to Rancho Cucamonga for an extended period until power is restored.

Public Safety Power Shutoff

The State's investor-owned utilities have general authority to shut off electric power to protect public safety under California law. Utilities exercise this authority during severe wildfire threat conditions as a last resort preventative measure through Public Safety Power Shutoffs (PSPS).²¹ **Figure 2-7** illustrates the PSPS circuits identified by Southern California Edison (SCE), which have the potential of being de-energized during heightened wildfire threat conditions. Based on this information, the City has 14 circuits throughout the community that could be affected by future events. During PSPS events, the City is regularly notified of potential de-energization of these circuits. In addition to the PSPS circuits, **Figure 2-7** also identifies fire facilities and city facilities that intersect with these circuits. This information could be helpful for future investments in backup energy generation for assets within these circuit areas.

PSPS events were first implemented in 2018. The circuits located north near the foothills and north to the east near Fontana are affected the most by PSPS. The City began preparing for PSPS events by understanding the potential circuits that could be impacted and special populations affected by these events. These incidents typically occur during high fire threat conditions (i.e., dry conditions and strong winds) and may affect communities located far away from any actively occurring fires. With several SCE circuits in the City that could be affected by future PSPS events, residents and businesses could experience the impacts of these events if they do not have alternative options for electricity at their homes and places of business. These events will likely affect City resources since many of the City's facilities rely on electricity to function.

Natural Gas

Natural gas is provided to Rancho Cucamonga and surrounding jurisdictions by the Southern California Gas Company (SoCalGas). To ensure sufficient transmission of natural gas throughout the region, SoCalGas owns and operates transmission lines that transect

²⁰ California Energy Commission. 2016. "Local Reliability Areas for 2016, Enlargement Maps".

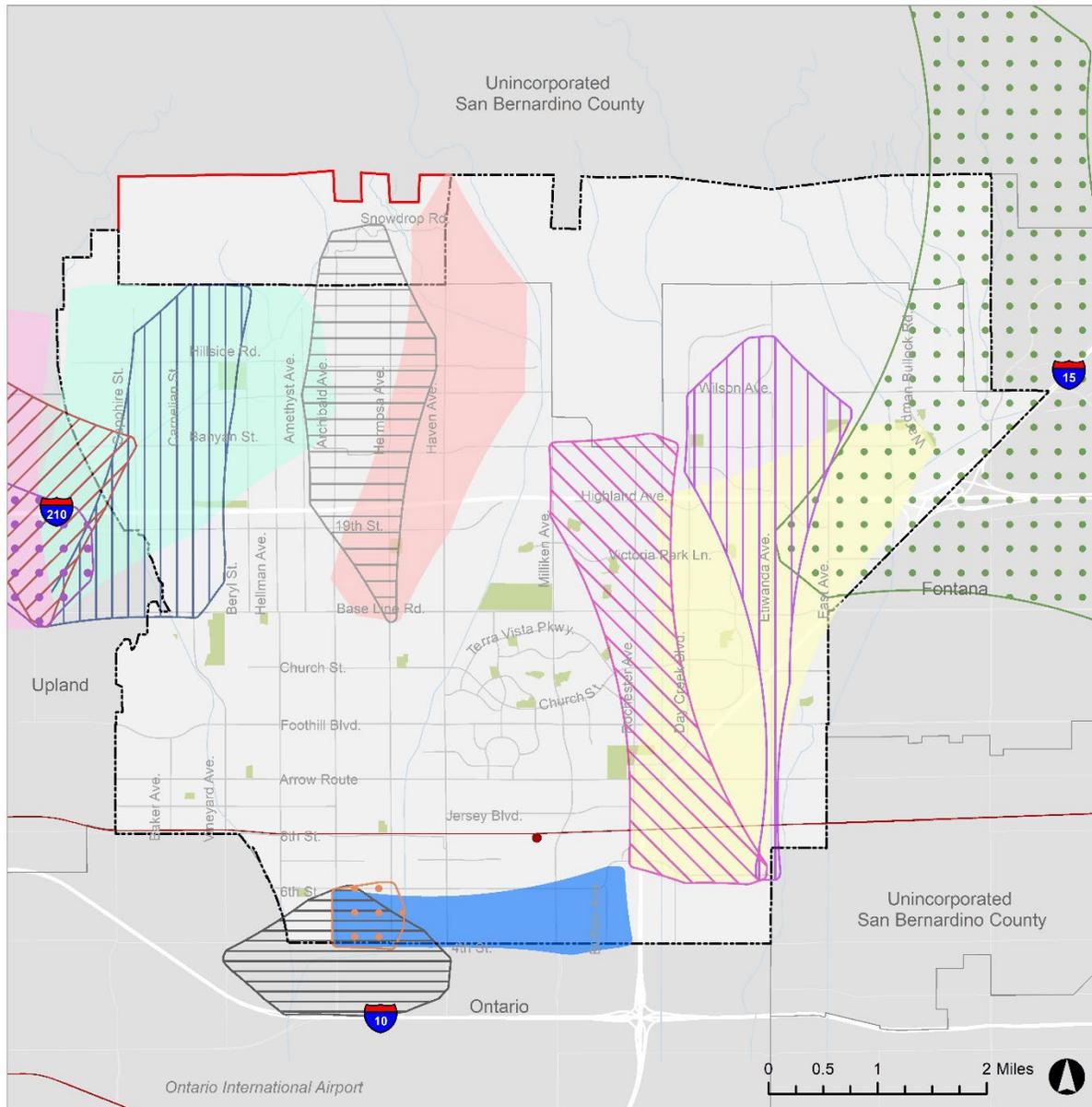
https://www.energy.ca.gov/maps/reliability/LRA_Enlargement_Area.pdf

²¹ California Public Utilities Commission. 2020. Public Safety Power Shutoff information.

<https://www.cpuc.ca.gov/wildfiresinfo/>

the City. These pipelines are in the southern portion of the City and run east to west. If these lines are damaged, there is a potential to interrupt the flow and delivery of natural gas throughout the City. Additionally, natural gas ignites very easily and any rupture in a transmission line could cause additional damage to properties in the vicinity of the leak due to fire from the escaped natural gas. The presence of this infrastructure creates unique challenges for the City from an emergency management perspective. The inclusion of hazards associated with damage to this infrastructure is an important element of an effective response to future incidents involving natural gas use and transmission.

Figure 2-7 PSPS Circuits



PSPS Circuits

- | | | |
|-----------|------------|--------------------------|
| Acosta | Magoo | City Boundary |
| Amethyst | Parina | Sphere of Influence |
| Belushi | Rutherford | Adjacent City Limits |
| Bianco | Ruttmann | Rancho Cucamonga Station |
| Fano | Santorini | Metrolink |
| Hope | Tully | Parks |
| La Grande | Yarborough | Waterways |

Atlas Planning Solutions, 2020 |
Sources: City of Rancho Cucamonga, 2020;
SCAG, 2020; County of San Bernardino, 2020.
SCE, 2020



Water and Wastewater

Water in Rancho Cucamonga is provided by the Cucamonga Valley Water District (CVWD) and the Fontana Water Company (FWC). CVWDs service area covers over 83% of the City boundary, with the remaining portion, primarily in the east of the City, covered by FWC. Water supplies provided by CVWD are a mixture of groundwater, surface water, and imported water. Groundwater supplies are sourced from both the Chino Groundwater Basin and the Cucamonga Basin through 20 groundwater wells. Surface



water is sourced from local canyons (Cucamonga Canyon, Day Canyon, Deer Canyon, East Etiwanda Canyon) and tunnels that flow out of the foothills of the San Gabriel Mountains. Water sourced locally is treated at either the Arthur H. Bridge or Lloyd W. Michael Treatment Plants before entering the District's distribution system. Imported water is sourced through purchases from the Inland Empire Utilities Agency (IEUA), which purchases wholesale water from the Metropolitan Water District of

Southern California.

In addition to water distribution, CVWD also provides wastewater services that rely on approximately 421 miles of wastewater collection pipelines ranging from 8-36 inches in diameter. This system conveys wastewater to IEUA Wastewater Treatment facilities, where it is processed into recycled water.

Transportation System and Context

The City of Rancho Cucamonga has convenient access to local and regional transportation facilities, including freeways, arterial roadways, a commuter rail connection, and convenient proximity to the Ontario International Airport. The three major freeways that serve the City include Interstates 10 and 15 and State Route 210. Interstate 10 (I-10) runs just south of the City limits with several interchanges at major arterials. Interstate 15 (I-15) runs along the City's eastern edge, and State Route 210 (SR-210) runs east and west through the northern part of the City. To the east of Rancho Cucamonga lies the City of Fontana, to the south is the City of Ontario, to the west is the City of Upland, and to the north is U.S. Forest Service land.



Public transportation via fixed-route bus services are provided by OmniTrans, which is the public

transportation agency in San Bernardino County. Omnitrans operates seven bus routes within the City that connect the Rancho Cucamonga Metrolink Station, Civic Center, Chaffey College, Ontario International Airport, Victoria Gardens, and the surrounding cities of Fontana, Upland, Ontario, Montclair, and Chino. OmniTrans also provides a demand-response service called Access, a curb-to-curb van service for people unable to independently use the fixed-route service.

The City also has a Metrolink station that provides commuter rail services operated by the Southern California Regional Rail Authority (SCRRA). As a commuter rail service, Metrolink provides service from outlying suburban communities to employment centers like downtown Los Angeles. For Rancho Cucamonga, the San Bernardino Line (SBL) train services Metrolink stations in San Bernardino, Rialto, Fontana, Rancho Cucamonga (pictured above), Upland, Montclair, Claremont, Pomona, Covina, Baldwin Park, El Monte, and Los Angeles.²²

Airport travel is provided by Ontario International Airport (ONT), which is a medium-hub, full-service airport with commercial jet service to major U.S. cities and many international destinations. The airport, located in the City of Ontario, is approximately one mile from Rancho Cucamonga's southern boundary. This airport is one of five commercial airports providing air travel in the Los Angeles metropolitan area. Carrying the third highest passenger volume behind the Los Angeles International Airport (LAX) and John Wayne Airport (SNA), this is the only airport in the region with significant growth capacity.

In addition, Cable Airport is a non-towered, public-use airport located three miles from the western boundary of Rancho Cucamonga in the City of Upland. This privately-owned airport covers a 95-acre area facility with an average of 252 aircraft operations per day.

COVID-19

The City began experiencing the effects of COVID-19 in March 2020. To address these impacts, the City took several internal actions to ensure the pandemic would not overwhelm resources. As part of the City's COVID-19 response, staff activated the Emergency Operations Center (EOC) virtually, began conducting weekly internal

WHAT IS COVID-19?

COVID-19 is the common name used for the Novel Coronavirus Disease 2019, first identified in Wuhan, China in December 2019. The coronavirus associated with COVID-19 is called SARS-CoV-2.

Coronaviruses are a large family of viruses that are common in people and many different species of animals, including camels, cattle, cats, and bats. A wide range of COVID-19 symptoms have been reported – ranging from mild symptoms to severe illness that can appear 2-14 days after exposure to the virus. Symptoms reported include coughing, shortness of breath or difficulty breathing,

²² Metrolink. 2020. "Rancho Cucamonga." <https://metrolinktrains.com/rider-info/general-info/stations/rancho-cucamonga/>

coordination meetings, and participated in County Joint Information Center and Department of Public Health conference calls to ensure consistent messaging and information was disseminated to the public and internal staff.

The City also modified operational hours and City facilities to better accommodate social distancing, disinfection, and testing to ensure City staff were better protected from exposure. Remote working policies were implemented to allow certain staff to work from home, reducing staff presence in City facilities, allowing for greater social distancing during normal working hours.

During this time, the City conducted significant coordination with the County of San Bernardino Office of Emergency Services and County and State Departments of Public Health. This coordination provided the City with an increased understanding of the state of the pandemic, current medical resource capacity, ability to support testing and mitigation strategies, and vaccination protocols. The knowledge and resources gained help to support the safe reopening of City functions and the economy to adapt to changing conditions.

The 2020 Covid-19 effects have impacted the City financially through reduced sales and transient occupancy taxes. These revenue reductions are estimated to cause a \$9 million deficit in the fiscal year 2020-21, which could impact the City's maintenance and upkeep of assets like parks, streets, sidewalks, and public facilities.²³ To assist community members, the City adopted Resolution 2020-019, which "suspended business license penalties and administrative citations to counter the significant economic impacts of the public health orders affecting business in the city,"²⁴ and issued a temporary moratorium on evictions for non-payment of rent by residential or commercial tenants impacted by COVID-19.²⁵

²³ League of California Cities. 2020. *City Leaders Share Devastating Fiscal Impact of COVID-19 and Call for State and Federal Aid*. <https://www.cacities.org/Top/News/News-Articles/2020/April/City-Leaders-Share-Devastating-Fiscal-Impact-of-CO>

²⁴ City of Rancho Cucamonga Resolution No. 2020-019. https://www.cityofrc.us/sites/default/files/2020-04/Executive%20Order%202020-01%202020-019%20-%20Resolution_0.pdf

²⁵ City of Rancho Cucamonga Urgency Ordinance No. 967. <https://rcdocs.cityofrc.us/WebLink/DocView.aspx?id=562132&searchid=42eb98be-1c78-4009-9c4c-6e7e16e0fc30&dbid=0&repo=RanchoCucamonga&cr=1>

Chapter 3 – Hazard Assessment

This chapter discusses the types of hazards that might reasonably occur in Rancho Cucamonga. It describes these hazards and how they are measured, locations in Rancho Cucamonga where they may occur, a history of these hazards in and around Rancho Cucamonga, and the future risk they pose. The discussion of future risks includes any changes to the frequency, intensity, and/or location of these hazards due to climate change. This chapter also discusses how the Hazard Mitigation Planning Committee (HMPC) selected and prioritized the hazards in this Plan.

Hazard Identification

FEMA guidance identifies several hazards that communities should evaluate for inclusion in a hazard mitigation plan. Communities may also consider additional hazards for their plans. The HMPC reviewed an extensive list of hazards and excluded those that do not pose a threat to Rancho Cucamonga. **Table 3-1** lists the hazards considered and explains the reasoning for inclusion/exclusion. For context, this table also shows if a hazard is recommended for consideration by FEMA, if it is included in the 2018 California State Hazard Mitigation Plan (SHMP), and if it is included in the San Bernardino County Hazard Mitigation Plan (SBC HMP).

Table 3-1: Hazard Evaluation for Rancho Cucamonga LHMP

Hazard	Recommended for Consideration	Included in LHMP?	Reason for Inclusion or Exclusion
Agricultural Pests	SHMP	No	While agricultural uses were a key element of the City when it was first developed, the City no longer contains a significant amount of these resources that could be vulnerable to agricultural pests.

Air Pollution	SHMP	No	Air pollution is a state and regional issue addressed through plans and regulations administered by the South Coast Air Quality Management District and/or California Air Resources Board. Given the City's historical focus on health through the Healthy RC initiative, the City is concerned about air quality issues and how it can affect vulnerable populations. Although air quality is a concern of the City, Rancho Cucamonga has no authority to mitigate air pollution.
Aircraft Incident	SHMP	Yes	The City is located near the Ontario International Airport (located south of the City) and Cable Airport (located west of the City). Given the proximity to these facilities and past incidents associated with aircraft, the HMPC determined this hazard should be included in the plan.
Aquatic Invasive Species	SHMP	No	There are no major bodies of water in Rancho Cucamonga where aquatic invasive species could endanger the community.
Avalanche	FEMA guidance SHMP	No	Rancho Cucamonga is not located within potential avalanche zones.
Civil Disturbance or Riot	SHMP	No	The HMPC determined that civil disturbances of the degree that would endanger property or life to residents have the potential to occur, especially in locations of the City where large populations visit/congregate (Victoria Gardens, etc.). However, it was determined that these types of incidents would not be appropriate to address in the LHMP and would be better suited in the City's Emergency Operations Plan (EOP).
Climate Change	SHMP SBC HMP	Yes	Climate change is a concern of the HMPC, which is discussed as a function of each relevant hazard and is mentioned throughout the Plan.
Coastal Flooding and Storm	FEMA guidance SHMP	No	Rancho Cucamonga is not located along the coast of California. Coastal flooding and storms are not anticipated to impact the community.
Cyber Threats	SHMP	Yes	With the increase in cyber threats occurring throughout California and the nation, the HMPC considers them serious, requiring evaluation within the LHMP.
Dam Failure / Inundation	FEMA guidance SHMP SBC HMP	Yes	Several dams are located within Rancho Cucamonga and surrounding areas. Given the potential for inundation to impact the

			community, the HMPC identified dam inundation as a hazard of concern.
Drought	SHMP SBC HMP	Yes	The HMPC identified droughts as a recurring and potentially severe hazard in Rancho Cucamonga.
Energy Shortage	SHMP	No	The Rancho Cucamonga Municipal Utility provides electricity to many businesses and residents in the southeastern portion of the City. Aside from this, the remaining areas of the City are served by Southern California Edison, which is outside of the City's control. While energy shortage is a concern for the City and State, the HMPC did not identify this hazard as a concern that should be included in the LHMP. A discussion of Public Safety Power Shutoff concerns is included in this plan as it is closely related to Severe Weather and Wildfires.
Epidemic, Pandemic, Vector-Borne Disease	SHMP	No	Rancho Cucamonga is in San Bernardino County, which has experienced several regional and global health-related incidents in the past. The City supports the County Department of Public Health as the jurisdictional agency for public health emergencies. The City will continue to work closely and seek guidance from County, State, and Federal partners to combat these types of hazard events. Therefore it was not deemed a hazard that should be addressed in the LHMP. However, public health emergencies are an issue that is included in the City's emergency management planning efforts.
Erosion	FEMA guidance SHMP	No	While erosion occurs in some City regions, this hazard is generally associated with other hazards like wildfire, landslide, and flooding. Refer to these hazards for any discussion regarding erosion.
Expansive Soil	FEMA guidance	No	Expansive soils were not identified as an issue within the City that should be addressed in the LHMP. The City requires compliance with the California Building Code and site-specific geotechnical report, which is equipped to mitigate issues associated with expansive soils.
Extreme Cold	FEMA guidance SHMP	No	Temperatures in Rancho Cucamonga do not fall to a level that would be considered a danger to public safety.
Extreme Heat	FEMA guidance SHMP	Yes	Extreme heat has occurred in Rancho Cucamonga and is expected to be an

			increasingly recurring issue due to climate change. As a result, this hazard was included in the LHMP under the Severe Weather hazard profile.
Fault Rupture	FEMA guidance SHMP SBC HMP	Yes	The City contains two known Alquist-Priolo Special Study Zones (Cucamonga Fault, Etiwanda Fault Scarp) and a city-designated study zone (Red Hill Fault Zone). Given the presence of these study zones, the HMPC identified fault rupture as a concern to be addressed in the LHMP. This hazard is included in the Seismic Hazard profile.
Flooding	FEMA guidance SHMP SBC HMP	Yes	Several dams and basins are located within the City, and portions of the City are located within FEMA-designated flood hazard zones. Significant flooding events have occurred in the past, which have affected properties. Given the proximity to the San Gabriel Mountains' foothills, flooding is still a key concern within the City.
Fracking	SHMP	No	Fracking does not occur in Rancho Cucamonga.
Hail	FEMA guidance	No	Hail that is severe enough to pose a threat to people and property is too rare in Rancho Cucamonga to be included.
Hazardous Materials release	SHMP SBC HMP	Yes	The presence of hazardous material use, storage, manufacturing, disposing, and transport was identified as a concern for the HMPC. Several major roadways, freeways, and rail lines transecting the City allow for transporting these materials that could endanger the community if a release into the environment were to occur.
Hurricane	FEMA guidance SHMP	No	Hurricanes do not occur in Rancho Cucamonga.
Infrastructure Failure	SHMP	No	Infrastructure failure can pose a threat to people and property in Rancho Cucamonga. A discussion of infrastructure failure is discussed as a function of other hazards, where applicable.
Earthquake Induced Landslide	FEMA guidance SHMP	Yes	Areas within the City of Rancho Cucamonga are considered to have a high potential for earthquake-induced landslides. As a result, the HMPC felt it was essential to include this hazard in the plan.
Levee Failure	SHMP	No	The HMPC did not identify levee failure as a hazard of concern.
Lightning	FEMA guidance	No	Although lightning occasionally occurs in Rancho Cucamonga, it does not pose a significant threat to people or property.

Liquefaction	FEMA guidance SHMP	Yes	Small portions of the City are located within potential liquefaction areas, identifying a concern of the HMPC. This hazard has been included as part of the Seismic Hazards profile.
Methane-containing Soils		No	The City does not have methane containing soils that pose a threat to residents' and businesses' public health and safety.
Natural Gas Pipeline Hazards	SHMP	No	Natural gas pipelines exist within the City and could pose a danger to people and property if they were to breach and release their contents into the community. They were not identified as a hazard of concern by the HMPC, but pipeline failure is addressed because of a seismic event.
Oil Spills	SHMP	No	There is no history of oil drilling and extraction within the City. Based on this, the HMPC did not think this hazard needed to be addressed.
Power Failure		No	While power failure was not identified as a key hazard of concern by the HMPC, the LHMP does discuss Public Safety Power Shutoff concerns within the LHMP.
Radiological Accidents	SHMP	No	There are no known significant radiation sources in Rancho Cucamonga or the immediate surrounding area that could pose a severe threat to the community.
Sea-level Rise	FEMA guidance SHMP	No	Rancho Cucamonga is not located along the State's coastal portions where sea-level rise is a concern.
Seiche	FEMA guidance SHMP	No	There are no major bodies of water in Rancho Cucamonga that could be subjected to seiche.
Seismic Shaking	FEMA guidance SHMP SBC HMP	Yes	Rancho Cucamonga is in a seismically active area; several major fault-lines run within and around the City, where shaking can be severe enough to damage property or cause loss of life. For this reason, the HMPC determined it should be addressed in this Plan as a primary concern.
Severe Wind	FEMA guidance	Yes	Severe wind is a common occurrence within the City. This hazard is included in the Severe Weather profile, including discussions of extreme heat and drought. Severe wind events typically occur during Santa Ana wind conditions.
Severe Weather	FEMA guidance SHMP SBC HMP	Yes	Severe Weather includes discussions regarding extreme heat, severe wind, and drought, which are weather-related hazards most common in Rancho Cucamonga and

			is expected to increase due to climate change.
Storm Surge	FEMA guidance	No	Rancho Cucamonga is not a coastal community where storm surge is a concern.
Subsidence	FEMA guidance	No	Subsidence is not a significant concern identified by the HMPC.
Mass-Casualty Incident (Terrorism)	SHMP	Yes	The HMPC was concerned about mass-casualty incidents posing a threat to public safety. A discussion of this is in the Human-Caused Hazards profile.
Thunderstorm	SHMP	No	Thunderstorms that cause damage and endanger public safety are rare in the Southern California region and were not identified by the HMPC.
Tornadoes	FEMA guidance SHMP	No	No tornadoes are known to have ever occurred in Rancho Cucamonga.
Transportation Accidents	SHMP	No	While transportation accidents can occur within the City, this hazard was not identified as a key hazard of HPMC concern.
Tree Mortality	SHMP	No	The HMPC noted that the City's trees are a potential asset at risk; however, tree mortality was not identified as a hazard of concern for the City.
Tsunami	FEMA guidance SHMP	No	Rancho Cucamonga is not a coastal community.
Urban Fire	SHMP OC HMP	Yes	The HMPC identified urban fires as a risk to property and life in Rancho Cucamonga. A discussion of this topic is included in the wildfire section of the document.
Volcano	SHMP SBC HMP	No	There are no volcanoes near Rancho Cucamonga to pose a valid threat.
Wildfire	FEMA guidance SHMP SBC HMP	Yes	The HMPC identified wildfire as a major threat to the developed and undeveloped areas of the City and is a topic included in the document.

After hazard evaluation and the organizational changes made by the Committee, this Plan discussed the following hazards in detail; if the targeted hazard was a sub-category, the parent hazard was listed in parenthesis:

- Seismic Hazards
- Wildfire
- Flooding (includes Dam Inundation)
- Severe Weather (Extreme Heat, Drought, Severe Wind)
- Human-Caused Hazards (Terrorism/MCI, Cyber Threats)
- Hazardous Materials Release
- Aircraft Incident

Hazard Scoring and Prioritization

The Committee followed FEMA guidance for hazard mitigation plans and prioritized each of the 11 hazards. The initial step assigned a score of 1 to 4 for each of the 10 hazards. The four criteria were as follows:

- Probability:** The likelihood that the hazard event will occur in Rancho Cucamonga in the future.
- Location:** The size of the area that the hazard event would affect.
- Maximum probable extent:** The severity of the direct damage of the hazard event to Rancho Cucamonga.
- Secondary impacts:** The severity of indirect damage of the hazard event to Rancho Cucamonga.

The Committee assigned a weighting value to each criterion, giving a higher weight to the criteria deemed more critical and multiplied the score for each criterion by weighing the factor in determining each criterion's overall score. FEMA recommended the weighting values as follows:

- Probability: 2.0
- Location: 0.8
- Maximum probable extent: 0.7
- Secondary impacts: 0.5

Table 3-2 shows the Criterion Scoring used to assign a score for each criterion.

Table 3-2: Criterion Scoring

Probability		Maximum Probability Extent (Primary Impact)	
THE ESTIMATED LIKELIHOOD OF OCCURRENCE BASED ON HISTORICAL DATA		THE ANTICIPATED DAMAGE TO A TYPICAL STRUCTURE IN THE COMMUNITY	
Probability	Score	Impact	Score
Unlikely—less than a 1 percent chance each year	1	Weak—little to no damage	1
Occasional—a 1 to 10 percent chance each year	2	Moderate—some damage, loss of service for days	2
Likely—a 10 to 90 percent chance each year	3	Severe—devastating damage, loss of service for months	3
Highly likely—more than a 90 percent chance each year	4	Extreme—catastrophic damage, uninhabitable conditions	4
Location		Secondary Impact	
The projected area of the community affected by the hazard		The estimated secondary impacts to the community at large	
Affected Area	Score	Impact	Score
Negligible—affects less than 10 percent of the planning area.	1	Negligible—no loss of function, downtime, and/or evacuations	1
Limited—affects 10 to 25 percent of the planning area.	2	Limited—minimal loss of functions, downtime, and/or evacuations	2

Significant—affects 25 to 75 percent of the planning area.	3	Moderate—some loss of functions, downtime, and/or evacuations	3
Extensive—affects more than 75 percent of the planning area.	4	High—major loss of functions, downtime, and/or evacuations	4

After calculating each hazard's total impact score (sum of the location, maximum probable extent, and the secondary impact), FEMA guidance recommends multiplying the total impact score by the overall probability of determining each hazard's final score. A final score between 0 and 12 is considered a low-threat hazard, 12.1 to 42 is a medium-threat hazard, and a score above 42 is considered a high-threat hazard. This final score determines the prioritization of the hazards.

Table 3-3 shows the individual criterion scores, the final score, and the threat level for each hazard based on the above prioritization process.



Earthquakes are high priority hazards because they are likely to happen, affect a wide area, and can be very damaging.

Table 3-3: Individual Criterion Scores for the Rancho Cucamonga HMPC

Hazard Type*	Probability	Impact			Total Score	Hazard Planning Consideration
		LOCATION	PRIMARY IMPACT	SECONDARY IMPACTS		
Seismic Hazards ¹	4	4	4	4	64.00	High
Wildfire	4	3	4	4	57.60	High
(Severe Weather) Extreme Heat	4	4	3	3	54.40	High
Human-Caused Hazards (Cyber Threats)	4	4	1	4	47.20	High
Severe Weather (Severe Wind)	4	3	2	4	46.40	High
Flooding ²	3	3	3	4	39.00	Medium
Severe Weather (Drought)	3	4	1	2	29.40	Medium
Human-Caused Hazards (Terrorism/MCI)	2	2	2	3	18.00	Medium
Hazardous Materials Release	2	2	2	2	16.00	Medium
Aircraft Incident	2	1	1	1	8.00	Low

* Climate Change considerations are discussed as part of each Hazard Profile identified in this table.
 1 Seismic Hazard includes: Fault Rupture, Seismic Shaking, Liquefaction, and Landslide
 2 Flooding includes Dam Inundation

Hazard Profiles

The following hazard profiles below discuss the key hazards of concern identified by the HMPC. These profiles include a description of the hazard, discussion of the location, magnitude/severity (extent) of potential events, historical occurrences, and potential for future events. In addition, each profile includes a discussion of climate change considerations.

Seismic Hazards

Rancho Cucamonga sits within a seismically active region of Southern California. Surrounded by active earthquake faults of varying size and significance, the City is prone to these seismic hazards, more commonly known as earthquakes. Typically, seismic shaking and fault rupture are deemed primary hazards as they occur during an

earthquake. Liquefaction and earthquake-induced landslides are considered secondary hazards because an earthquake triggers these types of events. If strong enough, earthquakes can trigger other effects such as building damage/collapse, infrastructure failure, pipeline breakage, and damage to transportation and communication facilities. The size of the earthquake and distance from the epicenter typically determine the severity of these events. Seismic hazards of concern in Rancho Cucamonga include the primary hazards of fault rupture and shaking and the secondary hazards of liquefaction, earthquake-induced landslide, and settlement.

DESCRIPTION

SEISMIC SHAKING (PRIMARY)

Seismic shaking (ground shaking) is the term that refers to the movement of the Earth's surface resulting from an earthquake. This shaking is typically the primary cause of earthquake damage, which generally correlates to the earthquake magnitude and proximity to the event epicenter.

The intensity of seismic shaking relates to the amount of energy discharged by the seismic event, dictated by the fault's length and depth. The amount of earthquake shaking is correlated to the length of movement along the fault associated with the event. The greater the distance that movement occurs along a fault line, the stronger the event. Other factors that affect the event magnitude is the earthquake's location in relation to the earth's surface and the types of soils exposed to seismic shaking. The smaller the distance from the event, the stronger the shaking will be felt.

In most cases, areas nearest to the earthquake events will feel the strongest shaking, while the effects dissipate as that distance increases. Seismic shaking can damage or destroy structures leading to partial or even total collapse. The ground's shaking can also damage or destroy underground utilities or pipelines, potentially leading to releases of hazardous materials and flooding if water lines are breached.

FAULT RUPTURE (PRIMARY)

Fault Rupture occurs when the earth's surface shifts and cracks along a fault line during a seismic event. While this phenomenon is not especially dangerous in natural environments, issues arise when structures are built near or on top of an active fault. Per the California Geological Survey (CGS), an active fault is one that has experienced surface movement in the past 11,700 years.

The shifting and movement of the earth's tectonic plates are responsible for seismic events. These tectonic plates can pull away from, move toward, or pass by each other. As they do, the plates sometimes lock together. This inability to move creates tension, and eventually, the built-up tension is released like a springboard. The tension dissipates into the earth's crust.

The location at which two tectonic plates join is called a fault line. Fault lines are sometimes visible on the earth's crust as sudden rifts or anomalies in the landscape's continuity. In California, the major north-south fault line is the San Andreas Fault; it is where

the North American and Pacific Plates meet. However, constant friction between the two plates over the millennia has caused the areas where the two plates intersect to become fragmented, creating new, smaller faults.

The area near a fault line is at risk of damage due to the potential for a fault rupture—the deformation or displacement of land on either side of the fault—and may move a few inches to several feet in opposite directions. Buildings or infrastructure situated near a fault line could be severely damaged or destroyed. The fault rupture's direction depends on the fault type: dip-slip faults produce vertical shearing, strike-slip faults produce horizontal shearing, and oblique-slip faults produce both vertical and horizontal shearing. A fourth kind of fault, called a "blind" fault, produces virtually no visible land displacement.

Some faults have emerged recently in geologic history. Quaternary faults have developed between the Holocene Era and the present (within the last 1.8 million years). These faults are especially concerning since they are the most likely to be active and cause future earthquakes.

LIQUEFACTION (SECONDARY)

Liquefaction is a ground failure phenomenon that occurs because of a seismic event. Liquefaction can occur when seismic energy shakes an area with low-density, fine grain soil, like sand or silt, that is also saturated with water. When the shaking motion reaches these areas, these loosely packed soils experience decompaction, making the saturated sediment behave more like a liquid than solid ground. During liquefaction events, the liquified soil can lose most of its stability, causing damage to buildings and infrastructure built upon it. In severe cases, some buildings may completely collapse. Pipelines or other utility lines running through a liquefaction zone can be breached during an event, potentially leading to flooding or the release of hazardous materials.

EARTHQUAKE-INDUCED LANDSLIDE (SECONDARY)

Ground failure resulting from an earthquake can occur in the form of an Earthquake-Induced Landslide. These failures typically happen in areas with steep slopes or unstable soil conditions. Landslides can impact structures, sever utility lines, block roadways, and impact people and properties in the failure path.

SETTLEMENT (SECONDARY)

Seismic settlement can occur because of an earthquake. Typically, the amount of settlement that occurs is based on the intensity and duration of ground shaking and the subsurface soils' relative density. Most soils are susceptible to some degree of seismic settlement, and much of the soil underlying the City is alluvial, which can settle from an earthquake. However, most earthquake damage is associated with differential settlement, a phenomenon associated with two different earth materials settling at two different rates. This type of settlement typically occurs slowly and is not considered dangerous to building occupants. However, over time it can cause significant damage to buildings.

- If differential settlement occurs within the City, it is anticipated to be in areas where un-engineered fill or areas where loose soils occur, which have not been identified at the city-scale.

- Mapping of potential settlement areas is not currently available; however, this information is typically identified during geotechnical investigations associated with site-specific developments.

LOCATION AND EXTENT

SEISMIC SHAKING (PRIMARY)

The intensity of seismic shaking occurs with the amount of energy discharged by the seismic event. In most cases, areas nearest to the fault experience the greatest seismic shaking while areas further away experience less shaking. Seismic shaking can damage or destroy structures leading to partial or even total collapse. The ground's shaking can also damage or destroy underground utilities or pipelines, potentially leading to releases of hazardous materials and flooding if water lines are breached.

Southern California is a highly seismic area because of the major faults that run through the region and the frequency of seismic events in the region. The intensity of seismic shaking is usually measured with the Modified Mercalli Intensity (MMI) scale based on the amount of observed damage. Seismic shaking may also be measured using the more widely known moment magnitude scale (MMS, denoted as M_w or sometimes M), which measures the amount of energy the earthquake releases. The MMS begins at 1.0 and increases the more energy is released. This scale is based on a logarithmic scale, meaning that the difference in energy between two measurements is substantially greater than the difference between the measurements themselves. For example, a 6.5 M_w earthquake releases approximately 1.4 times as much energy as a 6.4 M_w earthquake, and 1,000 times as much energy as a 4.5 M_w earthquake. The MMS replaces the Richter scale, which is a similar scale but less reliable when measuring large earthquakes. Since the degree of shaking and consequential damage generally decreases as the seismic energy travels farther away from the event's point of origin, different sections of a city or region can report different MMI measurements in different locations. Given Rancho Cucamonga's size, it is likely that different sections of the City would report different MMI measurements. The MMI scale depicted in **Table 3-4** uses Roman numerals on a 12-point scale to measure and describe the effects of the shaking event.

Table 3-4: Moment Magnitude and Modified Mercalli Intensity Scale^{26,27}

Moment Magnitude	Modified Mercalli Intensity	Description	Description
1.0-3.0	I	Instrumental	Felt only by a very few people, under especially favorable conditions.

²⁶ United States Geological Survey. 2019. *The Modified Mercalli Intensity Scale*.

<https://earthquake.usgs.gov/learn/topics/mercalli.php>

²⁷ Michigan Tech. UPSeis: An educational site for budding seismologists.

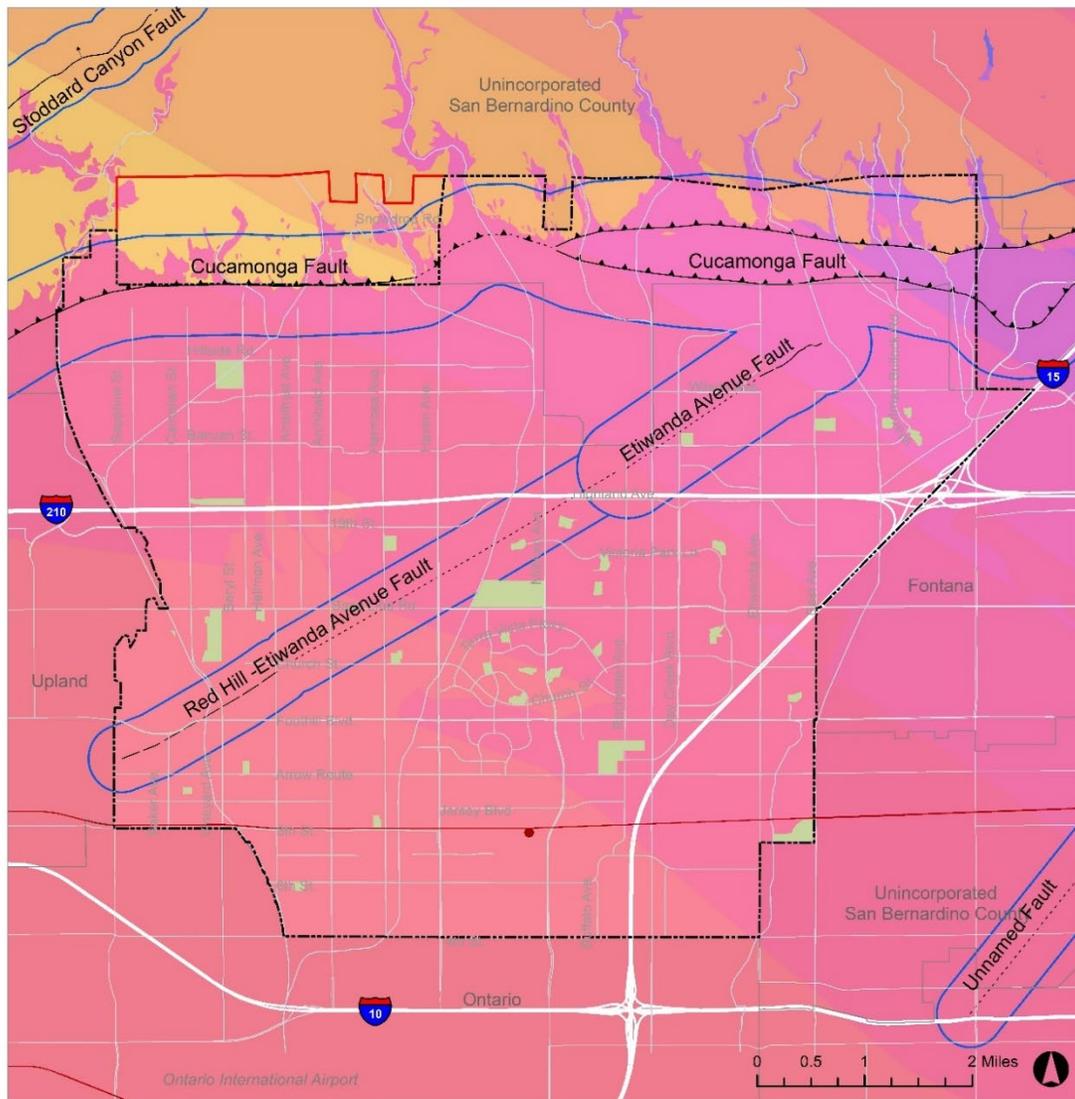
<http://www.geo.mtu.edu/UPSeis/magnitude.html>

3.0-3.9	II	Feeble	Felt only by a few people at rest, especially on the upper floors of buildings.
	III	Slight	Noticeable by people indoors, especially on upper floors, but not always recognized as an earthquake.
4.0-4.9	IV	Moderate	Felt by many indoors and by some outdoors. Sleeping people may be awakened. Dishes, windows, and doors are disturbed
	V	Slightly Strong	Felt by nearly everyone, and many sleeping people are awakened. Some dishes and windows were broken, and unstable objects overturned.
5.0-5.9	VI	Strong	Felt by everyone. Some heavy furniture is moved, and there is slight damage.
	VII	Very Strong	Negligible damage in well-built buildings, slight to moderate damage in ordinary buildings, and considerable damage in poorly built buildings.
6.0-6.9	VIII	Destructive	Slight damage in well-built buildings, considerable damage and partial collapse in ordinary buildings, and great damage in poorly built buildings.
	IX	Ruinous	Considerable damage in specially designed structures. Great damage and partial collapse in substantial buildings, and buildings are shifted off foundations.
7.0 and higher	X	Disastrous	Most foundations and buildings with masonry or frames are destroyed, along with some well-built wood structures. Rail lines are bent
	XI	Very Disastrous	Most or all masonry structures are destroyed, along with bridges. Rail lines are greatly bent.
	XII	Catastrophic	Damage is total. The lines of sight are distorted, and objects are thrown into the air.

The City is located near a variety of active faults in southern California. The closest faults include the Etiwanda Avenue Fault and Cucamonga Fault, both located within the City and Sphere of Influence (SOI). While these faults are considered active and can generate earthquakes, the probability of producing a significant event is relatively low when compared to other faults located in the region.

Figure 3-1 identifies the faults located within the City and vicinity and the potential intensity of seismic shaking expected from a seismic event. The data mapped is measured in relationship to the force of Earth's gravity (g) or percent g. Percent g is computed by determining the acceleration of the earthquake's motion relative to the force of

Figure 3-1: Seismic Shaking Potential



Atlas Planning Solutions,
2020| Sources: City of
Rancho Cucamonga, 2020;
SCAG; 2020 County of San
Bernardino, 2020;
California Geological
Survey, 2021.



<ul style="list-style-type: none"> — Fault (Location Certain) - - - Fault (Approximate Location) Fault (Location Concealed) —▲— Thrust Fault (Location Certain) - -▲- Thrust Fault (Approximate Location) 	<p>Seismic Shaking Potential (%g)</p> <table border="0"> <tr> <td>0.65</td> <td>1.15</td> </tr> <tr> <td>0.75</td> <td>1.25</td> </tr> <tr> <td>0.85</td> <td>1.35</td> </tr> <tr> <td>0.95</td> <td>1.45</td> </tr> <tr> <td>1.05</td> <td>1.55</td> </tr> </table> <p>□ Fault Buffer Zones (Non-Regulatory)</p>	0.65	1.15	0.75	1.25	0.85	1.35	0.95	1.45	1.05	1.55	<ul style="list-style-type: none"> - - - - Rancho Cucamonga City Limits — Sphere of Influence □ Adjacent City Limits ■ Parks — Waterways ● Metrolink Station — Metrolink
0.65	1.15											
0.75	1.25											
0.85	1.35											
0.95	1.45											
1.05	1.55											

gravity, which is 1.0g. Based on this, parts of the City are expected to experience shaking intensity ranging from .65g (65%) to 1.55g (155%). Factors that impact the intensity of shaking include the types of earth materials (soil, rock, etc.), degree of consolidation (loose, compact, etc.), and proximity to the earthquake source. The two active faults expected to generate large earthquakes that could affect the City include the San Andreas and San Jacinto fault zones. Areas in the northeastern portion of the City (closest to the San Andreas and San Jacinto Faults) will likely experience the highest degree of shaking.

FAULT RUPTURE (PRIMARY)

The Alquist-Priolo Earthquake Fault Zoning Act enables the California State Geologist to designate zones surrounding active faults as Alquist-Priolo Special Study Zones (AP Zones), which is a special regulatory zone that requires additional study to determine the location of an active fault and define the limits where construction should be prohibited to reduce the placement of structures on top of an active fault.

Two major active faults are identified within Rancho Cucamonga. The first is the Cucamonga Fault, an east-west trending thrust fault that separates the basement rock of the San Gabriel Mountains from the alluvial fan deposits at the base of the mountain range. This fault, located within a special study zone, is believed to generate events ranging from M6.0-7.0 and impact the City and SOI's northern portions if a major earthquake were to occur. The second fault is the Etiwanda Avenue Fault, a northeast-southwest trending thrust fault (thought to be part of the Cucamonga Fault) found in the northern portion of the City. This fault is delineated within a special study zone and thought to be active; however, its slip rate and rupture interval is currently unknown. This fault is believed to be the northern segment of the Red Hill-Etiwanda Avenue Fault. **Figure 3-2** identifies the CGS designated AP Zones for these two faults (outlined in blue).

In addition to the AP Zones identified, the City has established its special study zone for the Red Hill-Etiwanda Avenue Fault. The southern section of the fault is located at the base of Red Hill, which is better defined and located by changes in subsurface geology and groundwater elevations in the area as mapped by the California Department of Water Resources (DWR). As the fault moves northeast, the theory is that a central segment connects the Red Hill segment to the Etiwanda Avenue Fault (discussed above); however, previous studies have not located this segment.

Given the uncertainty of the fault location and lack of understanding regarding its potential activity, the City identified a special study zone for the southern and central segments to



Liquefaction caused by the 1964 Niigata, Japan earthquake caused these apartment blocks to experience severe leaning. Image from the University of Washington.

gather evidence of any connection between the Red Hill Fault and the Etiwanda Avenue Fault. As of 2018, a Geologic Fault Investigation, prepared by RMA for the City's Proposed Public Safety Facility, found no conclusive evidence of an active fault crossing the site, which is within the special study zone.

LIQUEFACTION (SECONDARY)

Soils must be saturated with water for liquefaction to occur. Areas with high water tables generally have saturated soil since the distance between the shallowest aquifer and the surface is minimal. Areas with alluvial soils—soft sands, silts, and clays—are also susceptible to liquefaction as these soils are fine grain and generally do not bond together well. Liquefaction events do not have a scale of measurement; however, other factors can be used to assess the extent of damage associated with a liquefaction event, such as:

- Soil type
- Strength of shaking near liquefaction
- Size of the affected area
- Destruction due to liquefaction

According to the CGS, small areas of Rancho Cucamonga may be susceptible to liquefaction (**Figure 3-3**). These areas are located near Hellman Avenue and Base Line Road, and west of Vineyard Avenue and south of Base Line Road. These hazard locations are identified due to the potential for shallow groundwater (less than 50 feet from the ground surface) to occur and will require additional analysis associated with new development.

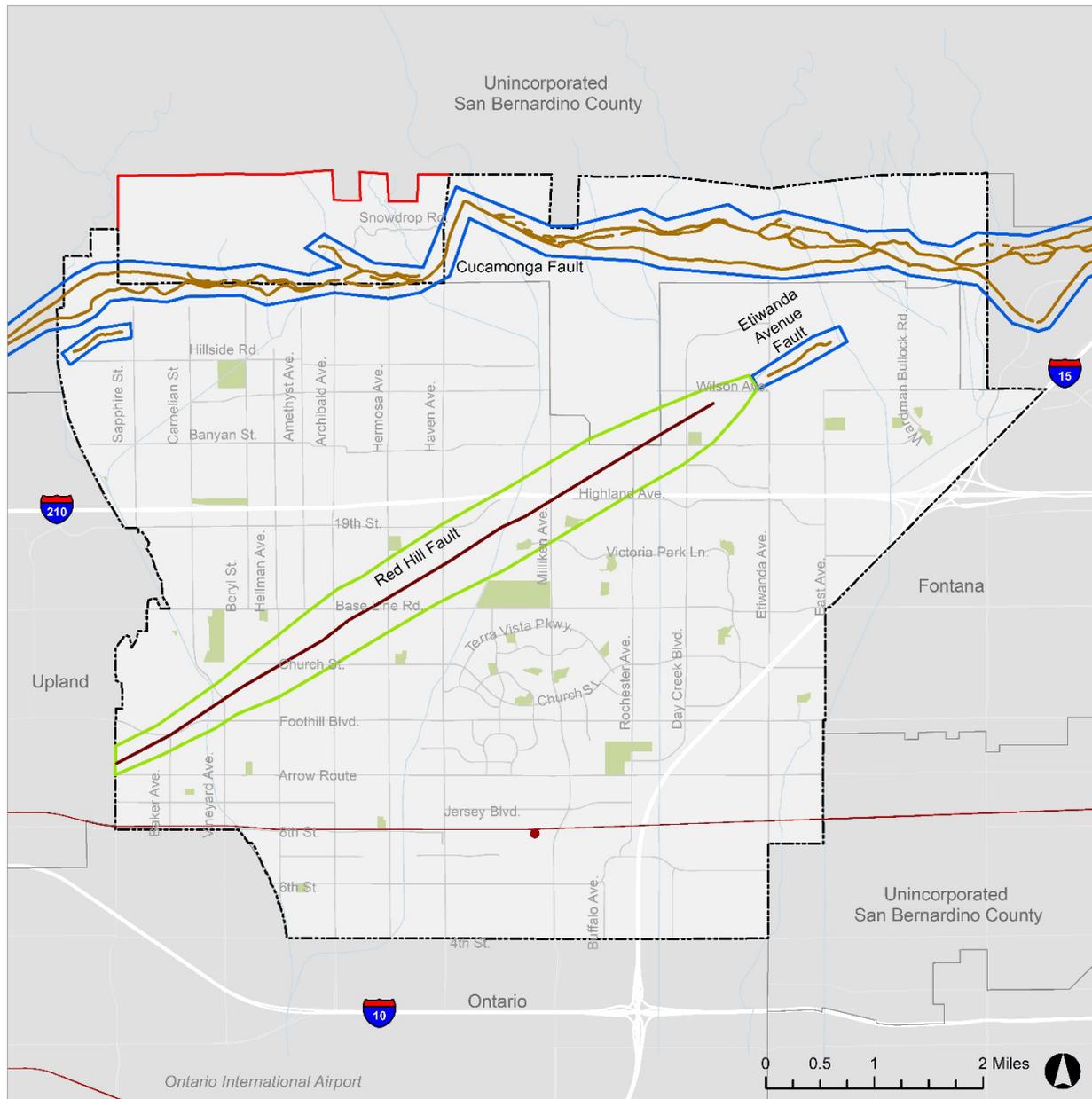
EARTHQUAKE-INDUCED LANDSLIDE (SECONDARY)

Areas in the City are also at risk for earthquake-induced landslides. **Figure 3-3** depicts these risk areas, predominantly located in the City's undeveloped northern portions against the mountain and foothills. While these areas are potentially prone to earthquake-induced landslides, other areas of the City may be prone to landslides resulting from erosion from precipitation events. **Figure 3-4** identifies the landslide susceptibility ratings based on CGS mapping for deep-seated landslides. Areas of high susceptibility are isolated to the northern portions of the City and SOI and the Red Hill area. The severity of a landslide is often measured by the amount of material that slid (e.g., in cubic feet), but there is no standardized scale for measuring individual landslides.

SETTLEMENT (SECONDARY)

Settlement associated with a seismic event can occur anywhere where loose consolidated soils are located. Most areas of the City are located within alluvial soils, which have some potential for settlement. The City has not identified locations prone to settlement; however, standard geotechnical investigations required as part of the development process are intended to identify these conditions if they exist.

Figure 3-2: Alquist Priolo Special Study Zones

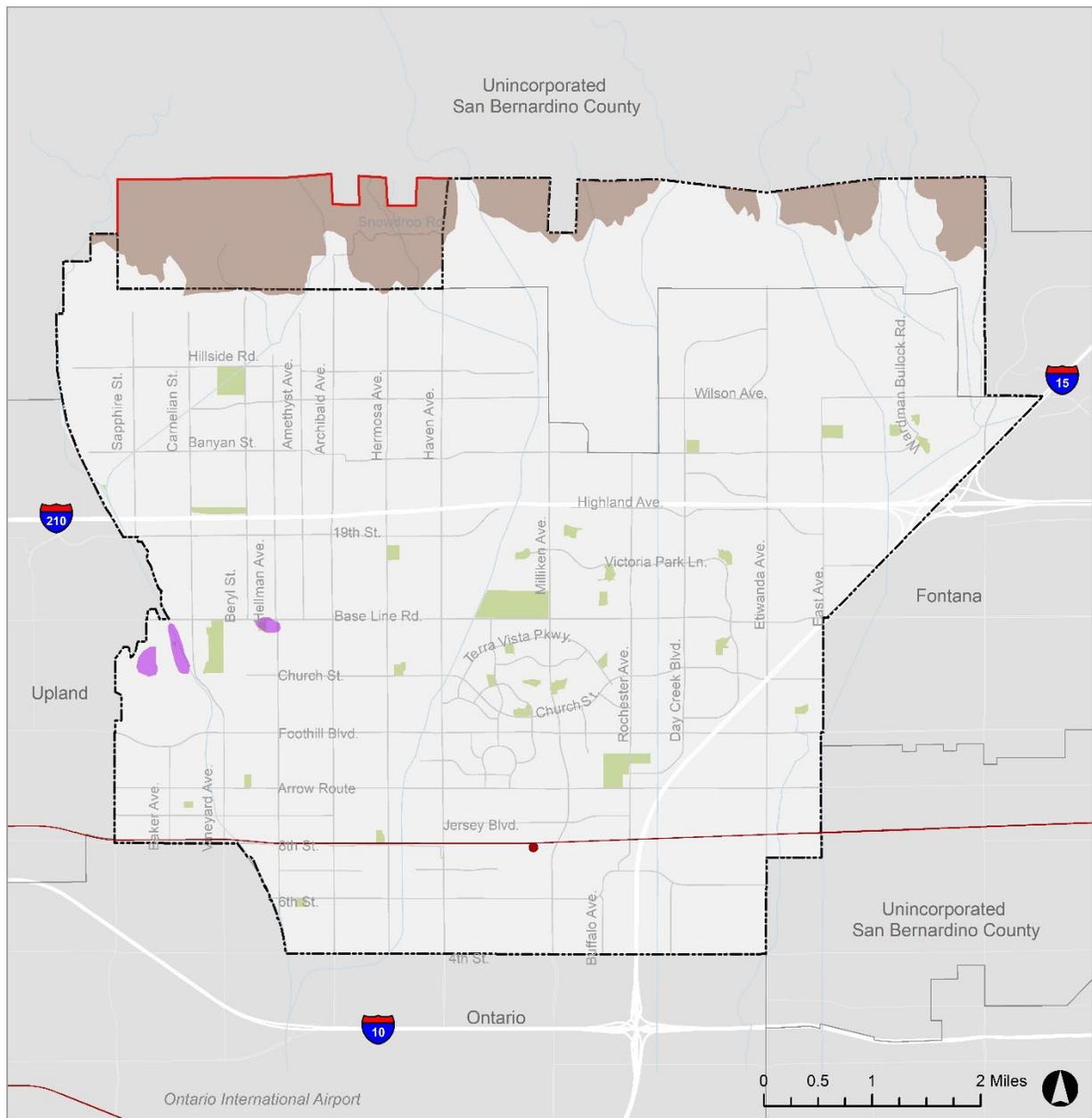


- Fault Hazard Zones**
- Alquist-Priolo Faults
 - Alquist-Priolo Special Study Zone
 - Red Hill Fault
 - Red Hill Fault Special Study Zone
 - City Boundary
 - Sphere of Influence
 - Adjacent City Limits
 - Rancho Cucamonga Station
 - Metrolink
 - Parks
 - Waterways

Atlas Planning Solutions, 2020 |
 Sources: City of Rancho Cucamonga, 2020;
 SCAG, 2020; County of San Bernardino, 2020;
 California Geological Survey, 2021



Figure 3-3: Potential Liquefaction and Earthquake-Induced Landslides Zones



Secondary Seismic Hazards

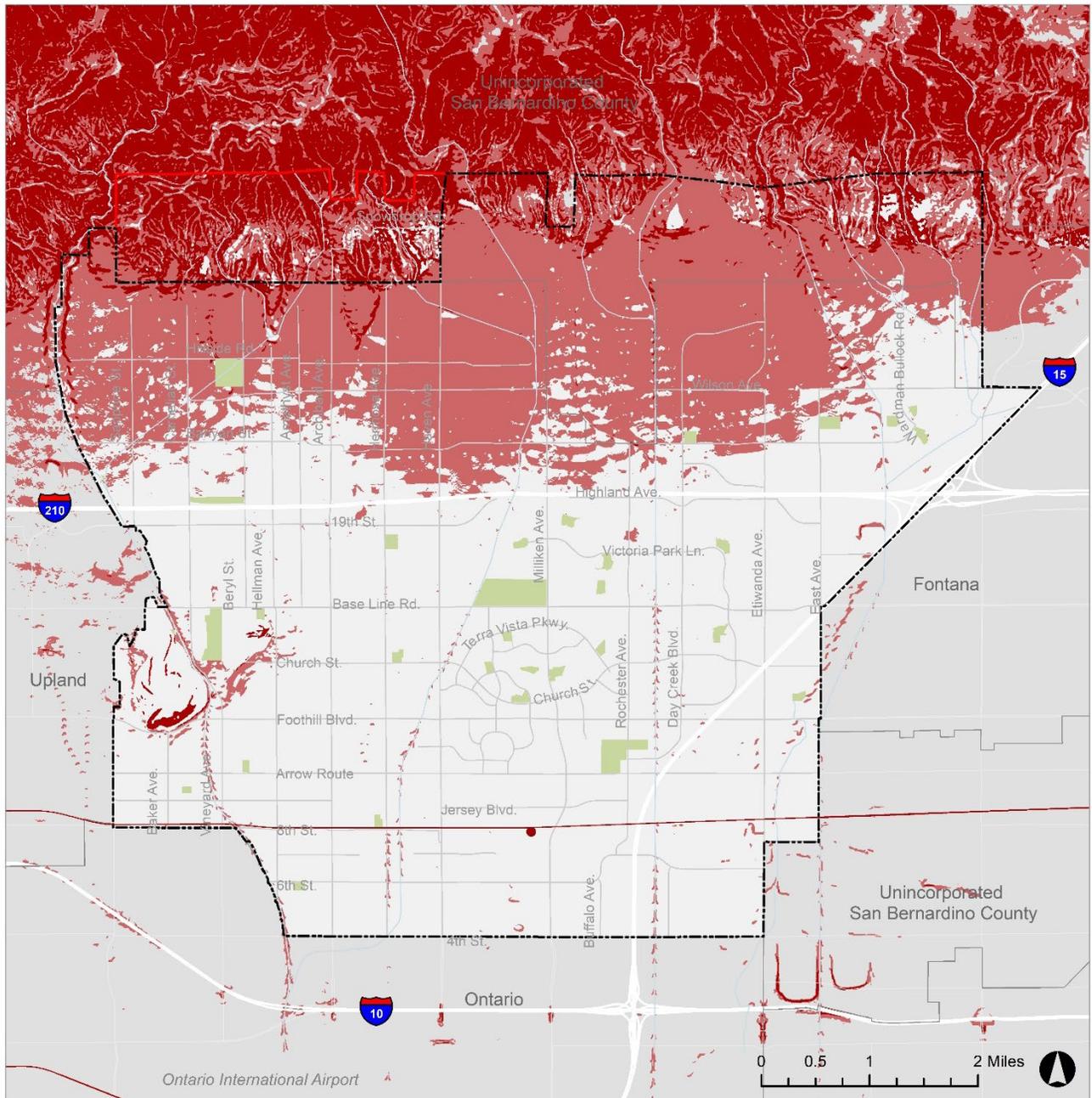
- Liquefaction Hazard Zone
- Earthquake-Induced Landslide Hazard Zone

- City Boundary
- Sphere of Influence
- Adjacent City Limits
- Rancho Cucamonga Station
- Metrolink
- Parks
- Waterways

Atlas Planning Solutions, 2020 |
 Sources: City of Rancho Cucamonga, 2020;
 SCAG, 2020; County of San Bernardino, 2020;
 California Geological Survey, 2021



Figure 3-4: Deep-Seated Landslide Susceptibility



Deep-Seated Landslide Susceptibility

- Low Susceptibility
- Medium Susceptibility
- High Susceptibility

- City Boundary
- Sphere of Influence
- Adjacent City Limits
- Rancho Cucamonga Station
- Metrolink
- Parks
- Waterways

Atlas Planning Solutions, 2020 |
 Sources: City of Rancho Cucamonga, 2020;
 SCAG, 2020; County of San Bernardino, 2020.
 California Geological Survey, 2020



PAST EVENTS

SEISMIC SHAKING (PRIMARY)

While no significant earthquake has originated within Rancho Cucamonga within the last 100 years, the City has felt the shaking of regional earthquakes. The most recent major seismic shaking event near Rancho Cucamonga was the Ridgecrest Sequence of Earthquakes on July 4, 2019. The event itself was a sequence of multiple earthquakes registered as an M6.4 and followed by an M7.1.²⁸ The event itself caused over 25 injuries, resulted in one death, and caused over \$5 billion in damage.²⁹ The next most recent event occurred on January 17, 1994, in Northridge, registering as an M6.7³⁰ causing 57 deaths, more than 8,700 injuries; and approximately \$20 billion in damage costs, plus an additional economic loss of \$40+ billion.

On June 6, 1992, there were multiple large events in Big Bear and Landers, California, with a rating of M6.5 and M7.3, respectively. These events resulted in three deaths, nearly 500 injuries, and approximately \$1.52 billion in damages.³¹

Many major faults are located throughout Southern California, including some well-known faults, such as the San Andreas and San Jacinto Fault Zones. Proximity to a variety of active faults ensures that seismic hazards will continue to be a major concern for the City. **Table 3-5** identifies the major earthquakes that have occurred within 100 miles of the City. While populations may have felt the 2019 Ridgecrest earthquakes within the City, these events were located over 100 miles away and thus were not added to **Table 3-5**.

FAULT RUPTURE (PRIMARY)

Seismic events involving fault rupture within the City have not occurred in the recent past. Of the two major faults transecting the City, the Cucamonga Fault has a historic rupture interval of approximately 600-700 years.

LIQUEFACTION (SECONDARY)

There have been no instances of liquefaction within the City. However, if soil conditions, shallow groundwater levels, and a strong seismic event coincide, an event could occur.

EARTHQUAKE-INDUCED LANDSLIDE (SECONDARY)

Prior landslide (erosion) events have occurred within the City. However, they have been minor in scale and typically associated with weather-related precipitation events.

²⁸ California Earthquake Authority. 2020. List of Notable and Major California Earthquakes.

<https://www.earthquakeauthority.com/California-Earthquake-Risk/California-Earthquake-History-Timeline>

²⁹ National Centers for Environmental Information. 2020. Global Significant Earthquake Database, 2120 B.C. to present. <https://www.ngdc.noaa.gov/hazard/earthqk.shtml>

³⁰ California Department of Conservation. N.d. Northridge Earthquake, January 17, 1994.

<https://www.conservation.ca.gov/cgs/earthquakes/northridge>

³¹ National Centers for Environmental Information. 2020. Global Significant Earthquake Database, 2120 B.C. to present. <https://www.ngdc.noaa.gov/hazard/earthqk.shtml>

SETTLEMENT (SECONDARY)

The City has not recorded incidents of seismic settlement after an earthquake.

Many major faults are located throughout Southern California, including some well-known faults, such as the San Andreas and San Jacinto Fault Zones. Proximity to a variety of active faults ensures that seismic hazards will continue to be a major concern for the City. **Table 3-5** identifies the major earthquakes that have occurred within 100 miles of the City. While populations may have felt the 2019 Ridgecrest earthquakes within the City, these events were located over 100 miles away and thus were not added to **Table 3-5**.

FAULT RUPTURE (PRIMARY)

Seismic events involving fault rupture within the City have not occurred in the recent past. Of the two major faults transecting the City, the Cucamonga Fault has a historic rupture interval of approximately 600-700 years.

LIQUEFACTION (SECONDARY)

There have been no instances of liquefaction within the City. However, if soil conditions, shallow groundwater levels, and a strong seismic event coincide, an event could occur.

Table 3-5: Significant Earthquakes (M6.0+) Within 100 Miles of City Hall

Event Location/Name**	Distance (Miles)*	Magnitude
1947 Fort Irwin	98	6.5
1999 Hector Mine	98	7.1
1937 Oasis	91	6.0
1948 Desert Hot Springs	91	6.0
1992 Thousand Palms	91	6.1
1992 Landers	65	7.3
1986 Morongo Valley	56	6.0
1994 Northridge	55	6.6
1971 Agua Dulce	51	6.7
1992 Big Bear	43	6.3
1918 Southern California (Hemet)	40	6.8
1933 Long Beach	38	6.4

*Distance between the epicenter and Rancho Cucamonga City Hall. Distance is calculated "as the crow flies."

** Name assigned here is the name of the closest reference location (based on the epicenter).

Source: USGS KML data imported into Google Earth Pro

EARTHQUAKE-INDUCED LANDSLIDE (SECONDARY)

Prior landslide (erosion) events have occurred within the City. However, they have been minor in scale and typically associated with weather-related precipitation events.

SETTLEMENT (SECONDARY)

The City has not recorded incidents of seismic settlement after an earthquake.

RISK OF FUTURE EVENTS

SEISMIC SHAKING (PRIMARY)

Seismic shaking events are expected to occur throughout California. Given the City's proximity to some of the most active faults within the State, it is anticipated that future events will occur and be felt. According to the Third Uniform California Earthquake Rupture Forecast (UCERF3) (**Figure 3-5**), the probability of an M6.7 earthquake in the next 30 years along the Cucamonga Fault is approximately 1.5%. In comparison, two of Southern California's most active faults (San Jacinto and San Andreas) are located within 8-12 miles of the City. They have a probability between 4% and 20%, respectively, over the same time frame. The UCERF3 was released in 2015 and provides the likelihood of a major earthquake on various faults between 2015 and 2044. **Table 3-6** identifies the probability of seismic events that could occur near the City based on the UCERF3 analysis. These probabilities are based on events ranging in magnitude from 6.7, 7.0, 7.5, and 8.0.

FAULT RUPTURE (PRIMARY)

Given the Cucamonga and Red-Hill/Etiwanda faults within the City, it is likely that fault rupture could occur in the future. The Cucamonga Fault has a decreasing probability range from 1.47% to .03% for events increasing in magnitude from 6.7 to 8.0.

LIQUEFACTION (SECONDARY)

Since liquefaction events are triggered by seismic shaking, the probability of a liquefaction event occurring depends on an earthquake's likelihood. An earthquake could occur along the numerous local faults running through San Bernardino County that may lead to a liquefaction event. Refer to **Table 3-6** for the probability of a major earthquake occurring in faults close to Rancho Cucamonga. Like the San Andreas or San Jacinto, regional faults are more likely to experience a significant earthquake within the next quarter-century. Therefore, it is only possible to say that liquefaction could occur in the City, but it is impossible to say with certainty when and where it may occur.

EARTHQUAKE-INDUCED LANDSLIDE (SECONDARY)

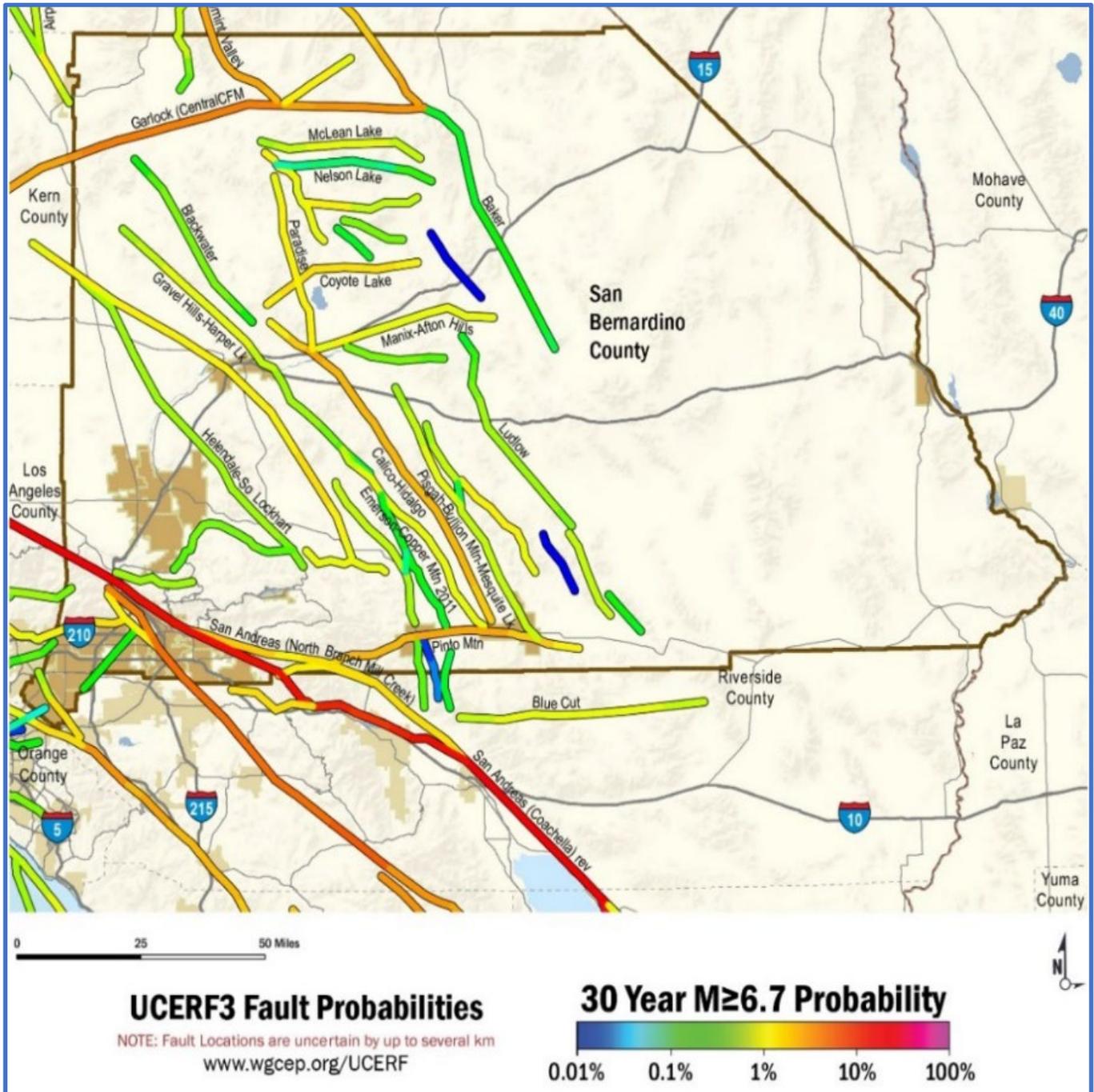
Landslides pose a threat to some City areas, especially in the undeveloped foothills. Topography and terrain, soil type, precipitation, and seismic activity contribute to landslides' potential to occur. Destabilization of slopes and hills due to intense rainstorms also has the potential to cause future landslides. Overall, the probability of future occurrence within Rancho Cucamonga is considered occasional (1-10% chance per year).³²

³² Masih, A. 2018. "An Enhanced Seismic Activity Observed Due to Climate Change: Preliminary Results from Alaska." IOP Conference Series: Earth and Environmental Science. <https://iopscience.iop.org/article/10.1088/1755-1315/167/1/012018/pdf>

SETTLEMENT (SECONDARY)

With little information regarding past events, it is assumed that settlement potential in the future is possible. Future areas of potential risk can be identified as part of the development process.

Figure 3-5. Major Active Faults within San Bernardino County



Source: San Bernardino County Multi-Jurisdictional Hazard Mitigation Plan, July 13, 2017

Table 3-6: Fault Location in Miles from City Hall and Potential for Large Seismic Event

Fault	Miles from RC City Hall	6.7+ M*	7.0+ M*	7.5+ M*	8.0 M*
Cucamonga	5.5	1.47	1.27	.76	0.03
Lytle Creek (San Jacinto)	10.25	1.13	1.13	1.12	.49
Fontana	5.5	.23	Negligible	Negligible	Negligible
San Jacinto	14	5.15	5.14	5.09	2.77
Chino Alt 2	13	.82	.22	.09	Negligible
Whittier Alt 1	19	1.45	1.26	.66	<0.01
San Andreas	15.5	18.16	15.08	11.59	4
Elsinore (Temecula)	50	2.20	1.80	1.08	<0.01
Santa Susana	50	2.44	1.79	1.00	<0.01
San Gabriel	30	.52	.45	.23	<0.01
Palos Verdes	50	2.67	2.28	.88	Negligible
San Jose	13	.30	.20	.03	Negligible
Sierra Madre	18	1.10	1.06	.72	.03

*Probability percentages based on the USGS UCERF3 probability data
 Source: USGS 30-year probability KMZ data imported into Google Earth Pro

CLIMATE CHANGE CONSIDERATIONS

SEISMIC SHAKING (PRIMARY)

There is no direct link between climate change and seismic activity that could impact Rancho Cucamonga, so climate change is not expected to cause any changes to the frequency or intensity of seismic shaking. Some research indicates that climate change could result in “isostatic rebounds,” or a sudden upward movement of the crust because of reduced downward weight caused by glaciers.³³ As glaciers are known to melt when global temperatures increase, climate change could indirectly increase seismicity.

FAULT RUPTURE (PRIMARY)

Generally, there is no known direct connection between fault rupturing and climate change. Some evidence suggests that greater oceanic pressure on tectonic plates due to melting land ice could influence seismic events' behavior.³⁴ Still, there is little to indicate that this would play a major factor in any seismic event, including fault rupture.

LIQUEFACTION (SECONDARY)

Climate change is anticipated to change the usual precipitation patterns in Southern California. Periods of both rain and drought are anticipated to become more intense

³³ Ibid., 47.
³⁴ Ibid., 47.

and frequent. Therefore, more precipitation will likely occur during rainy periods, and drought is expected to last even longer. As a result, the groundwater aquifer beneath Rancho Cucamonga and San Bernardino County could rise during intense precipitation periods. Alternatively, a longer-lasting drought may lead to more groundwater withdrawal and could lower groundwater elevations. Consequently, depending on the circumstances, climate change could increase or decrease the future risk of liquefaction in Rancho Cucamonga.

EARTHQUAKE-INDUCED LANDSLIDE (SECONDARY)

Due to the variety of factors that lead to landslides, climate change could indirectly affect landslides' conditions. More frequent and more intense rains may cause more moisture-induced landslides. Warmer temperatures and more frequent drought conditions may lead to more fires, destabilizing soils, and making future landslide events more likely.³⁵

SETTLEMENT (SECONDARY)

Seismic settlement is an isolated condition that is not anticipated to be affected by changing climatic conditions within the future.

Wildfires

DESCRIPTION

Wildfires are fires that burn in largely undeveloped and natural areas, and they are a regular feature of ecosystems throughout California. These fires help to clear brush and debris from natural areas and are necessary for the health of many ecosystems and various species' life cycle. However, since the early twentieth century, the common practice was to suppress naturally occurring fires in wildland areas, allowing dry plant matter and other fuels to build up.

At the same time, human activity has caused changes in the buffer zone between urbanized and undeveloped areas, known as the wildland-urban interface (WUI). The more natural setting of a WUI can make these zones highly desirable places to live. In many parts of California, the WUIs have become developed, albeit at lower densities than fully urbanized areas. However, this development activity has brought more people into wildfire-prone areas. The availability of fuel and increasing encroachment into the WUI, together with a changing climate, have made wildfires among the most common and dangerous natural hazards in California.

Lightning, accidents, or arson can spark wildfires. The size and severity of any fire depend on fuel, weather conditions, and topography availability. However, wildfires in the WUI do not need to be large to be damaging. In Oakland, the 1991 Tunnel Fire was relatively small, only 1,600 acres, but was the third deadliest and third most destructive wildfire in

³⁵ Center for Climate and Energy Solutions. n.d. Wildfires and Climate Change.

<https://www.c2es.org/content/wildfires-and-climate-change/#:~:text=Wildfire%20risk%20depends%20on%20a,shrubs%2C%20and%20other%20potential%20fuel.&text=Research%20shows%20that%20changes%20in,these%20increases%20in%20wildfire%20risk.>

California history.³⁶ The flames from wildfires create severe risks to property and lives. Smoke and other particulate matter from wildfires pose a health risk, even to those not near the blaze. Burned areas can be more susceptible to flooding and landslides because wildfires destroy the vegetation that helps slow down water runoff and hold slopes together.³⁷ The ground may repel water rather than absorb it when faced with ash deposits. Due to the change in the landscape structure after a fire, repelled water can carry debris into water reservoirs.³⁸

LOCATION AND EXTENT

Wildfires are not measured on a specific scale and are usually classified by size (e.g., acres burned) or impact (buildings destroyed or damaged, injuries or deaths, cost of damage, etc.). The wildfire hazard is classified by the California Department of Forestry and Fire Protection (Cal Fire) on a three-tier scale of fire hazard severity zones (FHSZs): very high, high, and moderate. These zone classifications do not correspond to a specific risk or intensity of fire but are qualitative terms that consider many factors. Fire-prone areas are also classified by the agency responsible for fire protection. Federal Responsibility Area (FRA) falls to federal agencies such as the US Forest Service, the Bureau of Land Management, and the National Park Service. State Responsibilities Area (SRA), which includes unincorporated land within counties that has statewide watershed value, falls to the Cal Fire. Local Responsibility Area (LRA), which includes portions of incorporated cities with identified wildfire hazard zones, falls to local governments.

Due to the San Gabriel Mountains foothill topography, Rancho Cucamonga has a susceptibility to and long history in dealing with wildfires. The community extends into the undeveloped hillside areas/mountains to the north of the city, adjacent to the Angeles/San Bernardino National Forests. Wildfires present a significant threat to the City, and the County, as it is a region of relatively high temperatures, low humidity, and low precipitation during the summer. This long summer season is followed by a fall season famous for high velocity and arid winds originating from the desert (Santa Ana winds). **Figure 3-6** identifies the historic wildfire perimeters between 1964 and 2014 in and around the city. In addition, **Figure 3-7** identifies the fire hazard zones within the City and surrounding areas. The zones depicted include areas of the national forest (FRA), areas within unincorporated San Bernardino County (SRA), and the Rancho Cucamonga Wildland Urban Interface Fire Area (WUIFA), which includes SRA and LRA within the jurisdictional boundaries of the Rancho Cucamonga Fire District. Development requirements are consistent throughout the WUIFA and meet development requirements in Very High Fire Hazard Severity Zones.

³⁶ Cal FIRE. 2020. https://www.fire.ca.gov/media/5512/top20_deadliest.pdf

³⁷ EPA. 2019. "Wildfires: How Do They Affect Our Water Supplies?" <https://www.epa.gov/sciencematters/wildfires-how-do-they-affect-our-water-supplies>

³⁸ Bichell, R. 2019. "How Wildfires May Muck Up the West's Reservoirs." Colorado Public Radio. <https://www.cpr.org/2019/09/25/how-wildfires-may-muck-up-the-wests-reservoirs/>

PAST EVENTS

From 1956 to 2020, there have been 244 fire incidents in California that resulted in a Major Disaster Declaration, Emergency Declaration, or Fire Management Assistance Declaration from FEMA. The most destructive and deadliest fire in the state's history is the 2018 Camp Fire in Butte County, which destroyed nearly 19,000 structures and killed 85 people. 2020 has become a highly destructive wildfire season, with five of the six largest fires in the state's history totaling nearly 2.5 million acres.

The Alta Loma and Etiwanda areas were most affected by the October 2003 Grand Prix fire, which combined with the Old Fire. The Grand Prix fire began October 21, 2003, ripped across the mountains just above and, in some places, down into Alta Loma and Etiwanda for six days. Overgrown brush-fueled fire, which ran across the mountain tops and higher foothills, eventually flew into the canyons surrounded by homes. It destroyed 13 homes, 5 outbuildings, and damaged 9 others in Alta Loma. Thirty-five people were injured in the fire.³⁹

The fire risk assessment shows that the City's area with the highest risk level is in the north, along the Wildland Urban Interface (WUI). New construction within WUI areas is required to comply with the California Building Code and the California Residential Code, including requirements for fire retardant or ignition resistant construction materials at roofs, eaves, vents, exterior walls, exterior windows, doors, and decks. California Government Code Section 51182 also requires buildings within these areas to provide defensible space. **Table 3-7** identifies historic wildfires that have affected the city of Rancho Cucamonga.

Table 3-7: Historical Fires in Rancho Cucamonga

Year	Name	Acres Burned	Description
2014 4/30 – 5/5	Etiwanda Fire	> 2,100	A Santa Ana wind-driven fire burned within the City's Sphere of Influence required the evacuation of approximately 1,650 homes and the closure of nine schools. The location of this fire coincides with the North Etiwanda Heights Specific Plan.
2003 10/21- 11/5	Grand Prix Fire (Old Fire)	>91,000	This Santa Ana wind-driven fire burned over 91,000 acres within San Bernardino and Los Angeles Counties. In total, the fires destroyed 975 buildings and killed six people. The total cost associated with fire response and suppression activities totaled over \$1.2 billion in 2003 dollars. Within the City, the fire destroyed 15 homes, and thousands of residents were threatened and evacuated during the incident.

³⁹ Incident Control. 2003. Grand Prix Fire. <http://www.incidentcontrol.com/grandprixfire/>

1997 Summer	Amethyst Fire	150	Started by children playing with fireworks near the horse ranch at the top of Amethyst. Pushed by mild onshore winds, it burned 150 acres. The fire threatened structures at the top of Archibald and Santana Road. Power lines were affected, eliminating power to the Greater Los Angeles area temporarily.
1996 Winter	Etiwanda Fire	400	Started by toppled high tension towers during the 90 MPH Santa Ana wind event. Burned 400 acres. Jumped Summit Avenue to Highland, damaging Summit Intermediate and some properties on 23rd Street.
1992 Summer	Etiwanda Fire	1200	Started near I-15 and Foothill Blvd. Pushed by onshore winds, burned through fields around housing tracts. Jumped Etiwanda, Base Line, East, and Highland Ave. Burned 1200 acres, damaging several structures.
1988 Fall	Texas Fire	12,000	Started near Lytle Creek. Pushed by strong Santa Ana winds, the fire came into the eastern part of the City of Rancho Cucamonga. Twelve thousand acres burned. The fire stopped at Etiwanda Canyon; several structures were damaged, including Summit Intermediate School.
1985 Summer	Archibald Fire	500	Started at the top of Archibald. The fire burned 500 acres in a northerly direction. Structures were threatened, but there was no damage.
1980 Fall	Thunder Fire	3,000+	Burned several thousand acres in the mountains above the City of Rancho Cucamonga. The fire did not come down into the City.
1970 Fall	Meyers Fire	N/A	Started near Lytle Creek. Pushed by strong Santa Ana winds, the fire burned to Cucamonga Canyon (similar to Grand Prix Fire). Little or no structural damage due to the lack of structures in the area. Chaffey College campus was the main concern as the fire surrounded the site, but firefighters protected the campus.

Source: City of Rancho Cucamonga. 2013. Local Hazard Mitigation Plan.

RISK OF FUTURE EVENTS

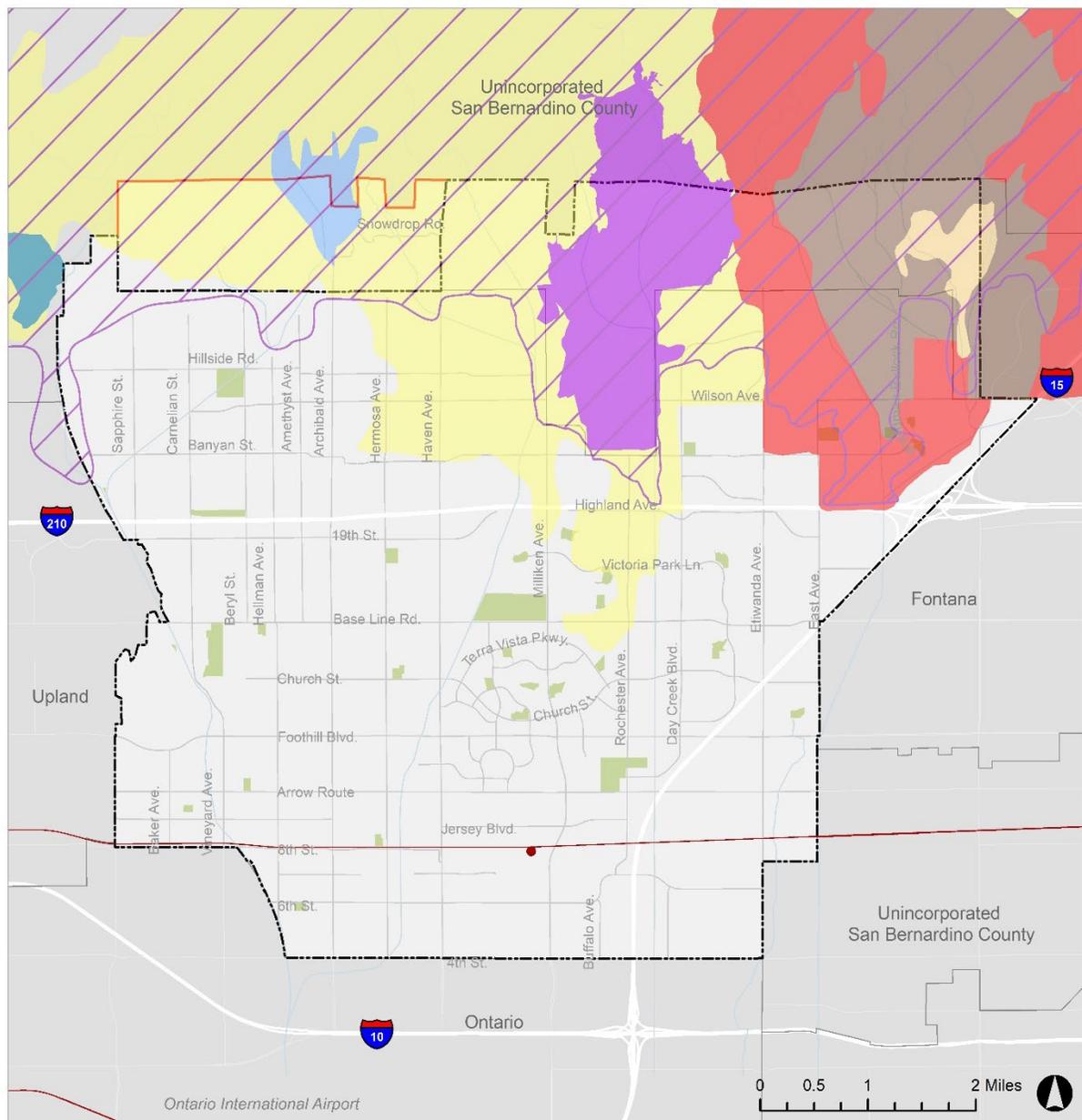
The history of wildfires in San Bernardino County and Rancho Cucamonga and the presence of development within the City's WUIFA, which includes very high fire hazard severity zones (VHFHSZ), indicates that wildfire events are likely in the future. Since 1970 nine major wildfire events have affected the City, which equates to a return interval of approximately one fire every 5.5 years. This risk is expected to remain highest in the undeveloped land in the foothills within both the City and the unincorporated areas of the Fire District as well as National Forest lands that border the City and SOI.

CLIMATE CHANGE CONSIDERATIONS

Climate change is expected to cause an increase in temperatures and more frequent and intense drought conditions. This increase will likely increase the amount of dry plant matter available for fuel, increasing wildfire risk statewide. In the foothills of the San

Gabriel Mountains and San Bernardino Mountains, which are already highly prone to wildfires, climate change is expected to increase the number of acres burned annually. However, increases in fuel supplies could cause wildfires to move faster or spread into more-developed areas, increasing the future threat to Rancho Cucamonga.

Figure 3-6 Historic Wildfire Perimeters Rancho Cucamonga



Historic Wildfire Perimeters

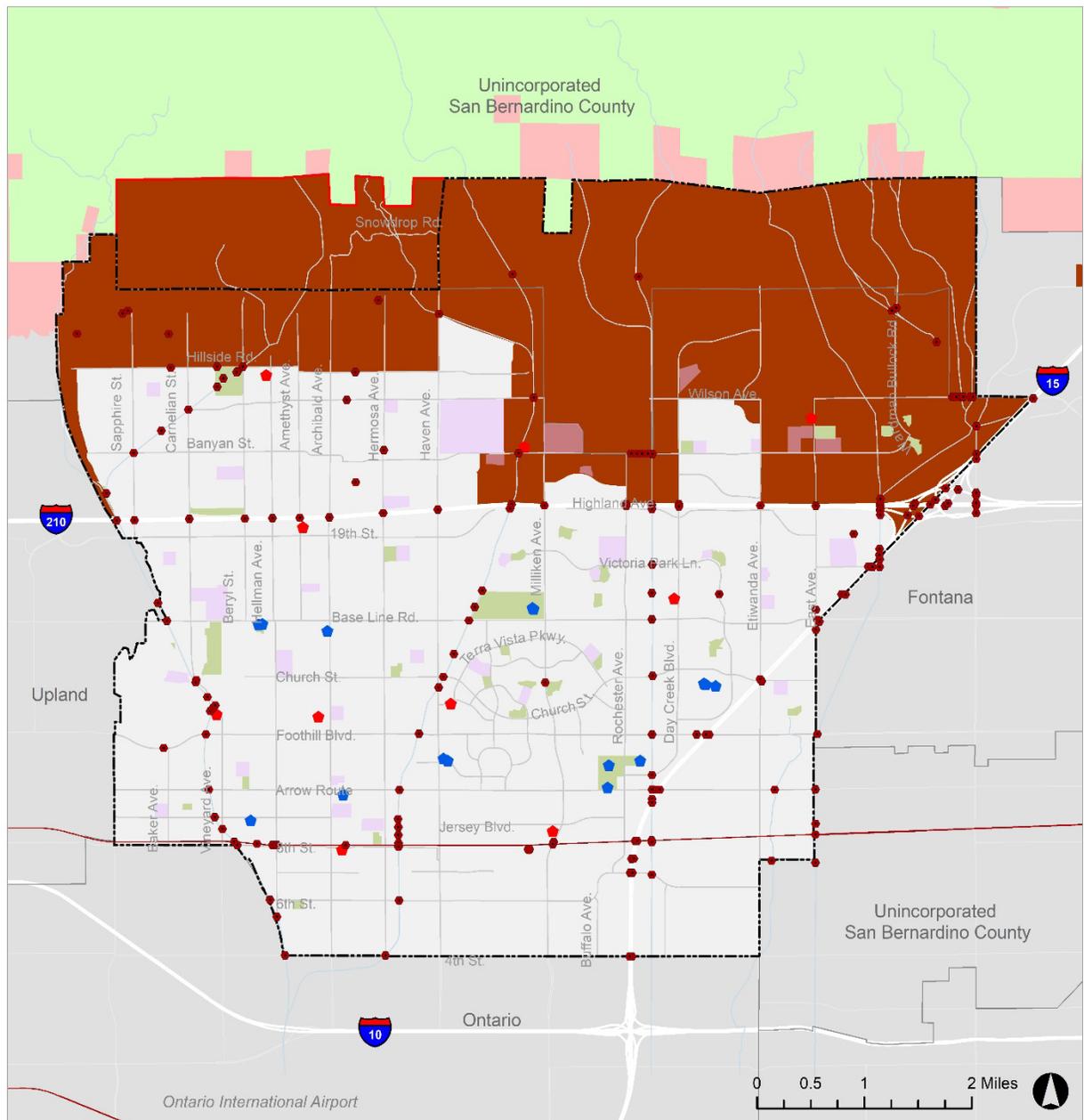
- 1970 Meyers Fire
- 1980 Summit Fire
- 1985 Archibald Fire
- 1988 Texas Fire
- 2003 Grand Prix Fire
- 2008 Foxborough Fire
- 2008 San Antonio Fire
- 2014 Etiwanda Fire

- City Boundary
- Sphere of Influence
- Adjacent City Limits
- Rancho Cucamonga Station
- Metrolink
- Parks
- Waterways

Atlas Planning Solutions, 2020 |
 Sources: City of Rancho Cucamonga, 2020;
 SCAG, 2020; County of San Bernardino, 2020;
 California Board of Forestry and Fire Protection,
 2021



Figure 3-7: Fire Hazard Zones



- | | | | |
|---|--|-------|--------------------------|
| Historic Wildfire Perimeters | | ----- | City Boundary |
| | National Forest
(Federal Responsibility Area) | ----- | Sphere of Influence |
| | Cal Fire State Responsibility Areas | ----- | Adjacent City Limits |
| | Wildland Urban Interface Fire Area | ● | Rancho Cucamonga Station |
| Essential Facilities | | ----- | Metrolink |
| ● | Bridges | ■ | Parks |
| ● | Fire Stations | — | Waterways |
| ● | City Facilities | ■ | Schools |

Atlas Planning Solutions, 2020 |
 Sources: City of Rancho Cucamonga, 2020;
 SCAG, 2020; County of San Bernardino, 2020;
 California Board of Forestry and Fire Protection,
 2021



Flooding

DESCRIPTION

Floods are a common hazard in many parts of California, including Rancho Cucamonga. Ultimately, a flood occurs when there is too much water on the ground to be held within local water bodies, causing water to accumulate in naturally dry areas. They are often caused by heavy rainfall, though floods can also occur after a long period of moderate rainfall or if unusually warm weather causes mountain snow to melt faster than expected. Floods that develop quickly, known as flash floods, are especially dangerous because there may be little warning that one is occurring, but floods can also build over a more extended period.

Floods are dangerous for several reasons. The floodwaters themselves can be deep enough for people to drown and moving fast enough to sweep people away. The moving water can damage buildings with its force (in extreme cases, it may move entire structures) or carry large debris that damages objects with which it collides. When water gets into buildings, it can cause extensive damage to personal property, ruining building materials, furniture, electronics, and numerous other items. Both standing and moving water can be barriers to movement, isolating people and hindering evacuation, rescue, or relief efforts.

LOCATION AND EXTENT

Flood events are measured by their likelihood of occurrence. For instance, a 100-year flood is a flood that has a 1 in 100 (1.0 percent) chance of occurring in any given year. A 500-year flood is a flood that has a 1 in 500 (0.2 percent) chance of occurring in any given year. The 100-year flood has been designated as the benchmark for major flood events. Thus 100-year floods are referred to as “base floods.”

Floodplains are areas that are prone to flooding and often experience frequent flooding. While it is possible for areas outside of these designated floodplains to experience flooding, the most likely locations to experience future flooding are low-lying areas near bodies of water. FEMA is the governmental body responsible for designating which areas of the United States can be classified as floodplains.

The three most common designations are:

- Special Flood Hazard Area: The area within a 100-year floodplain.
- Moderate Flood Hazard Area: The area outside of the 100-year floodplain but within the 500-year floodplain.
- Minimum Flood Hazard Area: The area outside of the 500-year floodplain.

Within these three designations, FEMA has multiple floodplain categories for each unique environment. **Table 3-8** shows these detailed floodplain categories. FEMA classifies Rancho Cucamonga under three of the floodplain categories: AE, X500, and B; the location of these flood plains can be seen on the FEMA Flood Hazard Zone Map depicted in **Figure 3-8**.

Flooding hazards can potentially impact a significant amount of the community; however, less than 10% of this area is subject to a 100-year event. Development within flood hazard areas is expected to comply with flood protection standards that reduce vulnerability to flood impacts and ensure safe use and occupation of structures.

PAST EVENTS

Located at the base of the San Gabriel Mountains, the city of Rancho Cucamonga has a long history of flooding. **Table 3-9** describes historical flood events that have occurred within the City.

Table 3-8: FEMA Flood Plain Categories

Category	Description
A	Within a 100-year flood plain, but the water height of the 100-year flood is not known.
A1-30 or AE	Within a 100-year flood plain and the water height of the 100-year flood is known.
AO	Within a 100-year flood plain, and the water height of the 100-year flood is between one and three feet but not specifically known.
A99	Within a 100-year flood plain, it is protected by flood protection infrastructures such as dams or levees.
AH	Within a 100-year flood plain, and the water height of the 100-year flood is between one and three feet and is specifically known.
AR	Within a 100-year flood plain, it is protected by flood protection infrastructure that is not currently effective but is being rebuilt to provide protection.
V	Within a 100-year flood plain for coastal floods, but the water height of the flood is not known.
V1-30 or VE	Within a 100-year flood plain for coastal floods and the water height of the flood is known.
VO	Within a 100-year flood plain for shallow coastal floods with a height between one and three feet.
B	Within a 500-year flood plain, or within a 100-year flood plain with a water height less than one foot (found on older maps).
C	Outside of the 500-year flood plain (found on older maps).
X	Outside of the 500-year flood plain (found on newer maps).
X500	Within a 500-year flood plain or within a 100-year flood plain with a water height less than one foot (found on newer maps).
D	Within an area with a potential and undetermined flood hazard.
M	Within an area at risk of mudslides from a 100-year flood event.
N	Within an area at risk of mudslides from a 500-year flood event.
P	Within an area at risk of mudslides from a potential and undetermined flood event.
E	Within an area at risk of erosion from a 100-year flood event.

Source: 24 CFR, Section 64.3

Table 3-9: Historic Flood Events in Rancho Cucamonga

Date	Event Description	Impact
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1983	This storm caused classrooms to flood with mud and water. Floodwaters ripped out asphalt streets and flooded homes. The street damage throughout the Cucamonga area was extensive, with washouts and cave-ins common.	The damage estimate for streets exceeded \$180,000 from the initial hours of the storm.
1978	The storm caused significant debris to get into the newly constructed Cucamonga Channel, causing severe damage to the concrete channel walls. As debris was removed from the channel, it became clear that whole sections of the channel would need to be rebuilt. Flood flows from the storm eroded the entire six-inch concrete wall, exposing and damaging the rebar. Thousands of feet of channel were in danger of total collapse during the storm. Significant damage occurred to Beryl Avenue near Banyan. All of the block retaining walls were washed out. Large chunks of pavement from Hellman Avenue from a large dam diverting flood waters into 15 homes on La Vine Street.	County Flood Control Director estimated the storm caused \$70 million in damages. More than \$2 million of the damage was to local roads. It cost more than \$2.9 million to repair the channel. It is estimated that if this storm had occurred in 1981, it would have caused \$280 million in damages due to the extensive amount of development occurring in the City at the time.
1969	This flood was rated as the eighth largest storm in the previous 100 years. No repairs were made when builders digging for fill dirt damaged a flood levee structure in the Cucamonga Spreading Grounds, which failed. The remaining levees and check dams held back the four million tons of debris from Cucamonga Canyon. This debris was added to the million and a half tons left by a previous storm (1966). Marine helicopters picked up flood victims from rooftops, while homeowners from the Dawn Haven tract were evacuated with ropes by sheriff's deputies and fire personnel. Three-foot deep water smashed through windows, flowed through homes, and picked up cars, which were never recovered.	Most of the \$68 million in damages resulted from a debris blockage within Cucamonga Creek, causing water and debris to jump out of its channel, carving a new one. The creation of this channel impacted homes along Carnelian, destroying four in the process.
1943	In a small storm in January 1943, Arrow Highway (Route) was washed away at Hellman.	Various small buildings, vineyards, and citrus groves were washed out.
1938	The storm from February 28 - March 3, 1938, was the sixth-largest storm of record and double the size of the 1969 flood. While the recently constructed flood control projects on the major canyons minimized flood damages, it was discovered that the Cucamonga and Deer Creek Spreading Grounds were the only functioning flood structures remaining in the entire tri-county area.	Fifteen hundred acres of orchards & vineyards were entirely washed away. Severe post-burn debris flows and flooding were reported from Etiwanda Canyon, which caused extensive damage.

1934	Two floods hit the Rancho Cucamonga area in 1934 from two cloudbursts. Four inches of rain fell in just a few hours.	Boulders washed across the highways. Schools closed, and train service was halted.
1916	In 1916, Cucamonga Creek began flooding down the west side of Red Hill into Upland. Twenty-one structures located on the Deer debris cone were washed away after this series of storm activity.	Turner Avenue was a canyon 10 to 30 feet deep; 1,000 feet of recently paved roadway on Archibald was washed out. A subsequent storm caused the Day & Deer creek channel to shift west, cutting a deep 30-foot gully and causing the destruction of valuable farming lands.
1891	In 1891, a great storm was combined with a rapidly melting snowpack, but with so few inhabitants' damages were limited. The damages would be repeated in 1910 and 1911 as all the tracks were washed out from Cucamonga, Deer, and Day Creeks. Again in 1914, the railroads were hard hit. Hellman was entirely washed out to a depth of 8 feet.	The main damage was to the railroads from flows from Deer Creek. The "rail barons" pressed Congress to build a dam at the canyon mouth. The 500-ton boulders carried down by the flood flows persuaded the railroads' engineers that a dam was impractical."
1884	In 1884 severe flooding stranded travelers when twenty-foot walls of water came roaring out of the canyons.	Construction activities on the railroads were disrupted.
1862	The largest storm of record occurred in 1862. This storm was seven times larger than the 1969 Storm. It rained steadily for 28 days. Lytle Creek cut a permanent new channel toward San Bernardino, making it unlikely to flood Cucamonga again.	There was little reported damage as there were only two ranches in the entire area.

Source: 2013 City of Rancho Cucamonga Local Hazard Mitigation Plan

RISK OF FUTURE EVENTS

There is no indication that the severe rainfall that leads to flooding will abate in the future, either in Rancho Cucamonga or the greater region of Southern California. While Rancho Cucamonga may experience prolonged periods of dry or wet years, flood events will likely continue to impact the city. For areas within the 100-year and 500-year flood hazard zones, the likelihood of flooding to occur annually is 1% and 0.2%, respectively.

Because the City is vulnerable to flooding during the winter storm season, it is an active participant in the FEMA National Flood Insurance Program (NFIP). Through this program, "Special Flood Hazard Areas" within the City are identified and mapped on Flood Insurance Rate Maps (FIRMs), identifying the areas that require flood insurance. FIRMs generally describe flooding in terms of a 100- or 500-year flood event, which translates into the probability (1.0% or 0.2%, respectively) that flooding could occur within the designated zone in any given year. In addition to the federal requirements within the NFIP, the City has also adopted flood protection standards requiring minimum building elevation, flood-proofing, and anchoring of buildings in areas identified as prone to flooding. **Figure 3-8** identifies the FEMA Flood Hazard Zones mapped within the City.

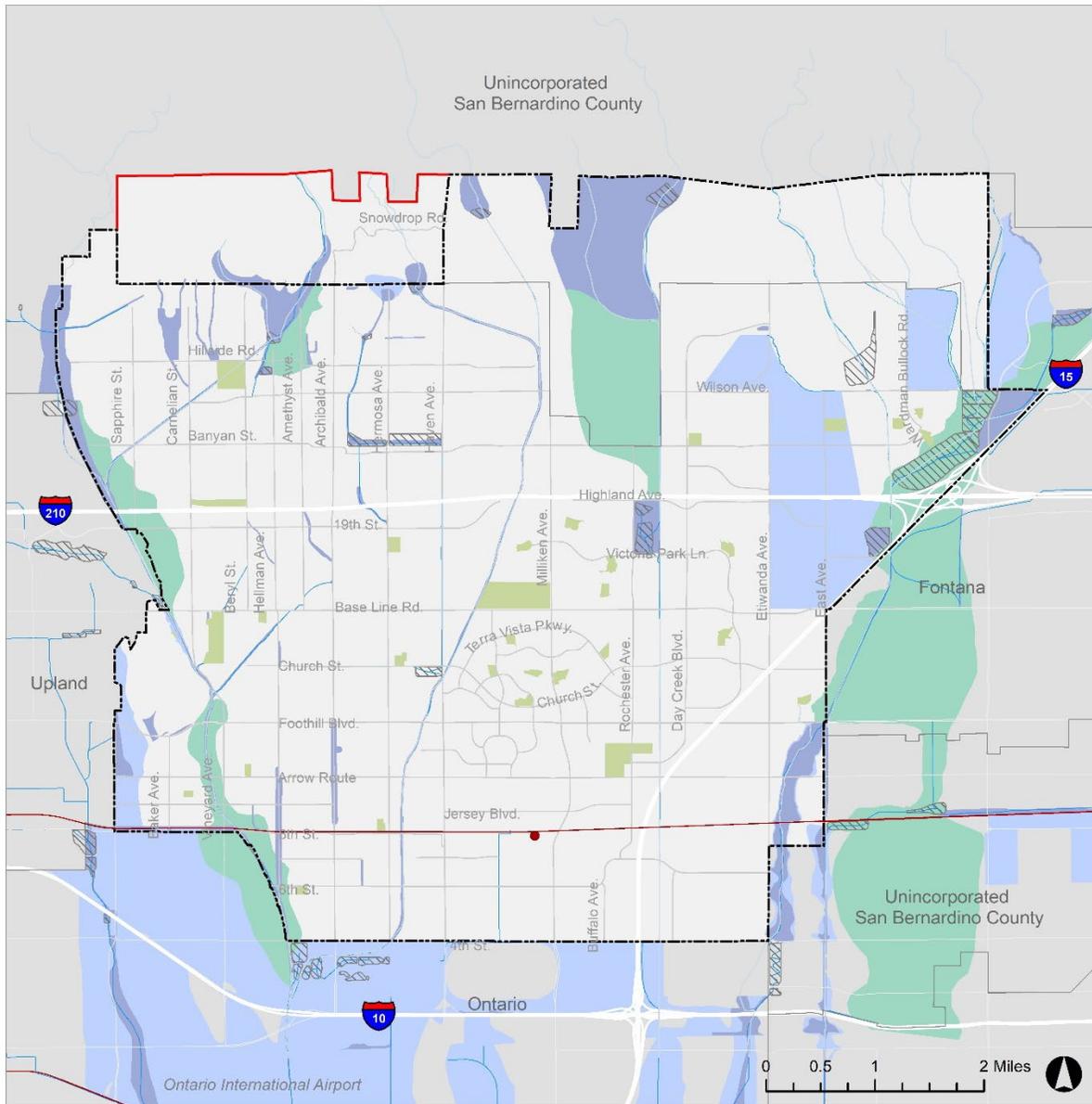
Since its incorporation, the City has worked with San Bernardino County on flood management and mitigation projects. The City also takes steps on an annual basis to maintain and prepare for flood events, ensuring the existing infrastructure can effectively convey floodwaters. Flood events within the City can occur either due to large storms and flash flooding that overwhelms infrastructure or the failure of flood control facilities that inundate downstream communities.

CLIMATE CHANGE CONSIDERATIONS

Climate change is expected to affect California's precipitation patterns, which are likely to influence future flood events. A 2017 study found that the number of very intense precipitation days in California is projected to more than double by the end of the century, increasing 117 percent, making it likely that flood events will become more frequent⁴⁰. More flood events could increase the frequency of maintenance and repair activities and require operational changes to City function. Much of the City's infrastructure may require modification and retrofit to better accommodate changes anticipated from climate change. As a result, significant investment in future infrastructure may be necessary.

⁴⁰ Polade, S.D., Gershunov, A., Cayan, D.R., Dettinger, M.D., & Pierce, D.W. 2017. Precipitation in a warming world: Assessing projected hydro-climate changes in California and other Mediterranean climate regions. *Scientific Reports*. <https://www.nature.com/articles/s41598-017-11285-y>

Figure 3-8: FEMA Flood Hazard Zones



- | | |
|--|----------------------------|
| Flood Hazard Zones | ----- City Boundary |
| Flood Control Channels | ----- Sphere of Influence |
| Flood Control Basins & Dams | ----- Adjacent City Limits |
| 100 Year Flood Zone | ● Rancho Cucamonga Station |
| 500 Year Flood Zone | ----- Metrolink |
| 500 Year Flood Zone (Protected by Levee) | Parks |
| | ----- Waterways |

Atlas Planning Solutions, 2020 |
 Sources: City of Rancho Cucamonga, 2020;
 SCAG, 2020; County of San Bernardino, 2020;
 Federal Emergency Management Agency,
 2021



Dam Failure/Dam Inundation

DESCRIPTION

Dam failure can result from several causes such as earthquakes, rapidly rising floodwaters, and structural design flaws. These events can occur instantaneously or very gradually, depending on the source of the failure. Inundation associated with these events can cause loss of life, damage property, along with other hazard related events., and the displacement of persons residing in the inundation path. According to the California Division of Safety of Dams (DSOD), a dam falls under their jurisdiction if its height is greater than 6 feet and impounds more than 50 acre-feet of water or height is greater than 25 feet and impounds 15 acre-feet of water.⁴¹ Based on these criteria, 1,537 dams fall under DSOD jurisdiction, 7 of which are located within the City of Rancho Cucamonga.

LOCATION AND EXTENT

The City of Rancho Cucamonga has eight catch-basins that can inundate areas of the City if a failure occurs. The basins serve several purposes, with a primary function of slowing and controlling the flow of water. Without basins to capture these flows, the County’s flood control channels could be inundated with so much water they would not be able to function.⁴² **Figure 3-9** identifies the inundation zones for the catch basins within the City, described in **Table 3-10**. Of these seven inundation areas, two can flood properties outside of the City—Cucamonga Creek and San Sevaine. Based on this mapping, the San Sevaine Basin generates the largest inundation area, which inundates a portion of the City and neighboring Fontana.

Table 3-10: Reservoir Capacity/Dam Inundation Areas

Catch Basin Name	Reservoir Capacity	Dam Inundation Area
Alta Loma Basin #1 & #2	155 acre-feet	332.4 acres
Cucamonga Creek	355 acre-feet	353.3 acres*
Day Creek	140 acre-feet	122.9 acres
Deer Canyon	24 acre-feet	212.3 acres
Demens Creek	35 acre-feet	206.9 acres
Etiwanda Basin	283 acre-feet	119.9 acres
Hickory Basin	220 acre-feet	333.7 acres
San Sevaine Basin #5	2,765 acre-feet	2,982.7 acres*

* Inundation zones impact areas outside of the city limits.

Source: Dams Within Jurisdiction of the State of California, September 2019, California Department of Water Resources, Division of Safety of Dams.

PAST EVENTS

Despite some significant flooding events in the late 1800s and early 1900s, including one in 1862 that wiped out the tiny Santa Ana River hamlet of Agua Mansa near present-day

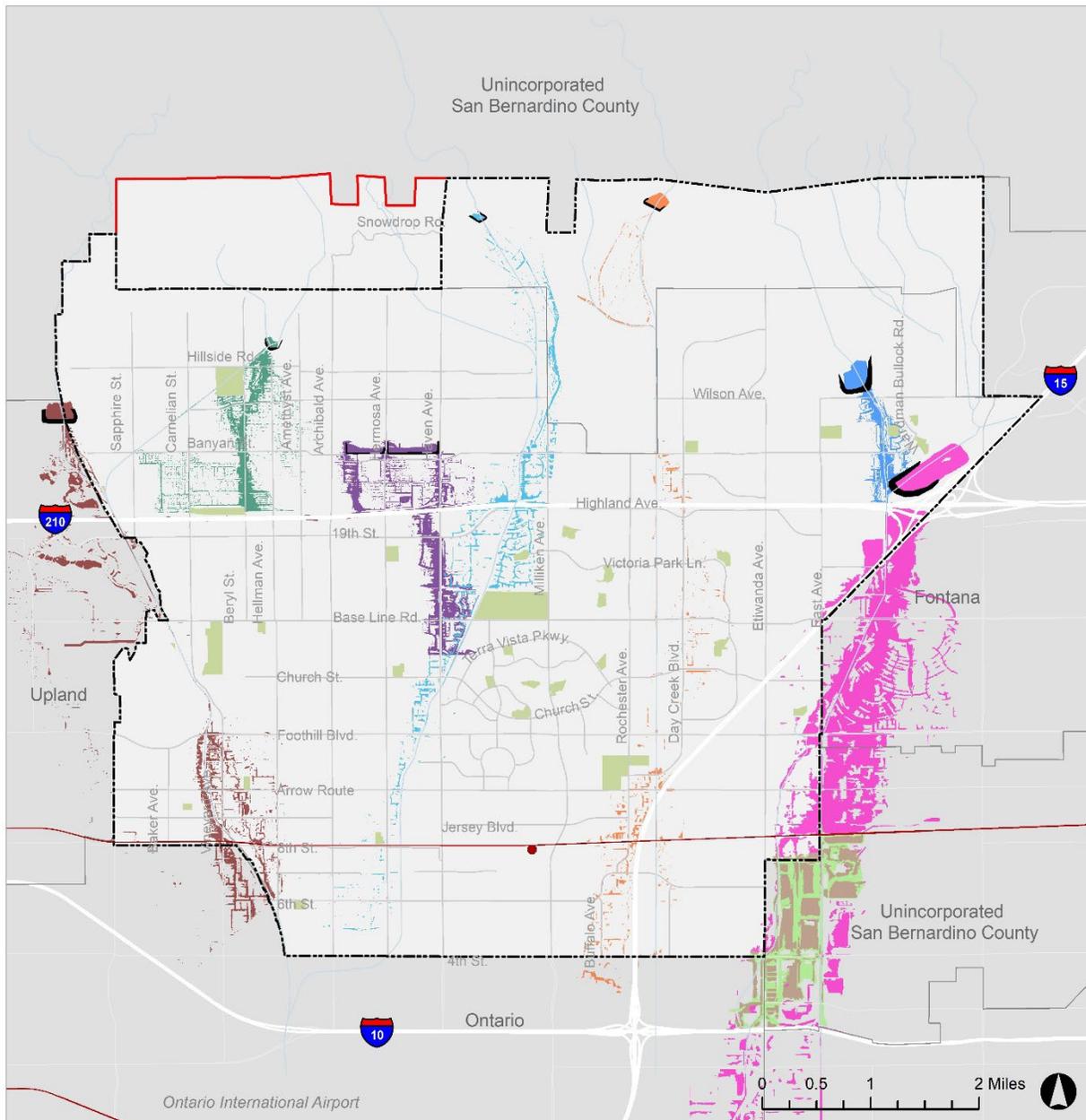
⁴¹ California Department of Water Resources. Jurisdictional Sized Dams. <https://water.ca.gov/Programs/All-Programs/Division-of-Safety-of-Dams/Jurisdictional-Sized-Dams>

⁴² The Rutherford Report, San Bernardino County.

http://www.sbcounty.gov/rutherford/report/issues/2012_may/floodcontrol.html

Colton, regional flood management and mitigation wasn't given a great deal of consideration in San Bernardino County until the Great Flood of March 1938. That deluge claimed 14 lives, left hundreds homeless, and caused an estimated \$12 million (\$220 million in 2020) in property damage.

Figure 3-9: Dam Inundation Zones



- Dam Inundation Zones**
- Hickory Basin
 - San Sevaine #5
 - Etiwanda Basin
 - Demens Creek
 - Day Creek
 - Deer Canyon
 - Alta Loma Basins #1 & #2
 - Cucamonga Creek

- City Boundary
- Sphere of Influence
- Adjacent City Limits
- Rancho Cucamonga Station
- Metrolink
- Parks
- Waterways

Atlas Planning Solutions, 2020 |
 Sources: City of Rancho Cucamonga, 2020;
 SCAG, 2020; County of San Bernardino, 2020;
 California Department of Water Resources,
 2020



In 1939, the State Legislature passed the San Bernardino County Flood District Act, which empowered the County to begin developing regional flood protection facilities to protect life and property. Today, San Bernardino County Flood Control operates and maintains 14 dams, 119 basins, 82 levees, and more than 250 miles of flood control channels. The dams, levees, and channels are designed to convey runoff around homes and businesses in the valley safely.⁴³

RISK OF FUTURE EVENTS

With the adoption of SB 92 in 2017, new dam safety requirements mandate that dam owners map the downstream inundation areas for dams governed by the California Department of Water Resources (DWR). In addition to the mapping, owners must prepare Dam Emergency Action Plans that identify the emergency management plans and procedures in place for these facilities. **Figure 3-9** identifies the inundation areas mapped for these seven catch basins located within the City. For inundation to occur as depicted in this map, it is assumed the reservoir behind the dam is full, and failure occurs suddenly, releasing water in a relatively short amount of time. Failures typically occur from an earthquake, erosion, design flaw, or water overflow condition during intense storms. **Table 3-11** identifies each catch basin's (dam) hazard potential.

Table 3-11: Catch Basin Hazard Potential

Catch Basin Name*	Hazard Potential	Dam Function
Alta Loma Basin (1964), (1971)**	High	Flood Control
Cucamonga Creek (1980)	High	Flood Control
Day Creek (1988)	High	Debris Control
Deer Canyon (1980)	High	Flood Control
Demens Creek (1980)	High	Flood Control
Etiwanda [Debris] Basin (2008)	High	Flood Control
Hickory Basin	Significant	Flood Control
San Sevaine Basin (2004)	High	Flood Control

* The year indicates when the dam was completed
** NID lists two dams under this name; both with the same hazard potential, dam function, and inspection date
Source: National Inventory of Dams <https://nid.sec.usace.army.mil/ords/f?p=105:1:::>

CLIMATE CHANGE CONSIDERATIONS

Overall, engineers say that most dams that were built decades ago in the United States are unsuited to a warmer world and stronger storms.⁴⁴ Some recent dam episodes have been shown to have a climate change link. In February 2017, at Oroville Dam in California, the tallest in the nation, heavy mountain runoff into the reservoir led to an

⁴³ Ibid.
⁴⁴ Fountain, H. 2020. "'Expect More': Climate Change Raises Risk of Dam Failures." New York Times. <https://www.nytimes.com/2020/05/21/climate/dam-failure-michigan-climate-change.html#:~:text=the%20main%20story,'Expect%20More'%3A%20Climate%20Change%20Raises%20Risk%20of%20Dam%20Failures,warm%20world%20and%20stronger%20storms.&text=The%20dam%20that%20failed%20in,it%20was%20overwhelmed%20by%20water>

emergency spillway's near failure and severe damage to the main spillway. Nearly 200,000 people were evacuated as a precaution, and repairs cost more than \$1 billion. A later study found that an increase in early season Sierra Nevada runoff contributed to the dam's high-water levels. This early season runoff can be attributed to human-caused warming.⁴⁵

In addition to short-duration extreme precipitation, rainfall of longer duration but less intensity—an overall wetter climate, which climate models forecast for parts of the United States in the coming decades—can contribute to the risk.⁴⁶ Overall, the main consideration will be the weather patterns and how rainfall will affect the City and the County, as many of the catch basins and dams in the region connect multiple cities and counties. San Sevaine is the largest basin in the City and has the largest impact area if inundation occurs, affecting the neighboring City of Fontana.

Severe Weather

The severe weather hazard profile includes discussions regarding drought, extreme heat, and severe wind. For additional information and analysis regarding severe weather effects associated with climate change, please refer to the [Greenhouse Gas Emissions and Climate Change Vulnerability Assessment Existing Conditions Report](#) prepared as part of the General Plan.

DESCRIPTIONS

DROUGHT

A drought is a long period with substantially less precipitation than usual. The primary direct impact of a drought is the reduction of available water supplies. This is particularly concerning in agricultural areas and natural environments, but it can also affect urban areas. Droughts can harm landscapes because plants do not get the water that they need to survive. In severe cases, droughts may lead to a human health risk if available water supplies are insufficient to meet basic needs.

Indirectly, drought causes soils to dry out, making them harder and less able to absorb water. When precipitation returns, the soil absorbs less water, increasing runoff, which can lead to flooding. Dry soils are more susceptible to erosion, especially if plants have died or no longer provide stability due to loss of roots and soil composition changes. Drought causes many plants in natural areas to dry out, making them more susceptible to the risk of pests/diseases and increased risk of wildfires.

EXTREME HEAT

Extreme heat is a period when temperatures are abnormally high relative to the normal temperature range. There are generally three types of extreme heat events:

⁴⁵ Fountain, 2020.

⁴⁶ Fountain, H. 2020. 'Expect More': Climate Change Raises Risk of Dam Failures. *The New York Times*. <https://www.nytimes.com/2020/05/21/climate/dam-failure-michigan-climate-change.html>

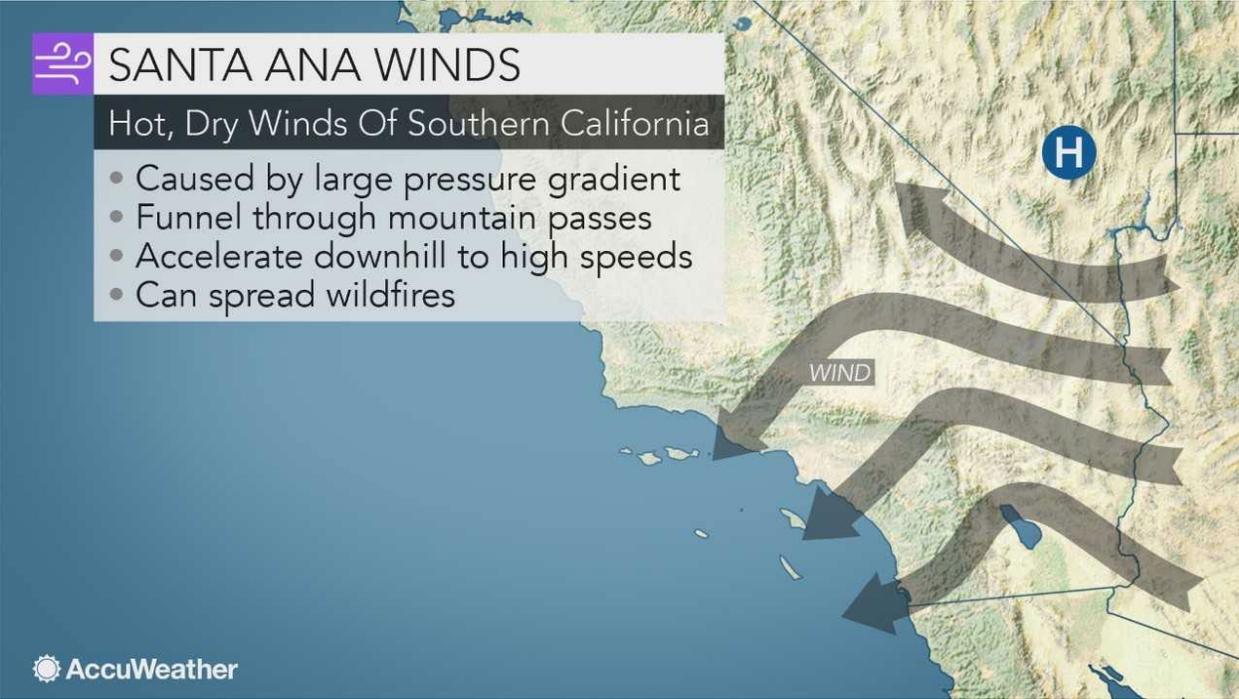
-
- Extreme Heat Days: a day during which the maximum temperature surpasses 98 percent of all historic high temperatures for the area, using the time between April and October from 1950 to 2005 as the baseline.
 - Warm Nights: a day between April to October when the minimum temperature exceeds 98 percent of all historic minimum daytime temperatures observed between 1950 to 2005.
 - Extreme Heat Waves: a successive series of extreme heat days and warm nights where extreme temperatures do not abate; while no universally accepted minimum length of time for a heatwave event exists, Cal-Adapt considers four successive extreme heat days and warm nights to be the minimum threshold for an extreme heatwave.

SEVERE WIND

Wind is simply the movement of air caused by differences in atmospheric pressure and temperature. High-pressure air will naturally move to areas of low pressure. Usually, the distance between these high- and low-pressure zones is far; however, on occasion, these low- and high-pressure zones may be near one another. When this happens, air will flow dramatically, creating high-speed winds. The most common wind events in southern California are the "Santa Ana" winds. **Figure 3-10** depicts the typical conditions that occur in the fall and winter to create these events.

When winds are fast enough, they can damage homes, public facilities, utilities, and other infrastructure. They can also uproot or topple mature trees or pick up debris and send it careening through the air. This debris can injure or even kill bystanders who may find themselves stranded outside. High-speed winds can also deposit this debris in the middle of rights-of-way, such as roads, freeways, and railways, blocking exit routes for would-be evacuees or impeding access to first responders trying to reach wounded people.

Figure 3-10: Santa Ana Winds



Source: <https://www.accuweather.com/en/weather-news/what-are-santa-ana-winds-2/343027>

LOCATION AND EXTENT

DROUGHT

Droughts are somewhat frequent in California and typically occur when precipitation is limited for an extended period. Rain arrives in California via atmospheric rivers (channels of moist air located high in the atmosphere) and the El Niño Southern Oscillation (ENSO) cycle (a regional meteorological phenomenon in the southern Pacific Ocean). This cycle typically gives rise to two distinct phases known as El Niño, the warm and wet phase, or La Niña, the dry and cold phase. When California experiences a drought, it is typically the result of fewer atmospheric rivers or an active La Niña phase, resulting in lower-than-average precipitation levels. Drought may also occur when conditions in areas where water sources are located experience drought conditions, even though the local region does not. **Table 3-12** identifies the drought classifications used by the US Drought Monitor program. This classification system synthesizes multiple different scales into a descriptive index.

Communities that rely on water supplies from other parts of the State feeling the effects of drought versus communities that source their water supplies locally may experience drought differently. Currently, the Cucamonga Valley Water District sources almost half of its water from imported sources that may come from outside the region.⁴⁷

⁴⁷ Cucamonga Valley Water District. <https://www.cvwwater.com/133/Water-Supply>

Droughts are regional events, and so all parts of Rancho Cucamonga face the same risk of drought. However, urban areas will likely experience different effects than open space areas. It is also possible for communities to experience a “long-distance drought” since many urban areas in California receive water supplies from great distances. If these distant areas experience drought, it may cause water shortages in the urban areas that rely on them, even if these areas are experiencing normal precipitation levels.

Table 3-12: US Drought Monitor Classification Scheme

Category	Description	Possible Impacts
D0*	Abnormally Dry	Slower growth of crops and pastures
D1	Moderate Drought	Some damage to crops and pastures. Water bodies and wells are low. Some water shortages may occur or may be imminent. Voluntary water use restrictions can be requested.
D2	Severe Drought	Likely crop and pasture losses. Water shortages are common, and water restrictions can be imposed.
D3	Extreme Drought	Major crop and pasture losses. Widespread water shortages and restrictions.
D4	Exceptional Drought	Exceptional and widespread crop and pasture losses. Emergency water shortages develop.

Source: US Drought Monitor
 * D0 areas are those under “drought watch” but not technically in a drought. They are potentially heading into drought conditions or recovering from drought but not yet back to normal.

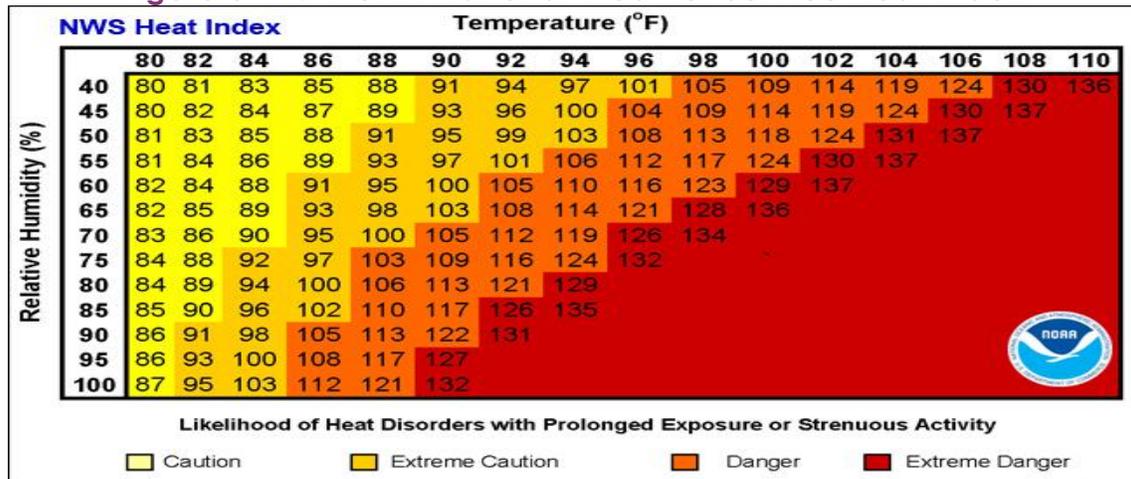
EXTREME HEAT

Extreme heat events will feel different from region to region since different areas have different historic high temperatures. For example, an extreme heat day on the coast will feel different than an extreme heat day in the High Desert. The reason for this is how humidity plays a factor in the perceived heat that people feel. Humid conditions will make a day feel hotter than non-humid conditions, even though the temperature may be the same. The difference between the perceived temperature and the actual temperature is known as the “heat index.” To illustrate the effect of the heat index, a 90-degree day with 50 percent humidity feels like 95°F, whereas a 90°F day with 90 percent humidity feels like 122°F. **Figure 3-11** illustrates the National Oceanic and Atmospheric Administration (NOAA)'s National Weather Service Heat Index.

Extreme heat events are not limited to any part of the City. They occur with the same intensity and duration at the same time across all locations in Rancho Cucamonga. For Rancho Cucamonga, an extreme heat day involves a temperature that exceeds 103.9° F, and a warm night involves a temperature that exceeds 68.7°F.⁴⁸

⁴⁸ <https://cal-adapt.org/tools/extreme-heat/>

Figure 3-11: NOAA National Weather Service Heat Index



SEVERE WIND

In Southern California, the most common type of severe wind event is called the Santa Ana winds. High pressure over Nevada and Utah, often during the fall and winter months, forces air down from the high desert toward the ocean. As the winds descend, they heat up and increase in speed, sometimes carrying particulate matter and aggravating the respiratory health of those who have allergies. Rancho Cucamonga is often affected by Santa Ana winds blowing through the San Gabriel and San Bernardino Mountain ranges via the Cajon Pass. Santa Ana winds are a contributing factor to the threat and spread of wildfires in California. Santa Ana winds can damage the electrical distribution infrastructure, which can create wildfire ignitions due to arcing or downed power lines. Santa Ana winds can also result in rapid fire spread from ordinarily contained or small fires such as vehicle fires or fires caused by discarded smoking materials. More information on this is available in the “Wildfire” section. Depending on the severity of the wind event, any part of the City can be affected by severe winds.

Generally, winds are measured using the Beaufort scale, developed in 1805, which categorizes wind events on a force scale from 0 to 12 using their speed and impacts. Any wind classified as force nine or above is generally considered a severe wind event.

Table 3-13 identifies the Beaufort scale, which classifies wind events in detail.

PAST EVENTS

DROUGHT

Rancho Cucamonga, like the rest of California, has experienced many drought events throughout its history. Each event has been distinct, with varying lengths, severity, and frequency.

Table 3-13: Beaufort Scale

Force	Speed (mph)	Description
0	0 to 1	Calm: Smoke rises vertically
1	1 to 3	Light air: The direction of the wind is shown by smoke drift, but not wind vanes.
2	4 to 7	Light breeze: Wind is felt on the face, leaves rustle, and wind vanes are moved.
3	8 to 12	Gentle breeze: Leaves and small twigs are in motion, and light flags are extended.
4	13 to 18	Moderate breeze: Dust and loose paper become airborne, and small branches are moved.
5	19 to 24	Fresh breeze: Small trees begin to sway
6	25 to 31	Strong breeze: Large branches are in motion, and using an umbrella becomes difficult.
7	32 to 38	High wind: Whole trees are in motion and walking against the wind can be hard.
8	39 to 46	Strong wind: Walking is difficult and twigs break off trees.
9	47 to 54	Severe wind: Slight structural damage.
10	55 to 63	Storm: Trees are uprooted and considerable damage to structures.
11	63 to 72	Violent storm: Widespread damage.
12	73 and above	Hurricane: Devastating damage.

Source: <https://www.weather.gov/mfl/beaufort>.

One of the earliest recorded major droughts in state history is known as the “Great Drought,” which occurred in 1863 and 1864. This drought killed 46 percent of the cattle in the state and ultimately led to the decline of cattle ranching. The “Dustbowl Droughts,” lasting from 1928 to 1935, caused great impacts on the state’s agriculture. The effects of this drought were so severe that it sparked the movement to create some of California’s modern water irrigation infrastructure, such as the California Aqueduct. Another drought occurred in 1976 and 1977, which lead to agricultural losses estimated at nearly \$1 billion. Implementation of water-saving practices resulted from this drought, which are still in effect today across the state. Further water conservation practices were enacted during a drought lasting from 1987 to 1993, which caused an estimated \$250 million in agricultural damages each year.

California experienced its most recent drought beginning in 2012 and lasting until 2017. All areas of the state were impacted, and by 2014 it was reported as the most severe drought in 1,200 years. **Figure 3-12** illustrates the severity of the drought conditions experienced over the past 19 years.

By the summer of 2014, almost all of California was experiencing D2 (Severe Drought) conditions. Rancho Cucamonga, all of San Bernardino County, and more than 75 percent of California were reported as experiencing the most intense level of drought conditions, D4 (Exceptional Drought). By 2015, emergency water-saving mandates were enacted, which required all jurisdictions to reduce water use by no less than 25 percent. In late 2016 and early 2017, successive heavy rains helped end the drought conditions in

the state. The following winter, in late 2017 and early 2018, rains did not return in the same quantity, and slight drought conditions returned across California. This moderate drought was again abated in the winter season of late 2018 and early 2019 when heavy rains ended any existing drought conditions.

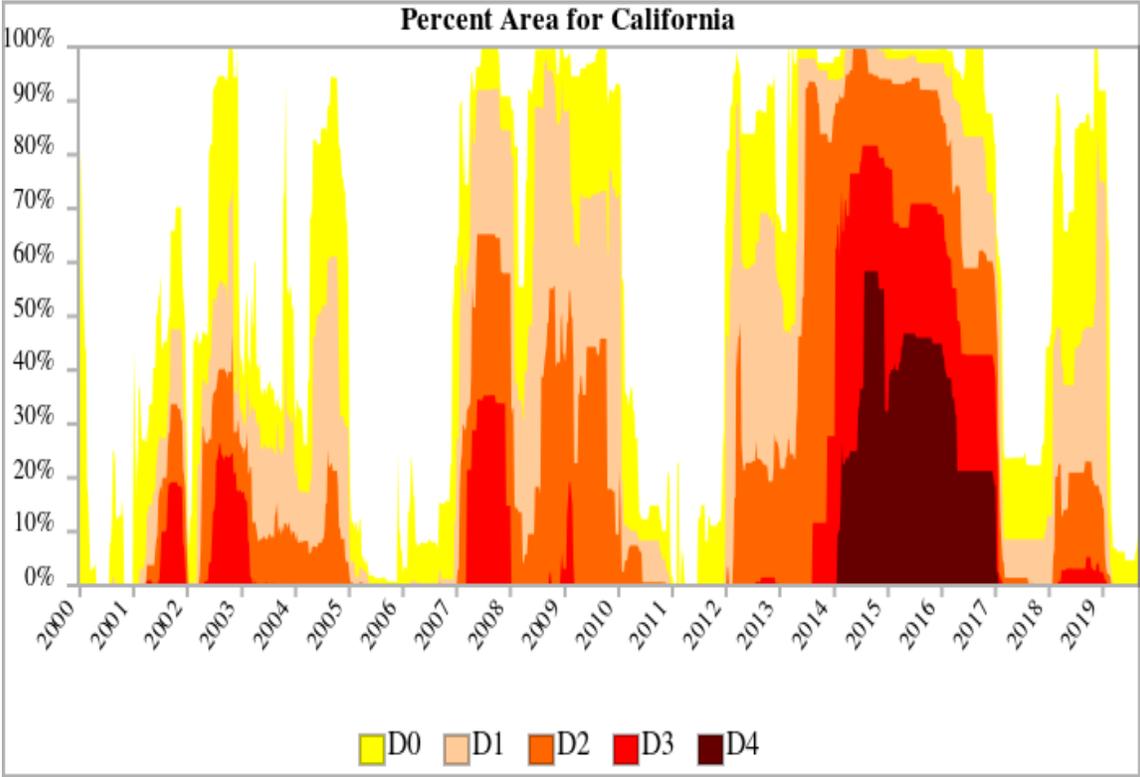
As of February 2021, parts of California are experiencing conditions that range from abnormally dry to exceptional drought. A majority of the extreme drought conditions are focused in the counties north of the San Francisco Bay region and eastern California, while Southern California is predominantly experiencing abnormally dry to moderate drought conditions. **Figure 3-13** identifies current drought conditions as of February 9, 2021.

EXTREME HEAT

Based on Cal Adapt's historical information (1950 through 2005), the City experiences four extreme heat days per year. During this same period, the City experienced a 4-day heatwave, approximately every five years. Over the past 21 years (1999-2019), the city has experienced an extreme heat event (103° F or higher) every year except 2005. During this period, the temperature reached an average of 108.4° F. The four highest temperatures occurred in 2006 (114°F), 2017 (114°F), 2018 (117°F), and 2020 (117°F).⁴⁹

⁴⁹ NOAA National Centers for Environmental Information, <https://www.ncdc.noaa.gov/cdo-web/datasets/GSOY/stations/GHCND:USW00003102/detail>

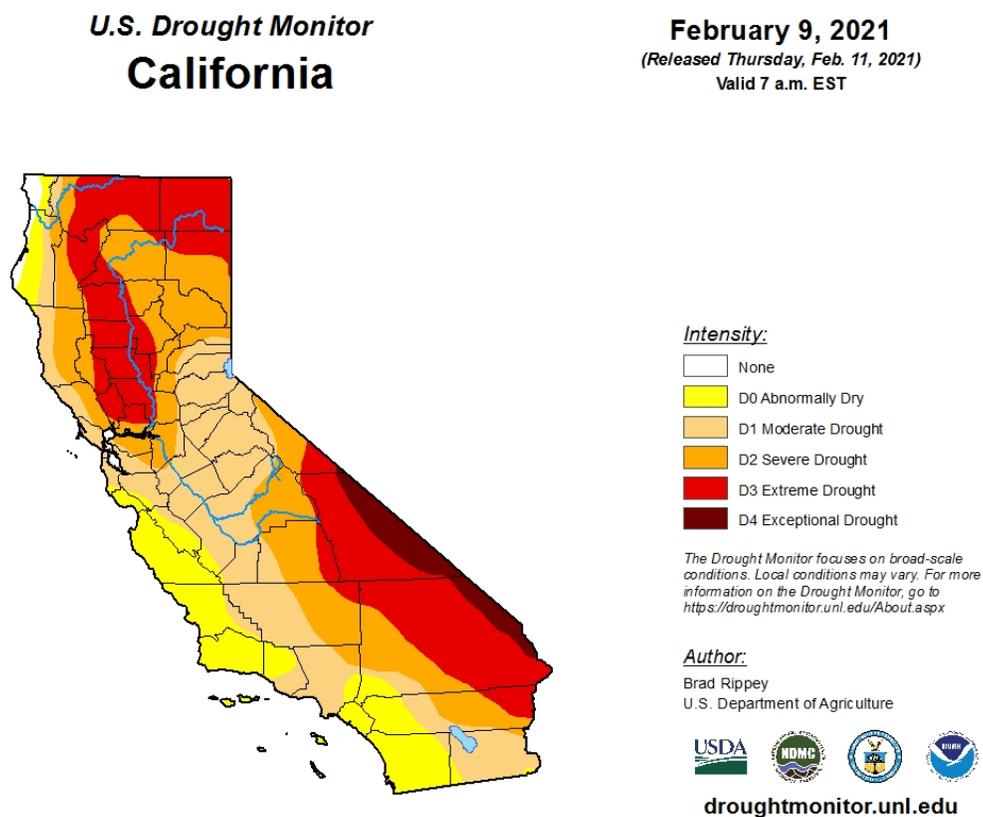
Figure 3-12 Drought History (2000-2019)



SEVERE WIND

Severe wind incidents are a common occurrence in the City. Annually the City is subjected to Santa Ana Wind conditions that can cause significant damage to trees, buildings, and vehicles. The following are significant events that have affected the City and region in the past:

- On May 5, 1998, strong thunderstorms across the region caused high winds that shredded an auto repair shop's roof in Rialto.
- On January 6, 2003, a strong Santa Ana windstorm knocked down powerlines, trees, damaged structures, and generated dust, impacting residents and businesses. The City received nearly 60 calls for service due to this event.
- On March 4, 2005, a small tornado touched down in Fontana. The tornado blew shingles off three homes, knocked down power lines and several trees, and ripped the roof off a water well building.
- A strong Santa Ana wind event on December 28, 2006, knocked down trees and power lines throughout the region.
- A storm in early December of 2011 caused wind speeds more than 65 mph, knocking down hundreds of trees, downing power lines, and overturning trucks throughout the San Bernardino Valley. Later that month, another strong storm caused 45 to 65 mph winds, with one recorded gust of at least 70 mph.
- A storm system that hit the region in late January of 2012 caused wind gusts over 60 mph, knocking down power lines and blowing containers off semi-trucks.

Figure 3-13: U.S. Drought Monitor - California

- In early March of 2012, strong winds affected the San Bernardino Valley region after a storm event, with gusts of over 60 mph.
- On April 30, 2014, a Santa Ana wind event contributed to the rapid southwest spread of the Etiwanda Fire. Wind gusts in excess of 100 mph were recorded during the fire.
- A Santa Ana wind event in November of 2014 caused winds of approximately 50 mph, with damage reported throughout the region.
- In January of 2017, a series of three storms caused strong winds that knocked down hundreds of trees throughout the region, causing millions of dollars in damage.
- On October 9, 2017, a strong Santa Ana wind event caused wind gusts of 70 mph.
- On October 26 and 27, 2020, the City experienced extreme wind gusts of more than 65 mph with extensive damage to trees, sidewalks, traffic signals, and ballfield lighting. Southern California Edison activated their Power Safety Shut Off which affected over 1000 customers with loss of power for up to 24 hours.

RISK OF FUTURE EVENTS

DROUGHT

Drought will continue to be a foreseeable event in the future of California, including Rancho Cucamonga. Droughts in the area are expected to become more frequent and

intense due to climate change. Droughts that result from infrastructure failure are equally impossible to predict since the circumstances that lead to infrastructure failure are unique to each situation.

EXTREME HEAT

According to Cal-Adapt data archives powered by the NOAA databanks, Rancho Cucamonga does experience extreme heat days. The city historically (1950-2005) experiences, on average, four extreme heat days annually from the data provided. That number of days increased to 8 days annually from 2006-2019. According to Cal-Adapt's projected models, the City is projected to experience between 21 and 35 extreme heat days annually from 2050 to 2099.⁵⁰ As temperatures rise throughout California, the number of extreme heat days will increase.

SEVERE WIND

Given Rancho Cucamonga's history of severe wind events, it is very likely that wind events will continue to impact the city. The most probable source of these events in the future will likely originate from the Santa Ana winds or extreme storms. All expectations are that the probability they will occur again in the future is highly likely.

CLIMATE CHANGE CONSIDERATIONS

DROUGHT

Climate change is anticipated to abate drought in certain situations but, on the other hand, could also intensify and exacerbate it in other cases. In some cases, climate change-intensified weather patterns, like ENSO, may bring more rain to California and Rancho Cucamonga, which would abate drought conditions for the State's affected parts. In other cases, climate change may also prolong the La Niña phase of ENSO, leading to longer dry periods with no precipitation in California.

Due to climate change, droughts are expected to become more frequent and intense in San Bernardino County and, more broadly, throughout California by mid-century. Scientific studies indicate:

- Climate change is projected to drive more frequent historically warm temperatures, reduced precipitation and snowpack, abnormally dry soils and, in turn, drought conditions.
- Modeling studies attribute more frequent coincident warm and dry years and more severe drought conditions in Southern California due to climate change.
- The incidence of extremely dry years (those occurring in 1 out of every 100 years over the historical period) could triple by the end of the century.

⁵⁰ Greenhouse Gas Emissions and Climate Change Vulnerability Assessment Existing Conditions Report., https://www.cityofrc.us/sites/default/files/2020-06/PlanRC_ExistingConditionsReport_Vulnerability%26GHG_May2020.pdf

-
- The likelihood of long-duration droughts in San Bernardino County would increase significantly, with some studies showing a more than 80% chance of multidecadal drought by the end of the century.⁵¹

Climate change is also expected to increase the average temperature and cause more frequent and prolonged heat waves in California and Rancho Cucamonga. During these events, water supplies may be diverted for cooling functions in the City. Hotter temperatures may also lead to increased surface water evaporation, which could contribute to greater water consumption. If a drought were to occur during a future heatwave, it could place water supplies under strain.

From a regional perspective, warmer overall temperatures in California are anticipated to reduce statewide water supplies. Much of California's water comes from melted snow in the High Sierra, where mountain snowpack acts as a natural reservoir. As the average temperature grows warmer with climate change, the amount of precipitation that falls as snow is expected to shift towards rain. Precipitation as rain will not flow into reservoirs and aqueducts the same way snowmelt does. The natural water reservoirs created by the snowpack stays intact as the initial snowpack runoff begins in the early spring and ends in early to late summer, depending on the level of the snowpack.⁵² The runoff from the snowpack can be managed due to the slow pace at which the snow melts; however, when rain occurs in place of snowfall, there is no significant way to collect the water and retain it because it falls at a much faster pace. As less snow falls, the amount of melted water from the snowpack in the Sierra Nevada will decrease, reducing the water that will flow into the reservoirs and aqueducts that supply Southern California, placing strain on the City's imported water supply, leading to greater reliance on local groundwater. If regional water agencies, like the Metropolitan Water District of Southern California (MWD) and Cucamonga Valley Water District (CVWD), do not account for increased groundwater withdrawal, Rancho Cucamonga and the San Bernardino County region could experience greater dependence on imported water.

EXTREME HEAT

The primary effect of climate change is warmer average temperatures. The hottest years on record have occurred since 2000, with 2016 and 2020 being tied.⁵³ As climate change accelerates in the 21st century, it is anticipated that extreme heat events will become more frequent and intense in the City. With the projection that extreme heat days could

⁵¹ San Bernardino County Vulnerability Assessment. <https://wrcog.us/DocumentCenter/View/7477/San-Bernardino-County-Vulnerability-Assessment>

⁵² NASA. "World of Change: Snowpack in the Sierra Nevada." <https://earthobservatory.nasa.gov/world-of-change/SierraNevada#:~:text=The%20snowpack%20on%20the%20Sierra%20Nevada%20has%20generally%20peaked%20and, reservoirs%20while%20recharging%20the%20groundwater.>

⁵³ Rebecca Hersher and Lauren Sommer. 2020. "2020 May be the Hottest Year on Record. Here's the Damage it did." NPR. <https://www.npr.org/2020/12/18/943219856/2020-may-be-the-hottest-year-on-record-heres-the-damage-it-did>

increase between 21 and 35 days annually by 2100, the City can expect a shift in residential and business needs for cooling and addressing heat-related issues.

SEVERE WIND

It is anticipated that the atmospheric rivers that deliver storms to Southern California may intensify because of climate change. While the average number of storms in Southern California will remain the same, storms are expected to increase by 10 to 20 percent.⁵⁴ This increase in storm intensity may also bring more intense winds to the Southern California region, including Rancho Cucamonga.

Regarding Santa Ana winds, however, studies indicate that these events may be affected in varying ways. According to one study that examined two global climate models, there is a projected increase in future Santa Ana events. However, other studies have found that the number of Santa Ana events may decrease by about 20% in the future.⁵⁵ Given the anticipated increases in temperatures throughout the region, future events are anticipated to become more severe in some cases, even if the number of events decreases.

Human-Caused Hazards

The Human-Caused Hazards profile includes discussions of cyber threats and terrorism/mass-casualty incidents. It is important to note that while these hazards are not considered natural, they are a concern identified by the HMPC. Future updates to the City's EOP will expand on these hazards, where appropriate.

DESCRIPTIONS

CYBER THREATS

Cyber threats are when an individual or a group threatens or attempts to disrupt the computer network or systems and data belonging to private citizens, religious groups, educational institutions, government agencies, or businesses. These threats take the form of online harassment, hacking, or in-person tampering with electronic equipment. Successful cyber threats can lead to service disruptions, infrastructure damage, theft, and severe instances that may cause injury or death.

TERRORISM/MASS CASUALTY INCIDENT

Terrorism is the use or threat of force to achieve a particular social or political outcome. The goals of terrorism may sometimes be overturning a government, the reversal of a public policy, political prisoners' release, and other such motives. Acts of terror may overlap with acts of war or hate crimes. Generally, terrorism involves an attempt to kill or seriously harm people, or an attempt to disrupt civil society by destroying property or

⁵⁴ Atmospheric Rivers to Soak California as Climate Warms. <https://www.livescience.com/49225-atmospheric-rivers-double-climate-change.html>

⁵⁵ Hall, Alex, Neil Berg, Katharine Reich. (University of California, Los Angeles). 2018. Los Angeles Summary Report. California's Fourth Climate Change Assessment. https://www.energy.ca.gov/sites/default/files/2019-11/Reg%20Report-%20SUM-CCCA4-2018-007%20LosAngeles_ADA.pdf

infrastructure, attacking government operations at all levels, interrupting essential public services, creating chaos, or a combination of some or all these goals. Firearms and explosives are the most common weapons used among terrorists. In extreme situations, terrorists may gain access to mass destruction weapons, including bioweapons, chemical agents, radioactive materials, or high-yield explosives. It should be noted that these events are infrequent. While incidents of terror caused by foreign individuals or groups receive significant media and public attention, most acts of terror in the United States have been caused by domestic terrorists.

A mass casualty incident describes an incident within the United States where emergency medical service resources, such as personnel and equipment, are overwhelmed by the number and severity of casualties. The more commonly recognized events of this type include building collapses, train and bus collisions, plane crashes, earthquakes, and other large-scale emergencies. The most common types are generally caused by terrorism, mass-transportation accidents, or natural disasters. Events such as the Oklahoma City bombing in 1995 and the September 11 attacks in 2001 are well-publicized examples of mass casualty incidents.

LOCATION AND EXTENT

CYBER THREATS

Since computers are so ubiquitous, a cyber threat could appear in virtually any part of the City. In extreme circumstances, a threat could impact the entire city. Cyber threats vary in their length and severity of impact. A minor threat could simply cause computer systems to slow down for a few minutes and not behave responsively. On the other hand, a major cyber threat could cause a complete shutdown of critical systems, including those used by banks, healthcare institutions, universities, major businesses, and city government.

Cyber threats are not measured on any scale, but they can be assessed by determining:

- The type of incident (website defacement, denial of service, unauthorized surveillance)
- The use of malicious software
- The level of security countermeasures that failed in preventing the cyber threat
- The duration of the cyber threat (a few hours, a few days, several weeks, etc.)

Globally cyber threats are increasing and becoming more sophisticated. The most common types of attacks include:

- Phishing
- Ransomware
- Intellectual Property Theft
- Spyware/Malware
- Vulnerable and Unpatched Software
- Distributed Denial of Service (DDoS)

- Crypto-mining

To understand the status of cyber threats, **Figure 3-14** identifies the Index of Cyber Security, which identifies the measure of perceived risk. Since 2015 this index has trended upward and appears to have doubled in this timeframe.

TERRORISM/MASS CASUALTY INCIDENT

Mass Casualty Incidents can occur anywhere, although public spaces and locations where many people congregate (parks, schools, places of worship, government facilities, shopping centers, and areas of public gathering) are most common. Critical locations in Rancho Cucamonga may be large shopping centers (i.e., Victoria Gardens), governmental facilities (i.e., City Hall and Rancho Cucamonga Superior Court (it should be noted that these two facilities are in very close proximity to each other)), universities and colleges (i.e., Chaffey College), schools, medical facilities (i.e., Rancho Mesa, Kindred Hospital, and the Loma Linda University VA), parks (i.e., Central Park), and large employers within the City.

Acts of terrorism may be located at the locations listed above; however, the perpetrators may also choose high-value targets such as electric-generating facilities, water treatment plants, dams or reservoirs, railroads, highways, and other facilities that could impact governmental operations and services.

Mass Casualty Incidents and acts of terrorism are typically measured by the fatalities, injuries, and destruction they cause, but there is no universally used scale for measuring these events.

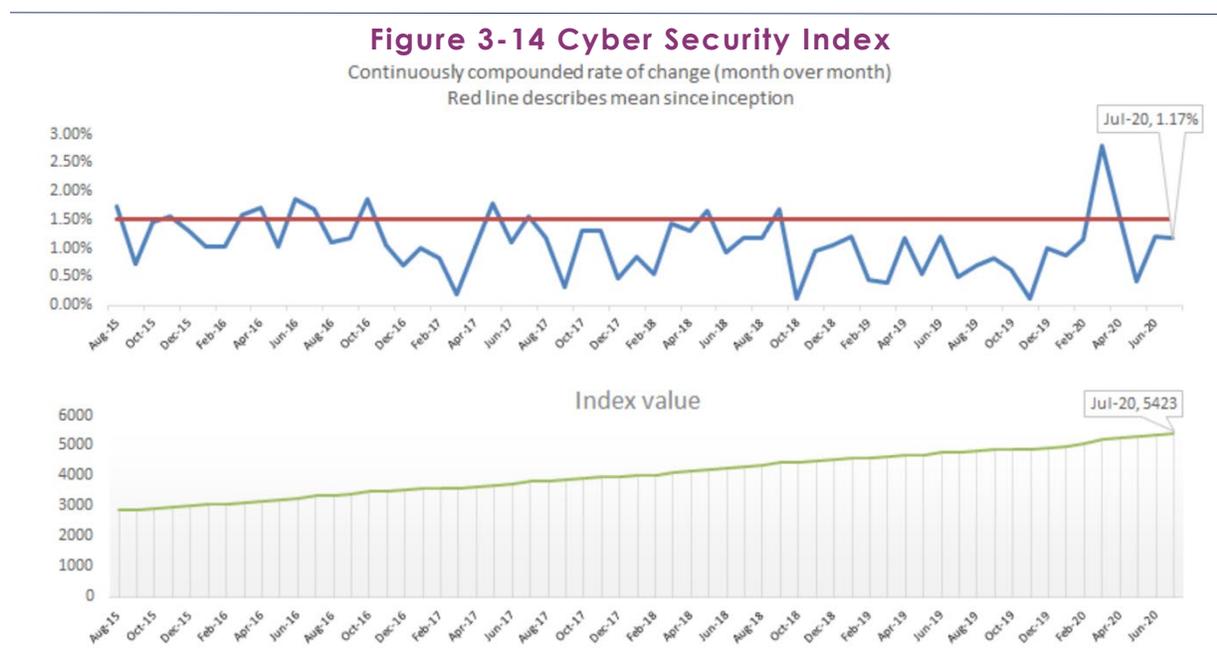
PAST EVENTS

CYBER THREATS

The City of Rancho Cucamonga has not experienced a cyber-attack incident. Several agencies throughout Southern California (listed below) have experienced recent cyber-attacks, which include:

- On December 4, 2019, the Cucamonga Valley Water District disclosed a data breach between August 26, 2019, and October 14, 2019. The breach occurred on a server that is used to accept one-time credit card payments from customers.
- On December 24, 2019, the City of Seal Beach was the victim of a ransomware attack that affected City computer systems. The attack was targeted at the City’s Information Technology service provider, which allowed the hackers to encrypt City computers with the malware, primarily impacting city email and voicemail functions.
- On March 11, 2019, the Orange County Sanitation District was the victim of a phishing data breach. Over 1,000 employee records were accessed as part of the breach through the District deferred compensation plan.

Table 3-14 is a compiled list of the most recent cybersecurity breaches on a larger global scale, affecting millions and, in some cases, billions of user’s personal information.



Source: Mateski, M., C. Trevino, C. Veitch, J. Michalski, J. Harris, S. Maruoka, and J. Frye. 2012. "Cyber Threat Metrics." Sandia National Laboratories. <https://fas.org/irp/eprint/metrics.pdf>.

Table 3-14: History of Recent Cyber Security Attacks

Incident Name	Affected Users	Information Exposed
Leaky Elasticsearch Server	1.2 billion Users	Personal Data, LinkedIn, Facebook profiles, and email addresses.
JustDial Data Breach	156 million Users	Information and data were left vulnerable; however, no loss of data or money was reported.
Capital One Data Breach	106 million individuals in the US and Canada	Personal information, social security numbers, bank account numbers, and credit scores. Capital One said no account or login information was compromised.
Facebook Data Leak	419 million users worldwide	This incident exposed around 146 GB of data that contained over 540 million records detailing comments, likes, reactions, account names, FB IDs, and other sensitive information.
Canva Hack	140 million users	According to Canva, encrypted personal data like usernames and passwords were accessed by hackers. No credit card details or designs were exposed/accessed in the attack.
DoorDash	4.9 million users	Customers' information, delivery workers, and merchants who were using its service platform.
Ecuador Data Breach	20 million citizens of Ecuador, including the president, Julian Assange	The exposed information included names, date of birth, contact information, National identification numbers, bank account details, taxpayer-identification numbers, and driving records.
Instagram Data Breach	49 million records	The exposed data included users' biodata, profile picture, the number of followers they have, location by city and country, and contact information like the

		Instagram account owner's email address and phone number.
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Source: <https://cisomag.eccouncil.org/rewind-biggest-cyber-incidents-we-saw-in-2019/>

TERRORISM/MASS CASUALTY INCIDENT

The City of Rancho Cucamonga has been fortunate and has not experienced any direct terrorist attack or incident of mass casualties. However, Southern California has experienced such attacks near the city itself, the most recent in neighboring San Bernardino. The following are some historical terrorism-related incidents dating to the early 1970s that have occurred within California.⁵⁶

- A 1970 bombing of the Stanford Research Institute facility caused approximately \$500,000 in property damage—no injuries or deaths occurred during this incident.
- A 1970 bombing of a Bank of America Branch caused approximately \$500,000 in property damage—no injuries or deaths occurred during this incident.
- In December 2015, a mass shooting and terrorist attack committed by a married couple who had reportedly sworn allegiance to ISIS killed 14 people and injured at least 17 others at a medical facility in San Bernardino, roughly 21 miles east of Rancho Cucamonga.
- In October 2017, Stephen Paddock opened fire on the Route 91 Harvest Festival concert, from an elevated position at the Mandalay Bay Hotel. The attack resulted in 58 people killed and 851 injured. Paddock shot and killed himself before responding officers reached him. The FBI Behavioral Analysis Unit determined that there was no clear motivation for the attack. Although this attack did not occur in California, many California residents were affected by the event as more than half the 58 people killed were from California.⁵⁷
- In July 2019, 19-year-old Santino Legan opened fire on a crowd at the Gilroy Garlic Festival in Gilroy, CA, killing three and wounding a dozen others. Legan was shot and killed by police officers within a minute of the start of the attack. Although his motivations are unknown, Legan had possible links to the white supremacist movement.⁵⁸

RISK OF FUTURE EVENTS

CYBER THREATS

Due to the integrated nature of technology into the everyday lives of Rancho Cucamonga's residents, businesses, and government operations, the risk of future cyber threats is certain. While there have been no reported successful cyber threat attacks that

⁵⁶ University of Maryland. 2019. National Consortium for the Study of Terrorism and Responses to Terrorism. <https://www.start.umd.edu/gtd/search/IncidentSummary.aspx?gtdid=201512020012>

⁵⁷ Los Angeles Times Staff. "Las Vegas Shooting Victims: Portraits of the Fallen." October 2017. <https://www.latimes.com/projects/la-na-las-vegas-shoot>

⁵⁸ H. Fry, L. Nelson, M. Ormseth, C. Shalby, A. Tchekmedyian, and R. Winton. "Disturbing portrait emerges of Gilroy Garlic Festival shooter." LA Times. July 2019. <https://www.latimes.com/california/story/2019-07-29/gilroy-garlic-festival-shooting-suspect>

have disrupted City operations, the City, like most public agencies, is threatened by cyber-attacks daily. Whether or not these attacks are successful is based on the use of appropriate security measures and protocols. In 2019, government agencies reported over 28,500 cybersecurity incidents, which equates to an average of 78 incidents per day. The future likelihood of a cyber threat affecting the residents, businesses, and/or governmental operations is highly likely and increasing as more governmental and business functions are conducted online.

TERRORISM/MASS CASUALTY INCIDENT

Given that mass casualty incidents and acts of terrorism, whether foreign or domestic, stem from a variety of factors: economics, societal pressures, mental health, geopolitics, warfare, religion, etc., it is impossible to predict when an incident will occur. While Rancho Cucamonga does not feature critical facilities of national or state importance, future incidents would likely originate domestically and are less likely to attract international terrorist groups' attention. Incidents of these types are more likely to be conducted by smaller organizations or individuals aligned with greater-known organizations, although the effects may be no less significant. For this reason, mass casualty incidents and terrorism related events have the potential to occur within the City, however the likelihood is still considered low. See Chapter 4 for further discussion regarding terrorism/mass casualty incident vulnerabilities to Rancho Cucamonga.

CLIMATE CHANGE CONSIDERATIONS

CYBER THREATS

Climate change is not likely to impact cyber threats in the future within Rancho Cucamonga.

TERRORISM/MASS CASUALTY INCIDENT

The link between mass casualty incidents/terrorism and climate change is not well understood. However, it has been suggested that the impacts of a changing climate may exacerbate existing social, political, religious, and ethnic tensions.⁵⁹ For example, longer, more intense droughts may restrict food supply or limit economic growth for cities, regions, or even countries. Nevertheless, the likelihood of climate change impacting mass casualty incidents/acts of terrorism in Rancho Cucamonga is negligible since these changes are more likely to impact developments on the national or international level.

⁵⁹ Nett, Katharina, and Lukas Ruttinger. 2016. "Insurgency, Terrorism and Organised Crime in a Warming Climate: Analysing the Links between Climate Change and Non-State Armed Groups. Climate Diplomacy." https://doi.org/10.29171/azu_acku_pamphlet_ge320_a33_n488_2016.

Aircraft Incident

DESCRIPTION

An aircraft incident refers to an airborne vehicle—such as an airplane, helicopter, or airship that experiences failure to the degree that people within the vehicle or on the ground are endangered. This could result from human error, inclement weather, deferred maintenance, design flaw, equipment failure, or a collision in a worst-case scenario.

LOCATION AND EXTENT

Rancho Cucamonga has no airports within the city boundaries itself. However, there are two airports located in the adjacent cities of Ontario and Upland. Located south of Rancho Cucamonga, the Ontario International Airport is a major international airport in Southern California and the home to major shipping facilities for the United Parcel Service (UPS) and Federal Express (FedEx). Cable Airport is a small regional airport located in the City of Upland (west of the City) that houses many privately owned and operated aircraft.

- Cable Airport is located approximately 4.5 miles west of the residential areas located in the Alta Loma area of the City.
- Ontario International Airport is located approximately 3.2 miles southwest of Rancho Cucamonga’s City Hall.

To better understand the differences between an aircraft accident and an aircraft incident, based on Title 49 of the Code of Federal Regulations Part 830 (§830.2):

An Accident is an occurrence associated with the operation of an aircraft that:

- Occurs between when the first boarding person enters the aircraft – with intention of flight – and the last person disembarks.
- Results in death or serious injury, or
- Causes substantial damage to the aircraft.

An Incident is an occurrence— other than an accident (no intention of flight)— associated with the operation of an aircraft that affects or could affect the safety of operations.

PAST EVENTS

Table 3-15: Cable Airport Aircraft Accident Statistics (1982-2020)

Type	Quantity	Percentage
Accident	40	100%
Incident	0	0.0%
Fatal Accidents	9	22.5%
Fatality Range	1 to 2	N/A
Aircraft Destroyed	8	20%
Total Fatal Injuries	9	12.5%

Given the proximity to airport facilities, the City and surrounding areas have been impacted by past aircraft hazard events. **Tables 3-15** and **Table 3-16** identify the prior accident statistics for both Cable and Ontario International

Total Serious Injuries	11	15.3%
Total Minor Injuries	15	20.8%
Total Uninjured	37	51.4%

Source:
[https://www.ntsb.gov/ layouts/ntsb.aviation/index.aspx](https://www.ntsb.gov/layouts/ntsb.aviation/index.aspx)

Airports, based on available records that began in 1982, through mid-2020. Based on this information, Cable Airport has a higher propensity for aircraft accidents, and previous events have occurred in and around the City of Rancho Cucamonga.

Recent accidents near Rancho Cucamonga include the following:

- 11/07/2019: A small plane crashed into a private residence in Upland as the pilot attempted to return to Cable airport. The pilot was killed on impact; the father and infant son within the residence escaped unharmed.⁶⁰
- 06/15/2019: A small plane carrying a pilot and two passengers crash-landed in Upland on the 1300 N. Block of Benson around 9:45 am. All 3 sustained severe injuries and were transported to the hospital.⁶¹
- 12/31/1994: Small Cessna model aircraft crashes, resulting in the pilot's death and destroying the plane. The wreckage was not discovered for almost 10 months.⁶²

Table 3-16: Ontario International Airport Aircraft Accident Statistics (1982-2020)

Type	Quantity	Percentage
Accident Incident	4	44.4%
Fatal Accidents	5	55.6%
Fatality Range	0	0.0%
Aircraft Destroyed	0	N/A
Total Fatal Injuries	0	0.0%
Total Serious Injuries	3	0.6%
Total Minor Injuries	1	0.2%
Total Uninjured	509	99.2%

Source:
[https://www.ntsb.gov/ layouts/ntsb.aviation/index.aspx](https://www.ntsb.gov/layouts/ntsb.aviation/index.aspx)

Major accidents in Rancho Cucamonga include the following:

- 07/18/2014: A small plane with only the pilot aboard crashed near the north end of Haven Avenue, injuring the pilot.⁶³
- 01/25/2003: A light plane crashed into a house in Rancho Cucamonga, killing the pilot and narrowly missing a 17-year-old boy watching television.⁶⁴

⁶⁰ Kurzweil, A., Von Quednow, C., & McGraw, J. 2019. NTSB Helping Investigate Deadly Plane Crash Into Upland Home; Pilot Still Unidentified. KTLA 5. <https://ktla.com/news/local-news/ntsb-to-investigate-deadly-plane-crash-into-upland-home-pilot-still-unidentified/>

⁶¹ Eyewitness News. 2019. 3 Injured in plane crash near Cable Airport in Upland. ABC 7. <https://abc7.com/3-injured-in-plane-crash-near-cable-airport-in-upland/5348196/>

⁶² Idoni, J. 2013. San Gabriel Mountains Cessna 182B N2569G 9/15/13. <https://joeidoni.smugmug.com/Aircraft-Crash-Sites/9D/>

⁶³ Capps, G. 2014. Small plane crashes in Rancho Cucamonga field; pilot Injured. Daily Bulletin. <https://www.dailybulletin.com/2014/07/18/small-plane-crashes-in-rancho-cucamonga-field-pilot-injured/>

⁶⁴ Sahagun, L. 2003. Pilot Dies When Plane Plunges into House. LA Times. <https://www.latimes.com/archives/la-xpm-2003-jan-25-me-plane25-story.html>

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- 03/28/1986: Small Beech model aircraft crashes, resulting in pilot and passenger deaths and destroying the plane.

RISK OF FUTURE EVENTS

Given the high volume of air traffic in the area, the possibility of an aircraft accident occurring in Rancho Cucamonga will continue to exist. Based on historical events, it is anticipated that future impacts will be similar. A key component to aircraft safety is the administration of the Airport Environs Land Use Plan for Ontario International Airport. This plan identifies the height restrictions and safety zones that require land-use restrictions to minimize potential impacts. Future land-use decisions that adhere to these restrictions and are planned accordingly will help reduce future impacts associated with aircraft accidents. While these efforts can help reduce impacts on the ground, little can be done to reduce the impacts associated with aircrafts flying overhead under normal flight conditions. The risk associated with this is similar to that of other parts of San Bernardino County and Southern California.

CLIMATE CHANGE CONSIDERATIONS

There is no direct link between aircraft incidents and climate change; it is not anticipated that future hazards would be affected by changing climatic conditions at this time.

Hazard Materials Release

DESCRIPTION

Hazardous materials release refers to a hazard event whereby harmful concentrations of hazardous or toxic substances are released into the environment, which occurs when storage containers of hazardous materials leak or fail. It can happen due to industrial accidents, vehicle crashes, as a direct result of other disasters (e.g., a flood or earthquake), or as a deliberate act.

The threat that hazardous materials pose to human health depends on the type of material, frequency, and duration of exposure, and whether chemicals are inhaled, penetrate the skin, or are ingested, among other factors. Exposure to hazardous materials can result in short- or long-term effects, including major damage to organs and systems in the body or death. Hazardous waste is any material with properties that make it dangerous or potentially harmful to human health or the environment. Hazardous materials can also cause health risks if they contaminate soil, groundwater, and air, potentially posing a threat long after the initial release.

As part of this analysis, the City also identified the potential environmental justice issues associated with hazardous materials. The mapping prepared in this analysis uses the CalEnviroScreen data set from the California Environmental Protection Agency (Cal EPA).⁶⁵ This dataset helps identify California communities most affected by many pollution sources and where people are often especially vulnerable to pollution's effects.

⁶⁵ California Office of Environmental Health Hazard Assessment. 2018. CalEnviroScreen 3.0 (updated June 2018). <https://oehha.ca.gov/calenviroscreen/report/calenviroscreen-30>

The dataset uses environmental, health, and socioeconomic information to produce scores for every census tract in the state that is mapped using a scale based on the location's pollution burden. The higher the percentage, the greater the burden, and the higher likelihood of environmental justice concerns.

LOCATION AND EXTENT

Hazardous materials and chemicals are used daily in households and businesses throughout Rancho Cucamonga. In addition to the locations of large industrial uses, sources of hazardous materials can originate from seemingly harmless places such as service stations, dry cleaners, medical centers, and almost any industrial business. Hazardous waste can take the form of liquids, solids, contained gases, or sludge, and can be the by-products of manufacturing processes or simply discarded commercial products, like cleaning fluids and pesticides. **Figure 3-15** identifies the locations of the hazardous material facilities within the City registered in the Environmental Protection Agency's Facility Registry Service (FRS). The FRS is a centrally managed database that identifies facilities, sites, or places subject to environmental regulations or of environmental interest. These facilities include anything from grocery stores to gas stations. These locations have been overlaid on the CalEnviroScreen dataset that identifies California communities by census tracts disproportionately burdened by and vulnerable to multiple pollution sources.

In severe situations, Rancho Cucamonga may also be at risk of hazardous materials release events regionally. With the right prevailing wind conditions, airborne toxic material could spread to and impact various parts of the air basin, including Rancho Cucamonga areas.

PAST EVENTS

Rancho Cucamonga has experienced an average of 15 hazardous materials spills annually (2010-2020), reported to the Cal OES Spill Release Reporting database. Most of these incidents involve sewage and petroleum products. **Table 3-17** identifies the yearly releases reported to Cal OES during this period.

RISK OF FUTURE EVENTS

Most of the release events within Rancho Cucamonga have occurred due to human error, malfunctioning equipment, or deliberate acts. Given this, it is anticipated that future events within the City will include minor incidents like the past occurrences identified. Based on this historical average, the City can expect at least one reported spill per month.

Table 3-17: Rancho Cucamonga Spill Release Reporting

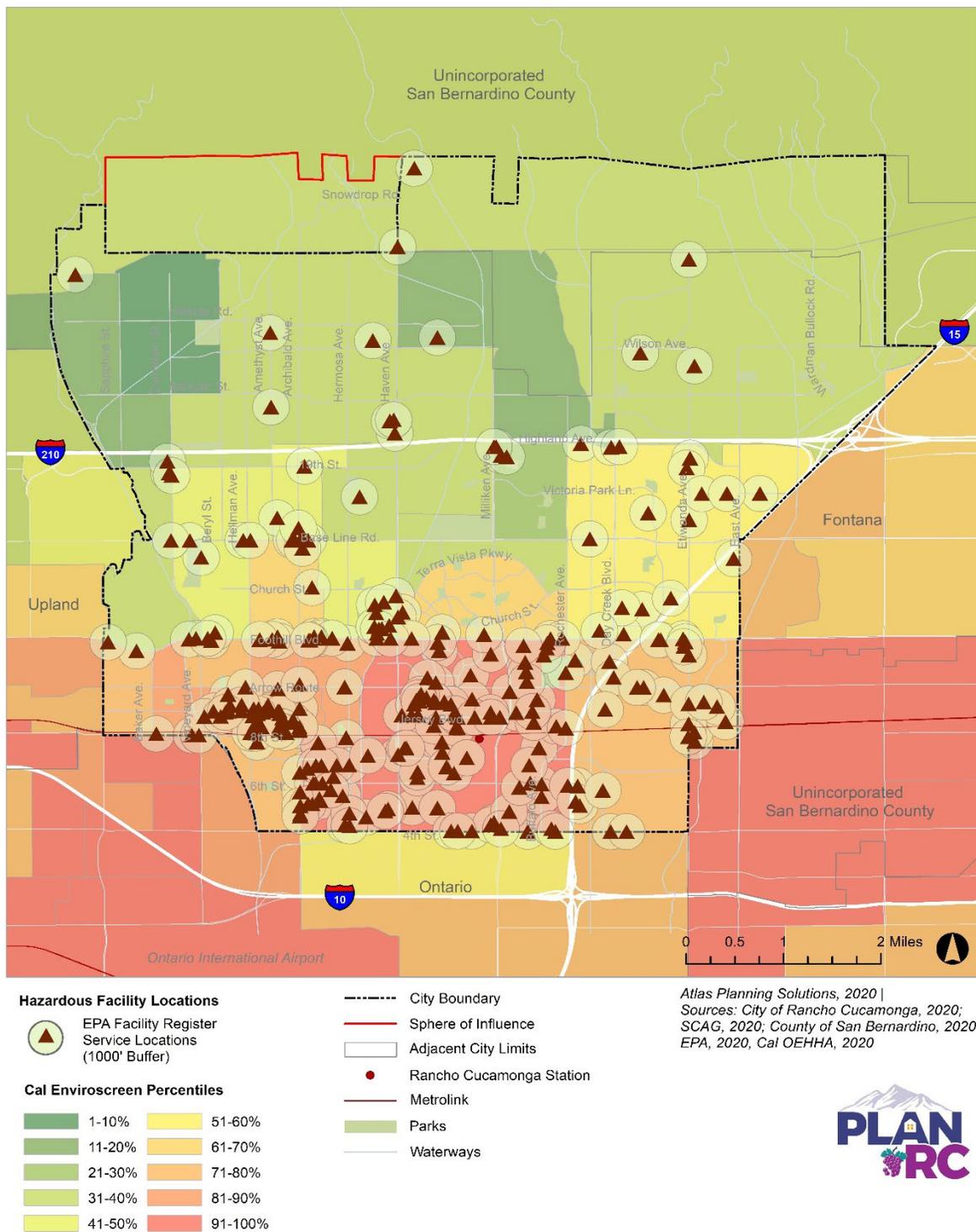
Year	Reported Releases
2010	14
2011	15
2012	27
2013	20
2014	18
2015	4
2016	10
2017	20
2018	16
2019	17
2020	14

Table Source: <https://www.caloes.ca.gov/cal-oes-divisions/fire-rescue/hazardous-materials/spill-release-reporting>

CLIMATE CHANGE CONSIDERATIONS

Climate-related natural hazard events, such as an intense flood, could cause hazardous materials releases. These releases could occur due to traffic accidents associated with inclement weather or flooded roadway conditions, or leakage from storage containers due to intense weather events. Climate-related hazards could also exacerbate the effects and impacts of such events. For example, heavier rains could lead to more runoff from contaminated sites. Extreme heat could affect the storage of hazardous materials and is also a concern for the combustibility of these materials. These issues should be monitored during the 5-year implementation period of this plan.

Figure 3-15 Hazardous Materials Locations



Chapter 4 – Threat and Vulnerability

Threat Assessment Process

The threat assessment process looks at the harm that each hazard event discussed in Chapter 3 may cause in three different areas: the physical threat to key facilities, the threat to vulnerable populations, and other threats that may be unique to the hazard or community assets.

Critical Facilities and Facilities of Concern

Critical Facilities (CFs) consist of properties and structures that play important roles in government operations and their services to the community. Examples of CFs include local government offices and yards, community centers, public safety buildings like police and fire stations, schools, and any other properties a city has deemed essential for its operations. Critical Facilities may also serve dual roles if a city designates them as public assembly points during an emergency. The City often owns CFs, but many are also owned and operated privately, such as some utilities and telecommunication infrastructure.

The Hazard Mitigation Planning Committee identified 239 CFs and 38 Facilities of Concern (FOC) in Rancho Cucamonga that fall into seven categories based on their function or characteristics. **Table 4-1** shows the number of CFs and FOC in each category, the total estimated value of the facilities in each category, and examples of the facilities in each. **Appendix D** has a complete list of the CFs and FOC. **Figure 4-1** shows the locations of CFs and FOC in Rancho Cucamonga that were mapped. Some facilities were not mapped due to security concerns.

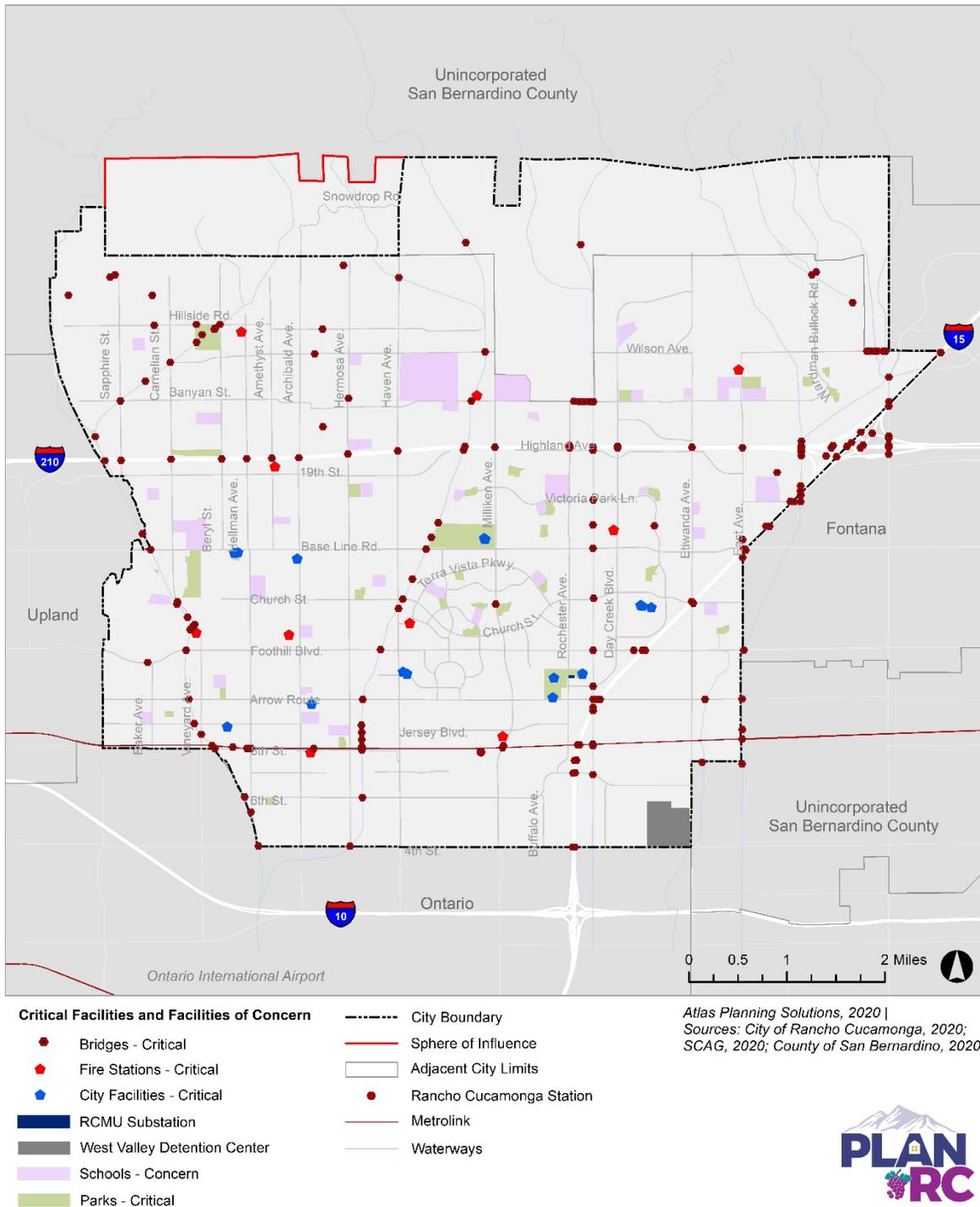
The potential loss value is the total insured value of the CFs that fall within the hazard zone. It is intended to provide the ballpark estimate of replacement cost if the property is entirely or severely damaged. The actual costs of repair could be smaller or larger than the provided estimate. The City’s Property Schedule provided the data; information for facilities not owned by the City are not shown (e.g., bridges, private buildings). In some instances, replacement cost information was not made available. Where this occurs, “N/A” has been used within the table.

Table 4-1: Critical Facilities and Facilities of Concern Replacement Cost

Category	Facility Count	Examples	Replacement Cost
Bridge (CF)	178	Overpasses and underpasses within the city	\$534,000,000
City Facility (CF)	14	City Hall, Operations Support	\$184,298,364
Fire Facility (CF)	9	Fire Stations and Sub Stations	\$65,757,769
Parks (CF)	33	Parks, Recreational Facilities, Sports Complexes, and support facilities.	N/A
Police Facility (CF)	3	Police Stations, Sub Stations	\$19,342,329

Other Facility (FOC)	2	Etiwanda Substation, CVWD Water Treatment Plan	N/A
Schools (FOC)	38	Elementary, Middle, High Schools	N/A
All Facilities Total	278	Critical Facilities and Facilities of Concern	\$803,398,462
* Replacement cost based on an estimate of 3 million per bridge			

Figure 4-1: Critical Facilities and Facilities of Concern



Based on the City's available data, there is a minimum of \$803,398,462 worth of City-owned assets. The total potential loss value of all City-owned and non-City-owned assets is much higher but is unknown due to data limitations. The greatest potential for loss among the City-owned assets comes from the Bridge category. The next category with the greatest potential for loss is City Facility. To better understand the magnitude of impacts, this plan identifies representative percentages of potential impact based on City assets' total valuation. For planning purposes, we identified different tiers of impact that could happen. It is reasonable to assume that impacts would not exceed 50% of the total asset value city-wide. The following are parameters to help understand how much a proposed investment/improvement compares to the existing assets within the City:

- 1% Impact - \$8,033,984
- 5% Impact - \$40,169,923
- 10% Impact - \$80,339,846
- 20% Impact - \$160,679,692
- 50% Impact - \$401,699,231

The likelihood that all facilities are completely damaged at the same time is extremely remote. Most impacts are anticipated to be isolated to certain locations based on the hazard. This estimate does not include the value of underground infrastructure and surface drainage facilities owned and operated by the City.

Vulnerable Populations

Factors such as age, physical and/or mental condition, socioeconomic status, access to key services, and many other factors affect people's ability to prepare for and protect themselves and their property from a hazard event. Even though some hazard events may impact all parts of Rancho Cucamonga with equal severity, different people may experience the impacts differently. For instance, higher-income households are likely able to afford the cost of retrofitting their homes to resist flooding or move to a location that is less prone to flooding than a lower-income household. As a result, the higher income household is less likely to experience significant effects during a flood event than the lower-income household, even if the same amount of rain falls on both.

A social threat analysis examines the ways hazard events are likely to impact different demographic populations in Rancho Cucamonga and where these different demographic populations live in the City. This analysis includes assessing whether the people in an area of an elevated hazard risk are more likely than the average person to be considered a threatened population. The social threat analysis uses the following criteria to assess the threat to vulnerable populations:

- **Disability status:** Persons with disabilities may often have reduced mobility and experience difficulties living independently. As a result, they may have little or no ability to prepare for and mitigate hazard conditions without others' assistance.
- **Income levels:** Lower-income households are less likely to have the financial resources to implement mitigation activities on their residences. They may also struggle with having the necessary time to find and access educational

resources discussing hazard mitigation strategies. Furthermore, lower-income households are less likely to afford to move to areas that are safer or less at risk of being impacted by a hazard event. The national poverty limit standard for the U.S. for a four-person family is approximately \$26,200 or less. For San Bernardino County, the FY 2020 Low-Income Limits for a four-person family, according to the Housing Authority of the County of San Bernardino (HACSB), is \$37,650. See Table 4-2 for household data.

- **Seniors (individuals at least 65 years of age):** Seniors are more likely to have reduced mobility, physical and/or mental disabilities, and lower-income levels, all of which may decrease their ability to prepare for and mitigate a hazard event.
- **English-language proficiency:** Individuals who have limited English proficiency will be present when the community is faced with a hazard event. These individuals are those who have difficulty understanding, speaking, reading, or writing English. Consequences can be deadly if these individuals cannot access hazard information in their primary language.

Table 4-2 shows the metrics in the City of Rancho Cucamonga for threatened or vulnerable populations. For broader demographic information regarding the City, please refer to **Chapter 2**.

Table 4-2: Rancho Cucamonga Threatened-Population Metrics

Threatened Population Metric	Community-Wide Data
Total Population	177,742
Total Households	55,950
Median household income	\$86,355
Renter Households	38.49%
Percentage of households with at least one person living with a disability	20.7%
Percentage of households living under the poverty limit	8.1%
Percentage of households with one-member aged 65+	23.7%
Percentage of households aged 65+ living alone	5.9%

Sources: https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_17_5YR_DP02&prodType=table
https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_17_5YR_DP03&prodType=table

The social threat analysis also shows the threat other populations may encounter, such as persons experiencing homelessness or persons without access to lifelines (vehicles or communication networks). Since data for these groups are not readily available, there is no definitive way to determine these persons' number in elevated risk areas. This assessment will discuss how these other threatened groups may also be affected on a general level.

Data Limitations and Notes on Vulnerability Tables

Due to data limitations, the data comparing the hazard zone population with the Citywide population comes from two separate sources. The Citywide data comes from the US Census Bureau's American Community Survey (ACS). The hazard zone population data comes from ESRI's Business Analyst reports, which rely on ESRI and ACS data

estimates. As a result, there may be minor discrepancies in comparing the two data sets. The data that should be relied on when addressing demographics for the entire community is ACS data reported in **Chapter 2**.

Other Assets

In addition to the City's designated inventory of CFs/FOC and vulnerable populations, hazard events could threaten other important assets to Rancho Cucamonga. These assets may include services, artistic or cultural landmarks, or local economic activities. The threat assessment describes the potential harm to these other assets based on available information.

Threat Profiles

Seismic Hazards

PHYSICAL THREAT

SEISMIC SHAKING (PRIMARY)

Seismic shaking associated with an earthquake has the most significant potential to cause injuries and loss of life along with property and economic damage within the City. As part of the San Bernardino County Hazard Mitigation Plan update, a Hazus⁶⁶ estimate was prepared for the City. **Table 4-3** identifies the results of this analysis, which estimates losses of approximately \$5.2 billion for all community segments, resulting from a significant earthquake along the San Andreas Fault.

Building Type	Total Value	Total Loss Estimation (% of Total Value)	Total Estimated Loss
Agricultural	\$120,868,000	15.8%	\$19,137,000
Commercial	\$8,306,428,000	20.9%	\$1,733,335,000
Educational	\$316,191,000	14.8%	\$46,745,000
Government	\$112,050,000	15.8%	\$17,695,000
Industrial	\$3,882,509,000	20.6%	\$800,729,000
Religious	\$408,060,000	18.3%	\$74,692,000
Residential	\$32,521,315,000	8.0%	\$2,601,189,000
Grand Total	\$45,667,421,000	11.6%	\$5,293,523,000

Source: San Bernardino County Multi-Jurisdictional Hazard Mitigation Plan, July 13, 2017,
http://countywideplan.com/wp-content/uploads/2018/09/SBC_MJHMP_FEMAapproved_20170713.pdf

Many physical assets in the City are estimated to experience the same seismic shaking intensity, ranging from 95 to 125% g (shaking intensity concerning earth's gravity). Therefore, all facilities could be damaged during a significant seismic event, which would

⁶⁶ Hazus is a nationally standardized risk modeling methodology.

likely be extremely costly for the City. Suppose all facilities were to be damaged at the same time during a seismic shaking event. In that case, it can be assumed that the City would incur a percentage of the maximum potential loss of its physical assets. Assuming 20% of the City's assets are impacted, this potential loss could amount to over \$54.9 million. Underground infrastructure, like pipelines or utilities, could be damaged if shaking intensity damages these assets. In such a scenario, natural gas and water delivery service to Rancho Cucamonga homes and businesses would be out of commission until repairs are completed.

FAULT RUPTURE (PRIMARY)

The City has several active faults located within AP Zones that have been mapped along the foothills of the San Gabriel Mountains. To better understand the risks associated with fault rupture, the properties located within these zones were identified and analyzed. **Table 4-4** identifies approximately 4,018 acres of property within the City and SOI located in these zones, which includes nearly 600 parcels. Of these parcels, over 900 acres contain 363 single-family residences, whereas over 2,850 acres (nearly 70%) of this area is currently vacant. Based on the current assessor parcel roles, these parcels are valued at nearly \$325 million, which could be at risk if fault rupture impacts them.

Table 4-4: Fault Rupture Risks

Parcels Located in AP Zones	Parcels	Acreage
Total	592	4,081.2
Vacant Uses	153	2,854.1
Single Family Residential	363	902.6
Other Uses (Commercial, Religious, Infrastructure)	76	324.5
Property Values		
Average	\$530,114	
Maximum	\$9,741,968	
Total	\$324,429,645	
Source: City of Rancho Cucamonga Assessor Parcel Database, 2019		

In addition to the properties potentially impacted by fault rupture, **Table 4-5** identifies the CFs and FOC located within the AP Zones for the Cucamonga Fault and Etiwanda Avenue Fault, as well as the City designated Special Study Zone for the Red Hill Fault. Based on this analysis, the City has approximately \$31 million

in assets located near these faults.

Table 4-5: Critical Facilities and Facilities of Concern (Fault Rupture)

Category	Number of Facilities (AP Zones)	Total Replacement Costs**	Number of Facilities (Red Hill Fault Zone)	Total Replacement Costs**
Bridge	1	\$3,000,000	14	\$42,000,000
City Facility	0	\$0	1	\$12,522,692

Fire Facility	0	\$0	1	\$18,387,385
Parks	0	\$0	3	N/A
Police Facility	0	\$0	0	\$0
Other Facilities	0	\$0	0	\$0
School Facilities	0	\$0	6	N/A
Total	1	\$3,000,000	25	\$72,910,077

N/A – Replacement Values Unavailable

* Replacement cost based on an estimate of 3 million per bridge

** Based on the City of Rancho Cucamonga insured replacement values

LIQUEFACTION/ EARTHQUAKE-INDUCED LANDSLIDES

Liquefaction has no known history within the city itself; however, the potential to occur does exist. Areas of potential liquefaction risk are small and represent a minimal risk to the City; however, the hazard has been identified. As with Liquefaction, there have been no known records of an earthquake-induced landslide (EQ-I Landslide) within the City itself. These zones are primarily located in the foothills within the SOI. Since many of these areas are vacant or

Sparsely populated, it is anticipated that this type of event would impact few structures. **Table 4-6** identifies the properties located within the liquefaction and earthquake-induced landslide hazard zones. These areas contain approximately 166 acres (Liquefaction) and approximately 3,704 acres (EQ-I Landslide).

A majority of the 125 parcels within the Liquefaction hazard zone are developed, with 139 dwelling units and other uses. In total, these properties are valued at over \$55 million. Whereas the EQ-I Landslide areas include 162 parcels, a majority of which are vacant, with approximately 32 dwelling units. In total, these properties are valued at

Table 4-6: Liquefaction/ Earthquake-Induced Landslide Potential Property Losses

Parcels within Secondary Seismic Hazard Zones	Liquefaction	EQ-I Landslide
Total Acres	166.7	3703.6
Total Parcels	125	162
<i>Vacant Parcels</i>	5	118 (10 units)
<i>Single Family Residential Parcels</i>	91 (139 units)	22 (22 units)
<i>Other Parcels</i>	29	22
Average Property Value	\$438,657	\$393,621
Maximum Property Value	\$4,794,000	\$3,118,609
Total Property Value	\$54,832,141	\$63,766,582

Source: City of Rancho Cucamonga Assessor Parcel Database, 2019

over \$63 million. Given the larger area located within the EQ-I Landslide areas, the steeper topography and prevalence of hazards create development challenges. **Table 4-7** identifies the CFs and FOC that are located within these hazard zones.

Table 4-7: Critical Facilities and Facilities of Concern

(Liquefaction and Earthquake Induced Landslide)

Category	Number of Facilities (Liquefaction)	Total Replacement Costs**	Number of Facilities (EQ-I Landslide)	Total Replacement Costs**
Bridge	0	\$0	0	\$0
City Facility	2	\$4,523,015	0	\$0
Fire Facility	0	\$0	0	\$0
Parks	2	N/A	0	\$0
Police Facility	0	\$0	0	\$0
Other Facilities	0	N/A	0	\$0
School Facilities	1	N/A	0	\$0
Total	5	\$4,523,015	0	\$0

N/A - Replacement Values Unavailable
 ** Based on the City of Rancho Cucamonga insured replacement values

In addition to EQ-I Landslide hazards, the City also identified potential losses associated with deep-seated landslides (Table 4-8).

SOCIAL THREAT

The risk of a seismic event is a danger to all groups in Rancho Cucamonga though some are more threatened than others.

SEISMIC SHAKING

Seniors, pregnant women, and persons with disabilities are more threatened by seismic shaking since they may have limited mobility and cannot reach shelter in time. Even if these groups reach shelter in time, they may find themselves trapped if furniture or building components have fallen around them. Renters and low-income persons are also more threatened by seismic shaking since these groups may live in homes that are not properly retrofitted to survive the stresses of a seismic event. These groups may not absorb the costs associated with repairing their homes or looking for new housing should their existing housing be too damaged for occupancy. In terms of geography, the effects of seismic shaking on vulnerable populations are anticipated to reduce in areas of higher elevation, which tend to have lower population densities and higher household incomes. Table 4-9 compares the areas within the City subjected to

Table 4-8: Critical Facilities and Facilities of Concern (Deep-Seated Landslides)

Category	Number of Facilities	Total Replacement Costs**
Bridge	31	\$93,000,000
City Facility	0	\$0
Fire Facility	4	\$34,715,375
Parks	5	N/A
Police Facility	0	\$0
Other Facility	1	N/A
School Facilities	16	N/A
Total	57	\$127,715,375

N/A – Replacement values unavailable
 ** Based on the City of Rancho Cucamonga insured replacement values

seismic shaking below and above 1g. As part of this comparison, the data indicates that areas subjected to lower seismic shaking also have lower median household incomes and higher percentages of persons living with disabilities, households living under the poverty limit, persons aged 65+ living alone.

Table 4-9: Seismic Shaking Threatened Populations

Threatened Population Metric	Seismic Shaking (< 1g)	Seismic Shaking (>1g)	City of Rancho Cucamonga
Total Population	75,158	112,490	177,742
Total Households	25,412	33,928	55,950
Median household income	\$67,642	\$103,913	\$86,355
Renter Households	23.5%	21.5%	20.70%
Percentage of households with at least one person living with a disability	10.6%	6.5%	8.10%
Percentage of households living under the poverty limit	21.9%	25.2%	23.70%
Percentage of households with one-member aged 65+	7.4%	5.1%	5.90%

FAULT RUPTURE

To analyze the social threat associated with fault rupture, the City identified the populations located within both the AP Zones and Red Hill Special Study Zone. **Table 4-10** identifies the characteristics of these areas, which include households with higher median household incomes, higher percentages of persons living with a disability, and higher percentages of households with one-member aged 65+.

Table 4-10: Fault Rupture Threatened Populations

Threatened Population Metric	AP Zones	Red Hill Special Study Zone	City of Rancho Cucamonga
Total Population	823	24,498	177,742
Total Households	246	7,922	55,950
Median household income	\$114,494	\$89,708	\$86,355
Percentage of persons living with a disability	24.9%	23.7%	20.70%
Percentage of households living under the poverty limit	3.5%	8.9%	8.10%
Percentage of households with one-member aged 65+	31.7%	28.5%	23.70%
Percentage of households aged 65+ living alone	4.9%	10.5%	5.90%

LIQUEFACTION/ EARTHQUAKE-INDUCED LANDSLIDES

As secondary seismic hazards, both liquefaction and earthquake-induced landslides impact small areas of the City. Due to the small size of the liquefaction hazard zone and the sparse population within the EQ-I landslide zones, the social vulnerability analysis could not provide reliable results. It is estimated that these areas have small populations that could be impacted by these hazards and could be challenged if there is a higher proportion of residents with lower household incomes and high proportions living under the poverty limit or with a disability.

DEEP SEATED LANDSLIDES

Landslide-prone properties are predominantly located within the northern portions of the City within the San Gabriel Mountains foothills. **Table 4-11** identifies the threatened populations within these areas. Based on this analysis, these areas have a higher proportion of households with persons living with a disability

Table 4-11: Landslide Threatened Populations

Threatened Population Metric	Landslide Zones	City of Rancho Cucamonga
Total Population	43,580	177,742
Total Households	12,952	55,950
Median household income	\$122,338	\$86,355
Percentage of households with at least one person living with a disability	23%	20.7%
Percentage of households living under the poverty limit	4.7%	8.1%
Percentage of households with one-member aged 65+	28.2%	23.7%
Percentage of households aged 65+ living alone	3.7%	5.9%

and households with one-member aged 65+. While these indicators are higher, these areas have a significantly higher median household income compared to the City, which may allow households in this area to rebuild easier after a disaster incident.

OTHER THREATS

SEISMIC SHAKING

As early earthquake warnings systems become operational soon, it can be expected that utilities will take advantage of these warnings to shut off gas, water, and power transmission to control any potential leaks following the seismic shaking. Authorities may have enough time to halt the use of bridges or move workers to a safe distance away from hazardous materials. Workers will cease their activity and take shelter until they can be safely evacuated. Therefore, all services will be non-operational during the seismic shaking and remain inactive until authorities are confident that it is safe to reactivate utilities and return employees to their workplaces. The length of this time would vary depending on the magnitude of the event. A significant earthquake would likely put utilities out of commission and halt any employment activity in the City for a few hours or several days. The City and the region would lose economic activity that would normally occur during the outage period. Like telephone poles or power transmission towers, structures that have fallen by the shaking could potentially block roadways and prevent

emergency response personnel from reaching victims or evacuees who need assistance. As with fault rupture, seismic shaking could also affect flooding and dam inundation zones.

FAULT RUPTURE

Seismic events that cause surface fault rupture tend to damage roads and structures in the areas of impact. The length of rupture is typically a component of the magnitude of the seismic event. The stronger the event, the greater distance that rupture can occur. Strong events can create a larger problem with other identified hazards, such as dam inundations and flooding.

LIQUEFACTION/ EARTHQUAKE-INDUCED LANDSLIDES

Services and mobility may be disrupted during and following a seismic event. As liquefaction and EQ-I landslides typically occur in isolated areas of the City, these areas' effects may include damage to roadways, infrastructure (power poles and underground pipelines), and storm management infrastructure. This damage could result in loss of utility services or inability to access areas of the City.

DEEP-SEATED LANDSLIDES

Areas subjected to deep-seated landslide hazards may be subjected to large movements of earth materials. If this occurs, any infrastructure built on top or within these areas may be impacted. Depending on the size and scale of the movement, structures within these areas may become uninhabitable. If a large landslide event were to occur, it could require significant mitigation to make the area safe to build structures. In addition, landslides tend to impact the environments they migrate into. These impacts could include filling of streams and channels (which could exacerbate flooding), filling flood control basins and drainage infrastructure, which could affect the capacity and effectiveness of flood control systems and prohibit access to areas of the City by emergency response services if roadways become impassable or blocked. If a small-scale landslide were to occur, the effects could be minimal or cause very little damage to the community.

Wildfire

PHYSICAL THREAT

The Rancho Cucamonga Fire Protection District designated the WUIFA (Wildland Urban Interface Fire Area), which encompasses both the Cal FIRE Very High Fire Hazard Severity Zones as well as other areas of the City deemed susceptible to wildfire effects. Within the WUIFA, there are currently 5,424 improved parcels, which have an estimated value of approximately \$2.825 billion, which is the second greatest threat to residents and businesses in the City.

All structures located within this zone are at an elevated risk to wildfire impacts. **Table 4-12** identifies 52 CFs and FOC within the WUIFA, resulting in a potential loss of approximately \$130 million based on available replacement values. Additional losses associated with the parks and schools in these areas could also occur.

While these areas have a high degree of vulnerability to wildfire, other areas of the City may also be susceptible to ember cast. These areas typically referred to as the WUI (Wildland Urban Interface), are vulnerable if the right conditions exist. Typically, the WUI is impacted if adequate fuels are combined with dry conditions and strong winds. Sometimes the ignition of a wildfire may occur if power lines around overgrown trees cause a spark and catch the tree on fire. These incidents are the main impetus for the recently established PSPS program occurring throughout the State.

Table 4-12: Critical Facilities and Facilities of Concern (Wildfire)

Category	Number of Facilities	Total Replacement Costs**
Bridge	38	\$114,000,000
City Facility	0	\$0
Fire Facility	2	\$16,328,000
Parks	4	N/A
Police Facility	0	\$0
Other Facility	1	N/A
School Facilities	7	N/A
Total	52	\$130,328,000

N/A – Replacement values unavailable

** Based on the City of Rancho Cucamonga insured replacement values

SOCIAL THREAT

Outside of the property owners directly impacted by a wildfire event, wildfires can also impact seniors and persons with disabilities. These groups may have limited mobility, be immuno-compromised, and/or not receive notifications regarding current conditions and evacuation requirements. For example, a senior who lives alone may not be aware that a wildfire is burning close to their residence, and they have been ordered to evacuate if those notifications were sent in a manner that does not reach them. Persons with disabilities may require special mobility devices or caregiver assistance to go outside, which may not arrive as quickly as needed. Other groups with increased threat levels include people with lower-incomes, renters, and the homeless. These groups may not possess enough financial resources to rebuild their homes or search for new homes after a fire. **Table 4-13** identifies the populations living in the WUIFA. Based on this analysis, these residents have a median income that is approximately \$49,000 higher than the city-wide figure and a greater proportion of households with one member aged 65+ and persons living with a disability. In contrast, a smaller proportion of this area has households living under the poverty limit and households aged 65+ living alone. Based on this, households in this part of the City would be considered more resilient to wildfire impacts, given the lower percentage living under the poverty limit and a significant increase in median household income compared to city-wide statistics.

Table 4-13: Wildfire Threatened Populations

Threatened Population Metric	WUIFA	City of Rancho Cucamonga
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Total Population	20,332	177,742
Total Households	5,870	55,950
Median household income	\$135,757	\$86,355
Percentage of households with at least one person living with a disability	21.7%	20.7%
Percentage of households living under the poverty limit	4.1%	8.1%
Percentage of households with one-member aged 65+	28.9%	23.7%
Percentage of households aged 65+ living alone	2.8%	5.9%

OTHER THREATS

Other threats associated with wildfires may involve the loss of electricity (PSPS) or other utilities, evacuation of areas potentially under threat, or the health effects of wildfires located near the City or throughout the region. Loss of utility services can impact vulnerable populations to a greater degree if they rely on the service for medical reasons (oxygen, dialysis, etc.) or to ensure adequate heating/cooling occurs. Wildfire events generally occur when the weather is hot and dry. These weather conditions place a high demand on air conditioning, especially for those whose health conditions are made worse by extreme heat. During these conditions, the loss of power can place a greater strain on vulnerable residents, especially those who cannot supply their own backup power or afford to relocate during the power disruption.

The health effects associated with wildfires can also be very detrimental to a community. As wildfires in California become larger and more intense, there is a greater potential for smoke production. Chronic exposure to particulates generated during a wildfire can cause health outcomes that range from eye and respiratory tract irritation to more serious disorders, including reduced lung function, bronchitis, exacerbation of asthma and heart failure, and premature death. Children, pregnant women, and the elderly are especially vulnerable to smoke exposure. Emissions from wildfires are known to cause increased visits to hospitals and clinics by those exposed to smoke.⁶⁷

A study of the 2003 wildfires in southern California concluded that wildfire-related PM(2.5) led to increased respiratory hospital admissions, especially asthma, suggesting that better preventive measures are required to reduce morbidity among vulnerable populations.⁶⁸ With the expectation that wildfire incidents will increase in size and severity in the future, it will be important to understand how the City can assist residents with poor air quality during wildfires occurring throughout the region.

⁶⁷ <https://www.epa.gov/air-research/wildland-fire-research-health-effects-research#:~:text=The%20effects%20of%20smoke%20from,especially%20vulnerable%20to%20smoke%20exposure.>

⁶⁸ The relationship of respiratory and cardiovascular hospital admissions to the southern California wildfires of 2003. <https://pubmed.ncbi.nlm.nih.gov/19017694/>

Flooding

PHYSICAL THREAT

Portions of the City are located within the 100-year flood zone (1.0% Annual Chance of Flooding) and the 500-year flood zone (0.2% Annual Chance of Flooding). Any physical assets located within these mapped boundaries can expect to be inundated if enough precipitation were to fall, exceeding the storm drain infrastructure design-capacity in these areas. Electronic or mechanical equipment on the ground could become waterlogged and nonfunctional. **Table 4-14** identifies the City's physical assets within the 100-year flood zone, 500-year flood zone, and the 500 Year/Levee. In total, these facilities total over \$423 million in value.

In addition to the CFs and FOC, land within flood hazard zones amounts to approximately 3,857 acres. **Table 4-15** identifies over 4,500 improved parcels located within flood hazard zones, with a majority in the 500-year flood hazard zone. In total, properties within these flood hazard zones account for approximately \$1.9 billion in potential property losses resulting from flooding. While this estimate is significant, there is still some uncertainty involved since changing precipitation conditions can cause flooding in areas that have not experienced these conditions in the past.

Table 4-14: Critical Facilities and Facilities of Concern (100-year Flood/500-year Flood)

Flood Risk	Flooding (100 Year)	Flooding (500 Year)	Flooding (500 Year/Levee)
Bridge	72	6	38
City Facility	3	0	0
Fire Facility	2	1	1
Parks	2	2	1
Police Facility	1	1	0
Other Facilities	1	2	0
School Facilities	2	5	2
Total Facilities	83	17	42
Total Replacement Costs**	\$253,190,256	\$37,614,299	\$132,387,375

Table 4-15: Flood Hazard Risks

Flood Hazard Zone	Improved Parcel Count (Percentage) *	Acreage	Total Exposure
100-Year Flood	310 (6.7%)	871.2	\$174,652,000
500-Year Flood	3,450 (75.4%)	2,338.4	\$1,488,227,000
500-Year (Protected by Levee)	814 (17.8%)	647.8	\$260,682,000
Total	4,574	3,857.3	\$1,923,561,000

* Improved parcels include residential, commercial, industrial, and institutional uses within the flood hazard zone.

Source: San Bernardino County Multi-Jurisdictional Hazard Mitigation Plan, July 13, 2017

SOCIAL THREAT

The threat of a flood will primarily affect those residents living within the 100-year and 500-year flood zones, many of which are located along drainages within the City. Floodwaters in these areas are anticipated to rise to more than a maximum of one foot. Flooding of this type would likely inundate curb cuts as well as sidewalks to some extent. Any people in Rancho Cucamonga who walk or bike as their main form of transportation may encounter greater difficulties with mobility if they do not have access to alternative transportation means. Seniors, persons with disabilities, and low-income persons are those most likely to be threatened. **Table 4-16** shows the proportions of Rancho Cucamonga’s vulnerable populations who are likely to face a greater threat from a flood event in the City. In comparison to the citywide average, households within the 100-year flood zone have a lower median household income and a higher proportion of persons with a disability, living under the poverty line, having a member aged 65+, and 65+ living alone. In contrast, households in the 500-year flood zone have higher incomes and a lower proportion of persons living under the poverty line, having a member aged 65+, and 65+ living alone.

Additionally, flooding events are typically associated with rainstorms, which can impact persons who are experiencing homelessness. If these populations are caught outside during flood conditions without any shelter, they could be disproportionately impacted. Though floodwaters in Rancho Cucamonga are not expected to exceed a depth of one foot, a floodwater depth of six inches may render any makeshift structures uninhabitable during a flood event. Possessions such as sleeping bags or electronic devices may be damaged or swept away by the floodwaters.

Table 4-16: Flood Hazard Threatened Populations

Flood Hazard Zone	100-Year Flood	500-Year Flood	500-Year (Protected by Levee)	City of Rancho Cucamonga
Total Population	3,521	11,309	5,746	177,742
Total Households	1,190	3,266	1,842	55,950
Median Household Income 2019	\$80,566	\$104,381	\$82,246	\$86,355
Percent of Households with One or More Persons with a Disability	22.10%	21.70%	22.60%	20.70%
Percent of Households under Poverty Line	8.30%	7.50%	6.20%	8.10%
Percentage of households with one-member aged 65+	33.70%	22.90%	21.70%	23.70%
Percentage of households aged 65+ living alone	8.40%	1.70%	5.40%	5.90%

OTHER THREATS

Flooding may temporarily stop any type of transportation in the City. Debris carried by floodwaters can block roadways, hinder vehicles' access, and potentially affect emergency response services. Rushing water only one foot deep is enough to carry small vehicles. A severe flood situation where the maximum anticipated flood depth of one foot is realized may prevent people who own smaller vehicles from driving to work, leading to reduced economic activity. Severe flooding that causes serious damage to homes and businesses may also reduce economic activity until repair work is completed. Additionally, health issues may arise from flooding. Mold could become an issue if flooded properties are not properly repaired. There is also the potential for chemical/hazardous materials exposure if the flooding compromises particular facilities.

Dam Failure/Dam Inundation

PHYSICAL THREAT

The extent to which dam failure events threaten physical assets in the City is based on a variety of factors, such as the amount of water released, the distance between the dam failure site, and the topography of the surrounding land. Some reservoirs, like Day Creek or Demens Creek, simply hold less water, which in turn reduce the threat to physical assets in the City. Other reservoirs, like San Sevaine (largest basin), Deer Canyon, and Cucamonga Creek, have large storage capacities or are located near assets that are expensive to replace.

Table 4-17 identifies the physical assets in Rancho Cucamonga that are threatened by the potential failure of the following dams:

- Alta Loma Basin
- Cucamonga Creek
- Day Creek
- Deer Canyon
- Demens Creek
- Etiwanda Basin
- San Sevaine Basin

If any of these dams were to fail at maximum capacity and release the water in their reservoir, it would threaten various assets in Rancho Cucamonga. The dams expected to impact the greatest number of facilities include San Sevaine, Cucamonga Creek, and Deer Canyon, which could impact between 25 and 27 facilities, respectively. Based on replacement cost values, the San Sevaine dam's impacts could impact assets totaling approximately \$88.8 million, based on current asset valuation information.

Table 4-17: Critical Facilities and Facilities of Concern (Dam Failure)

Dam Inundation	San Sevaine	Etiwanda Basin	Demens Creek	Day Creek	Deer Canyon	Alta Loma Basin	Cucamonga Creek
Bridge	24	6	6	0	19	6	21

City Facility	0	0	0	0	0	0	3
Fire Facility	0	0	1	1	1	0	0
Parks	0	1	3	0	3	0	0
Police Facility	1	0	0	0	0	0	0
Other Facilities	1	0	0	0	0	0	0
School Facilities	0	0	1	1	4	1	1
Total Facilities	26	7	11	2	27	7	25
Total Replacement Costs**	\$88,819,299	N/A	N/A	\$5,281,927	\$71,673,029	N/A	\$74,121,783

N/A - Replacement Values Unavailable

** Based on the City of Rancho Cucamonga insured replacement values

SOCIAL THREAT

Dam Failure hazards in the City would impact a variety of downstream properties. **Table 4-18** identifies individual dam impacts associated with the failure of these facilities and the potential harm that could occur to downstream properties. Based on this analysis, the greatest number of people potentially affected would occur from the Deer Canyon Dam. The Cucamonga Creek Dam would impact populations that have the lowest median income. In contrast, the Demens Creek, Cucamonga Creek, and the Alta Loma Basin dams would impact a higher percentage of populations living with a disability.

OTHER THREATS

Dam failures are often triggered by other events (seismic shaking, intense rainstorms, etc.). Often when these events occur, there would almost certainly be service disruptions in Rancho Cucamonga. Floodwaters would quickly inundate downstream portions of the City, disrupting utilities, such as water, power, heating, and other services such as communications or transportation infrastructure, especially since most of the vulnerable facilities are bridges within the City. Residents may find that street lighting and traffic signals may be temporarily disabled if the inundation area interferes with the electrical systems that control them. The rapid inundation of water would sweep up any debris, which could block roads, impeding traffic flow. Water would most likely inundate roadways and other low-lying, flat areas, such as parking lots, open spaces, and schoolyards. People's mobility in these areas would likely be restricted or even impossible in severe scenarios. Any unprotected or unhooded mechanical or electrical equipment that is not adequately elevated would become waterlogged and inoperable until crews can conduct repairs or replacement, if necessary.

Table 4-18: Dam Failure – Threatened Populations

Threatened Population Metric	City of Rancho Cucamonga	San Sevaine	Etiwanda Basin	Demens Creek	Day Creek	Deer Canyon	Alta Loma Basin	Cucamonga Creek
Total Population	177,742	9,080	217	743	13,337	24,766	2,912	15,646
Total Households	55,950	1,919	56	222	4,079	8,100	963	5,449
Median Household Income 2019	\$86,355	\$98,310	\$163,352	\$114,390	\$101,443	\$85,184	\$101,726	\$64,637
Percent of Households with One or More Persons with a Disability	20.7%	20.80%	19.40%	26.80%	17.30%	20.80%	24.00%	25.40%
Percent of Households under Poverty Line	8.1%	4.60%	3.30%	3.90%	5.30%	8.20%	7.80%	12.60%
Percentage of households with one-member aged 65+	23.7%	24.80%	23.20%	36.00%	16.80%	21.30%	26.70%	20.80%
Percentage of households aged 65+ living alone	5.9%	0.90%	1.80%	4.50%	3.60%	4.90%	5.30%	6.40%

Severe Weather

PHYSICAL THREAT

Severe weather events like drought, extreme heat, and severe wind could affect any area within the City. Based on this, all CFs and FOC are located within these hazard zones and discussed below.

DROUGHT

Since the primary threat from drought is reduced water supply and availability, there are no foreseeable threats to any of the City's physical assets. It is possible that any water delivery infrastructure not used or used less than usual may fall into some degree of disrepair if maintenance is deferred. Lower water pressures may cause some aged water pipes to release rust particles into the water supply. Amenities within facilities like water features and landscaping could be affected by reduced watering. If dead or dying vegetation becomes a nuisance, the City may have to replace or retrofit locations affected.

EXTREME HEAT

Extremely high temperatures can cause roads to deform and buckle as the pavement expands in the heat, especially in areas that have not been maintained well. Power lines

and other electrical grid sections are less effective in higher temperatures and may be damaged due to stress during extreme heat events. Buildings with dark pavement will absorb more heat than the surfaces with vegetation or lighter materials that are better at reflecting the sun's energy. This urban heat island effect is strongest during hot periods when the sun is strongest.

SEVERE WIND

Intense winds likely present the greatest threat to physical structures, particularly from trees or branches that fall on buildings and cause substantial damage. Older structures that have deferred maintenance or have not been retrofitted for high wind conditions may suffer greater damage than newer/updated structures. Utility lines and wooden utility poles face an elevated threat from wind, as do buildings without reinforced roofs.

Another physical threat associated with severe wind is wildfire impacts and electric utilities' current practice conducting Public Safety Power Shutoff activities. During high wind events, these shutoffs may impact structures that rely on electricity for normal operations. See social threats for population impacts that may also occur because of these events.

SOCIAL THREAT

DROUGHT

Droughts are unlikely to cause serious social threats to Rancho Cucamonga households, though residents and business owners in the City may experience financial costs associated with water conservation efforts. Those who have less access to financial resources, such as low-income households or seniors, could be harder hit if higher water fees are imposed during a severe drought event.

EXTREME HEAT

Whereas a heat event can be relatively harmless for those with a reliable means for staying hydrated and cool, the event can be deadly for others. Young children, the elderly, or people suffering from serious medical conditions are physiologically more vulnerable to heatstroke. Some senior citizens also take medicines that can make it harder for their bodies to maintain a safe internal temperature, creating an additional threat from extreme heat events. Young children may not be aware of the signs of dehydration or ways of protecting themselves from heatstroke.

People living in homelessness are at a high risk of health complications during heat waves, especially if they are unsheltered. According to data counts by the SBCounty.Gov, in 2019, there were approximately 2,607 individuals experiencing homelessness in the county, with 73 percent unsheltered.⁶⁹ Of the 2,607 individuals experiencing homelessness within the county, approximately 58 individuals are

⁶⁹ San Bernardino County. 2019. Homeless Count and Subpopulation Survey. <https://wp.sbcounty.gov/dbh/sbchp/wp-content/uploads/sites/2/2019/05/2019-homeless-count-and-survey-report.pdf>

experiencing homelessness within the city. During a heatwave, these people are very vulnerable to heatstroke, especially if they cannot reach a cooling center.

Sudden spikes in heat can catch people by surprise. Stores can rapidly sell out of fans, air-conditioning units, or drinking water during a heatwave. Many lower-income households live in older, poorly insulated and energy inefficient housing and cannot afford to run their air conditioning, which can be further compounded by the threat of PSPS events. During these events, extreme heat impacts may affect larger portions of the City and populations that would not be viewed as vulnerable under normal circumstances.

SEVERE WIND

Vulnerable populations may be challenged during severe wind events for several reasons. Housing and structures damaged during an event may become uninhabitable or expensive to repair, which could strain renters/ homeowners if they cannot make the repairs. If relocation is required, this location change could put additional strain on the resident. If businesses are damaged, clean up and repairs may require closing the business, affecting the City's economic activity. For residents that rely on public transportation, walking, or biking, exposure to severe winds could impede travel or delay arrival. Other vulnerable populations include those that work outside (i.e., construction workers, landscaping, etc.).

OTHER THREATS

DROUGHT

A typical drought is not anticipated to lead to any outages in service in Rancho Cucamonga. However, an exceptional drought may lead to restricted water use for residents or businesses in the City. Trees that are not adequately adapted to lower irrigation levels could perish, which would alter the City's aesthetic appearance as well as long-term air quality. Any open spaces with extensive lawns may start to die, turning brown, which could discourage residents from using these parks and open spaces. In addition, long-term drought conditions can change reduce the ability of soils to absorb water. When this occurs, water runoff from these areas may increase, which could cause downstream flooding and erosion in some areas.

EXTREME HEAT

Extreme Heat for any length of time can affect other hazards and risks within the city as well. For example, it can create a spike in electricity demand leading to power loss/failure, food insecurities, and a rise in vector-borne disease transmission. Coupled with extreme wind, it can cause or spread wildfires and jeopardizing additional neighborhoods/communities.

SEVERE WIND

Southern California and the City of Rancho Cucamonga all suffer from seasonal Santa Ana Winds and will for the foreseeable future. Extreme wind events such as these can make other risks such as wildfire exponentially worse. It could affect the take-off and

landing of small aircraft at nearby airports, leading to an increased risk of possible aircraft incidents.

Human-Caused Hazards

PHYSICAL THREAT

CYBER THREATS

Cyber threats would have a limited impact on physical assets. The extent of this impact would focus on City-owned computer and network infrastructure.

TERRORISM (MASS-CASUALTY INCIDENT)

There is no way to predict which of Rancho Cucamonga's facilities or assets may be impacted by a mass casualty incident/act of terrorism since the perpetrator's reasoning is often complex or not easily understood. Generally, these types of incidents occur at places of political, economic, or cultural importance. If the perpetrator's motives are to shut down City or regional governmental activity for some time, they may instead target infrastructure, like water systems, utility delivery systems, or transportation networks. In this situation, bridges may become prime locations for these types of activities. The financial losses that may result would depend on the degree of destruction associated with the activity. If the incident involves the destruction of physical assets, the City or property owners' cost would likely be immense.

SOCIAL THREAT

CYBER THREATS

Cyber threats may have an impact on residents and businesses throughout the City. While most cyber threats focus on large entities like major corporations and/or governmental agencies, all residents could become victims of cyber threats.

TERRORISM (MASS-CASUALTY INCIDENT)

Since mass casualty incidents/acts of terrorism could occur anywhere in Rancho Cucamonga, all groups are potentially threatened by these incidents; however, the extent of the threat would depend upon the event's type and magnitude. For example, an active shooter situation may be isolated to a single location, whereas a larger-scale incident may affect multiple locations. Some locations are more likely to be targeted than others, including but not limited to medical facilities, government buildings, schools, or financial institutions. Populations that frequently visit these areas may face a greater threat than the average person. For instance, seniors, pregnant women, and persons with disabilities are more likely to visit medical facilities than other subpopulations in the City. Should an incident occur at one of these facilities or within the community (overwhelming hospital resources), these groups are expected to face an increased impact from the incident.

An incident that occurs at a government building or financial institution may be more likely to threaten seniors or lower-income individuals that rely on in-person transactions in

place of online options.^{70,71} As such, their use of these services in-person may place them in harm's way. An incident at Rancho Cucamonga's City Hall or any bank in the City can be expected to be more of a threat to these groups. Seniors and persons with limited income may be challenged if there is a need to shelter in place or evacuate during an incident requiring additional services, assistance, and/or medical treatment.

OTHER THREATS

CYBER THREATS

The greatest impact that a cyber threat could present to the City itself would be a complete shutdown of city services and programs. Electricity, gas lines, and water could be shut off for extended periods if a cyber threat compromised the control systems. Additionally, a loss of control over streetlights, traffic lights, and railroad crossings could occur. To the average citizen, personal information, identity, and financial records could be stolen. As society becomes more and more technologically ingrained/dependent, the ever-evolving category of cyber threats will continue to change and grow in a possible impact.

Aircraft Incidents

PHYSICAL THREAT

All structures located within the planning areas surrounding the Ontario International Airport and Cable Airport are at an elevated risk to aircraft incidents, predominantly associated with landing, take off, and approach activities. Both airports are located in neighboring cities, which means the direct threat of those actions associated with take-off, landing, and approach, is at a lower risk to Rancho Cucamonga itself. Beyond this planning area, the risk associated with aircraft incidents is limited to flyover activities above the City. Incidents overhead can send the debris and materials from the aircraft crashing down on any structures or physical assets lying below. Even if the aircraft does not crash within the City, it is possible that falling debris could land on and damage structures in the City. An aircraft incident may be an act of terrorism, in which case the target of the terrorists would likely be a target of importance (religious, governmental, cultural) or a place where many people are gathered.

SOCIAL THREAT

An aircraft incident may threaten all persons in Rancho Cucamonga. Typically, populations located closer to Ontario International or Cable Airport would have a higher probability of being impacted versus populations located in portions of the City farther away.

⁷⁰ Smith, A. April 2014. *Older Adults and Technology Use*. <https://www.pewinternet.org/2014/04/03/older-adults-and-technology-use/>

⁷¹ Anderson, M., Kumar, M. May 2019. *Digital divide persists even as lower-income Americans make gains in tech adoption*. <https://www.pewresearch.org/fact-tank/2019/05/07/digital-divide-persists-even-as-lower-income-americans-make-gains-in-tech-adoption/>

Residents and employees in areas impacted by an aircraft accident may experience property damage or loss and/or emotional distress resulting from losing family or friends in the crash or having witnessed the event or its aftermath. If future events occur in Rancho Cucamonga, it is assumed that lower-income persons may not be able to recover as quickly (i.e., afford to repair the damage to their homes, purchasing new automobiles to replace any destroyed, etc.).

OTHER THREATS

Depending on the severity of the aircraft incident, some services in the City could be temporarily disrupted. For example, falling debris from an aircraft accident could damage or destroy a section of the City's power transmission lines, cutting off power to residents and businesses. Debris could also fall onto a roadway and obstruct the normal flow of traffic through the City. A more severe aircraft accident in which an entire aircraft crashes into a section of the City would likely ignite a fire that could impact the area where the plane went down. Any transmission wires or pipelines in the crash site would likely be affected to some degree, resulting in partial or complete outages of utility services to the sections of the City. A severe aircraft incident at a major employment center in the City would almost certainly result in the closure of the employers located in the crash area until authorities deem it safe for employees to return to work, which would result in a loss of economic activity in the City.

Hazardous Materials Release

PHYSICAL THREAT

Hazardous materials can cause damage to physical assets in Rancho Cucamonga if they are released into the environment. Corrosive hazardous materials can damage the exteriors of any buildings or structures designated as a CF or FOC. Flammable hazardous materials can potentially be ignited and may cause any CFs or FOC nearby to sustain damage. Generally, sites that are closer to the origin for the release of the hazardous materials are more at risk than those that are further away.

**Table 4-19: Critical Facilities and Facilities of Concern
(HazMat Buffer—500 feet)**

Category	Number of Facilities
Bridge	49
City Facility	8
Fire Facility	4
Parks	9
Police Facility	1
Other Facilities	0
School Facilities	15
Total Facilities	86
Total Replacement Costs**	\$304,425,858
N/A - Replacement Values Unavailable	
** Based on the City of Rancho Cucamonga insured replacement values	

Table 4-19 identifies the number of physical assets in Rancho Cucamonga threatened by a hazardous materials release within 500 feet of a site storing or using hazardous materials. A total of 86 assets are located near hazardous materials sites within the City. Based on replacement costs, the total potential losses associated with these assets are over \$304 million.

SOCIAL THREAT

The threat of a hazardous materials release event affects those closest to a source of hazardous materials, including industrial sites, gas stations, gas transmission lines, or sewer mains. Populations that live close to hazardous materials locations are at greater risk of exposure to chemicals and substances that could negatively affect health. Areas of the City south of Foothill Boulevard have a high concentration of registered locations that contain hazardous materials. Residential uses located within this part of the City are at greater risk for exposure under normal conditions as well as during a hazard event.

Rancho Cucamonga residents living next to major transportation infrastructure—highways or major arterial streets—face a greater threat of being affected by a release of hazardous materials because trucks or vehicles shipping hazardous materials may release their contents into the environment in a collision. Residents living near the major transportation corridors running through the City (I-15, SR-210) are at greater risk of transportation-related hazardous materials release than residents living in other parts of the City.

Groups such as the elderly, low-income persons, or renters, face a greater risk of exposure since they may not have the financial resources necessary to adapt to odors and noises coming from facilities that may emit hazardous materials or move to a location that is further from the potential sources of hazardous materials release events.

OTHER THREATS

Hazardous materials release could threaten the City's and potentially the region's transportation networks. Large areas of the local road or rail systems may be closed to keep people away from areas contaminated with hazardous materials to allow remediation and cleanup activities to occur. If a highly corrosive hazardous material is released, it could potentially cause significant damage to the exteriors of any homes or businesses in the area surrounding the release. Hazardous materials could also harm the City's landscaping/urban forest, resulting in the deaths of city-planted and maintained trees and foliage.

Chapter 5 – Hazard Mitigation Strategy

Strategy Development Process

Rancho Cucamonga's hazard mitigation strategy is a comprehensive set of actions intended to reduce the impacts of hazard events. These hazard mitigation actions will help protect the safety and well-being of residents, visitors, CFs and FOC, other buildings and structures, key services, the local economy, and other important community assets. Some actions will also help with emergency preparedness, allowing for a more effective community response to hazard events. Preparedness actions are not a required component of an LHMP, but they support and complement mitigation activities. The HMPC chose to include them as part of the overall hazard mitigation strategy.

Use of Hazard and Threat Assessment

The HMPC relied in part on the hazard profiles and threat assessments in this Plan to develop the mitigation strategy's actions. A comprehensive set of mitigation actions that respond to the relevant hazard situations and provide protection to residents, businesses, and community assets in Rancho Cucamonga was prepared. The HMPC took care to ensure that the mitigation actions will help reduce damage from the most frequent types of hazard events, the most significant that may reasonably occur, and those with the greatest potential to harm the community. The Committee also drafted mitigation actions to help protect the most vulnerable community members and the most vulnerable local assets.

Capabilities Assessment

As part of the effort to draft mitigation actions, the City completed a capabilities assessment, which included reviewing existing policies, personnel, and technical resources to support hazard mitigation activities in Rancho Cucamonga. The hazard mitigation actions build off these resources' existing success and leverage their capabilities to support improved resiliency in the community. The capabilities assessment looked at the following types of resources:

- Personnel resources: City employees and volunteers, and employees and volunteers at other agencies
- Plan resources: Advisory or enforceable plans adopted by the City or other agencies.
- Policy resources: Policies adopted and implemented by the City or other agencies
- Technical resources: Data and tools available to the City
- Financial resources: Funding mechanisms available to the City that support mitigation activities

As part of this assessment, the City has identified "Community Outreach & Engagement" capabilities as part of the resources identified above. Much of the outreach and

engagement conducted by the City occurs in a variety of formats and by a variety of departments, which have been highlighted within this assessment.

Table 5-1 shows the capabilities assessment for Rancho Cucamonga.

Table 5-1: Rancho Cucamonga Capabilities Assessment			
Resource Name	Type of Resource	Resource Description & Connection to Mitigation	Source
CITY OF RANCHO CUCAMONGA			
City Council	Policy and Personnel Resource	The Rancho Cucamonga City Council establishes local laws, sets policy, approves programs, adopts the annual budget, and appropriates funds. The City Council also serves as the Board of Directors for the Rancho Cucamonga Fire Protection District (a subsidiary district of the City). Mitigation activities implemented by City Council involve policy-making and adoption of ordinances and regulations to protect citizens and businesses, holding meetings to institute actions on the city's behalf, voting to pass measures and funding within the city.	2019/20 Budget
City Clerk	Personnel Resource	The City Clerk is an elected official charged with maintaining records of City Council actions, recording minutes for all City Council meetings, and verifying all Resolutions and Ordinances. Also, the City Clerk is responsible for all documents and duties associated with municipal elections. Mitigation activities by the Department include record keeping and document coordination. The appropriate department processes code updates. The City Clerk is responsible for the process of documenting and maintaining records of the adopted code changes.	2019/20 Budget
City Manager's Office	Personnel Resource Community Outreach and Engagement	The City Manager's Office oversees various interdepartmental activities and programs and provides direct support for the City Council. The City Manager's Office provides management of the City's Community Affairs Program, including publication of the Rancho Reporter newsletter, media relations, community outreach and engagement, social media	2019/20 Budget

		platforms, special projects, and other public information efforts. The City Manager's Office also manages the Legislative Advocacy Program to ensure that Rancho Cucamonga's interests are heard at the state and federal level. Mitigation activities implemented by this office may include direction setting with the City Council and City Departments and prioritization of new initiatives that support mitigation activities within the City	
City Manager's Office: Healthy RC	Personnel Resource Community Outreach and Engagement	Healthy RC has been a successful City-community partnership since 2008. The Healthy RC partnership is comprised of dedicated residents, community organizations, and public and private entities working together to create a Healthier Rancho Cucamonga. The Healthy RC initiative encourages a healthy and environmentally responsible lifestyle for those who live, work, and play in Rancho Cucamonga and focuses on the following community priorities: healthy eating and active living, community connections and safety, education and family support, mental health, economic development, healthy aging, clean environment, and disaster resiliency. Healthy RC can assist with mitigation by providing a forum to discuss mitigation concerns and actions and provide an avenue to seek out volunteers during a major disaster.	Healthy RC
Community Improvement Division	Personnel Resource	The Community Improvement Division provides enforcement services in response to nuisance conditions and other violations of the Municipal Code, providing a safer and more beautiful community. This division is also responsible for establishing forward-thinking goals and policies that affect community health through compassionate efforts that motivate residents to remedy concerns by providing resources or taking enforcement action. Mitigation activities for this department focus on the identification and abatement of nuisance conditions like code violations and brush clearance.	2019/20 Budget
Finance Department	Personnel Resource/	The Finance Department is responsible for managing the financial operations of the City and the Fire District per generally	2019/20 Budget

	Financial Resource	accepted accounting principles, as well as applicable laws, regulations, and City policies. The Department consists of five divisions to accomplish its mission: Accounting and Financial Reporting, Budget Management, Business Licensing, Revenue Management, and Special Districts. Financial management (and personnel) within the City can assist with mitigation activities by tracking costs associated with hazard events and disasters, identifying grant funding opportunities, and establishing financial risk calculations that can help departments with budgeting of operations, maintenance, and capital improvements.	
Human Resources	Personnel Resource	The Human Resources Department oversees the City's Human Resources and Risk Management functions. The Human Resources Department's mission is to recruit, develop, and retain a diverse, engaged, well-qualified, and professional workforce that reflects the world-class standards of the community. The department also leads other City departments in positive employee relations, talent acquisition, succession planning, and employee engagement. This department can support mitigation activities by identifying staffing needs and shortfalls and developing plans and agreements with other jurisdictions/agencies to ensure future needs are met.	2019/20 Budget
Department of Innovation and Technology "DoIT"	Personnel Resource	The Department of Innovation and Technology (DoIT) facilitates the impactful use of technology across all City Departments, allowing for increased efficiency, improved transparency, and overall enhanced service to the community. The Department comprises four divisions, including Systems and Network, Enterprise Applications, Geographic Information Services, and Operations. DoIT as a department can help utilize new technologies to improve City planning, research, data collection, mapping, and cybersecurity to assist in mitigation strategies and their creation.	2019/20 Budget

Records Management	Personnel Resource	As a partner in democracy, the Records Management Department promotes community involvement and awareness. It supports the City Council, staff, and Rancho Cucamonga citizens by coordinating the legislative process and administering City elections. As a service department, staff assists the public, elected officials, and the City organization with several important activities, including accurately preparing and processing agendas and administering the Citywide records management program, including records storage and destruction. This department can assist in mitigation by keeping records, data, maps, and information to create documents such as the LHMP, which in turn aid in funding for the City.	2019/20 Budget
Community Services	Personnel Resource Community Outreach and Engagement	The Community Services Department's role is to serve the community by creating opportunities to play, celebrate, connect, explore, and be entertained through quality programs, safe parks, and well-maintained facilities. The Department coordinates programs and services through seven divisions: Administration, Youth and Adult Sports, Youth and Family Programs, Special Events, Cultural Arts/Playhouse Operations, Senior Services, and Human Services. The Department also oversees park development, including the planning, design, and renovation of parks and facilities and advocating for open space. The Community Services department assists with mitigation activities by overseeing sheltering operations when mass evacuations occur and providing refuge for residents during extreme weather events.	2019/20 Budget
Library Services	Personnel Resource Community Outreach and Engagement	The Department supports and encourages education and the love of reading in a welcoming atmosphere with a knowledgeable, service-oriented staff. Library Services can help in mitigation by providing educational materials, teaching community members, and providing a refuge for residents during extreme weather events.	2019/20 Budget
Building and Safety Services	Personnel Resource	Building and Safety Services enforces a series of nationally recognized standards	2019/20 Budget

		<p>and construction codes and mandates from the State regulatory agencies regarding building construction, site development, and the permit process. Building and Safety Services enforces compliance with codes related to energy, accessibility laws, places of assembly, and housing requirements. The Department assists the Community Improvement Division in the evaluation and enforcement of substandard construction or property use and supports the community's construction projects through plan- check, permit, and inspection services to meet building and construction codes' requirements, State-mandated regulations, and municipal codes. Building and Safety Services works with other City departments to develop regulations and conditions for construction projects through the entitlement process. The department also coordinates and assists other City departments in managing building and structural capital improvement projects and enforcing accessibility regulations for City facilities. The staff works closely with the Police Department in illegal business activity bringing uses and structures within safe standards. Mitigation activities for this department come in the form of inspecting new and established buildings and construction, implementing the necessary retrofits to comply with established policies, and providing emergency response and damage assessment during and after disaster events.</p>	
<p>Engineering Services</p>	<p>Personnel Resource</p>	<p>In partnership with departments citywide, the Engineering Services Department strives to build a city where the infrastructure supports a community that is a great place to live, work, and play through strategic design, well-planned maintenance, and fiscal and environmental sustainability. There are four sections in the Engineering Services Department: The Capital Project Management Section plans, designs, and manages the construction of City-funded public improvement projects.</p>	<p>2019/20 Budget</p>

		<p>The Environmental Programs Section is working collaboratively for an environmentally safe, healthy, and sustainable community today and for future generations. The Land Development and Transportation Section provides services to residents, developers, businesses, and schools related to the development and redevelopment of land and operation and planning for traffic and transportation needs. This section also provides administration and clerical support for the department. Mitigation actions include the planning, designing, and managing of mitigation projects for the City. This department aids the City in the identification of potential violations and creating the projects to address them.</p>	
Planning	Personnel Resource	<p>The Planning Department's primary responsibilities include developing and implementing comprehensive plans that reflect the City's goals and policies. This ensures the long-term success of the community through effectively managing the City's growth, conducting a detailed analysis of all development proposals to verify consistency with the City's Goals and Policies, and working with other City departments to build and maintain a high quality, balanced, and sustainable community for Rancho Cucamonga residents, businesses, and visitors. Mitigation support can include identifying large systemic issues within the community and incorporating mitigation strategies or policies into new projects.</p>	2019/20 Budget
Public Works Services	Personnel Resource	<p>The Public Works Services Department's mission is to provide efficient stewardship of the City's public works infrastructure. The Department has four sections: Facilities, Parks and Landscape, Street/ Fleet/ Storm Drain, and Administration/ Project Management. These departments manage city facilities, fire district facilities, parks, stadiums, street-front landscapes, trees, trails, roadways, catch basins, city vehicles, city equipment, and signal-controlled intersections, along with managing departmental services, contracts, safety and risk management,</p>	2019/20 Budget

		budget, and capital maintenance projects. Mitigation action includes the maintenance and retrofitting of key infrastructure within the City. Also, during major emergencies, the Public Works Department manages debris removal while also identifying the potential for future damages to City assets such as trees, sidewalks, and trails.	
Fire Protection District	Personnel Resource Community Outreach and Engagement	The Fire Protection District is a subsidiary district of the City and has its statutory funding, with the City Council serving as the Fire District Board of Directors. The Fire District's mission is to serve the community by planning, promoting, and demonstrating a readiness to respond to and reduce threats to life and property by efficiently and effectively delivering emergency and non-emergency services and programs. Mitigation actions for the District include: Reducing risk and eliminating hazards through fire prevention, inspection, wildland fire threat reduction, and public education/community outreach.; The District aims to deliver an efficient and effective emergency response through structural and wildland fire suppression, emergency medical services, hazardous materials response, technical rescue, and tactical response. The District strives to reduce the City's vulnerability to hazards and to increase community disaster resiliency through timely economic recovery utilizing comprehensive mitigation, preparedness, and response programs.	2019/20 Budget
ReadyRC	Technical Resource Community Outreach and Engagement	The Fire Protection District created the ReadyRC program to assist residents and businesses in Rancho Cucamonga to prepare before, during, and after a disaster strikes. This program also includes training and presentations to community-based organizations, schools, and interested stakeholders, as well as videos to better understand how to prepare for emergency situations. Lastly, ReadyRC encompasses our disaster response volunteer programs such as CERT (Community Emergency Response Team), ACS (Auxiliary Communication Services), and LART (Large Animal Rescue Team).	ReadyRC

<p>Police</p>	<p>Personnel Resource Community Outreach and Engagement</p>	<p>Since the City's incorporation in 1977, law enforcement services in the City have been provided through a contract with the San Bernardino County Sheriff's. Throughout this partnership, the City continues to be one of the safest cities in California. The Department's services include Patrol, Traffic Safety, Investigations, Crime Prevention, Victoria Gardens Substation, and the Specialized Unit Program (SOP). The SOP provides active shooter training to the community and local public safety agencies. Mitigation actions could include the safe movement of traffic (e.g., during evacuations) and residents' public safety during emergency events. Terrorism-related mitigation activities may be implemented through police department staff.</p>	<p>2019/20 Budget</p>
<p>Animal Care and Services</p>	<p>Personnel Resource</p>	<p>The City of Rancho Cucamonga has an innovative Animal Services Department, whose mission is Creating PAWsitive impact by enriching the lives of animals and people. The Animal Services Department cares for more than 5,000 homeless pets annually and responds to more than 6,000 calls for service related to stray animals, rescues, and animal welfare. Mitigation actions include helping to relocate, transport, locate, and treat large and small animals/livestock in the event of a hazard such as a wildfire or seismic event. The department can also keep the public safe from frightened animals and prevent property damage or loss during hazard events.</p>	<p>2019/20 Budget</p>
<p>Adopted FY Budget</p>	<p>Financial resource</p>	<p>The City adopts its budget every year, which identifies the funding available for each fiscal year that can be used to support governmental operations. This budget is a key location where future mitigation projects can be identified from a funding perspective.</p>	<p>2019/20 Budget</p>
<p>Capital Improvement Program</p>	<p>Plan Resource</p>	<p>The Rancho Cucamonga Capital Improvement Program (CIP) provides needed infrastructure improvements citywide. The Plan is vital for planning and managing the City's growth and development and maintaining existing infrastructure. During Plan development, capital projects affecting public health</p>	<p>2019/20 Budget</p>

		and safety and/or legal mandates receive the highest priority; emphasis is also placed on projects maintaining service levels or preventing facilities' deterioration. Integration of this Plan into the CIP can assist in mitigation efforts by identifying new funding sources for future improvements. As new grant opportunities become available, the CIP may have projects consistent with the LHMP that can easily be used for grant submittals. Leveraging these two plans can help secure needed funds to reduce vulnerabilities throughout the City.	
General Plan	Plan Resource	The General Plan is the long-term, comprehensive blueprint for development and change in the community. The general plan's policies address land uses, public safety, environmental protection, transportation, and other matters of communitywide interest. The general plan serves as a framework for mitigation actions, establishing the overarching policies for mitigation activities. Mitigation actions may be directly incorporated into the general plan as policies and/or implementation actions to provide a stronger enforcement mechanism.	Rancho Cucamonga General Plan
California State Hazard Mitigation Plan	Plan Resource	The California State Hazard Mitigation Plan assesses the types of hazards that may be present in California. It includes descriptions of these hazards, summaries of past hazard events, descriptions of how these hazards may occur in the future, and how these hazards may harm California's people and assets. Like a local hazard mitigation plan, the State Hazard Mitigation Plan is updated every five years. The Committee can use the State Hazard Mitigation Plan as a source of information to refine the hazard profiles and vulnerability assessments in future Rancho Cucamonga LHMPs.	CA State Hazard Mitigation Plan
Building Code	Plan Resource	The Rancho Cucamonga Building Code and associated standards (Residential Code, Mechanical Code, Electrical Code, etc.) govern how new buildings are constructed. They are published by the state and are adopted by local communities, sometimes with amendments to make the codes more	Building Code

		locally applicable. Mitigation actions to construct buildings to a safer standard, allowing them to resist damage during a hazard event better could be part of future building code updates.	
Zoning Ordinance	Plan Resource	The Rancho Cucamonga Zoning Ordinance is an implementation tool for the City's general plan. It establishes regulations for land uses throughout the community, including where other development and land use activity can occur, how these developments can look, and how they may be operated. Mitigation actions related to the siting, construction, and operation of new developments in Rancho Cucamonga may be implemented through the Zoning Code to ensure these locations address risks identified in the plan.	Zoning Code
Cal-Adapt	Technical Resource	Cal-Adapt is an online tool that provides detailed projections for future climate-related conditions in California, including factors such as temperature, precipitation, and sea-level rise. These projections can help inform future hazard events and explain how hazard conditions are expected to change. The City can use Cal-Adapt to monitor anticipated changes in future climate conditions and adjust mitigation actions accordingly.	Cal-Adapt
California Department of Transportation	Technical Resource	The California Department of Transportation (Caltrans) is the state agency with jurisdiction over designated highways, including State Route 210 and Interstate Routes 10 and 15. Mitigation measures related to ensuring the resiliency of state-designated routes will be implemented through coordination with Caltrans.	Caltrans
California Governor's Office of Emergency Services	Technical Resource	The California Governor's Office of Emergency Services (Cal OES) is the state agency responsible for reducing hazards in the state through mitigation activities, conducting emergency planning, supporting emergency response and recovery activities, and acting as a liaison between local and federal agencies on emergency-related issues. Cal OES guides hazard mitigation planning activities, shares best practices, and distributes funding opportunities. The Committee can	Cal OES

		work with Cal OES to obtain funding to implement LHMP mitigation strategies and to receive guidance on future updates.	
Federal Emergency Management Agency	Technical Resource	The Federal Emergency Management Agency (FEMA) is the federal agency responsible for hazard mitigation, emergency preparedness, and emergency response and recovery activities. It guides state and local governments on hazard mitigation activities, including best practices and compliance with federal requirements. FEMA also provides funding for hazard mitigation actions through grant programs.	FEMA
Cucamonga Valley Water District	Technical Resource	The Cucamonga Valley Water District (CVWD) is a dynamic, growing organization whose sole purpose is to provide high quality, safe and reliable water and wastewater services while practicing good stewardship of natural and financial resources. CVWD serves a population of over 190,000 customers within a 47-square-mile area, which includes approximately 48,000 water connections and 37,000 sewer connections with an average daily demand of approximately 47 million gallons of water. As the City's primary water provider, CVWD can effectively manage and monitor water use and ensure adequate water supplies during severe drought times.	CVWD
The Rancho Cucamonga Municipal Utility (RCMU)	Technical Resource	The Rancho Cucamonga Municipal Utility (RCMU) provides economical and reliable electricity to over 1,200 metered businesses and residents in a selected area within the southeastern area of the City. RCMU is dedicated to the City's electrical distribution system, citywide streetlights, and the fiber optic infrastructure network.	RCMU
Southern California Edison	Technical Resource	Southern California Edison (SCE) is the primary electrical service provider for Rancho Cucamonga. SCE also owns the electrical distribution grid in the community. Mitigation actions relating to Rancho Cucamonga's electrical grid's resiliency will be implemented through coordination with SCE.	Southern CA Edison
Southern California Gas Company	Technical Resource	The Southern California Gas Company (SoCalGas) is the natural gas provider for Rancho Cucamonga and owns the	SoCalGas

		community's natural gas infrastructure. Mitigation actions that address the resiliency of natural gas infrastructure and services in Rancho Cucamonga will be implemented through coordination with SoCalGas.	
Burrtec Waste Industries	Technical Resource	Since 2007 Burrtec Waste Industries has been the single franchised waste hauler for the City of Rancho Cucamonga and has been responsible for providing recycling, refuse, and green waste services for residential, commercial, and industrial customers. Burrtec maintains sanitation and waste removal to keep the city functioning during hazard events.	Trash Services

Hazard Mitigation Strategies and Actions

Hazard Mitigation Goals

The goals identified in Chapter 1 help develop policies to protect community members, ecosystems, and other important assets from hazard events. These goals were developed to ensure consistency with the City's General Plan Safety Element, which plays an important role in risk reduction within Rancho Cucamonga. These goals informed the development of mitigation actions and act as checkpoints to help City staff determine implementation progress.

Evaluation of Potential Hazard Mitigation Actions

The Committee prepared a set of potential mitigation actions based on the hazard profiles, threat assessment, capabilities assessment, community survey results, discussions among Committee members, and existing best practices. Next, the Committee evaluated these potential actions using the following criteria:

FEMA requires local governments to evaluate the monetary and non-monetary costs and benefits of potential mitigation actions. While local governments are not required to assign specific dollar values to each action, they should identify the general size of costs and benefits. The Committee may elect to include measures with a high cost or low benefits, but such measures should be beneficial to the community and appropriate use of local resources.

Also, FEMA directs local governments to consider the following questions as part of the financial analysis:

- What is the frequency and severity of the hazard type to be addressed by the action, and how vulnerable is the community to this hazard?
- What impacts of the hazard will the action reduce or avoid?
- What benefits will the action provide to the community?

The Committee also chose to review and revise the potential hazard mitigation actions using the STAPLE/E (Social, Technical, Administrative, Political, Legal, Economic, and Environmental) criteria (**Table 5-2**). The Committee did not formally assess every potential mitigation action under all STAPLE/E criteria but used the criteria to guide and inform the discussion. The Committee also discussed how the criteria might evaluate grant applications the City may submit to receive funding for LHMP implementation.

Previous Mitigation Action Progress

The City reviewed the 2013 LHMP mitigation actions and incorporated these actions into the actions included in this plan. **Table 5-3** indicates the status of these actions and how the previous action was either integrated into this plan or completed during the previous implementation period.

Prioritization

As part of the mitigation actions development and review, the HMPC also prioritized the actions. The prioritization efforts looked at the risks and threats from each hazard,

financial costs and benefits, technical feasibility, and community values. Committee members were asked to identify their priority actions through a voting exercise. Items are prioritized based on the number of votes received by the HMPC members. These quantitative scores were then converted to qualitative categories of low, medium, and high priority.

COST ESTIMATES

To meet the hazard mitigation planning process's cost estimation requirements, the Committee identified relative cost estimates based on their understanding of the mitigation action intent and their experience developing identical or similar programs/implementing projects. Three cost categories based on the City's typical cost criteria were used for budgeting purposes:

Low cost (\$): \$100,000 or less

Medium cost (\$\$): \$100,001 to \$999,999

High cost (\$\$\$): Greater than \$1,000,000

Based on the criteria and evaluation processes used during Plan development, the Committee prepared a prioritized list of mitigation actions to improve Rancho Cucamonga's resilience to hazard events. **Table 5-4** lists the mitigation actions and the prioritization of each action, and other details related to implementation. In addition to mitigation action and strategies, several "Preparedness Activities" were identified and denoted with a letter "P."

National Flood Insurance Program

Rancho Cucamonga participates in the National Flood Insurance Program (NFIP), created by Congress in 1968 to provide flood insurance at subsidized rates to homeowners who live in flood-prone areas. Rancho Cucamonga has participated in NFIP since September of 1984.⁷²

Although participation is not a dedicated hazard mitigation action, Rancho Cucamonga will continue to participate in the NFIP and comply with the program's requirements through continued enforcement of the City's Floodplain Management Regulations.⁷³ This regulation applies to all areas identified as flood-prone within the City. This chapter of the Municipal Code identifies the purpose of the regulation, methods of reducing flood losses, basis for establishing flood hazard areas, development permit requirements, duties and responsibilities of the City's Floodplain Administrator (City Engineer), development standards that apply in flood-prone areas, and required documentation and analysis for construction within these areas. As part of the City's efforts to comply with NFIP, Rancho Cucamonga will make updates and revisions to the Floodplain Management regulations to minimize the threat of harm from flood events.

⁷² Community Status Book Report – California: Communities Participating in the National Flood Program. <https://www.fema.gov/cis/CA.pdf>

⁷³ Rancho Cucamonga Municipal Code. Title 19 Environmental Protection, 19.2 Floodplain Management Regulations. <http://acode.us/codes/ranchocucamonga/>

These updates and revisions may be promoted by changes in local demographics, shifts in land use, changes to flood regimes such as frequency and intensity of flood events, and other factors that may warrant municipal action. The City will also continue to incorporate any changes to mapped flood plains' locations and designations into future planning documents, including future updates to this Plan.

The City of Rancho Cucamonga contains Special Flood Hazard Areas that include 157 policies in force. Total insurance coverage for these policies amounts to \$43,301,900; however, three repetitive loss properties were identified by FEMA, with over \$108,000 in damages paid out. The City's most current FIRM (Flood Insurance Rate Map) was adopted on September 2, 2016.

Table 5-2: STAPLE/E Criteria

Issue	Criteria
Social	Is the action socially acceptable to Rancho Cucamonga community members? Would the action mistreat some individuals? Is there a reasonable chance of the action causing a social disruption?
Technical	Is the action likely to reduce the risk of the hazard occurring, or will it reduce the hazard's effects? Will the action create new hazards or make existing hazards worse? Is the action the most useful approach for Rancho Cucamonga to take, given the City and community members' goals?
Administrative	Does the City have the administrative capabilities to implement the action? Are there existing City staff who can lead and coordinate the measure's implementation, or can the City reasonably hire new staff for this role? Does the City have enough staff, funding, technical support, and other resources to implement the action? Are there administrative barriers to implementing the action?
Political	Is the action politically acceptable to City officials and other relevant jurisdictions and political entities? Do community members support the action?
Legal	Does the City have the legal authority to implement and enforce the action? Are there potential legal barriers or consequences that could hinder or prevent the implementation of the action? Is there a reasonable chance that the implementation of the action would expose the City to legal liabilities? Could the action reasonably face other legal challenges?
Economic	What are the monetary costs of the action, and do the costs exceed the monetary benefits? What are the start-up and maintenance costs of the action, including administrative costs? Has the funding for action implementation been secured, or is a potential funding source available? How will funding the action affect the City's financial capabilities? Could the implementation of the action reasonably burden the Rancho Cucamonga economy or tax base? Could there reasonably be other budgetary and revenue impacts to the City?
Environmental	What are the potential environmental impacts of the action? Will the action require environmental regulatory approvals? Will the action comply with all applicable federal, state, regional, and local environmental regulations? Will the action reasonably affect any endangered, threatened, or otherwise sensitive species of concern?

Table 5-3: Previous Mitigation Actions

Hazard	Goal / Strategy	Action	Status
Wildfire	Public Education	Present Ready/Set/Go and CERT wildland-urban interface classes to the public	Incorporated into Action P4.
Wildfire	Perform regular inspections	Implement codes specific to fire-retardant materials, construction	Action 3.08 replaces this action.
Wildfire	Perform regular inspections	Fire inspectors implement codes specific to defensible space and fire safety zones	Action 3.08 addresses adherence to these requirements.
Wildfire	Mitigate fire threat	Complete parking area for Cucamonga Canyon Visitors	This action was completed in 2014.
Flooding	Improve drainage	Execute new construction at Hellman Lower Drain	Completed in 2013.
Flooding	Improve drainage	Execute new construction at Cucamonga Drain	Completed January 2021.
Flooding	Improve drainage	Execute new construction at Etiwanda Storm Drain #10 and #11	SD #10 not feasible to construct due to SCE corridor construction regulations. SD #11 completed from Arrow to 6 th St.
Earthquakes	Public Education	CERT and Advanced CERT Training	Incorporated into Action P3 and P4.
Earthquakes	Perform regular inspections	Implement codes specific to earthquake-resistant construction	Incorporated into Action 1.03
High Winds	Reduce susceptibility to downed power lines.	Relocate electrical utilities to underground. (This has already proven to be a feasible approach at the new Central Park facility.)	Incorporated into Action 1.07

Table 5-4: Mitigation Actions Implementation Plan

Mitigation Action		Potential Funding Sources ¹	Responsible ² Departments	Relative Cost ³	Time Frame	Priority
Preparedness Activities						
P1	Conduct regular emergency preparedness drills and training exercises for City staff.	General Fund, Other Grants	RCFD	\$	Ongoing	N/A
P2	Continue to support the expansion of Red Cross Agreements with public agencies (City, School Districts) and private entities (Faith-Based Organizations, etc.) to ensure that facilities can act as evacuation sites during major emergencies.	General Fund, Other Grants	CSD, RCFD	\$	Ongoing	N/A
P3	Continue working with local businesses and organizations to conduct regular workplace emergency preparedness training.	General Fund, Other Grants	RCFD	\$	Ongoing	N/A
P4	Expand participation in the Rancho Cucamonga ReadyRC program for residents and businesses.	General Fund, Other Grants	RCFD	\$	Ongoing	N/A
P5	Develop means to evacuate community members who do not have access to private vehicles or are otherwise unable to drive.	General Fund, Other Grants	RCFD	\$	Ongoing	N/A
P6	Collaborate with the equestrian community in the City to ensure effective staging, evacuation, and sheltering plans for large animals.	General Fund, Other Grants	RCFD	\$	Ongoing	N/A
P7	Continue to ensure effective emergency notifications through multiple media formats—in at least English and Spanish—about pending, imminent, or ongoing emergency events. Ensure that information is accessible to persons with disabilities and functional needs.	General Fund, Other Grants	RCFD	\$	Ongoing	N/A
P8	Update the Rancho Cucamonga Emergency Operations Plan to identify backup power and communications locations for critical facilities.	General Fund, Other Grants	RCFD	\$	Ongoing	N/A
P9	Continuously update response procedures for first responder departments to properly address new hazard events as they emerge.	General Fund, Other Grants	RCFD	\$	Ongoing	N/A

Mitigation Action		Potential Funding Sources ¹	Responsible ² Departments	Relative Cost ³	Time Frame	Priority
P10	Ensure that the City has an adequate supply of sandbags for residents and businesses, including prefilled sandbags for individuals who may not be able to fill them independently.	General Fund, Other Grants	RCFD	\$	Ongoing	N/A
P11	Continue conducting active shooter drills for City staff by Police Department and Fire District tactical teams.	General Fund, Other Grants	PD	\$	Ongoing	N/A
P12	Continue supporting community active shooter preparedness through quarterly Active Shooter educational workshops.	General Fund, Other Grants	PD	\$	Ongoing	N/A
P13	Increase the number of City staff who have CalOES Safety Assessment Program (SAP) credentials.	General Fund, Other Grants	B&S	\$	Ongoing	N/A
Multiple Hazards						
1.01	Explore the feasibility of connecting critical facilities (i.e., Civic Center, key community centers, fire stations) to a microgrid power supply network. (Hazards addressed: All)	General Fund, PDM/HMGP Grants, Other Grants	CMO, CSD, PW, B&S, RCFD, ENG, RCMU	\$\$	2026	Medium
1.02	Upgrade or install energy-efficient fixtures, appliances, and/or equipment within Critical Facilities to increase the fuel supply's longevity for backup generators. (Hazards addressed: All)	General Fund, PDM/HMGP Grants, Other Grants	PW, RCMU, CMO, B&S	\$\$\$	TBD	Low
1.03	Repair, as feasible, all major deficiencies discovered by inspections to prevent collapse, failure, or damage of key infrastructure in the event of a natural disaster. (Hazards addressed: All)	General Fund, PDM/HMGP Grants, Other Grants	PW, B&S, CMO, ENG	\$\$\$	Ongoing	High
1.04	Identify City facilities that can serve as key cooling centers, evacuation, and sheltering locations. (Hazards addressed: All)	General Fund, PDM/HMGP Grants, Other Grants	RCFD, PW, CSD	\$	TBD	Low
1.05	Conduct a feasibility assessment for the installation of alternative energy (solar, fuel cell, battery backup, etc.) at key critical facilities within the City. (Hazards addressed: All)	General Fund, PDM/HMGP Grants, Other Grants	CMO, PW, B&S, ENG	\$	TBD	Low

Mitigation Action		Potential Funding Sources ¹	Responsible ² Departments	Relative Cost ³	Time Frame	Priority
1.06	Work closely with community groups to increase awareness of hazard events and resiliency opportunities among socially vulnerable community members. (Partnership with Healthy RC and Ready RC) (Hazards addressed: All)	General Fund, PDM/HMGP Grants, Other Grants	CMO, PW, B&S, ENG	\$	Ongoing	High
1.07	Avoid building new City-owned key facilities in mapped hazard areas. If no feasible sites outside of mapped areas exist, ensure that such facilities are hardened against hazards beyond any minimum building requirements/mitigation standards. (Hazards addressed: All)	General Fund, PDM/HMGP Grants, Other Grants	PLAN, ENG	\$	Ongoing	Low
1.08	Coordinate with regional social service agencies and nonprofit care providers to obtain temporary shelter for homeless persons in advance of potential hazard events. (Hazards addressed: All)	General Fund, PDM/HMGP Grants, Other Grants	CMO	\$	Ongoing	Low
1.09	Coordinate with Caltrans to monitor bridges within the City and develop recommendations for upgrade/retrofit when deemed necessary. Prioritize upgrades/retrofits on key evacuation routes. (Hazards addressed: All)	General Fund, PDM/HMGP Grants, Other Grants	ENG	\$	Ongoing	Medium
1.10	Closely monitor changes in the boundaries of mapped hazard areas resulting from land-use changes, new or updated information, changes to state or federal hazard maps, or climate change, and adopt new mitigation actions or revise existing ones to ensure continued resiliency. (Hazards addressed: All)	General Fund, PDM/HMGP Grants, Other Grants	PLAN, GIS	\$	Ongoing	Low
1.11	Integrate policy direction and other information from this Plan into other City documents, including the General Plan, Emergency Operations Plan, Capital Improvements Program, Sustainability Plan, and Healthy RC Strategic Plan. (Hazards addressed: All)	General Fund, PDM/HMGP Grants, Other Grants	PLAN, ENG, RCFD, CMO	\$	2022	High

Mitigation Action		Potential Funding Sources ¹	Responsible ² Departments	Relative Cost ³	Time Frame	Priority
1.12	Install and harden an emergency power generation system at Central Park that the City can use as an emergency evacuation site.	General Fund, PDM/HMGP Grants, Other Grants	PW, ENG, RCFD, B&S, CSD	\$\$\$	2025	Medium
1.13	Develop a Climate Resiliency Strategy that enhances existing efforts within the City and analyzes changing climatic conditions that may impact public health, natural resources, the built environment, and socioeconomic vulnerability.	General Fund, PDM/HMGP Grants, Other Grants	CMO	\$\$	TBD	Low
Seismic Hazards (Fault Rupture, Seismic Shaking, Landslides, Liquefaction)						
2.01	Monitor and track development applications that propose seismic improvements and ancillary issues to accommodate changes in the original use of the structure.	General Fund, PDM/HMGP Grants, Other Grants	B&S	\$	Ongoing	Medium
2.02	Expand education and outreach by community groups and industry representatives to residents and businesses to obtain earthquake insurance.	General Fund, PDM/HMGP Grants, Other Grants	RCFD, B&S	\$	Ongoing	Medium
2.03	Improve local understanding of the threat of a major earthquake by conducting a citywide scenario modeling potential loss of life and injuries, destroyed and damaged structures, and interruptions to key services.	General Fund, PDM/HMGP Grants, Other Grants	RCFD	\$	2022	High
2.04	Retrofit key critical facilities with seismically rated and tinted window film treatments that ensure glass windows do not shatter and install tie-downs and straps for fixtures inside buildings.	General Fund, PDM/HMGP Grants, Other Grants	PW	\$\$	2023	High
2.05	Collaborate with CVWD to monitor groundwater elevations for potential liquefaction areas to ensure shallow groundwater conditions do not increase seismic vulnerability.	General Fund, PDM/HMGP Grants, Other Grants	ENG	\$	Ongoing	Medium

Mitigation Action		Potential Funding Sources ¹	Responsible ² Departments	Relative Cost ³	Time Frame	Priority
2.06	Reduce land use densities in areas of significant landslide threat and identify strategies for existing development downstream of these hazard areas.	General Fund, PDM/HMGP Grants, Other Grants	PLAN	\$	Ongoing	Medium
Wildfire						
3.01	Promote the proper maintenance and separation of power lines.	General Fund, PDM/HMGP Grants, Other Grants	RCFD	\$	Ongoing	Medium
3.02	Promote the efficient response to fallen power lines.	General Fund, PDM/HMGP Grants, Other Grants	RCFD	\$	Ongoing	Low
3.03	Coordinate programs with private entities to decrease highly flammable vegetation in the developed portions of the Wildland Urban Interface Fire Area (WUIFA) and replant with fire-resistant specimens.	General Fund, PDM/HMGP Grants, Other Grants	RCFD	\$	Ongoing	High
3.04	Evaluate a hillside weed abatement pilot program using goats or other livestock to reduce fuel loads in fire-prone areas.	General Fund, PDM/HMGP Grants, Other Grants	RCFD	\$	2024	Medium
3.05	Prepare a Community Wildfire Protection Plan for areas within the WUIFA and surrounding areas north of Interstate 210.	General Fund, PDM/HMGP Grants, Other Grants	RCFD	\$	2021	High
3.06	Work with property owners to manage dead vegetation in flood control facility footprints, railroad rights-of-way, parks, and open spaces, especially during and after a drought episode.	General Fund, PDM/HMGP Grants, Other Grants	RCFD, PW	\$	Ongoing	Medium
3.07	Continue fire hazard prevention awareness campaigns to residents in the WUIFA and surrounding areas.	General Fund, PDM/HMGP	RCFD	\$	Ongoing	Medium

Mitigation Action		Potential Funding Sources ¹	Responsible ² Departments	Relative Cost ³	Time Frame	Priority
		Grants, Other Grants				
3.08	Require all new development in the WUIFA and surrounding areas to use building materials and methods approved by CA Building Standards Commission and establish zones of defensible space around structures in these areas.	General Fund, PDM/HMGP Grants, Other Grants	RCFD, B&S	\$	Ongoing	Medium
3.09	Update Chapter 17.80, Tree Preservation of the Municipal Code, to allow for removing and modifying eucalyptus windrows in the WUIFA or areas with heightened wildfire susceptibility.	General Fund, PDM/HMGP Grants, Other Grants	PLAN, RCFD	\$	TBD	Low
3.10	Coordinate RCFD and CVWDs recommended landscaping vegetation lists and design recommendations that illustrate wildfire resilient strategies.	General Fund, PDM/HMGP Grants, Other Grants	RCFD, PLAN	\$	2024	Medium
3.11	Work with partners to better manage safe and equitable access into the National Forest via routes through Cucamonga Canyon and the Etiwanda Preserve while ensuring fire safety for surrounding areas.	General Fund, PDM/HMGP Grants, Other Grants	RCFD, PLAN	\$	Ongoing	Medium

Flooding (includes Dam Failure)

4.01	Investigate the use of permeable paved and landscaped swales for new construction and replacement of City-owned hardscaped areas.	General Fund, PDM/HMGP/FMA Grants, Other Grants	PW, PLAN, ENG	\$	TBD	Low
4.02	Update the City's Storm Drain Master Plan periodically (in conjunction with the LHMP and CIP) to incorporate new data and/or address emerging issues.	General Fund, PDM/HMGP/FMA Grants, Other Grants	ENG	\$\$	2022	High
4.03	Analyze if new critical facilities can be built a minimum of 1-foot higher than the anticipated 500-year flood elevation height to determine where it is feasible.	General Fund, PDM/HMGP/FMA Grants, Other Grants	ENG	\$\$	TBD	Low

Mitigation Action		Potential Funding Sources ¹	Responsible ² Departments	Relative Cost ³	Time Frame	Priority
4.04	Coordinate with dam owners/operators, state, and federal agencies to collectively identify threats to the City and the region and identify ways to retrofit/strengthen the dams under their control.	General Fund, PDM/HMGP/FMA Grants, Other Grants	RCFD, ENG	\$	Ongoing	Medium
4.05	Identify potential flood improvements that also reduce the threat to dam failure and/or inundation.	General Fund, PDM/HMGP/FMA Grants, Other Grants	ENG	\$	Ongoing	Medium

Severe Weather (Drought, Extreme Heat, Severe Wind)

5.01	Update Chapter 17.56 of the Rancho Cucamonga Municipal Code to reflect the latest advances in best practices in landscape design that reduce water use within the City while also addressing wildfire susceptibility. (Hazards addressed: Drought)	General Fund, PDM/HMGP Grants, Other Grants	PLAN, RCFD	\$	2023	Medium
5.02	Develop a campaign to encourage water/energy efficiency and reduce consumption for existing development and promote the expansion of electric vehicle ready construction in new development.(Hazards addressed: Drought, Extreme Heat)	General Fund, PDM/HMGP Grants, Other Grants	CMO, B&S	\$	2025	Medium
5.03	Use drought-tolerant plants when installing new or retrofitting City-owned landscapes. Limit turf that is not drought tolerant to recreational fields and lawns, and only in instances where no feasible drought-tolerant alternatives exist. (Hazards addressed: Drought)	General Fund, PDM/HMGP Grants, Other Grants	PW	\$\$	Ongoing	Medium
5.04	Implement an Urban Forest Master Plan to diversify tree age, increase resilience to drought and warmer temperatures, and expand shaded areas in the City to reduce the effects of the urban heat island effect. (Hazards addressed: Extreme Heat)	General Fund, PDM/HMGP Grants, Other Grants	PW, PLAN	\$\$	2023	High

Mitigation Action		Potential Funding Sources ¹	Responsible ² Departments	Relative Cost ³	Time Frame	Priority
5.05	Create a Cooling Center Plan to use designated public facilities (libraries, community centers, etc.) as cooling centers for vulnerable populations during extreme weather events. (Hazards addressed: Extreme Heat)	General Fund, PDM/HMGP Grants, Other Grants	RCFD, CSD	\$	2023	High
5.06	Promote passive cooling design (brise-soleil, long roof overhangs, locating windows away from southern facades, etc.) in new developments during the design review process. (Hazards addressed: Extreme Heat)	General Fund, PDM/HMGP Grants, Other Grants	B&S, PLAN	\$	Ongoing	High
5.07	Evaluate the equitable access and long-term capacity of designated cooling centers and shelters in the City to provide sufficient relief from extreme heat. Assess the need to expand services as the frequency, length, and severity of future heat waves potentially change because of climate change. (Hazards addressed: Extreme Heat)	General Fund, PDM/HMGP Grants, Other Grants	CMO, RCFD, CSD	\$	TBD	Medium
5.08	Conduct outreach to residents and businesses prior to the severe winds (Santa Ana Wind events) on proper tree maintenance and identification of potentially hazardous trees. (Hazards addressed: Severe Wind)	General Fund, PDM/HMGP Grants, Other Grants	RCFD, CMO	\$	Ongoing	Low
5.09	Increase the use and construction of shade structures within new developments, City facilities, parks, and trails to reduce urban heat island impacts.	General Fund, PDM/HMGP Grants, Other Grants	PLAN, All Departments	\$\$ - \$\$\$	Ongoing	Low
5.10	Expand access to alternative energy technologies, energy efficiency improvements and appliances, and programs for vulnerable populations to reduce energy consumption and the need for City services during extreme heat conditions.	General Fund, PDM/HMGP Grants, Other Grants	CMO, B&S	\$	Ongoing	Medium

Mitigation Action		Potential Funding Sources ¹	Responsible ² Departments	Relative Cost ³	Time Frame	Priority
Human-Caused Hazards (Cyber Threats, Terrorism/MCI, Aircraft Incidents)						
6.01	Coordinate with the San Bernardino County Sheriff to monitor potential incidents resulting in terrorism and mass casualty incidents. (Hazards addressed: Terrorism/Mass Casualty Incidents)	General Fund, PDM/HMGP Grants, Other Grants	PD	\$	Ongoing	High
6.02	Disseminate information on cyber threats or potential terrorist activity to City staff and continually follow-up with information on further developments on the situation. (Hazards addressed: Terrorism/Mass Casualty Incidents, Cyber Threats)	General Fund, PDM/HMGP Grants, Other Grants	DoIT, PD	\$	Ongoing	Medium
6.03	Regularly update cybersecurity software and educate business owners and residents on current internet-based threats. (Hazards addressed: Cyber Threats)	General Fund, PDM/HMGP Grants, Other Grants	DoIT, PD	\$	Ongoing	Medium
6.04	Evaluate all critical facilities, City administration buildings, and other buildings the City may deem to be important in the future with counterterrorism design elements and building materials.(Hazards addressed: Terrorism/Mass Casualty Incidents)	General Fund, PDM/HMGP Grants, Other Grants	PD, All Departments	\$\$	2023	High
6.05	Coordinate and enhance datasets for schools, hospitals, and other critical facilities with the School District, Hospitals, and other key entities within the City to better respond to mass-casualty and terrorism incidents. (Hazards addressed: Terrorism/Mass Casualty Incidents)	General Fund, PDM/HMGP Grants, Other Grants	PD, RCFD	\$	Ongoing	Medium
6.06	Coordinate with the Federal Aviation Administration on flight paths over the City and potential changes that may increase vulnerability to aircraft incidents. (Hazards addressed: Aircraft Incidents)	General Fund, PDM/HMGP Grants, Other Grants	RCFD	\$	Ongoing	Low

Hazardous Materials Release

Mitigation Action		Potential Funding Sources ¹	Responsible ² Departments	Relative Cost ³	Time Frame	Priority
7.01	Discourage new sensitive land uses, including schools, parks, childcare centers, adult and senior assisted living facilities, and community centers, from locating near identified hazardous material facilities. Discourage or prohibit new hazardous material facilities from locating near sensitive land uses.	General Fund, PDM/HMGP Grants, Other Grants	PLAN, B&S	\$	Ongoing	High
7.02	Continuously inspect businesses and other properties, storing hazardous materials, and create an inventory of storage locations that require updates, maintenance, or renovation.	General Fund, PDM/HMGP Grants, Other Grants	RCFD	\$	Ongoing	High
7.03	Coordinate with hazardous materials generators/operators (So Cal Gas, Edison, etc.) regularly to understand changes to operations within the City.	General Fund, PDM/HMGP Grants, Other Grants	ENG, RCFD	\$	Ongoing	Medium

¹ Pre-Disaster Mitigation (PDM) | Hazard Mitigation Grant Program (HMGP) | Flood Mitigation Assistance (FMA)

² Rancho Cucamonga Fire District (RCFD) | Community Services (CSD) | Building and Safety (B&S) | Rancho Cucamonga Municipal Utility (RCMU) | City Manager's Office (CMO) | Police Department (PD) | Planning (PLAN) | Engineering (ENG) | Public Works (PW) | Geographic Information Systems (GIS) | Department of Information Technology (DoIT) | Bold text denotes primary responsible department.

³ Relative Cost Categories: \$ Less than \$100,000 | \$\$ \$100,001 to \$999,999 | \$\$\$ Greater than \$1,000,000

Chapter 6 – Plan Maintenance

For this LHMP to remain effective and useful to the community of Rancho Cucamonga, it must remain up to date. An updated version of the LHMP will continue to guide hazard mitigation activities in Rancho Cucamonga and will help keep the City eligible for state and federal hazard mitigation funding. The HMPC has structured this LHMP so individual sections can easily be updated as new information becomes available and as new needs arise, helping to keep this Plan current.

This chapter discusses how to update this Plan to comply with applicable state and federal requirements. This chapter also describes how the City can incorporate the mitigation actions described in Chapter 5 into existing programs and planning mechanisms and how public participation will remain an important part of Plan monitoring and future update activities.

Coordinating Body

The HMPC will remain responsible for maintaining and updating the Plan, including evaluating the Plan's effectiveness as needed. Members of the HMPC will also coordinate the implementation of the Plan through their respective positions. **Table 1-1** contains a list of current members. In future years, staff and representatives (either current Committee members or other individuals) from the following departments, districts, and agencies should be included in maintenance and update activities:

- Building and Safety Services
- City Clerk
- City Manager's Office
- Community Improvement
- Community Services
- Department of Innovation and Technology
- Engineering Services
- Financial Management and Strategic Planning
- Fire District
- Human Resources
- Planning
- Police/Sheriff
- Public Works Services
- Transportation

The staff member currently serving as the HMPC leader (the person responsible for coordinating future updates) is in the Fire District. He/she will serve as the project manager during the update process or designate this role to another staff member. The HMPC leader or their designee will coordinate maintenance of this Plan, lead the formal Plan review and evaluation activities, direct the Plan update, and assign tasks to other members of the HMPC to complete these activities. Such tasks may include collecting

data, developing new mitigation actions, updating mitigation actions, making presentations to City staff and community groups, and revising the Plan sections.

Plan Implementation

The effectiveness of the Plan depends on the successful implementation of the mitigation actions. Implementation includes integrating mitigation actions into existing City plans, policies, programs, and other implementation mechanisms. The mitigation actions in this Plan are intended to reduce the damage from hazard events, help the City secure funding, and provide a framework for hazard mitigation activities. Committee members prioritized the hazard mitigation actions in **Table 5-4** in Chapter 5. These priorities will guide the implementation of these actions through new or existing City mechanisms as resources are available. The LHMP project manager is responsible for overseeing the implementation, promotion, and maintenance of this Plan, and is responsible for facilitating meetings and coordinating activities related to Plan implementation and maintenance.

The key City Plans that should incorporate content from this LHMP include:

- Rancho Cucamonga General Plan Safety Element – this element should incorporate relevant mapping and analysis in the Safety Element to ensure this plan's goals and policies are reinforced throughout future developments and projects proposed within the City.
- Rancho Cucamonga Emergency Operations Plan – The EOP focuses on the effective preparedness and response to hazard events that occur within the City. Incorporating relevant content from this plan into the EOP ensures consistency regarding the hazards addressed in both plans.
- Rancho Cucamonga Capital Improvements Program – The CIP identifies key infrastructure investments throughout the City that may include hazard mitigation elements. Incorporating this plan into the CIP may assist with enhancing infrastructure investment through additional funding and/or modification of improvements to include hazard mitigation elements.

This integration of the LHMP into the Rancho Cucamonga General Plan also allows the City to comply with AB 2140 requirements, as identified in Chapter 1 of this plan.

Plan Maintenance Process

The City's plan maintenance process will rely on the Rancho Cucamonga Mitigation Implementation Handbook, located in Appendix E. The handbook is intended to function as a stand-alone document that gives concise and accessible guidance to City and Fire District staff to implement and maintain the Plan. A key component of the handbook is the specific mechanisms that the City and Fire District can use to integrate this plan into the other City planning mechanisms.

Plan Monitoring and Evaluation

When members of the Committee are not updating the Plan, they should meet at least once a year to go over mitigation action implementation and evaluate the Plan's effectiveness. These meetings should include:

- Discussion of the timing of mitigation action implementation
- Mitigation action implementation evaluation and determination of success
- Mitigation action prioritization revisions, if deemed necessary
- Mitigation action integration into other mechanisms, as needed

The first of these meetings will be held in the 2021-2022 fiscal calendar year. To the extent possible, Committee meetings should be scheduled at an appropriate time in the City's annual budgeting process, which will help ensure that funding and staffing needs for mitigation actions are considered.

When the Committee meets to evaluate the Plan, members should consider these questions:

- What hazard events, if any, have occurred in Rancho Cucamonga in the past year? What were the impacts of these events on the community? Were the impacts mitigated, and if so, how?
- What mitigation actions have been successfully implemented? Have any mitigation actions been implemented but not successfully, and if so, why?
- What mitigation actions, if any, have been scheduled for implementation but have not yet been implemented?
- What is the schedule for implementing future mitigation actions? Is this schedule reasonable? Does the schedule need to be adjusted for future implementation, and are such adjustments appropriate and feasible?
- Have any new concerns arisen, including hazard events in other communities or regions not covered by existing mitigation actions?
- Are new data available to inform the Plan's updates, including data relevant to the hazard profiles and threat assessments?
- Are there any new planning programs, funding sources, or other mechanisms to support hazard mitigation activities in Rancho Cucamonga?

Plan Updates

The information in this Plan, including the hazard profiles, threat assessments, and mitigation actions, is based on the best available information, practices, technology, and methods available to the City and Committee when this Plan was prepared. As factors change, including technologies, community demographics and characteristics, best practices, and hazard conditions, it is necessary to update the Plan to remain relevant. Additionally, Title 44, Section 201.6(d)(3) of the Code of Federal Regulations requires that LHMPs be reviewed, revised, and resubmitted for approval every five years to remain eligible for federal benefits.

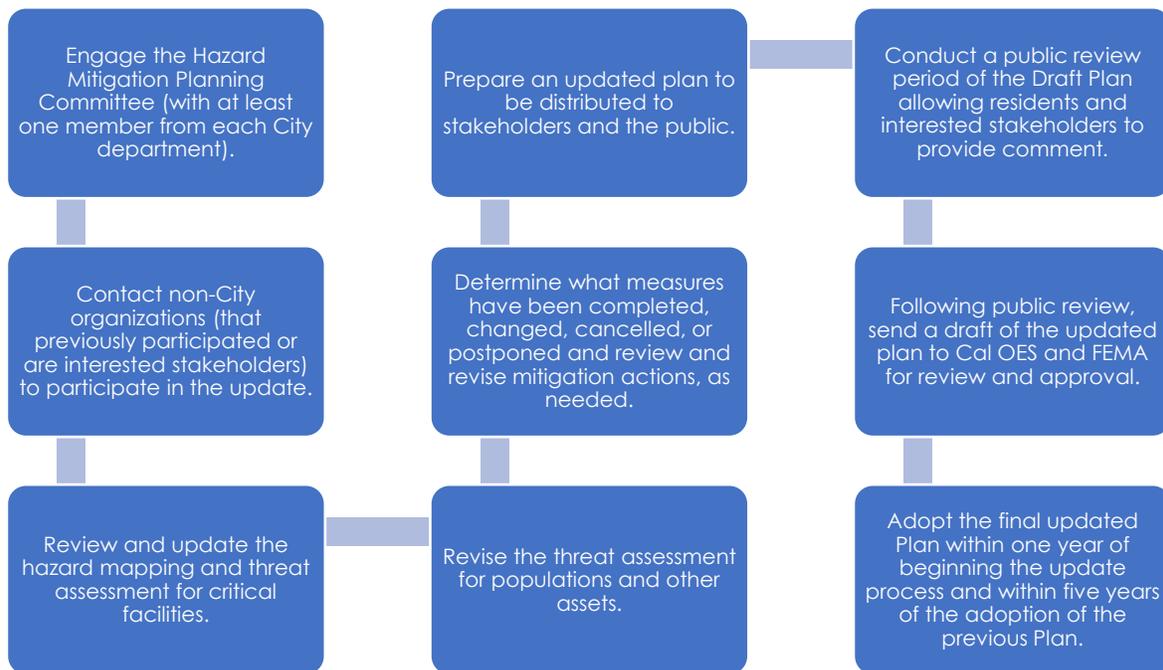
UPDATE METHOD AND SCHEDULE

The update process should begin no later than four years after this Plan is adopted, allowing a year for the update process before the Plan expires. The LHMP project

manager or their designee may also choose to begin the update process sooner, depending on the circumstances. Some reasons for accelerating the update process may include:

- A presidential disaster declaration for Rancho Cucamonga or an area that includes part or the entire City
- A hazard event that results in one or more fatalities in Rancho Cucamonga

The update process will add new and updated methods, demographic data, community information, hazard data and events, considerations for threat assessments, mitigation actions, and other necessary information, keeping the Plan relevant and current. The Committee will determine the best process for updating the Plan, which should include the following steps:



UPDATE ADOPTION

The Rancho Cucamonga City Council is responsible for adopting this Plan and all future updates. As previously mentioned, adoption should occur every five years. To ensure the plan remains active, the City should begin the update process at least one year before expiration. If the City has a grant application that relies on the LHMP, an update to the plan should occur no later than 18 months before expiration. Adoption should take place after FEMA notifies the City that the Plan is Approved Pending Adoption. Once the City Council adopts the Plan following FEMA's approval, the adopted plan should be transmitted to FEMA.

Continued Public Involvement

The City will continue to keep the public informed about the Committee's actions to review and update the LHMP. The Committee will develop a revised community engagement strategy that reflects the City's updated needs and capabilities. The

updated strategy should include a tentative schedule and plan for public meetings, recommendations for the use of the City's website and social media accounts, and content for public outreach documentation. The Committee will also distribute information annually through the most appropriate method that ensures the most significant dissemination of information to residents and businesses. These updates are anticipated to occur after the annual HMPC meeting is conducted by the City.

Point of Contact

The Hazard Mitigation Planning Committee leader for Rancho Cucamonga is the primary point of contact for this Plan and future updates. At the time of writing, the HMPC leader is Joseph Ramos, available at Joseph.Ramos@cityofrc.us | (909) 477-2700 ext. 3009.

Appendix A – HMPC Meeting Materials

Appendix B – Outreach and Engagement Materials

Appendix C – Resolution of Adoption

Appendix D – List of Key Facilities

Appendix E – LHMP Implementation Handbook