2022

Local Hazard Mitigation Plan

Public Review Draft

4/1/2022

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 often gets the most attention, it is only part of a larger emergency management cycle.

Emergency planners and responders can take steps during the cycle's response, recovery, mitigation, and preparedness phases to minimize the harm caused by a disaster. The City of Anaheim 2022 Local Hazard Mitigation Plan (LHMP) focuses on optimizing the mitigation phase of the process. Mitigation involves making a community more resilient so that when hazard events do ultimately occur, the community suffers minor damage and can recover more quickly and effectively. Mitigation 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 minor 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.

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 taken to reduce or eliminate long-term risk to people and property from natural or human-caused hazards and their effects."[1]

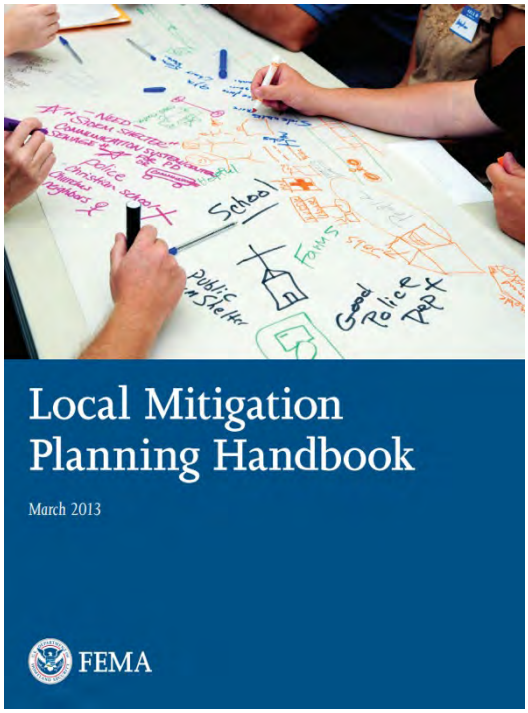
Resilience
the "capacity of any entity—an individual, a community, an organization, or a natural system—to prepare for disruptions, to recover from shocks and stresses, and to adapt and grow from a disruptive experience."[2]

The City of Anaheim (City), like other communities, could potentially suffer severe harm from hazard events. Although large disasters may cause widespread devastation, minor disasters can have more 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 play. This LHMP provides a comprehensive assessment of the city's threats from natural and human-caused hazard events and a coordinated strategy to reduce these threats. It identifies resources and information to 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 public agencies, local employers, service providers, community members, and other key stakeholders.

[1] California Governor's Office of Emergency Services. 2017. *State of California Emergency Plan*. https://www.caloes.ca.gov/PlanningPreparednessSite/Documents/California_State_Emergency_Plan_2017.pdf
[2] Rodin, J. 2014. The Resilience Dividend: Managing Disruption, Avoiding Disaster, and Growing Stronger in an Unpredictable World. New York: Public Affairs.

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 it 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.



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.

State Authority

California Government Code Sections 8685.9 and 65302.6

California Government Code Section 8685.9[3] 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 safety element in the jurisdiction's general plan. The State may cover more than 75% of the remaining disaster relief costs in these cases.

All cities and counties in California must prepare a general plan, including a safety element that addresses various hazard conditions and other public safety issues. A community may decide to make the safety element a stand-alone chapter or incorporate it into another section of the general plan. 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 creates a stronger mechanism for implementing the LHMP. This LHMP and future updates will be integrated into the City's General Plan Safety Element.

California Government Code Section 65302 (g)(4)

California Government Code Section 65302 (g)(4)[4] 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

[3] also known as Assembly Bill (AB) 2140
[4] also known as Senate Bill (SB) 379

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 Anaheim 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 Anaheim's history, physical setting, land use, demographics, and other important community characteristics.

Chapter 3: Hazard Assessment. This chapter identifies and describes the hazards that threaten Anaheim and discusses past and future events and the effects of climate change.

Chapter 4: Vulnerability Assessment. This chapter describes each hazard's threat to Anaheim's key facilities and community members, including socially vulnerable individuals.

Chapter 5: Mitigation Strategy. This chapter lists the mitigation actions to reduce Anaheim'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.

Previous Anaheim LHMP

This is an update to the City of Anaheim's 2017 LHMP and maintains the eligibility, once approved and adopted, to apply for FEMA grants for hazard mitigation projects and monetary relief during emergency situations. The content from the previous plan has been included in this document and updated accordingly. Key modifications in this plan focus on expanding the risk assessment (understanding potential losses and vulnerable populations) within **Chapter 4** and revised and modified mitigation strategies and actions within **Chapter 5**.

Plan Goals

This Plan was developed to increase resilience in Anaheim broadly, relying on the following goals:

- Strengthen Emergency Services and Infrastructure
- Protection of Life and Property
- Enhance Public Awareness
- Preserve Natural Systems
- Engage partners in the implementation

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.

Planning Process

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

The planning process used to create this plan for the City of Anaheim is described below.

Hazard Mitigation Task Force

The City established a Hazard Mitigation Task Force (hereafter referred to as the HMTF). The HMTF comprises representatives from key city departments and stakeholders 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 HMTF meetings.

TABLE 1-1: ANAHEIM HAZARD MITIGATION TASK FORCE

Name	Title	Department
Greg Garcia	Assistant City Manager	City Administrative Services
Indhira Gagnon	Law Office Administrator	City Attorney
Stephen Stoewer	Senior Project Manager	Housing and Community Development Dept
Julie Parker	Sr. Administrative Analyst	Community Services
Randy Howser	Operations Manager	Convention, Sports & Entertainment
Jennifer Sorensen	Senior Accountant	Finance
Dr. Jannine Wilmoth	Emergency Manager	Fire & Rescue
Deputy Chief Mike Molloy*	Deputy Fire Chief	Fire & Rescue
Susan Kim*	Principal Planner	Planning & Building
Heather Allen	Principal Planner	Planning & Building
Christine Nguyen	Associate Planner	Planning & Building
Lt. Rich LaRochelle	Police Lieutenant	Police
Kyle Bernard	Police Sergeant	Police
Janis Lehman	Interim AGM Admin & Risk Services	Public Utilities
Agustin Torres	Utilities Analyst II	Public Utilities
Eddie De La Torre	Street and Sanitation Manager	Public Works
Jonathan Heffernan	Operations Supervisor	Public Works
Cody Allman	Assistant Emergency Manager	Fire & Rescue
Patricia Alvarez	Management Assistant	Fire & Rescue
Aaron Pfannenstiel	LHMP Project Manager	Atlas Planning Solutions
Crystal Stueve	LHMP Planner	Atlas Planning Solutions
Robert Jackson	LHMP Planner	Atlas Planning Solutions

* City staff left during the plan preparation process

The HMTF 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.

HMTF Meeting #1 (September 16, 2021): The HMTF members confirmed the project goals and responsibilities. They revised the community engagement and outreach strategy, confirmed, prioritized the hazards included in the Plan, and identified critical threat assessment facilities.

HMTF Meeting #2 (February 10, 2022): 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.

HMTF Meeting #3 (February 16, 2022): The HMTF discussed and reviewed mitigation actions and strategies, made revisions, and assigned priorities.

Invitations to HMTF meetings, and agendas/materials, were provided via email. **Appendix A** contains copies of invitations, meeting agendas, 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. 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 of the LHMP include the following:

Online Engagement

The City has developed a "Be Ready" program (https://www.anaheim.net/5991/Be-Ready) to communicate and educate residents and businesses about emergency/disaster preparedness. As part of this effort, the City created a Be Ready Anaheim Hazard Mitigation Plan page that informs readers of the City's plan update process and provides access to the online survey developed for the project.

ONLINE SURVEY

The City released an online survey to community members to gather feedback on the planning process and hazards of concern. The City received 11 responses from community members and stakeholders during the survey period. Based on these responses, the following information was shared with the City:

- The top three hazards identified by respondents include wildland/urban fires, earthquakes, and severe weather.
- Over 70% of respondents are concerned that climate change may create new hazardous situations in Anaheim or worsen existing natural hazards.
- Over 63% of respondents have taken steps to make homes less vulnerable to hazards such as earthquakes, floods, and fires.

COMMUNITY MEETINGS

The City regularly conducts community meetings through its Neighborhood Services District Community Meetings. These meetings are intended to provide useful information to participants. During the planning process, three meetings were held, where City staff discussed the plan and process currently underway and provided opportunities for feedback. Participants provided zero feedback during these meetings. The following information provides dates and Districts addressed for each meeting:

- Districts 1&2 Community Meeting – Wednesday, February 9, 2022
- Districts 3&4 Community Meeting – Wednesday, February 10, 2022

- Districts 5&6 Community Meeting – Wednesday, February 16, 2022

All meetings were conducted via Zoom in a webinar format.

Public Review Draft

On April 1, 2021, the City released a draft copy of the LHMP for public review and comment. The document was posted electronically on the City's "Be Ready Anaheim" 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 April 1, 2021, through April 15, 2021.

Plan Revision and Adoption

The City received XX public comments on the plan during the public review period; however, none of the comments required edits or modifications to the plan content. 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 Anaheim City Council adopted the final LHMP on [Month, Day, 2021]. **Appendix C** contains a copy of the adoption resolution.

Plan Resources

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

Table 1-2: Key Resources for Planning Development

Section	Key Resources Reviewed	Data Incorporated from Resources
Multiple	• Cal-Adapt • California Department of Conservation • California Geological Survey • California Office of Emergency Services • California State Hazard Mitigation Plan • City of Anaheim General Plan • FEMA Local Hazard Mitigation Plan Guidance • National Oceanic and Atmospheric Administration • National Weather Service • US Geological Survey • US Census Bureau 2015-2019 American Community Survey • Orange County Vulnerability Assessment • Orange County Hazard Mitigation Plan	• Science and background information on different hazard conditions • Records of past disaster events in and around Anaheim • Current and anticipated climate conditions in and around Anaheim • Projections of future seismic conditions and events
Community Profile	• US Census Bureau 2015-2019 American Community Survey • City of Anaheim 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	• Demographic information for Anaheim and Orange County • History of the region • Economic trends in Anaheim • Commute patterns in Anaheim • Local land-use patterns • Background information on utilities serving Anaheim • Current Climate information in Anaheim

	• Community Mobility Existing Condition Report • California Energy Commission	
Hazard Assessment (Flood Hazards, includes Dam Failure)	• FEMA Map Service Center • Orange County Flood Control District • Orange County Water District • Metropolitan Water District of Southern California • US Army Corps of Engineers • California Department of Water Resources	• Records of past flood events in and around Anaheim • Locations of flood-prone areas in Anaheim • Mapping of dam failure inundation areas • Profiles and conditions of dams in and around Anaheim
Hazard Assessment (Human-Caused Hazards)	• Global Terrorism Database • Orange County Register	• Historical records of terrorism • Local records of terrorism and civil unrest events
Hazard Assessment (Hazardous Materials Release)	• Department of Toxic Substances and Control • Environmental Protection Agency	• Location and dates of past hazardous materials release • Effects of hazardous materials release
Hazard Assessment (Seismic Hazards)	• Southern California Earthquake Data Center • The Third California Earthquake Rupture Forecast (UCERF3) • California Geological Survey	• Location of fault zones • Records of past earthquakes
Hazard Assessment (Severe Weather Hazards)	• Cal Adapt • California Department of Water Resources • US Drought Monitor • Western Regional Climate Center	• Historic drought information • Current drought conditions • Science and background information on extreme weather events • Historical record of extreme weather events in and around Anaheim
Hazard Assessment (Wildfire Hazards)	• California Department of Forestry and Fire Prevention • Fire and Resource Assessment Program	• Records of past fire events • Location of fire hazard zones in and around Anaheim

Note: Sections that are not individually mentioned in this table relied primarily on sources identified in multiple sections.

CHAPTER 2 – COMMUNITY PROFILE

The Community Profile section of the LHMP describes Anaheim, 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 Anaheim, which inform the development of the hazard mitigation strategies and actions in **Chapter 5**.

SETTING AND LOCATION

Anaheim is in northwestern Orange County and encompasses roughly 50.88 square miles. According to the US Census, the population is approximately 349,964, making it the most populous city in Orange County, the 10th most populated city in California, and the 56th most populous city in the United States.[5] Yorba Linda, Fullerton, Placentia, and Buena Park border Anaheim to the north (from east to west). Buena Park and Cypress border to the west, and Stanton, Garden Grove, and Orange border to the south (from west to east). Anaheim extends east to the Orange County/Riverside County border.

The City experiences an average of 280 sunny days per year, compared to a national average of 205 days. There is rarely any recorded snowfall in Anaheim, ranking it as one of the least snowy places in California. Anaheim experiences about 14 inches of rain every year, compared to the national average of 38 inches per year.[6] The average temperature in Anaheim ranges between 70-85°F for most of the year. Like most of Southern California, Summers in Anaheim are hotter on average.

HISTORY

The area where the City of Anaheim is located, and the greater region, was originally the home of the indigenous people known as the Tongva. Evidence points to their presence in the region dating back as far as 3500 BCE, with the village of Hutuukuga occupying an area near the Santa Ana River and the City of Anaheim.[7] The area that makes up modern-day Anaheim, including Placentia and Fullerton, was originally a part of Rancho San Juan Cajon de Santa Ana, a rancho grant given by Juan Bautista Alvarado to Juan Pacifico Ontiveros in 1837. After the Mexican American War concluded, the California Land Act of 1851 established a commission to determine the validity of Spanish and Mexican land grants. In 1857, Ontiveros sold some 1,165 acres to a group of German American families from Bavaria to found the City of Anaheim. Anaheim was originally founded to start the Anaheim Vineyard Company, both as a vineyard and producer of wines, after the area was scouted and determined to be ideal for growing grapes due to the

[5] "QuickFacts Anaheim city, California". United States Census Bureau.
[6] "Best Places to Live", 2020, https://www.bestplaces.net/climate/city/california/anaheim
[7] Southern California Indian Curriculum Guide, http://www.tongvapeople.org/wp-content/uploads/2016/05/Bowers-Curriculum-Guide.pdf, The Bowers Museum of Cultural Art, 2002

climate and topography. The community was first dubbed *Annaheim*, meaning “home by the Santa Ana River” in German. It was later changed to the present-day spelling of Anaheim.[8]

The City began its humble beginnings in 1857 within the 40 acres set aside as a place for a town center and a school, which was the first building constructed. The first home was built in 1857, the Anaheim Gazette began circulation in 1870, followed by the first hotel in 1871. Anaheim was officially incorporated into California as a city on March 18, 1876.[9] The Anaheim area was the largest producer of wine in California for approximately 25 years before a devastating disease wiped out the grapevines destroying the entire industry in 1886-87. During the 1870s, irrigation systems were built, allowing more trees crops to be planted, such as apricots, walnuts, and some of the first orange groves. These crops quickly filled the void left by the grape/winemaking industry, becoming the backbone and most valuable commodity to the region once Los Angeles and the Orange County area were connected by the Southern Pacific railroad network in 1875.[10]

Archival 1965 aerial photo of Anaheim, California including Disneyland, the Disneyland Hotel, and the monorail system, Disneyland Heliport, surrounding orange groves, and Santa Ana Freeway (now I-5). Photo credit: http://www.airlinesafety.com/editorials/AboutTheEditor.htm.

Anaheim’s rural beginnings had disappeared by 1950 as the Los Angeles-Orange County urban and industrial growth continued to expand. 1955 saw the opening of Disneyland, which has grown to become one of the largest tourist attractions and most globally recognizable brands. Hotels, homes, restaurants, and retail stores began to spring up and expand the city.[11] In the 1960s, the explosion in growth attracted the Major League Baseball team, the California Angels, to relocate and build Anaheim Stadium. The Los Angeles Rams relocated to Anaheim Stadium until their relocation in 1995. In 1993, the Walt Disney Company founded the National Hockey League expansion team, the Mighty Ducks of Anaheim. The City had already begun building an arena in 1990 in hopes of attracting even more commerce to the city, despite having no tenant. In 1992, a tenant was finally found, and the Walt Disney Company signed contracts to become the tenants and the new home for the Mighty Ducks of Anaheim. Originally called the Arrowhead Pond of Anaheim, the name changed to the Honda Center in 2006 when Honda purchased the naming rights.[12] The 1960s also saw the City developing major aerospace facilities and constructing the Anaheim Convention Center (now the largest exhibition facility on the west coast) across the street from Disneyland Park. Anaheim renamed the area The Disneyland Resort in the 1990s when Disney expanded and built the Disney California Adventure Park, bringing further economic prosperity and renown to Anaheim.[13] The City has continued to grow in both population and economic diversity ever since, becoming the city it is today.

[8] Armor, Samuel; E.B. Merritt (1921). "IV". *History of Orange County, California: With Biographical Sketches*. Los Angeles: Historic Record Company. p. 53.
[9] *"California Cities by Incorporation Date". California Association of Local Agency Formation Commissions.*
[10] Phil Brigandi (March 9, 2007). "A brief history of Orange County" (PDF). County of Orange.
[11] Encyclopedia Britannica, “Anaheim” https://www.britannica.com/place/Anaheim
[12] Shaikin, Bill; Johnson, Greg (July 20, 2006). "Pond to Get a New Name". Los Angeles Times.

[13] "City of Anaheim official site". Anaheim.net. March 7, 2012.

DEMOGRAPHICS

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 2019, and the California Department of Finance (DOF). Based on this dataset, Anaheim's projected population is 349,964, with a median age of 34.5. This median age is approximately four years younger than the average median age in Orange County. Interesting, however, is that the percentage of senior residents (aged 65 and older) in the city is 11% higher than the rest of Orange County. Anaheim residents have a lower median income than the rest of Orange County. In addition, a higher proportion of Anaheim's residents rent their homes (53.4%) than the rest of Orange County residents (42.9%).

Table 2-1 identifies the basic demographics for Anaheim and Orange County according to the 2019 ACS and 2021 ACS projections.

TABLE 2-1: BASIC DEMOGRAPHICS—ANAHEIM & ORANGE COUNTY

Demographics	Anaheim	Orange County
Total Population	349,964*	3,175,692
Percent of residents who are less than 10 years old (i.e., children)	13.1%	11.6%
Percent of residents who are senior citizens (65+)	26.4%	15.4%
Median Age	34.5	38.6
Total households	104,973	1,044,280
Median household income	$77,441	$95,934
Percent of rental households	53.4%	42.9%

Source: American Community Survey, 2015-2019, ACS 2021 Projections
* 2021 Census projections identify an estimated population of 365,257, which is used in Chapter 4 of this plan.

In terms of its racial and ethnic composition, Anaheim is a white-majority city, with 66.4% of all Anaheim residents identifying as white. According to the ACS, this population makeup is similar to Orange County as a region, with minor variations. **Table 2-2** shows the racial and ethnic composition of all groups in the Anaheim and Orange County region.

TABLE 2-2: DETAILED DEMOGRAPHIC BREAKDOWN—ANAHEIM & ORANGE COUNTY

Race & Ethnicity	Anaheim		Orange County	
	Population	Percentage	Population	Percentage
White	232,438	66.4%	1,881,453	59.2%
Black	9,462	2.7%	55,517	1.7%
American Indian & Alaskan Native	1,768	0.5%	12,961	0.4%
Asian	58,864	16.8%	672,223	21.2%
Native Hawaiian & other Pacific Islander	1,478	0.4%	11,166	0.4%
Some other race alone	34,548	9.9%	410,006	12.9%
Two or more races, non-Hispanic	11,406	3.3%	132,366	4.2%
Hispanic or Latino (of any race) *	189,975	54.3%	1,081,091	34.0%
Total	349,964	100%	3,175,692	100%

* The US Census Bureau does not currently count persons identifying as Hispanic or Latino as a separate racial or ethnic category. Persons who identify as Hispanic or Latino are included in the other racial or ethnic categories.
Source: U.S. Census Bureau, 2019 American Community Survey (ACS) – Anaheim and Orange County

Anaheim residents have attained lower higher education levels in comparison to Orange County. For example, a slightly lower percentage of the city's population has earned a bachelor's degree. Similarly, a lower percentage of the city has attained a graduate or professional degree as compared to Orange County. Other categories also differ, such as a higher percentage of people not having education past ninth grade and a higher percentage of people not having graduated high school. However, a higher percentage of the city's population has a higher High school

graduate or equivalent level of education than Orange County. **Table 2-3** shows all levels of educational attainment of residents 25 years of age or older in both Anaheim and Orange County, according to American Community Service as of 2019.

TABLE 2-3: EDUCATIONAL ATTAINMENT OF RESIDENTS 25+ YEARS OLD—ANAHEIM & ORANGE COUNTY

Level of Education Completed	Anaheim		Orange County	
	Number	Percentage	Number	Percentage
Less than 9th grade	29,062	12.7%	160,132	7.3%
9th grade to 12th grade (no diploma)	24,293	10.6%	145,322	6.6%
High school graduate or equivalent	53,423	23.3%	391,016	17.8%
Some college (no degree)	48,042	20.9%	431,698	19.6%
Associate degree	16,208	7.1%	169,466	7.7%
Bachelor's degree	41,845	18.2%	568,673	25.8%
Graduate or professional degree	16,693	7.3%	334,171	15.2%
Total	229,566	100%	2,200,478	100%

Source: U.S. Census Bureau, 2019 American Community Survey (ACS) – Anaheim and Orange County
Percentage values are rounded to the nearest tenth decimal.

Anaheim has a wide range of non-English languages spoken at home among its residents, with varying proficiency levels. Generally, Spanish is the second most spoken language in Anaheim, with slightly over 40% that speak English less than "very well." Asian and Pacific Islander languages are the third most-spoken languages in Anaheim, with slightly over 50% that speak English less than "very well." This is similar to populations in Orange County, where slightly over 50% of Asian and Pacific Islander language speakers speak English less than "very well." According to the ACS, **Table 2-4** shows the most spoken languages and the levels of fluency among speakers aged five years and older in Anaheim and Orange County**.**

ECONOMY AND COMMUTE PATTERNS

TABLE 2-4: ENGLISH PROFICIENCY & LANGUAGES SPOKEN AT HOME AMONG RESIDENTS 5+ IN ANAHEIM & ORANGE COUNTY

Languages	Anaheim			Orange County		
	Number of speakers	% not fluent in English	Speak English "less than very well"	Number of speakers	% not fluent in English	Speak English "less than very well"
English	127,260	_	_	1,595,607	-	-
Spanish	142,968	17.6%	57,631 (40.3%)	765,060	25.6%	268,964 (35.2%)
Indo-European*	10,858	3.3%	3,961 (36.5%)	129,377	4.3%	31,473 (24.3%)
Asian & Pac Islander*	40,041	12.2%	20,224 (50.5%)	470,103	15.7%	235,365 (50.1%)
All other languages	6,026	1.8%	2,313 (38.4%)	30,215	1.0%	7,502 (24.8%)
Total	327,153	34.9%	81,129	2,990,362	46.6%	543,304**

*Census data does not break down the specific languages for languages spoken in these regions.
**Due to these figures only being a percentage of the overall number of speakers, they will not add up to 100%.
Source: U.S. Census Bureau, 2019 American Community Survey (ACS) – Anaheim and Orange County

Anaheim has a diverse economy of employers from various sectors, including amusement parks, professional sports teams, arts and entertainment services, restaurant services, manufacturing, wholesale and retail trade services, engineering services, construction, financial services, government, accommodation and food services, warehouses, and educational and health services. With a total employment base of 199,346 jobs for employees, the top 10 employers in

the City include The Disneyland Resort, Kaiser Permanente, L-3 Communications, Anaheim Regional Medical Center, Northgate Gonzalez Supermarkets, Makar Anaheim, LLC (Hilton Anaheim), West Anaheim Medical Center, Angels Baseball, Carrington Mortgage Services LLC, St Joseph Health.[14] These employers account for a little over 22% of the workforce within the city. In addition to these major employers, Anaheim GardenWalk is an "eatertainment" destination that blends dining, nightlife, family-friendly fun, outdoor art, and unique shops in a single fantastic location and concert venue. **Table 2-5** shows the top ten employers in Anaheim according to the City's 2020/2021 Comprehensive Annual Financial Report.

TABLE 2-5: 10 LARGEST EMPLOYERS IN ANAHEIM, AS OF 2021

Employer	Number of Employees	Percentage of Total City Employment
Disneyland Resort	19,000	13.7%
Kaiser Permanente	4,194	3.0%
L-3 Communications	1,234	0.9%
Anaheim Regional Medical Center	1,200	0.9%
Northgate Gonzalez Supermarkets	1,079	0.8%
Makar Anaheim, LLC (Hilton Anaheim)	1,000	0.7%
West Anaheim Medical Center	865	0.6%
Angels Baseball	824	0.6%
Carrington Mortgage Services, LLC	800	0.6%
St. Joseph Health	800	0.6%

Source: City of Anaheim, Comprehensive Annual Financial Report for FY Ending 2021.
Percentage rounded to the nearest tenth percentage.

As of 2019, over 185,141 Anaheim residents are employed, with approximately 28,352 (15.3%) working within the city. This local workforce accounts for 14.2% of the entire workforce, with the remaining workforce coming from surrounding cities throughout the region. **Table 2-6** shows the top five cities that contribute to Anaheim's workforce, accounting for approximately 30% of those employed within the city.

TABLE 2-6: TOP 5 CITIES-OF-ORIGIN FOR ANAHEIM'S WORKFORCE (2021)

Employee City-of-Origin	Number of Employees	Percentage of Total City Employment
Anaheim	28,352	14.2%
Santa Ana	8,836	4.4%
Los Angeles	8,676	4.4%
Fullerton	6,999	3.5%
Garden Grove	6,979	3.5%
Total	59,842	30%

Source: https://onthemap.ces.census.gov/

While most of Anaheim's residents commute outside the city for work, most commuting residents (45.3%) travel less than 10 miles to reach their place of employment. Approximately 7.3% of commuters traveled 50 miles or more, with most of those trips heading into the Los Angeles or San Diego areas. The City boasts convenient rail (Metrolink stations in Anaheim-Canyon Station and the Anaheim Regional Transportation Intermodal Center (ARTIC)), airport access (John Wayne International Airport, approximately 13 miles), and freeway access to Los Angeles, San Diego, Riverside, and San Bernardino Counties. **Table 2-7** shows the outflow of workers from Anaheim to other worksites in the region.

[14] City of Anaheim, 2020/2021 Annual Comprehensive Financial Report

TABLE 2-7: WORK COMMUTE DISTANCES FOR ANAHEIM'S RESIDENTS (2021)

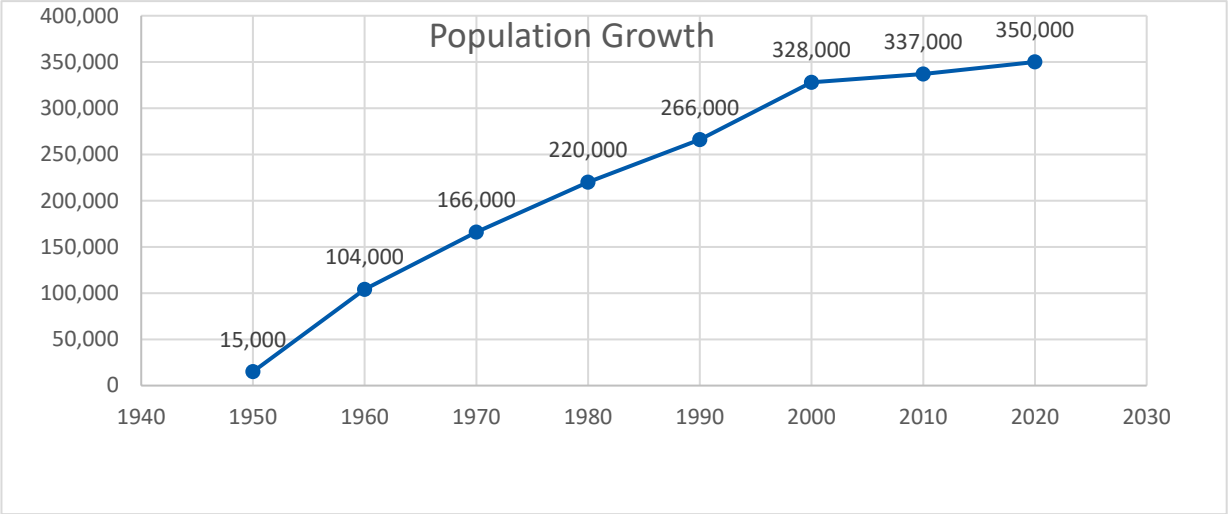
Work Destination for Anaheim Residents	Number	Percentage
Less than 10 miles	83,837	45.3%
10 to 24 miles	63,029	34.0%
25 to 50 miles	24,823	13.4%
Greater than 50 miles	13,452	7.3%
Total	185,141	100%

Source: https://onthemap.ces.census.gov/

DEVELOPMENT TRENDS

Anaheim is located within a dense part of northern Orange County that has experienced significant growth and development over the past 60 years. The city's population has grown by approximately 249,000 residents in the past 60 years. According to the California Department of Finance database, the City's 2021 population was around 353,000 residents. With land still available and multiple active developments ongoing within the city, population growth is expected to continue. **Figure 2-1** displays the population growth experienced in Anaheim from 1960 to 2020.

FIGURE 2-1: POPULATION GROWTH OF ANAHEIM FROM 1960 TO 2020



Source: World Population Review: Anaheim

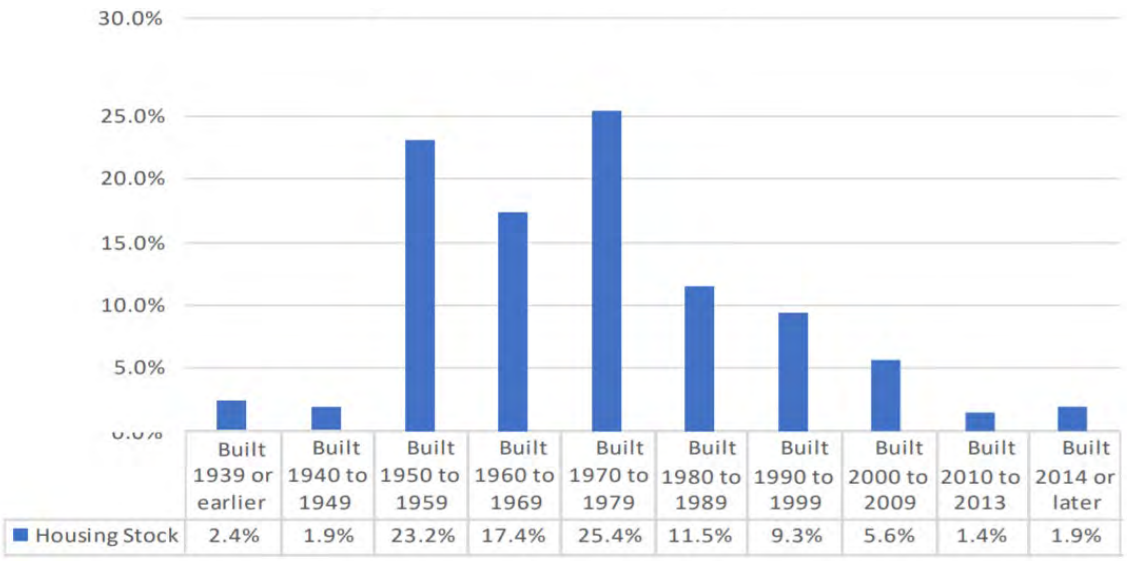
According to the 2021-2029 City of Anaheim Housing Element, the city has a state housing development requirement of 17,453 units. Currently, between the City's identified Pipeline Projects, Accessory Dwelling Units (ADUs), and Candidate sites, Anaheim not only meets the State requirement but has a surplus of 21,174 potential units available for development. **Appendix B,** Adequate Sites Analysis, of the 2021-2029 Housing Element provides a detailed analysis of this and can be accessed here. This appendix identifies all current residential development, anticipated future residential development, and the overall residential development capacity within the city.

MAJOR COMMUNITY COMPONENTS

Residential Uses

With approximately 350,000 residents, the City has a diverse residential base of residential structure types. **Figure 2-2** displays the details of the housing stock in Anaheim. The data shows that most of the City's housing stock is the result of housing construction that occurred between

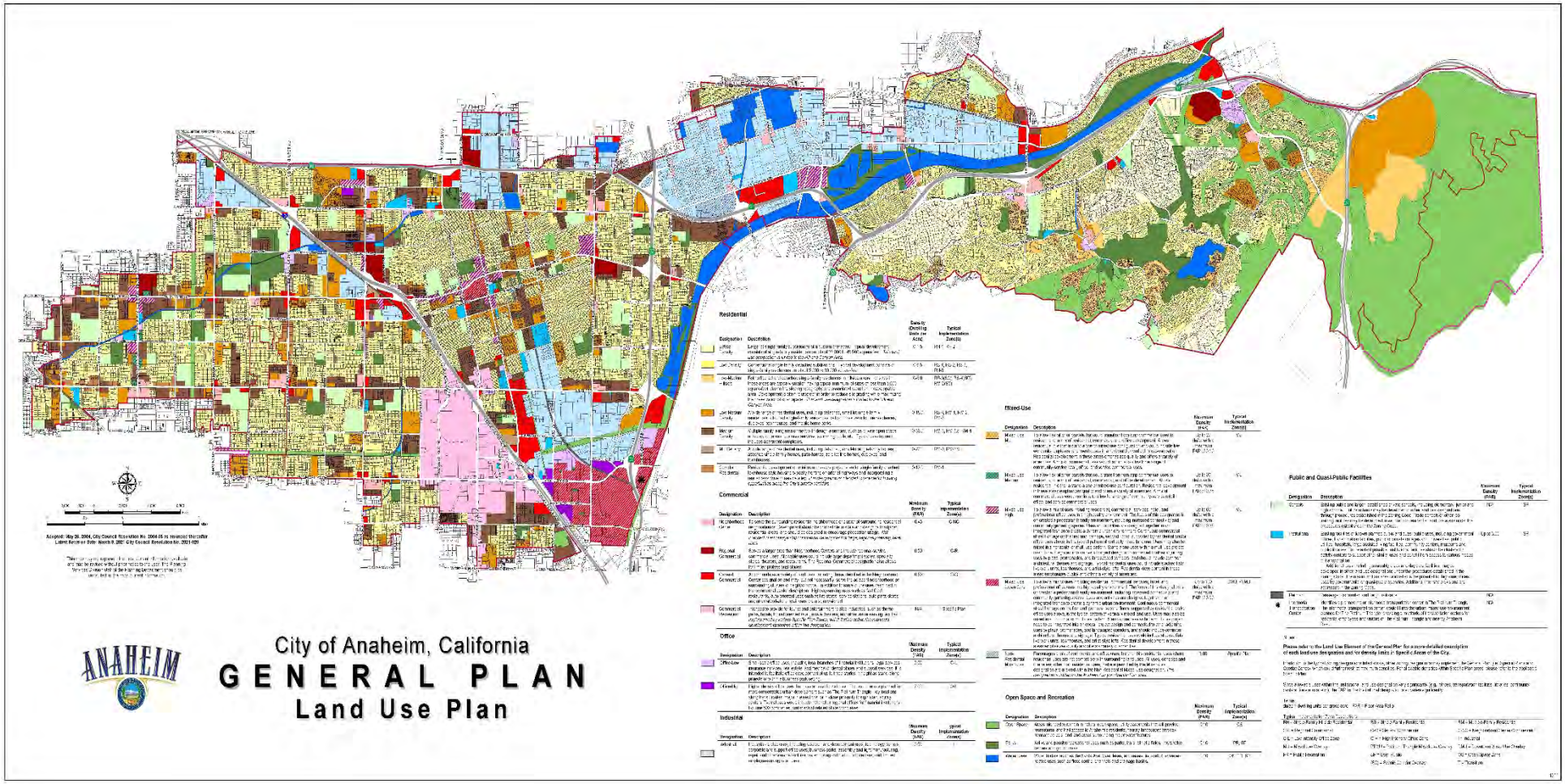
1950 and 1979 (approximately 40-70 years ago). Homes in older neighborhoods may require retrofit improvements to reduce risks from natural hazards and bring them into compliance with current building practices and requirements. Typically benefit from upgrades or renovations, so it is important to check for the age of the housing stock. **Figure 2-3** is the General Plan Land Use Designations Map, which depicts the various components that go into the composition of the City.



The Disneyland Resort

The Disneyland Resort is the adopted nickname the City gave to the 160-acre world-famous amusement park and brand. The "Happiest Place on Earth" is home to Mickey Mouse and the Marvel and Star Wars movie franchises. Disneyland Resort comprises two amusement parks, Disneyland and Disney California Adventure, and Downtown Disney—an enormous outdoor retail shopping and dining area with multiple hotels, restaurants, parking structures, and other buildings (maintenance buildings, administration offices, and backstage areas) for cast members and other Disney employees. As of 2019, over 700 million people have visited Anaheim's Disney realm, bringing tourist dollars and invaluable revenue to Anaheim. Disneyland Resort currently provides over 19,000 jobs in the city and generates a robust boost to the city's economy. Disneyland is the anchor upon which Anaheim has experienced some of its largest population and economic booms since its opening in 1956. Walt Disney was a man of vision and saw the potential in Anaheim and brought his vision to life, making Anaheim a name recognized worldwide.

FIGURE 2-3: CITY OF ANAHEIM GENERAL PLAN LAND USE PLAN MAP



Honda Center and Anaheim Stadium

Anaheim is also the home to two professional sports teams and their respective arena and stadium. The Anaheim Ducks are a professional NHL franchise that plays home games at the Honda Center. The Los Angeles Angels of Anaheim is a professional MLB franchise that plays all its home games at Anaheim Stadium. The stadiums are host to multitudes of major events each year, from the home games of their respective teams to the many headlining concerts, comedy shows, Monster Jam, and the Harvest Crusade, amongst many other events. Millions of visitors and their hard-earned tax dollars are drawn to the city annually as patrons of the events held at these two venues.

Anaheim Convention Center

The Anaheim Convention Center, at 1.8 million square feet, is one of the largest exhibition facilities in the nation and the largest on the west coast. It is in downtown Anaheim across from the Disneyland Resort. Since the building's inception in 1967, it has undergone six major expansions to become the facility it is today. It hosts annual trade shows and events such as VidCon, BlizzCon, D23 Expo, NAMM Show, and WonderCon. It has hosted Olympic events and collegiate championship tournaments and is home to countless professional conferences and conventions. The Convention Center brings in millions of visitors to the city every year along with the revenues expected from so many visitors.

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 Anaheim's electrical, gas, water and wastewater, and infrastructure transportation networks.

Anaheim Public Utilities

Electricity Service

Anaheim Public Utilities (APU) provides both electricity and water service to Anaheim. APU operates the only municipal electric system in Orange County. Since the ratepayers own the utility, key decisions concerning operation are made in Anaheim and not by an outside source. APU owns and operates one of the largest rooftop municipal solar photovoltaic (PV) systems on the roof of the Anaheim Convention Center. Its 7,908 panels at 2.4 megawatts produce some 3.5-million kilowatt-hours. APU receives its power supply from many local sources in the city and other facilities in the Western United States. Many of these facilities are renewable energy sources (wind, solar, geothermal, landfill gas, and hydroelectric). Anaheim residents enjoy the lowest electric rates in Orange County and are not subject to a utility users' tax. The City has 1.2 miles of transmission 220kV circuit miles and 88 transmission 69kV circuit miles, and the distribution system has over 3,200 circuit miles of up to 12kV to serve the customers.[15]

APU also owns and operates fourteen substations within the city. The Park Substation, built in 2006, was the nation's first underground electric substation, which lies beneath Roosevelt Park (a 2-acre facility swerving the East Anaheim neighborhood). The most recent one built in Anaheim

[15] Anaheim Public Utilities, https://www.anaheim.net/2104/About-Electric-Services

is the Harbor Substation is in the platinum triangle serving an area that includes thousands of planned and completed residential units, commercial properties, and venues such as Angel Stadium, Honda Center, and the Grove of Anaheim. The Harbor Substation is built within the interior of a building for improved reliability and security and to blend in with the surrounding area. These facilities improve reliability and provide additional capacity to the city's residents and businesses in the event of increased energy demands.[16]

Water Service

APU also owns and operates its own water production and distribution utility. The water supply for the city comes primarily from the local groundwater basin, with the remainder coming from imported water sources provided by the Metropolitan Water District of Southern California (MWD). MWD supplies its water from the Colorado River and Northern California to supplement local demand and supplies.[17]

August F. Lenain Water Treatment Plant

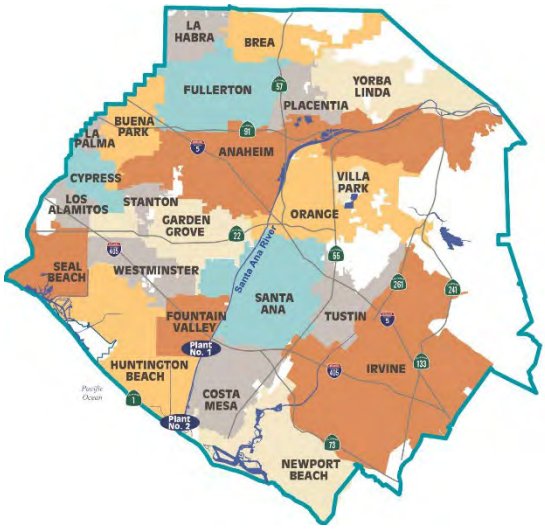
APU owns and operates the Lenain Water Treatment plant located adjacent to the Walnut Canyon Reservoir (920-million-gallon reservoir) and treats up to 20 million gallons of water a day for the city. It has the distinction of being the only City-owned surface water treatment plant in Orange County. Using a conventional treatment process and ozone disinfection, the facility ensures that the water quality exceeds all state and federal standards for drinking water. It is also home to a fully equipped water quality laboratory and the operations center for APU's water system.[18]

Natural Gas

The Southern California Gas Company (SoCalGas) provides natural gas to Anaheim and surrounding jurisdictions. To ensure sufficient natural gas transmission throughout the region, SoCalGas owns and operates transmission lines throughout Orange County. The main pipeline servicing Anaheim runs east to west in the city's northern section. If these lines are damaged, there is potential to interrupt the flow and delivery of natural gas throughout the region. Additionally, natural gas ignites easily. 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.

Wastewater Treatment

The wastewater treatment for the City of Anaheim is provided by the Orange County Sanitation District (OCSD). OCSD is a public agency that provides wastewater collection, treatment, and disposal services for approximately 2.6 million people in central and northwest Orange County. OCSD is a special district governed by a Board of



Orange County Sanitation District Service Area. OC San Map

[16] Anaheim Public Utilities, https://www.anaheim.net/3417/Harbor-Substation
[17] Anaheim Public Utilities, https://www.anaheim.net/1694/About-Water-Services
[18] Anaheim Public Utilities, https://www.anaheim.net/1694/About-Water-Services

Directors consisting of 25 board members appointed from 20 cities, 2 sanitary districts, 2 water districts, and 1 representative from the Orange County Board of Supervisors. OCSD has two operating facilities that treat residential, commercial, and industrial wastewater. OCSD has two treatment plants serving the City of Anaheim: Reclamation Plant No. 1 in Fountain Valley and Treatment Plan No. 2 in Huntington Beach. Average flows for Reclamation Plant No. 1 and Treatment Plan No. 2 are 81 million gallons per day (mgd) and 151 mgd, respectively. The combined average flow is 239 mgd. The Public Works Department's Sewer Maintenance Program maintains and operates the sanitary sewer collection system. The Sewer Maintenance Program practices preventative maintenance activities such as continual monitoring and maintenance of the entire system and hydraulic cleaning of the main lines.[19]

Transportation System and Context

The City of Anaheim has convenient access to local and regional transportation facilities, including freeways, arterial roadways, and access to Metrolink commuter rail connections to nearby counties and other cities. Four major freeways lie within the City of Anaheim: the I-5 Freeway, the SR-57 Freeway, the SR-91 Freeway, and the SR-55 Freeway. In addition, the Garden Grove SR-22 Freeway is located less than one mile south of the city.

Interstate Routes

The I-5 Freeway serves as the northwest-southeast route that connects and provides access to Los Angeles County to the north and San Diego County to the south, traversing through the city diagonally with eleven access points to the city.[20]

State Routes

SR-91 Freeway is the east-west route running along the city's northern edge, which provides regional access to the west and the South Bay cities of Los Angeles County, terminating in the east at the SR-60 allowing access to Riverside County, San Bernardino County, and points east. SR-57 Freeway is the north-south freeway that ends at the I-5 and SR-22 Freeways just to the south of the city limits. This freeway provides regional access to northern Orange County and eastern Los Angeles County, providing five access points to the city. SR-55 Freeway is a north-south freeway that terminates at the SR-91 within the northern city limits of Anaheim. It provides regional access to the central coastal communities of Orange County with one access point to the city. SR-22 lies to the south of the city limits (approximately one mile) and provides access to western Orange County and eastern Los Angeles County.

Additionally, two smaller routes provide access in and out of Anaheim. SR-90 (Imperial Highway) runs east-west and turns to then run north-west through eastern Anaheim. SR-39 (Beach Boulevard) is a major north-south arterial roadway passing through seven cities, including Anaheim.[21]

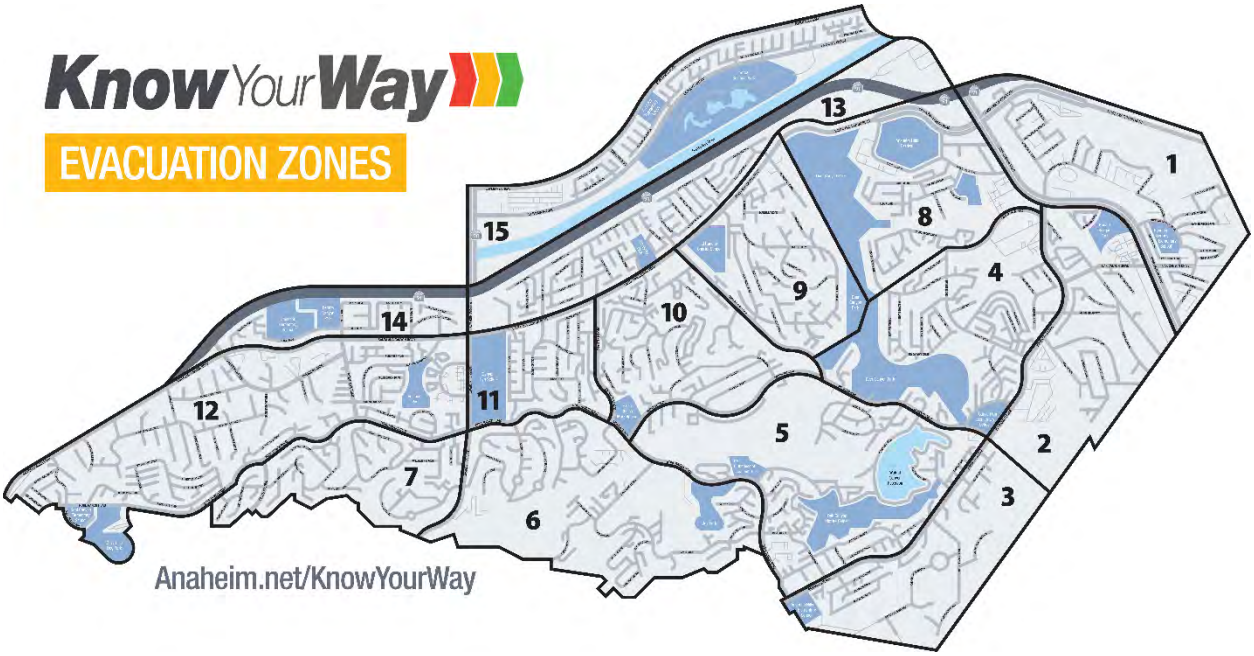
Evacuation Context

Evacuation routes within the City are designated to assist residents, business owners, and visitors during an emergency incident. To help those that may need to evacuate, the City has developed

[19] Orange County Sanitation District, https://www.anaheim.net/1694/About-Water-Services
[20] Anaheim General Plan/Zoning Code Update EIR, pg. 5-264, 2004. https://www.anaheim.net/DocumentCenter/View/2197/515-Traffic-and-Circulation-?bidId=#:~:text=Four%20freeways%20lie%20within%20the,mile%20south%20of%20the%20City.
[21] Anaheim General Plan/Zoning Code Update EIR, pg. 5-264, 2004. https://www.anaheim.net/DocumentCenter/View/2197/515-Traffic-and-Circulation-?bidId=#:~:text=Four%20freeways%20lie%20within%20the,mile%20south%20of%20the%20City.

its “Know Your Way” webpage, which provides helpful information and suggestions for evacuation. This resource includes pre-determined evacuation zones for East Anaheim, identifying 15 different neighborhoods and the suggested evacuation routes for those areas. **Figure 2-4** identifies these evacuation zones.

FIGURE 2-4: EAST ANAHEIM EVACUATION ZONES



Evacuation locations within the City are typically located at community centers, parks, libraries, schools, and other locations deemed safe based on incident specifics. The critical facilities locations identified in Chapter 4 include various city facilities that can be used as evacuation locations, which are determined at the time of the incident.

CHAPTER 3 – HAZARD ASSESSMENT

HAZARD PROFILES

This chapter discusses the types of hazards that might reasonably occur in Anaheim. It describes these hazards and how they are measured, where they may occur, a history of these hazards in and around the city, and the future risk they pose. The discussion of future risks includes changes to the frequency, intensity, and/or location of these hazards due to climate change. This chapter also discusses how the HMTF selected and prioritized this Plan's hazards.

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 HMTF reviewed an extensive list of hazards and excluded those that do not threaten Anaheim. **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 Orange County Hazard Mitigation Plan (OC HMP). This table does not include all potential impacts; the table is based upon FEMA and State guidance and the most probable impacts within Anaheim. As a result, some hazards like war or foreign invasion are better addressed at the Federal level.

TABLE 3-1: HAZARD EVALUATION FOR ANAHEIM LHMP

Hazard	Recommended for Consideration	Included in this LHMP?	Reason for Inclusion or Exclusion
Agricultural Pests	SHMP	No	Anaheim has minimal agricultural uses within the city that contribute to the economy. Concerns regarding agricultural pests are not a significant concern citywide.
Air Pollution	SHMP	No	Air pollution is a state and regional issue that is addressed through plans and regulations administered by the South Coast Air Quality Management District and/or California Air Resources Board. Since the City has little control over regulating air quality, this hazard was not included.
Aircraft Incident	SHMP	No	The City is located approximately 13 miles from John Wayne Airport. Given the distance and lack of history associated with this hazard in the city, it was determined that this hazard should not be included in the plan.
Aquatic Invasive Species	SHMP	No	There are no major water bodies or riparian environments in Anaheim where invasive aquatic species could endanger the community.
Avalanche	FEMA guidance SHMP	No	There is no potential for avalanches to occur within the city.
Civil Disturbance or Riot	SHMP	Yes	The HMTF determined that civil disturbances of the degree that could endanger property or the lives of residents or visitors could occur, especially in areas large populations visit/congregate (Disneyland Resort, Anaheim Convention Center, Anaheim Stadium, Honda Center, and the GardenWalk).
Climate Change	SHMP OC HMP	Yes	Climate change is a concern identified by the HMTF and has been included within each hazard profile, where relevant.
Coastal Flooding and Storm	FEMA guidance SHMP	No	Based on its distance from the coast, coastal flooding and storms are not a concern for the city.

Cyber Threats	SHMP	Yes	The growing threat of cyber security and data breaches has increasingly become a potential hazard of concern for cities including Anaheim.
Dam Failure	FEMA guidance SHMP OC HMP	Yes	The Prado Dam, Carbon Canyon Dam and Diamond Valley Lake are located upstream from the city and have the potential to inundate the city if failure were to occur, as well as the location of Walnut Canyon Reservoir within the city limits. Due to this potential, the HMTF identified dam failure as a hazard of concern.
Drought	SHMP OC HMP	Yes	Droughts are a recurring and potentially severe hazard in Anaheim and can affect city water supplies. Given the prevalence of droughts within the western US, the HMTF identified drought as a hazard of concern to be addressed in this LHMP.
Energy Shortage	SHMP	No	Anaheim Public Utilities creates and distributes electricity within Anaheim. APU has a long history of reliability, and therefore the HMTF decided that this is not a concern for the city.
Epidemic, Pandemic, Vector-Borne Disease	SHMP	Yes	Located in Orange County, the City has experienced several health-related incidents in the past. It is within proximity to a major airport, major attractions (i.e., Disneyland, etc.), and educational institutions, which can introduce new diseases to the region. The current COVID-19 global pandemic has impacted city staff and resources, indicating a desire by the HMTF to include this in the plan.
Erosion	FEMA guidance SHMP	No	The City has not experienced many cases of erosion; the HMTF decided it was not a concern for the city.
Expansive Soil	FEMA guidance	No	The City does not experience a significant issue with expansive soils.
Extreme Cold	FEMA guidance SHMP	No	Temperatures in Anaheim do not fall to a level that would be considered a danger to public safety.
Extreme Heat	FEMA guidance SHMP	Yes	Extreme heat conditions have occurred in the City and are expected to be a future recurring issue.
Fault Rupture	FEMA guidance SHMP OC HMP	Yes	There are no known active faults located within the City; however, inactive faults within the city resulted in the HMTF identifying fault rupture as a potential hazard of concern.
Flooding	FEMA guidance SHMP	Yes	The City is located on the banks and levees of the Santa Ana River and is identified within FEMA flood hazard zones. The presence of these flood zones indicates the potential for future hazards.
Fracking	SHMP	No	Fracking does not occur in Anaheim.
Hail	FEMA guidance	No	Hail that is severe enough to pose a threat to people and property is not a concern identified by the HMTF.
Hazardous Materials release	SHMP	Yes	Locations that store, manufacture, and dispose of hazardous materials within the City concern the HMTF. In addition, several major transportation routes through the City are used to transport these materials, which could impact properties and people if a release into the environment were to occur.
Hurricane	FEMA guidance SHMP	No	Hurricanes do not occur in Anaheim.
Infrastructure Failure	SHMP	No	Infrastructure failure poses a threat to people and property in Anaheim. A discussion of infrastructure failure is discussed as a function of other hazards.
Landslide	FEMA guidance SHMP	Yes	Areas in the eastern portions of the city have varying degrees of landslide potential. As a result, the HMTF identified this as a hazard of concern within the plan.
Levee Failure	SHMP	No	The HMTF identified flooding and dam failure as hazards of concern, which include a brief discussion on levee failure.

Lightning	FEMA guidance	No	Although lightning occasionally occurs in Anaheim, it does not pose a significant threat to people or property.
Liquefaction	FEMA guidance SHMP OC HMP	Yes	According to the California Geological Survey, portions of the city are located within liquefaction-prone areas. Based on this mapping, the HMTF identified liquefaction as a hazard of concern.
Methane-containing Soils	OC HMP	No	The City does not have a history of incidents involving methane-containing soils and is not a hazard of concern identified by the HMTF.
Natural Gas Pipeline Hazards	SHMP	No	Natural gas transmission pipelines are located within the City and could pose a danger to people and property if they breach and release their contents into the community. However, the HMTF did not identify this as a hazard of concern to the city.
Oil Spills	SHMP	No	This is not a hazard of concern for the city as there is no oil drilling within the city,
Power Failure	SHMP	No	Anaheim Public Utilities provides electricity to customers within Anaheim. APU has a long history of reliability, and therefore the HMTF decided that this is not a concern for the city.
Radiological Accidents	SHMP	No	There are no known major radiation sources in Anaheim or the immediate surrounding area that could seriously threaten the community.
Sea-level Rise	FEMA guidance SHMP	No	Anaheim is not located within close proximity to the ocean.
Seiche	FEMA guidance SHMP	No	There are no major bodies of water in Anaheim that could be subjected to seiche or that are a concern for the city.
Seismic Shaking	FEMA guidance SHMP OC HMP	Yes	Anaheim is in a seismically active area where shaking can be severe enough to damage property or cause loss of life. For this reason, the HMTF determined it should be addressed in this plan.
Severe Wind	FEMA guidance	Yes	Windstorms are a common occurrence within the City and southern California. This hazard is included in the Severe Weather profile, referred to as windstorms, including discussions of extreme heat and drought. Severe wind events typically occur during Santa Ana wind conditions.
Severe Weather and Storms	FEMA guidance SHMP OC HMP	Yes	Severe Weather includes discussions regarding extreme heat, severe wind (windstorms), and rain, which are weather-related hazards that are most common in Anaheim.
Storm Surge	FEMA guidance	No	The HMTF did not identify this as a hazard of concern since the city is not located near the California coastline.
Subsidence	FEMA guidance	No	The HMTF did not identify subsidence as a hazard of concern for the City.
Mass-Casualty Incident (Terrorism)	SHMP	Yes	The HMTF identified mass-casualty incidents and terrorism as potential threats of concern. This hazard is addressed in the Human-Caused Hazards section.
Thunderstorm	SHMP	No	Thunderstorms that cause damage and endanger public safety are rare in the Southern California region.
Tornadoes	FEMA guidance SHMP	No	Tornadoes were not considered a hazard that could impact the City and were not included in this LHMP.
Transportation Accidents	SHMP	No	While numerous major transportation corridors are located in and around the city, the HMTF did not identify this hazard as a concern for this plan.
Tree Mortality	SHMP	Yes	The HMTF noted that the City's trees are a significant asset at risk. Tree Mortality is discussed within the Diseases and Pests hazard profile.

Tsunami	FEMA guidance SHMP	No	The HMTF did not identify tsunamis as a hazard of concern since the city is not located near the California coastline.
Urban Fire	SHMP OC HMP	Yes	The HMTF identified urban fires as a risk to property and life in Anaheim, and therefore was included in this plan.
Volcano	SHMP	No	There are no volcanoes near Anaheim to pose a reasonable threat.
Wildfire	FEMA guidance SHMP	Yes	The HMTF identified wildfire as a major threat to the city, especially the eastern portions of Anaheim, and therefore was included in this plan.

After hazard evaluation and the organizational changes were made by the HMTF, this Plan discusses eight broad hazard types with their respective sub-categories, including climate change, which is discussed in each hazard profile:

Hazard Type	Sub-Categories
Wildland/Urban Fire	
Earthquake	Fault Rupture, Seismic Shaking, Liquefaction
Severe Weather	Windstorms, Extreme Heat, Drought
Dam Failure	
Landslide	
Disease and Pests	Public Health Emergencies, Vector Issues, Tree Mortality
Flood/Storm	
Human-Caused Hazards	Hazardous Materials Release, Terrorism, Civil Unrest
Climate Change	Discussed in each Hazard Profile

Hazard Scoring and Prioritization

The HMTF followed FEMA guidance for hazard mitigation plans and prioritized each of the eight hazards and their respective subcategories. In the initial step, it assigned a score of 1 to 4 for each of the hazards for the following criteria:

Probability: The likelihood that the hazard will occur in Anaheim in the future.

Magnitude/Severity: The severity of the direct damage of the hazard to Anaheim.

Warning Time: The time the city has before a disaster event/hazard impacts Anaheim.

Duration: The time that the disaster event will affect Anaheim.

The HMTF assigned a weighting value to each criterion, giving a higher weight to the criteria deemed more important and multiplied the score for each criterion by weighing the factor in determining the overall score for each criterion.

FEMA recommended the weighting values:

Probability: 45% **Magnitude/Severity:** 30%
Warning Time: 15% **Duration:** 10%

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

TABLE 3-2: CRITERION SCORING

CPRI Category	Degree of Risk Chart			Assigned Weight Factor
	Level ID	Description	Index Value	
Probability	Unlikely	Extremely rare with no documented history of occurrences or events. Annual probability of less than 0.001	1	**45%**
	Possible	Extremely rare with no documented history of occurrences or events. Annual probability of between 0.01 and 0.001	2	
	Likely	Occasional occurrence with at least two or more documented historic events. Annual probability of between 0.1 and 0.01	3	
	Highly Likely	Frequent events with a well-documented history of occurrence. Annual probability of greater than 0.1	4	
Magnitude/Severity	Negligible	Negligible property damages (less than 5% of critical and non-critical facilities and infrastructure) Injuries or illnesses are treatable with first aid and there are no deaths Negligible quality of life lost Shut down of critical facilities for less than 24 hours	1	**30%**
	Limited	Slight property damages (greater than 5% and less than 25% of critical and non-critical facilities and infrastructures) Injuries and illnesses do not result in permanent disability and there are no deaths Moderate quality of life lost Shut down of critical facilities for more than 1 day and less than 1 week	2	
	Critical	Moderate property damages (greater than 25% and less than 50% of critical and non-critical facilities and infrastructures) Injuries or illnesses result in permanent disability and at least one death Shut down of critical facilities for more than 1 week and less than 1 month	3	
	Catastrophic	Severe property damages (greater than 50% of critical and non-critical facilities and infrastructure) Injuries or illnesses result in permanent disability and multiple deaths Shut down of critical facilities for more than 1 month	4	
Warning Time	Less than 6 hours	Population will receive less than 6 hours of warning	4	**15%**
	6 to 12 hours	Population will receive between 6-12 hours of warning	3	
	12 to 24 hours	Population will receive between 12-24 hours of warning	2	
	More than 24 Hours	Population will receive greater than 24 hours of warning	1	
Duration	Less than 6 hours	Disaster event will last less than 6 hours	1	**10%**
	Less than 24 hours	Disaster event will last between 6-24 hours	2	
	Less than one week	Disaster event will last between 24 hours and 1 week	3	
	More than one week	Disaster event will last more than 1 week	4	

After calculating the total impact score for each hazard (sum of the probability, magnitude/severity, warning time, and duration). FEMA guidance recommends multiplying the total impact score by the overall probability to determine the final score for each hazard. A final score between 4.0 (High Threat) and 0.0 (No Threat) is calculated using the weighted scale provided in **Table 3-2** to determine each hazard's overall level of threat to Anaheim. Any hazard ranked from 4.0 to 3.0 is considered a high threat to the city, 2.9 to 2.0 is considered a medium threat, 1.9 to 1.0 is considered a low threat, and a score of 0.9 to 0.0 is considered an extremely low/negligible threat to the city.

Table 3-3 shows each hazard's criterion scores, final score, and threat level 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. Source Image: LA Times.

TABLE 3-3: HAZARD SCORES AND THREAT LEVEL

Hazard Type	Probability (1-4)	Severity (1-4)	Warning Time (1-4)	Duration (1-4)	Priority Ranking (1-4)
Wildland/ Urban Fire	4	3	4	4	3.7 (High)
Earthquake (Fault Rupture, Seismic Shaking, Liquefaction)	3	4	4	4	3.55 (High)
Severe Weather (Windstorms/ Extreme Heat/ Drought)	4	2	2	4	3.1 (High)
Dam Failure	2	4	3	4	2.95 (Medium)
Landslide	3	2	3	4	2.8 (Medium)
Disease and Pests (Public Health Emergencies, Vector Issues, Tree Mortality)	4	1	1	4	2.8 (Medium)
Flood/Storm	3	2	2	3	2.55 (Medium)
Human-Caused Hazards (HazMat Release, Terrorism, Civil Unrest, Cyber Security)	3	1	4	2	2.45 (Medium)

WILDLAND/URBAN FIRE

Description

WILDLAND FIRE

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, increasing encroachment into the WUI, and a changing climate have made wildfires among California's most common and dangerous natural hazards.

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 it was one of California's deadliest and most destructive wildfires.[22] 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.[23] 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.[24]

URBAN FIRE

An urban fire is a fire that causes damage to buildings or infrastructure in an urbanized area. In some minor situations, the fire prompts the evacuation of the building's occupants. The fire is contained within a short time by firefighting teams or the building's fire suppression systems. In severe cases, the fire leads to the destruction of the building and can spread to other surrounding properties. Common causes of urban fires include stoves that are accidentally left on, short-circuited electrical equipment, or mishandling of household tools. Larger urban fires may be caused by breaches in gas pipelines, large transportation accidents, or downed electrical transmission wires. Additionally, arsonists can intentionally start fires.

Location and Extent

WILDLAND FIRE

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 California Department of Forestry and Fire Protection (Cal Fire) defines the wildfire hazard zones

[22] Cal FIRE. 2020. https://www.fire.ca.gov/media/5512/top20_deadliest.pdf
23 EPA. 2019. "Wildfires: How Do They Affect Our Water Supplies?" https://www.epa.gov/sciencematters/wildfires-how-do-they-affect-our-water-supplies
24 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/

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.

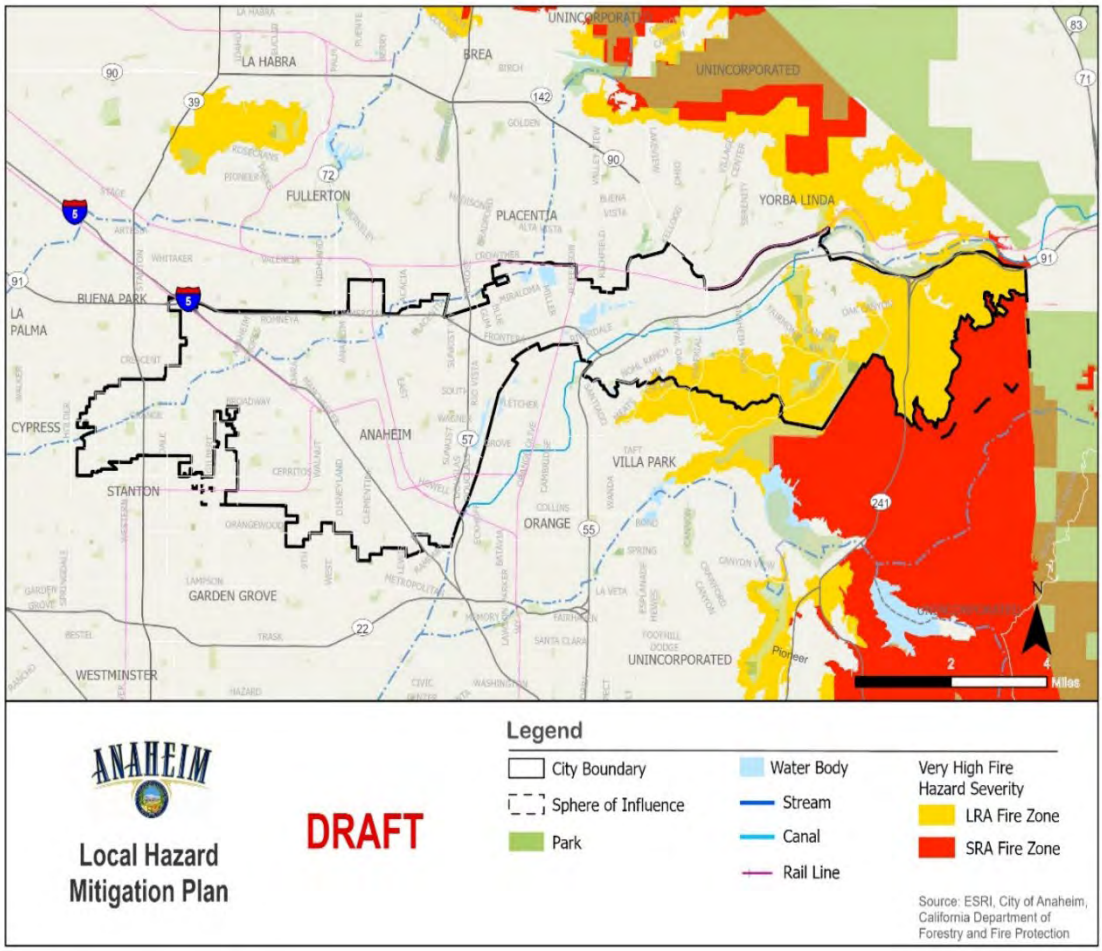
Due to the Santa Ana Mountains' foothill topography, eastern Anaheim is susceptible to wildfires. The community of Anaheim Hills is along the eastern portions of the City of Anaheim in the Santa Ana Mountain foothills in the wildland-urban interface (WUI). The WUI is the zone of transition between the wilderness and human-developed lands. Wildfires present a significant threat to the city and the County located in or near the WUI, as it is a region of relatively high temperatures, low humidity, and low precipitation during the summer. The fall brings with it the Santa Ana winds, which exacerbate the area's already dry conditions, increasing the foothills' susceptibility to wildfire. Fire threat assessment and Geographic Information System (GIS) mapping for Anaheim identify the WUI as the area with the city that has the highest risk of fire. **Figure 3-1** identifies the fire hazard zones within the city and the surrounding area, including the state responsibility areas (SRA) and the local responsibility areas (LRA). The zones depicted include the SRA, which is primarily unincorporated Orange County, under the jurisdiction of CAL Fire, while the LRA is under the control of the Orange County Fire Authority (OCFA). The city’s sphere of influence extends into the SRA and the Very High Fire Hazard Severity Zones (VHFHSZ) associated with this area. Development requirements within this area are regulated and must meet the development requirements for areas located within VHFHSZs.

Urban Fire

Most of Anaheim’s buildings consist of wooden-frame construction, which is vulnerable to catching fire. Structures that do not have wooden frames, such as large medical facilities or office towers, are also at risk of urban fires. These locations contain furniture, papers, plant material, textiles, and other objects that can be ignited. Given that a very large portion of Anaheim is developed, urban fires can occur at any location in the City since any one of these structures has the potential to burn.

Fires are also likely to occur where there are major infrastructures, such as gas pipelines, power lines, or highways. SoCal Edison owns and operates above-ground, high-voltage transmission lines strung from towers on a right-of-way through the City. While there are no structures directly beneath the towers in the utility right-of-way, numerous trees and extensive lawns could ignite if a downed power line were to come in contact with them. If this type of landscape caught fire, it could spread to surrounding homes and buildings. Anaheim has many major streets that carry heavy traffic like Katella Ave, Ball Rd, and Orangewood Ave.

The City is also surrounded by SR- 91 and SR-57 and also has the I-5 that runs directly through the city. These freeways contain an immense amount of traffic every day. If a major transportation accident were to occur on any of these freeways or roads, it could potentially cause a fire and spread to nearby houses and neighborhoods.



A fire can only ignite if three elements are present: heat, fuel, and oxygen. If any one of these elements is removed, the fire will extinguish itself. In Anaheim, there is copious amounts of fuel given to the thousands of structures which makes them extremely flammable. Activity that creates intense heat that is unmonitored or unregulated may lead to the ignition of a fire. The National Institute of Fire and Technology has developed a scale that measures the increase in temperature and the kind of fire response that develops. **Table 3-4** shows the progression of temperature relative to fire response.

Once a fire has been ignited, it could conceivably grow to an indefinite size if abundant fuel and oxygen are available. For example, a fire that ignites in one house could hypothetically continue to expand and even spread to other adjacent houses if there was enough fuel to link the structures together. Fires in confined spaces may occasionally burn so intensely that they consume all the oxygen available and burn out before they can expand.

TABLE 3-4: FIRE SUSCEPTIBILITY BASED ON TEMPERATURE INCREASE

Temperature (°F)	Response
98.6 °F	Average normal human oral/body temperature.
101 °F	Typical body core temperature for a working fire fighter.
109 °F	Human body core temperature that may cause death.
111 °F	Human skin temperature when pain is felt.
118 °F	Human skin temperature causing a first-degree burn injury.
130 °F	Hot water causes a scald burn injury with 30 s exposure.
131 °F	Human skin temperature with blistering and second degree burn injury.
140 °F	Temperature when burned human tissue becomes numb.
162 °F	Human skin temperature at which tissue is instantly destroyed.
212 °F	Temperature when water boils and produces steam.
482 °F	Temperature when charring of natural cotton begins.
>572 °F	Modern synthetic protective clothing fabrics begin to char.
≥752 °F	Temperature of gases at the beginning of room flashover.
≈1832 °F	Temperature inside a room undergoing flashover.

Past Events

WILDLAND FIRE

Anaheim has experienced wildfires in the past. The following are some of the major fires to have occurred since the development of Anaheim Hills began in 1982:

Gypsum Canyon: October 1982, the first major wildfire to occur in the newly developed Anaheim Hills area of Anaheim. Santa Ana winds spread a fire that caused some $50 million in property damages, destroying 14 homes and burning over 17,000 acres.[25]

Sierra Peak: On February 7, 2006, a wildfire broke out in the Cleveland National Forest, separating Anaheim Hills from the Riverside County border. High winds and temperatures prevented the containment of the fire. On February 9, 2006, the fire grew to the size that required the evacuation of roughly 75% of the Anaheim Hills community. The fire burned over 10,000 acres and caused significant natural resource damages to an endangered Tecate cypress grove, one of only four groves left in the U.S.[26]

[25] "Orange County Register: Fires in OC". Archived from the original on January 2, 2009.
[26] 2016 City of Anaheim LHMP.

241 Fire at Windy Ridge: On March 11, 2007, a fire broke out at the Windy Ridge Toll Plaza along the southbound SR 241 toll road. The fire spread quickly due to high winds, burning over 2,000 acres causing the evacuation of an estimated 2,500 homes destroying 2 outbuildings, damaging 2 homes, and causing 2 injuries.[27]

Freeway Complex: On November 15, 2008, the Freeway Fire broke out in Corona and continued to burn in a southwestern direction, where it met up with the Landfill Fire creating the Freeway Complex Fire. The combined fire continued making its way onto Anaheim Hills forcing the evacuation of 3,100 homes. It destroyed over 200 residences, including 14 houses and 86 apartments in Anaheim Hills. It burned over 30,305 acres, destroying 314 homes (including those in Anaheim Hills), 43 outbuildings, and 4 commercial properties. Fourteen (14) firefighters received non-fatal injuries fighting the combined fires.[28]

Canyon Fire 2: On October 8, 2017, the fire broke out at the interchange of California State Route 91 and California State Route 241 along the city's border. The fire was caused when the embers of the previous fire, the Canyon Fire, landed beyond the containment area. It was driven hard and fast by the Santa Ana winds and low humidity, causing the evacuation of some 16,570 residents, burning over 9,200 acres, destroying 25 structures, and damaging 55 more. It also resulted in 3 non-fatal injuries.[29]

URBAN FIRE

Anaheim and the surrounding area of Orange County have experienced urban fires. Some examples are included below:

Anaheim, CA: In April 1982, numerous homes and multi-family housing units caught fire, causing damages in the amount of $18.5 million and displacing 1,288 residents. The fire ignited in a palm tree after it repeatedly encountered a power line. The blaze eventually spread to surrounding buildings because of the intense Santa Ana winds.[30]

Fullerton, CA: An unknown serial arsonist started a series of 15 fires in trash bins and dumpsters throughout Fullerton across five months from 2016 to 2017. Nobody was injured, and no significant property was destroyed, though some of the containment sheds for the dumpsters were burned.[31]

Seal Beach, CA: The retirement community of Leisure World has experienced numerous fires within the last ten years. A carport caught fire in 2017, destroying eight vehicles and resulting in property damages worth $220,000. In 2014, five homes in the community caught fire and caused damages worth an estimated $1 million. In both instances, there were no fatalities.[32]

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[27] "Fire Update". Orange County Register. March 12, 2007. Retrieved January 2, 2020
[28] OC Register: By the Numbers: Anaheim Hills, Corona, Yorba Linda and Brea Fires Archived February 11, 2009, at the Wayback Machine
[29] Robinson, Alicia; Haire, Chris (11 October 2017). "Canyon Fire 2 Day 3: Lower temperatures help firefighters make progress on 9,217-acre blaze". Orange County Register. Retrieved 12 October 2017.
[30] Murphy, K. September 1985. “Anaheim Settles with Victims of 1982 Firestorm.” Los Angeles Times. https://www.latimes.com/archives/la-xpm-1985-09-12-me-21107-story.html
[31] CBS Los Angeles. February 2017. 4 Early Morning Fullerton Fires Likely Linked to Arson Spree, Policy Say. https://losangeles.cbslocal.com/2017/02/07/4-early-morning-fullerton-fires-likely-linked-to-arson-spree-police-say/
[32] Fausto, A. July 2017. “Fire at Leisure World in Seal Beach destroys 7 cars 1 golf cart.” *OC Register*. https://www.ocregister.com/2017/07/03/fire-at-leisure-world-in-seal-beach-destroys-7-cars-1-golf-cart/

Buena Park, CA: In 2017, an OCFA fire station near the theme park of Knott's Berry Farm (pictured at right) caught fire in the early morning resulting in the destruction of firefighting equipment worth $1.5 million, including a 100-foot fire engine, an SUV, and two swift-water emergency vehicles. Nobody was harmed by the fire. The cause of the fire was uncertain, but it is suspected that the building's age was a contributing factor.[33]

Risk of Future Events

Wildland Fire

The history of wildfires in Orange County and Anaheim and development within the City's WUI, which includes the very high fire hazard severity zones (VHFHSZ), indicates that wildfire events are likely to occur in the future. Since 1982, five major wildfire events have affected the city, equating to a return interval of approximately one fire every eight years. This risk is expected to remain highest in the undeveloped land in the foothills within both the city and the county's unincorporated areas, and National Forest lands that border the city and its sphere of influence (SOI).

Urban Fire

If the conditions for an urban fire exist in Anaheim, the City will forever be at risk of experiencing an urban fire event. It is impossible to predict the precise likelihood of an urban fire emerging in the City, given how each fire event has unique origins. However, some areas are at an increased risk of an urban fire, including buildings along the SoCalGas pipeline's course through the City, the Greenbelt along the SoCal Edison right-of-way, and the many populated areas freeways and roads that run through the city. Given the vast amount of activity and fuel that passes through the city, the likelihood of an urban fire outbreak in Anaheim is moderate to likely.

Climate Change Considerations

Wildland Fire

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. Climate change is expected to increase the number of acres burned annually in the foothills of the Santa Ana Mountains, which are already highly prone to wildfires. However, increases in fuel supplies could cause wildfires to move faster or spread into more-developed areas, increasing the future threat to Anaheim.

Urban Fire

While climate change has been linked to a potential increase in wildfire events, it is not clear exactly how climate change could influence the ignition or behavior of urban fires in Anaheim.

[33] Sudock, J. and Whitehead, B. January 2017. "Fire at fire station near Knott's destroys 4 fire vehicles, including $1 million aerial truck. *OC Register*. https://www.ocregister.com/2017/01/13/fire-at-fire-station-near-knotts-destroys-4-fire-vehicles-including-1-million-aerial-truck/

Earthquake Hazards (Fault Rupture, Seismic Shaking, Liquefaction)

Description

An earthquake is a sudden motion or trembling caused by a release of strain accumulated within or along the edge of the Earth's tectonic plates. The effects of an earthquake can be felt far beyond the site of its occurrence. They usually occur without warning and can cause massive damage and extensive casualties after just a few seconds. Common effects of earthquakes are ground motion and shaking, surface fault ruptures, and ground failure. Ground motion is the vibration or shaking of the ground during an earthquake. When a fault ruptures, seismic waves radiate, causing the ground to vibrate. The severity of the vibration increases with the amount of energy released and decreases with distance from the causative fault or epicenter. This sudden discharge of energy into the crust can lead to rupturing of land that sits on top of fault lines, liquefaction in areas with wet soil, or landslides in hilly or mountainous areas.

Fault Rupture

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 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 continuity of the landscape. California's major north-south fault line is the San Andreas Fault—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, which may move a few inches to several feet in opposite directions. Any buildings or infrastructure situated around, on top of, or across a fault line could potentially be severely damaged or destroyed. The direction of the fault rupture depends upon 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. The fourth kind of fault, called a “blind” fault, produces virtually no visible displacement of land.

Some faults have emerged recently in geologic history. Quaternary faults have developed any time 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.

The Alquist-Priolo Earthquake Fault Zoning Act enables the California State Geologist to designate zones surrounding active faults as Alquist-Priolo Special Study Zones, which is a special regulatory zone that requires additional study to determine the location of the fault and the limits of the area prohibited from surface construction on top of the known location of an active fault.

Seismic Shaking

Seismic shaking is the motion felt on the earth’s surface caused by an earthquake. In most cases, earthquakes are not powerful enough to feel the shaking. However, particularly powerful earthquakes can generate significant shaking, causing widespread destruction resulting in property damage.

LIQUEFACTION

Occurs when seismic energy is released within an area with low-density, fine grain soil, like sand or silt, which is saturated with water. When the shaking motion reaches these areas, it can cause loosely packed soils to suddenly compact, making the waterlogged sediment behave more like a liquid than solid ground. During liquefaction events, the liquified soil can lose most of its stability which can cause 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 a liquefaction event, potentially leading to flooding or the release of hazardous materials.

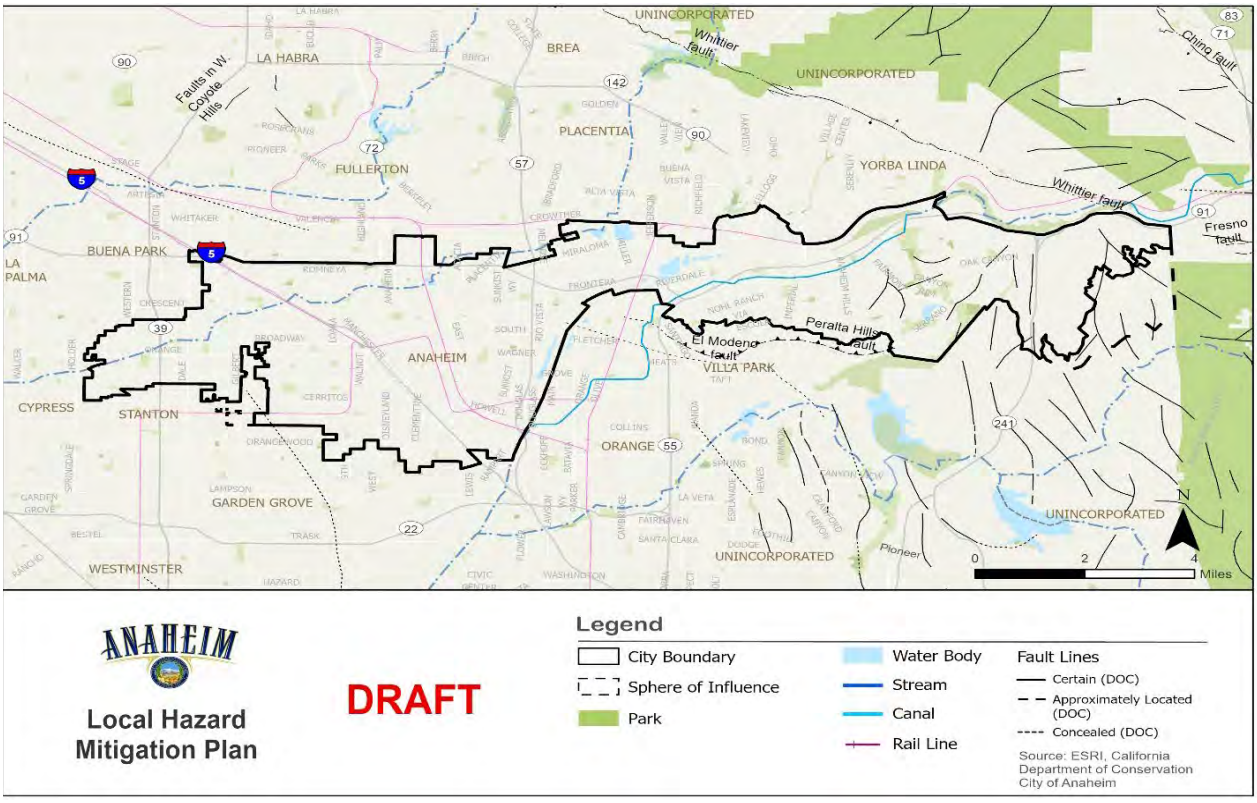
Location and Extent

Earthquakes are considered a major threat to the City of Anaheim due to the proximity of several fault zones, notably the San Andreas Fault Zone and the Newport-Inglewood Fault Zone. A recent Southern California Earthquake Center (SCEC) report (SCEC, 1995) indicated that the probability of an earthquake of Magnitude 7 or larger in southern California before the year 2024 is 80-90%. A significant earthquake along one of the major faults could cause substantial casualties, extensive damage, and other threats to life and property. The shaking of the ground 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

While no active faults (Alquist-Priolo Special Study Zones) are located within Anaheim, several regional faults within Alquist-Priolo Special Study Zones near the City could result in seismic hazards should an earthquake occur along one of them. In addition, numerous earthquake faults have been identified within the City (**Figure 3-2**); however, they are not considered active (shown

FIGURE 3-2: FAULTS IN ANAHEIM AND SURROUNDING AREA



movement at the surface in the past 13,000 years) and therefore do not require delineation within special study zone. Regardless, these faults should be accounted for in future development decisions.

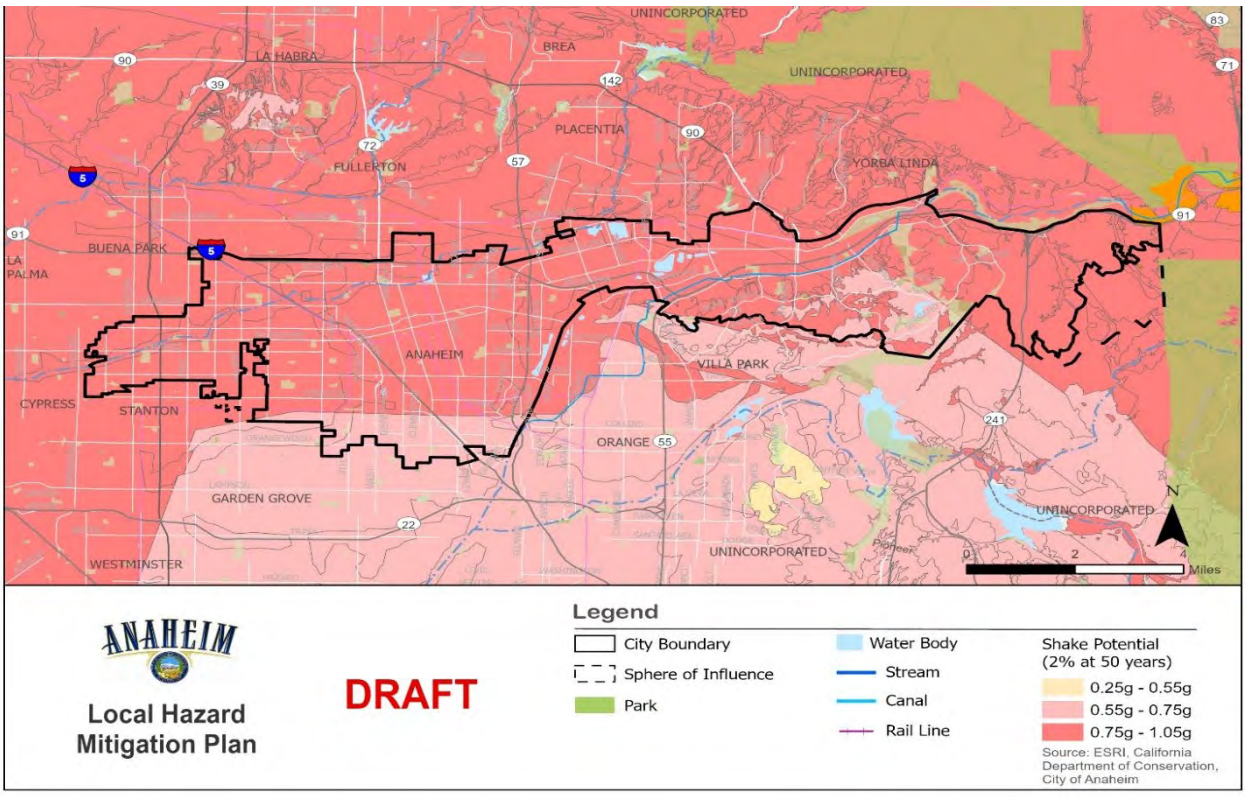
Seismic Shaking

Southern California, including Anaheim, is a highly seismic area due to the major faults that run through the region and is subject to experiencing seismic shaking. The intensity of seismic shaking is usually measured with the Modified Mercalli Intensity (MMI) scale, which is based on the amount of observed damage. The MMI scale has replaced the Richter scale, which is no longer used since it loses effectiveness when measuring larger earthquakes. Since the degree of shaking, and consequently damage, generally decreases as the seismic energy travels further away from the fault rupture's point of origin, different sections of a city or region can report different MMI measurements in different locations. The MMI scale uses Roman numerals on a 12-point scale to measure each degree of shaking intensity. **Table 3-5** shows the MMI scale.

Another scale for measuring seismic shaking is the moment magnitude scale (MMS, denoted Mw or simply M). The MMS measures the energy released by the fault rupture beginning at 1.0 and increasing as the earthquake's energy grows. The MMS is a logarithmic scale, meaning that the difference between numbers on the scale multiplies as they increase. An earthquake with 5.0 M is approximately 1.4 times greater than 4.9 M, 32 times greater than 4.0 M, and 1,000 times greater than 3.0 M.

Seismic shaking can also be measured in relationship to the force of Earth's gravity (g), or percent g. This method is useful for geographically displaying areas of seismic shaking potential. Percent g is computed by determining the acceleration of the earthquake's motion relative to the force of gravity. The acceleration of gravity is 980 centimeters per second, so if, for example, an earthquake's acceleration is measured at 765 centimeters per second, the shaking is modeled as

Figure 3-3: Seismic Hazard Zones



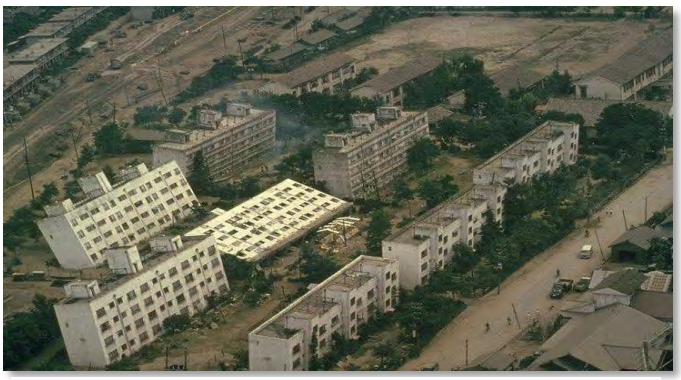
765/980, or .781 g (78.1% g). **Figure 3-3** shows the seismic hazard zones and shaking potential in Anaheim.

TABLE 3-5: MODIFIED MERCALLI INTENSITY SCALE

Intensity	Description	Description
I	Instrumental	Felt only by a very few people, under especially favorable conditions.
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.
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 broken, and unstable objects overturned.
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.
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.
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.

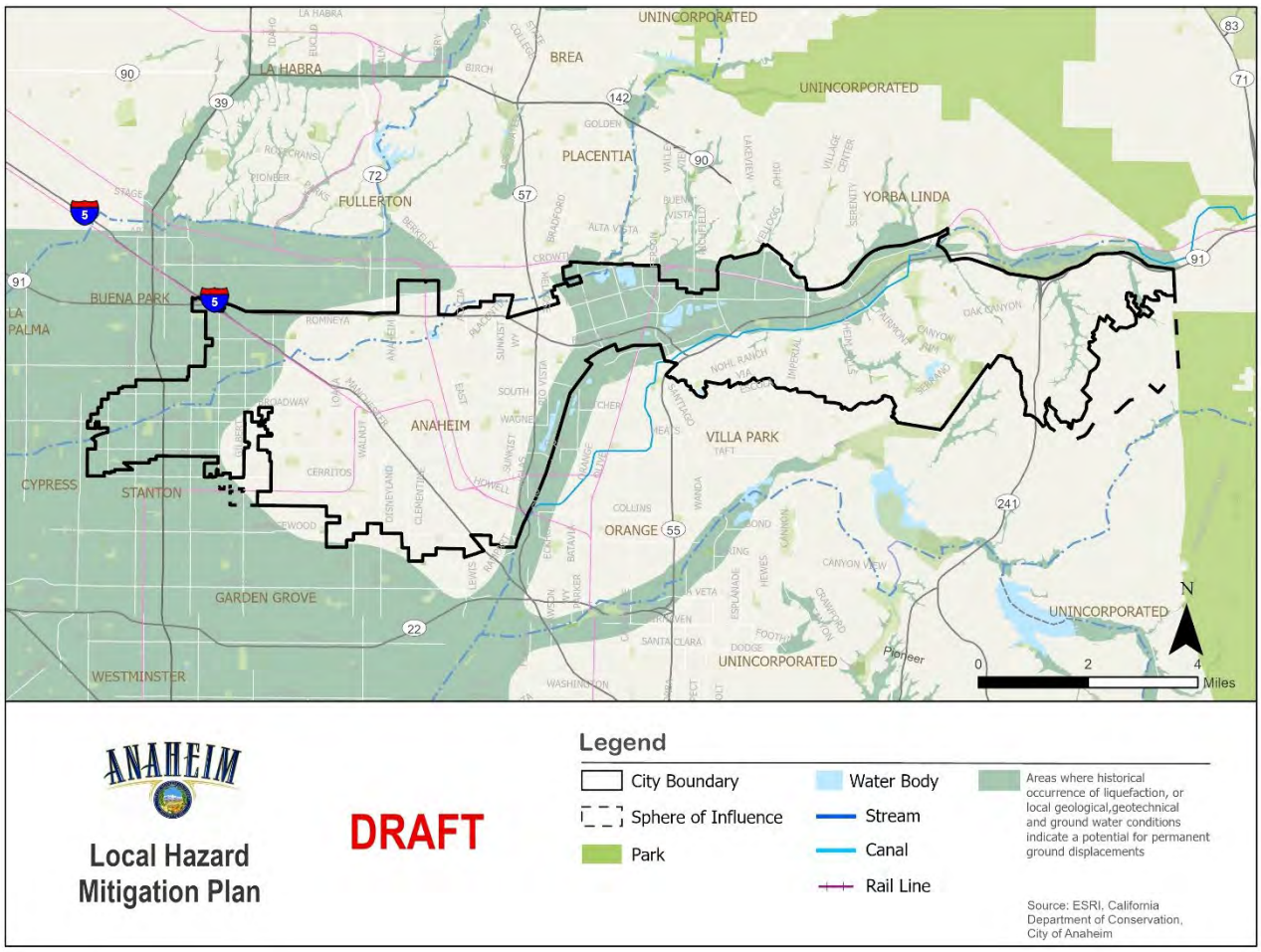
Source: United States Geological Survey. 2019. The Modified Mercalli Intensity Scale. https://earthquake.usgs.gov/learn/topics/mercalli.php

LIQUEFACTION



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

Occurs when ground shaking causes wet granular soils to change from a solid-state to a liquid state. This results in the loss of soil strength and the soil's ability to support weight. Buildings and their occupants are at risk when the ground can no longer support these structures. Liquefaction generally occurs during significant earthquake activity, and structures located on soils such as silt or sand may experience significant damage during an earthquake due to the instability of structural foundations and the moving earth. Many communities in Southern California are built on ancient river bottoms and have sandy soil. In some cases, this ground may be subject to liquefaction, depending on the depth of the water table. **Figure 3-4** shows the liquefaction zones in Anaheim as designated by the California Geological Survey.



Past Events

Since seismologists started recording and measuring earthquakes, there have been tens of thousands of recorded earthquakes in Southern California, most with a magnitude below three. No community in Southern California is beyond the reach of a damaging earthquake. **Table 3-6** shows all earthquakes in Southern California with a magnitude of 5.0 or higher.

TABLE 3-6: EARTHQUAKE EVENTS IN THE SOUTHERN CALIFORNIA REGION (5.0+ MW)

1812 Wrightwood	1940 Imperial Valley	1987 Whittier Narrows
1812 Santa Barbra Channel	1941 Santa Barbra	1991 Sierra Madre
1857 Fort Tejon	1942 Fish Creek Mountains	1992 Joshua Tree
1892 Laguna Salada	1947 Manix	1992 Big Bear
1899 Cajon Pass	1948 Desert Hot Springs	1994 Northridge
1899 San Jacinto Fault Zone	1952 Kern County	2001 West Hollywood
1910 Elsinore	1954 San Jacinto Fault (Arroyo Salada)	2008 Chino Hills
1915 Imperial Valley	1968 Borrego Mountain	2010 Baja CA
1918 San Jacinto	1971 San Fernando	2012 Brawley
1923 North San Jacinto Fault	1978 Santa Barbra	2014 La Habra
1925 Santa Barbra	1979 Imperial Valley	2016 Borrego Springs
1927 Lompoc	1986 North Palm Springs	2019 Ridgecrest
1933 Long Beach	1986 Oceanside	2021 Antelope Valley

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

FAULT RUPTURE

The largest recent fault rupture near Anaheim was the 1994 Northridge earthquake, a 6.7 Mw event approximately 50 miles from Anaheim and one of the most destructive earthquakes in the United States in nearly 100 years. This event killed sixty people, injured more than 7,000, left 20,000 people homeless, and damaged more than 40,000 buildings in Los Angeles, Ventura, Orange, and San Bernardino Counties. Damage to Angel Stadium occurred as a result of this event.[34] More recently and closer to the City, a 5.1 Mw earthquake occurred in La Habra in 2014. This event caused fault rupturing adjacent to but not directly on the Puente Hills and Whittier faults.[35] Most recently, a significant swarm of earthquakes in the Ridgecrest area occurred on July 4th and 5th, 2019. Three tremors ranging from 5.4 to 7.1 Mw occurred within the Eastern California shear zone, a region of distributed faulting associated with motion across the Pacific-North America plate boundary and an area of high seismic hazard.[36]

SEISMIC SHAKING

While no significant earthquake has originated within Anaheim or Orange County within the last 100 years, Anaheim has undoubtedly felt the shaking of regional earthquakes. The nearest earthquake event to Anaheim that caused significant damage throughout the Southern California region was the 1933 Long Beach earthquake. The actual epicenter of the quake was in the City of Huntington Beach; however, most of the damage occurred in areas north of the epicenter. The

[34] United States Geological Survey. 2020. M 6.7 - 1km NNW of Reseda, CA (Northridge Earthquake) Overview. https://earthquake.usgs.gov/earthquakes/eventpage/ci3144585/executive

[35] Graves, R., et al. n.d. "What We Know (and Don't Know) about the M5.1 La Habra Earthquake." http://nsm.fullerton.edu/fracking/images/Frack/Graves_-_USGS.pdf.

[36] United States Geological Survey. 2020. M 7.1 - 2019 Ridgecrest Earthquake Sequence Overview https://earthquake.usgs.gov/earthquakes/eventpage/ci3144585/executive

event caused more than $50 million in property damage and resulted in the deaths of 120 people. Most of the deaths and damage from the 1933 Long Beach Earthquake occurred because of collapsing unreinforced masonry buildings.

Seismic shaking primarily affects unreinforced masonry buildings, as seen here with this Long Beach middle school damaged by the 1933 Long Beach earthquake. Image from Los Angeles Times.

Other strong, regional earthquakes have occurred in Southern California, but their epicenters have been so distant from Anaheim that seismic shaking generated by the earthquake did not cause significant property damage or harm to the City.

The most recent significant earthquake event affecting Southern California was the Northridge Earthquake's January 17, 1994. At 4:31 A.M. on Monday, January 17, a moderate but very damaging earthquake of 6.7 struck the San Fernando Valley. Anaheim experienced damages from this earthquake, including the Jumbotron scoreboard falling onto the upper-deck seats at Angel Stadium, resulting in $10 million worth of damage. In the following days and weeks, thousands of aftershocks occurred, causing additional damage to affected structures. Fifty-seven people were killed, and more than 1,500 people seriously injured. For days afterward, thousands of homes and businesses were without electricity; tens of thousands had no gas, and nearly 50,000 had little or no water. Approximately 15,000 structures were moderately to severely damaged, leaving thousands of people temporarily homeless; 66,500 buildings were inspected, nearly 4,000 were severely damaged, and over 11,000 were moderately damaged. Several collapsed bridges and overpasses created commuter havoc on the freeway system. Extensive damage was caused by ground shaking, but the earthquake triggered liquefaction, and dozens of fires also caused additional severe damage. This extremely strong ground motion in large portions of Orange County resulted in record economic losses. **Table 3-7** shows significant earthquakes – magnitude 6.0 Mw or greater – that have occurred within 100 miles of Anaheim since the beginning of the 20th century. Although Anaheim had no significant damage, authorities made disaster declarations in Orange County for the 1994 Northridge Earthquake and 1987 Whittier Narrows Earthquake.

LIQUEFACTION

There is limited information available on the occurrence of past liquefaction events in Anaheim. Since these events occur in conjunction with strong earthquakes, the nearest and most recent liquefaction event would have occurred near the mouth of the San Gabriel River at Alamitos Bay

because of the Long Beach Earthquake in 1933. It was reported that pavement buckled, cracks appeared in the ground, and "mud volcanoes" erupted in the Los Alamitos area.[37]

TABLE 3-7: SIGNIFICANT EARTHQUAKES (6.0+ MW) WITHIN 100 MILES OF ANAHEIM

Event Name	Distance (Miles)*	Magnitude
1812 San Juan Capistrano	40	6.9
1855 Los Angeles	21	6.0
1899 Lake Elsinore Earthquake	53	6.4
1918 San Jacinto Earthquake	57	6.8
1933 Long Beach Earthquake	15	6.3
1971 San Fernando Earthquake	49	6.5
1986 North Palm Springs Earthquake	76	6.0
1992 Joshua Tree Earthquake	92	6.3
1992 Big Bear Earthquake	67	6.7
1992 Yucca Valley	88	7.6
1994 Northridge Earthquake	44	6.7

*Distance between the epicenter and Anaheim City Hall

Source: Southern California Earthquake Data Center. 2011. Earthquake Catalogs SCSN Catalog Search (1932-Present). http://service.scedc.caltech.edu/eq-catalogs/radius.php

Risk of Future Events

FAULT RUPTURE

Given the presence of faults within the City, it is likely that fault rupture could occur in the future. However, without further study of the fault segments within the City it is difficult to estimate how often seismic events could occur along these segments.

SEISMIC SHAKING

Historical and geological records show that California has a long history of seismic events. Southern California is probably best known for the San Andreas Fault, a 400-mile-long fault running from the Mexican border to a point offshore, west of San Francisco. Geologic studies show that over the past 1,400 to 1,500 years, large earthquakes have occurred at about 130-year intervals on the Southern San Andreas Fault. As the last large earthquake on the Southern San Andreas occurred in 1857, that section of the fault is considered a likely location for an earthquake within the next few decades. The Third Uniform California Earthquake Rupture Forecast (UCERF3) was released in 2015 and is the most recent assessment of the probability of a major earthquake on various faults between 2015 to 2044. **Table 3-8** shows the results for Anaheim's nearby and regional fault lines.

In addition to UCERF3 forecasts, which project the odds of a major earthquake on local and regional faults, the U.S. Geological Survey forecasts the severity of seismic shaking in different locations for various plausible earthquake scenarios. **Table 3-9** shows the anticipated shaking in Anaheim from some of these scenarios.

[37] California Geological Survey. 1998. "Seismic Hazard Zone Report for the Los Alamitos 7.5-Minute Quadrangle, Los Angeles and Orange Counties, California." http://gmw.conservation.ca.gov/SHP/EZRIM/Reports/SHZR/SHZR_019_Los_Alamitos.pdf

TABLE 3-8: EARTHQUAKE PROBABILITIES FOR KEY FAULTS NEAR ANAHEIM (2015–2044)

Fault	Distance (Miles)*	Probability			
		6.7+ Mw	7.0+ Mw	7.5+ Mw	8.0+ Mw
Peralta Hills	1.5	0.23%	0.15%	0.06%	Negligible
Yorba Linda	2	0.08%	0.08%	0.03%	<0.01%
Elysian Park	2.5	<0.01%	<0.01%	<0.01%	Negligible
Puente Hills	2.5	0.95%	0.65%	0.19%	Negligible
Richfield	3.5	0.02%	<0.01%	Negligible	Negligible
Anaheim	4	0.09%	0.07%	<0.01%	Negligible
Whittier	7.5	01.11%	1.00%	0.62%	<0.01%
San Joaquin Hills	10	0.40%	0.38%	0.24%	Negligible
Newport-Inglewood	12	0.95%	0.90%	0.43%	Negligible
Compton	14	0.60%	0.47%	0.04%	<0.01%
San Jose	14	0.31%	0.21%	0.02%	Negligible
Chino	15	0.66%	0.11%	0.06%	Negligible
Palos Verdes	20.5	2.67%	2.32%	0.90%	Negligible
San Jacinto	36	1.13%	1.12%	1.12%	0.49%
San Andreas†	39	20.25%	19.18%	16.22%	6.73%

* Distance between Anaheim City Hall and the nearest point of the fault. All distances are approximate. † Southern California segments only.
Note: UCERF3 results consist of two individual models (3.1 and 3.2), each of which provides rupture probabilities for each segment of the fault. This table shows the maximum probability for a section of the fault in either model.
Source: Working Group on California Earthquake Probabilities. 2015. The Third California Earthquake Rupture Forecast (UCERF3). http://www.wgcep.org/ucerf3

TABLE 3-9 SELECTED SHAKING SCENARIOS FOR ANAHEIM

Fault	Magnitude	Distance to Epicenter (Miles)*	MMI in Anaheim
Newport-Inglewood	7.2	15	VII (Very strong) – VIII (Destructive)
	7.2	16	VII (Very strong) – VIII (Destructive)
	7.0	34	VI (Strong) – VII (Very strong)
Anaheim	6.4	4	VIII (Destructive)
Peralta Hills	6.6	7	VII (Very strong)
Whittier	7.0	9	VII (Very strong) – VIII (Destructive)
Chino	6.6	12	VI (Strong)–VII (Very strong)
	6.8	13	VI (Strong)–VII (Very strong)
Palos Verdes	7.4	21	VII (Very strong)
San Jacinto	7.3	42	VI (Strong)
	7.6	50	VI (Strong)
San Andreas	7.2	47	VI (Strong)
	7.9	44	VI (Strong)

*Distance between Anaheim City Hall and the epicenter (the point on the surface above where the fault rupture began). Source: United States Geological Survey. 2014. Scenario Catalogs. https://earthquake.usgs.gov/scenarios/catalog/

The U.S. Geological Survey scenarios show that the Anaheim Fault could cause the strongest seismic shaking in Anaheim, followed by Whittier and the Newport-Inglewood faults. The more distant faults like Palos Verdes, San Jacinto, and San Andreas faults can produce more intense earthquakes but are less like to cause damage in Anaheim due to their greater distance from the City. However, as noted in **Table 3-8**, the likelihood of a powerful earthquake occurring along these faults within the next 25 years is exceptionally low.

Liquefaction

Soil liquefaction is a seismically induced form of ground failure, which has been a significant cause of earthquake damage in southern California. During the 1971 San Fernando and 1994 Northridge earthquakes, significant damage to roads, utility pipelines, buildings, and other structures in the Los Angeles area was caused by liquefaction. Research and historical data indicate that loose, granular materials situated at depths of less than 50 feet with fine (silt and clay) contents of less than 30%, which are saturated by a relatively shallow groundwater table, are most susceptible to liquefaction. These geological and groundwater conditions exist in parts of southern California and Anaheim, typically in valley regions and alluvial floodplains.

For liquefaction to occur, three general conditions must be met. The first condition – strong ground shaking of relatively long duration – can be expected to occur in the Anaheim area because of an earthquake on any of the several active faults in the region. The second condition – loose, or unconsolidated, recently deposited sediments consisting primarily of silt and sand – occurs in a large portion of the valley floors and the larger canyon bottoms prevalent throughout Orange County. The third condition is water-saturated sediments within about 50 feet of the surface. Liquefaction could occur but defining the precise likelihood isn't possible. Refer to **Table 3-8** for the probability of a major earthquake occurring in faults close to Anaheim.

Climate Change Considerations

Fault Rupture

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

Seismic Shaking

There is no direct link between climate change and seismic activity, 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. As glaciers are known to melt when global temperatures increase, climate change could indirectly lead to increased seismicity in Southern California.[38]

Liquefaction

While climate change may not impact seismic shaking, it can directly impact liquefication. 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 and frequent. This means that more precipitation will likely occur during rainy periods, and drought is expected to last even longer. As a result, the water table in Anaheim could rise during intense periods of precipitation. Alternatively, a longer-lasting drought may lead to more groundwater withdrawal and could lower the water table. Therefore, climate change could potentially increase or decrease the risk of liquefaction in Anaheim, depending on the circumstances. Prolonged droughts can decrease groundwater levels if additional water extraction occurs, decreasing the potential for liquefaction.

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

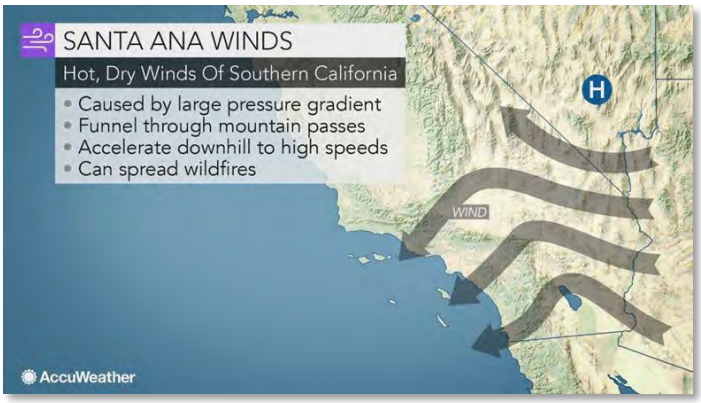
While an increase in precipitation intensity and frequency could increase groundwater levels, potentially increasing liquefaction potential.

Severe Weather (Windstorms, Extreme Heat, Drought)

Description

Windstorm

Wind is simply the movement of air caused by differences in atmospheric 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” wind conditions that typically occur in the fall and winter.



When winds are fast enough, they can cause property damage to 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.

Extreme Heat

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

> **Extreme Heat Days**: A day during which the maximum temperature surpasses 98% of all historic high temperatures for the area, using the time between April and October from 1961 to 1990 as the baseline.
>
> **Warm Nights**: A day between April to October when the minimum temperature exceeds 98% of all historic minimum daytime temperatures observed between 1961 to 1990.
>
> **Extreme Heat Waves**: A successive series of extreme heat days and warm nights where extreme temperatures do not abate. Although 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.

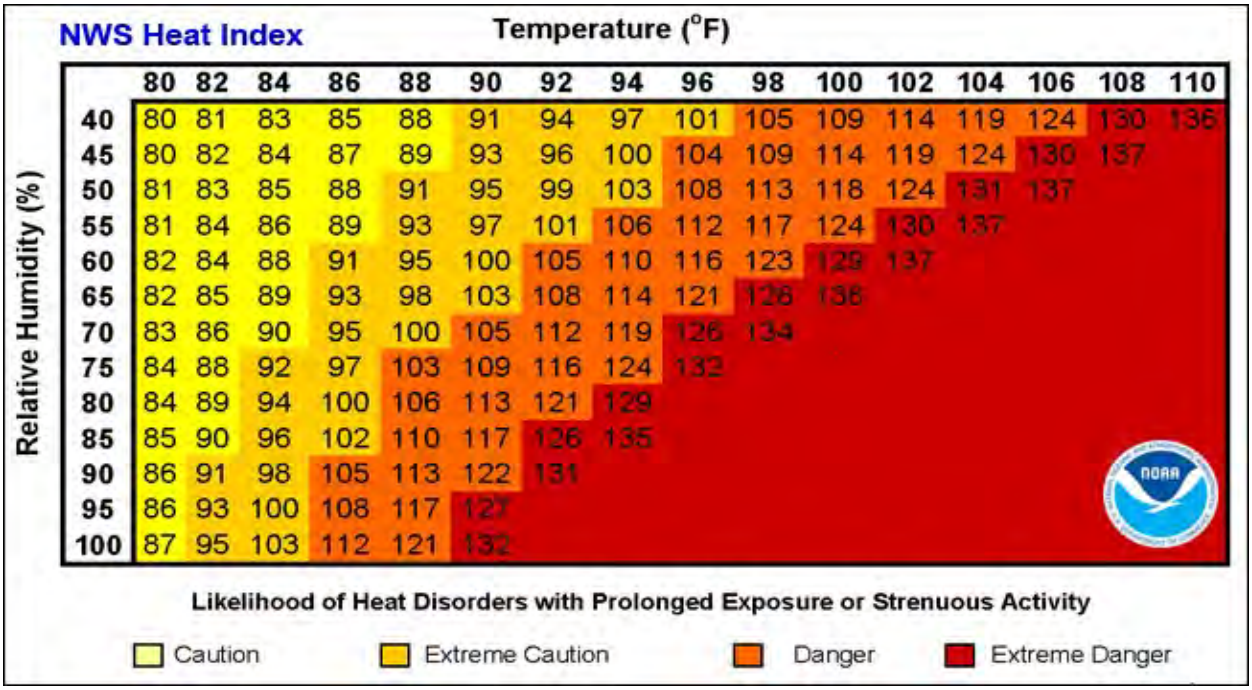
Extreme heat events will have unique metrics from region to region since different areas have different historic high temperatures. For example, an extreme heat day on the coast will have lower temperatures than an extreme heat day in the High Desert.

Humidity plays a factor in people's perception of heat, as humid conditions will make a day feel hotter than a non-humid day even though the temperature may be the same on both days. The

difference between the perceived and actual temperatures is known as the "heat index." To illustrate the effect of the heat index, a 90-degree day with 50% humidity feels like 95°F, whereas a 90°F with 90% humidity feels like 122°F. **Figure 3-5** shows National Oceanic and Atmospheric Administration (NOAA)'s National Weather Service Heat Index.

Extreme heat poses several dangers to public health. The human body is vulnerable to long periods of high temperatures and will eventually enter a state of heat exhaustion and dehydration if exposure to heat is extended. If exposure to high temperatures is particularly prolonged to the point that internal body temperature surpasses 105°F, heatstroke may occur, and organ failure and death may soon follow without intervention.

FIGURE 3-5: NOAA'S NATIONAL WEATHER SERVICE HEAT INDEX



DROUGHT

A drought is a period in which water supplies become scarce. This can occur for various reasons; in California, droughts occur when precipitation is limited for an extended period. Rain arrives in California from winter storms and via atmospheric rivers (channels of moist air located high in the atmosphere). When winter storms and atmospheric rivers bring less than usual moisture, the total amount of precipitation is reduced. Often droughts affect soil moisture and snowpack levels, contributing to overall reductions in water supplies in California and the western US, where water sources come from.

Winter storms are associated with the El Niño Southern Oscillation (ENSO) cycle, a regional meteorological phenomenon in the southern Pacific Ocean consisting of variations in ocean water and air temperature. These variations occur on a 2–5-year cycle giving rise to two distinct phases known as El Niño, the warm and wet phase, or La Niña, the dry and cold phase. Variations in this cycle can affect the areas and amounts of precipitation that fall in California. A drought may also occur when infrastructure connecting communities to long-distance water sources is degraded or fails. This can occur due to deferred maintenance from a natural disaster. For example, many

Southern California cities would experience water use restrictions similar to drought conditions if the State Water Project or Colorado Aqueduct severed during a powerful earthquake event.

Location and Extent

WINDSTORM

In Southern California, the most common type of severe wind event is called the Santa Ana winds. During the fall and winter months, high pressure over Nevada and Utah forces air currents 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.[39]

Anaheim is often affected by Santa Ana winds blowing through the Santa Ana Mountain range. Santa Ana winds are a leading cause of wildfires in California.

Generally, winds are measured using the Beaufort scale, developed in 1805, categorizing wind events on a force scale from 0 to 12 using their speed and impacts. Any wind that is classified as force nine or above is generally considered a severe wind event. **Table 3-10** shows how the Beaufort scale classifies wind events in detail.

TABLE 3-10: BEAUFORT SCALE

Force	Speed (mph)	Description
1	0 to 1	Calm: Smoke rises vertically, and the sea is flat
2	1 to 3	Light air: The direction of wind is shown by smoke drift, but not wind vanes
3	4 to 7	Light breeze: Wind is felt on the face, leaves rustle, and wind vanes are moved. Small wavelets appear on the ocean, but do not break
4	8 to 12	Gentle breeze: Leaves and small twigs are in motion, and light flags are extended. Large wavelets appear on the ocean, and crests begin to break
5	13 to 18	Moderate breeze: Dust and loose paper become airborne, and small branches are moved. Small waves appear on the ocean
6	19 to 24	Fresh breeze: Small trees begin to sway and moderate waves form
7	25 to 31	Strong breeze: Large branches are in motion, and using an umbrella becomes difficult. Large waves begin to form
8	32 to 38	Near gale: Whole trees are in motion and walking against the wind can be hard. Foam from breaking waves is blown in streaks
9	39 to 46	Gale: Walking is difficult, and twigs break off trees
10	47 to 54	Severe gale: Slight structural damage. Crests of waves begin to topple
11	55 to 63	Storm: Trees are uprooted and considerable damage to structures. Very high waves form in long, overhanging crests
12	63 to 72	Violent storm: Widespread damage. Exceptionally high waves form, and the ocean is completely covered in foam

*Source: https://www.weather.gov/mfl/beaufort.

EXTREME HEAT

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 Anaheim. The minimum threshold for an extreme heat day in Anaheim is 97.2°F. The minimum threshold for a warm night in Anaheim is 66.7°F. These values are displayed below as Extreme Heat Day (**Table 3-11**) and Warm Night (**Table 3-12**).

[39] UCSD (University of California, San Diego). 2016. "Santa Ana." http://meteora.ucsd.edu/cap/santa_ana.html

Cal-Adapt uses an emissions scenario when determining the data in its projections. An emissions scenario is a representation of future greenhouse gas emissions and resulting atmospheric concentrations through time. An emissions scenario illustrates a plausible future so that climate projections for that emissions scenario can be generated, used to inform analysis and decision-making, and compared to other scenarios. The data for these scenarios uses what are called representative concentration pathways, or RCPs (which are different scenarios for the future severity of climate change) and comes from California's *Fourth Climate Change Assessmen*t which uses two RCPs from the Fifth Intergovernmental Panel on Climate Change (IPCC) Assessment Report on Climate Change.[40]

RCP 4.5 (medium emissions scenario): A mitigation scenario where greenhouse gas (GHG) emissions peak by 2040 and decline. In California, annual average temperatures under this scenario are projected to increase 2°C - 4°C (35.60°F – 39.2°F) by the end of this century, depending on the location.

RCP 8.5 (high emissions scenario): A no-mitigation scenario where global GHG emissions continue to rise throughout the 21st century. In California, annual average temperatures under this scenario are projected to increase 4°C - 7°C (39.2°F- 44.60°F) by the end of this century.

TABLE 3-11: AVERAGE NUMBER OF EXTREME HEAT DAYS

Scenario	Historic (1961-1990)	Projected (2020-2050)	Projected (2050-2070)	Projected (2070-2099)
RCP 4.5	3	9	11	16
RCP 8.5	3	10	18	30

TABLE 3-12: AVERAGE NUMBER OF WARM NIGHTS

Scenario	Historic (1961-1990)	Projected (2020-2050)	Projected (2050-2070)	Projected (2070-2099)
RCP 4.5	5	21	31	43
RCP 8.5	5	25	54	89

DROUGHT

Any significant drought that reduces the water supply to Anaheim would impact most parts of the City. Anaheim gets its water supply from two main sources. It is a blend of the Orange County Groundwater Basin, replenished water from the Santa Ana River, local runoff, and purified recycled water and water imported from Northern California and the Colorado River by the Metropolitan Water District (MWD). Since the Groundwater Basin consists of a significant amount of Anaheim's water source, it is unlikely that Anaheim could undergo a long-distance drought - a drought that occurs when a distant water source becomes less available. Given that most of Anaheim's water comes from local groundwater sources; however, this type of event would have to be exceptional or prolonged for the City and its residents to feel the impact.

[40] https://cal-adapt.org/tools/extreme-heat

The U.S. Drought Monitor Classification Scheme is a common scale used to measure the impact of droughts in different communities across the United States. See **Table 3-13** for a complete description of each drought event classification.

TABLE 3-13: U.S. 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.

* 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.

Past Events

WINDSTORM

There have been several strong wind events recorded around the City of Anaheim:[41]

April 1983 - Strong winds at Disneyland jolted the cable lines of a guide wheel on the Skyway gondola lift prompting a shutdown. Elsewhere in the City, strong winds reportedly knocked a man through a glass window.

March 1986 - A tornado in Anaheim near Disneyland determined to be F1 strength shattered windows and tore roofs off several buildings. Its track was reported as 1.25 miles in length and was 20-40 yards wide.

December 1992 - Tornadoes of F1 strength turned over cars, destroyed mobile homes, and numerous trees and power lines were downed or destroyed.

February 2000 - A tornado was recorded in Anaheim Hills, destroying property and damaging power lines.

March 2000 - Santa Ana winds blew gusts of 67 mph through Anaheim Hills, damaging trees and power lines.

April 2012 - A severe thunderstorm hit Anaheim Hills, damaging a shopping center in nearby Fremont Canyon, gusts of 63 mph were reported.

November 2021 - On Thanksgiving day, a massive windstorm blew through, toppling utility lines and multiple trees throughout the City.

EXTREME HEAT

Local data from Anaheim is not available; however, nearby Daugherty Field at the Long Beach Municipal Airport has been recording weather data since 1949. The data indicates that the average maximum temperature for the area from all years between 1949 and 2016 is 83.9°F, occurring in the month of August. In addition, data from a weather station at the Santa Ana Fire

[41] National Oceanic and Atmospheric Administration. May 2017. "A History of Significant Weather Events in Southern California." https://www.weather.gov/media/sgx/documents/weatherhistory.pdf

Station also indicates an average maximum temperature of 84.7°F for the same time frame. Given that the minimum threshold for an extreme heat day in Anaheim is 98.3°F, it is rare that the temperature exceeds this threshold on a regular basis. Still, extreme heat events have occurred in the region, which occasionally impact the City as well. Some significant historic extreme heat events include:

September 1963 - The temperature reached 113°F at the Marine Corps Air Station El Toro, and the surrounding region, including coastal areas, was hot as well. Temperatures in Carlsbad and Oceanside reached 108°F. School children and employees were sent home due to the heat, and some crops were destroyed.

April 1989 - Daily high-temperature records were set for all weather monitoring stations in Southern California. Los Angeles and Riverside set records at 106°F and 104°F, respectively.

More recent extreme heat events have also affected the greater region surrounding Anaheim:

July 2018 - Throughout the month, extreme heatwaves occurred throughout Southern California, including Anaheim. The hottest day of the heat waves occurred on July 6, when temperatures reached 114°F in Santa Ana, CA. A second but less intense extreme heatwave occurred on July 25, where regional temperatures went above 100°F in Burbank and surrounding areas. While local temperature data for Anaheim is not available, the weather monitoring station near Long Beach Airport indicates that the temperature reached 95°F that day.

October 2017 - Southern California experienced two extreme heat days. The weather monitoring station near Long Beach Airport indicates that temperatures reached 105°F those days.

Drought

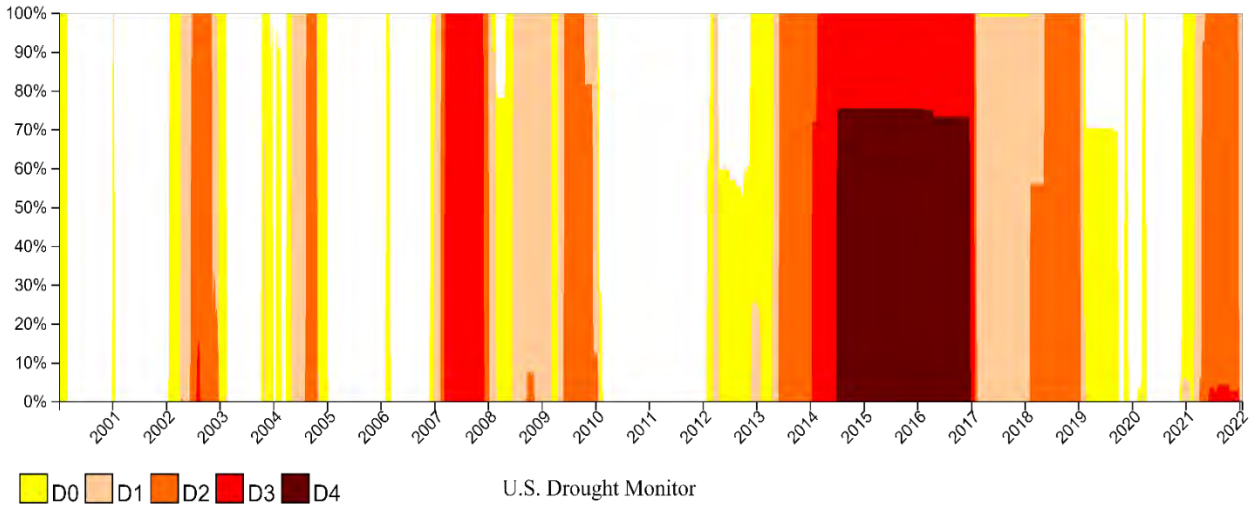
Like the rest of California, Anaheim has experienced many drought events throughout its history. Each event has been distinct, with varying lengths, severity, and frequency. One of the earliest recorded major droughts in state history is the “Great Drought,” which occurred in 1863 and 1864. This drought killed 46% 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, leading to nearly $1 billion in agricultural losses. This drought led to water-saving practices still in effect today across the state. Further water conservation practices were enacted during a drought lasting from 1987 to 1993, which caused agricultural damages at an estimated $250 million 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 3-6** illustrates the severity of the drought conditions experienced over the past 22 years in Orange County. By the summer of 2014, almost all of California was experiencing D2 (severe drought) conditions. Anaheim, all of Orange County, and more than 75% of California was reported as experiencing D4 (Exceptional Drought) conditions. By 2015, emergency water-

saving mandates were enacted, which required all jurisdictions to reduce water use by at least 25%.

FIGURE 3-6: DROUGHT HISTORY IN ORANGE COUNTY (2000-2022)



In late 2016 and early 2017, successive heavy rainy seasons 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 March 2022, all of California was experiencing at least D1 (Moderate Drought) conditions, with a majority of state experiencing severe drought or worse conditions. Most of Orange County and Anaheim are currently experiencing D1 – moderate drought conditions. **Figure 3-7** shows statewide drought conditions as of March 22, 2022.

Risk of Future Events

WINDSTORM

Given Anaheim's history of severe wind events in nearby cities, it is very likely that wind events will continue to impact the city. The most probable source of wind 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.

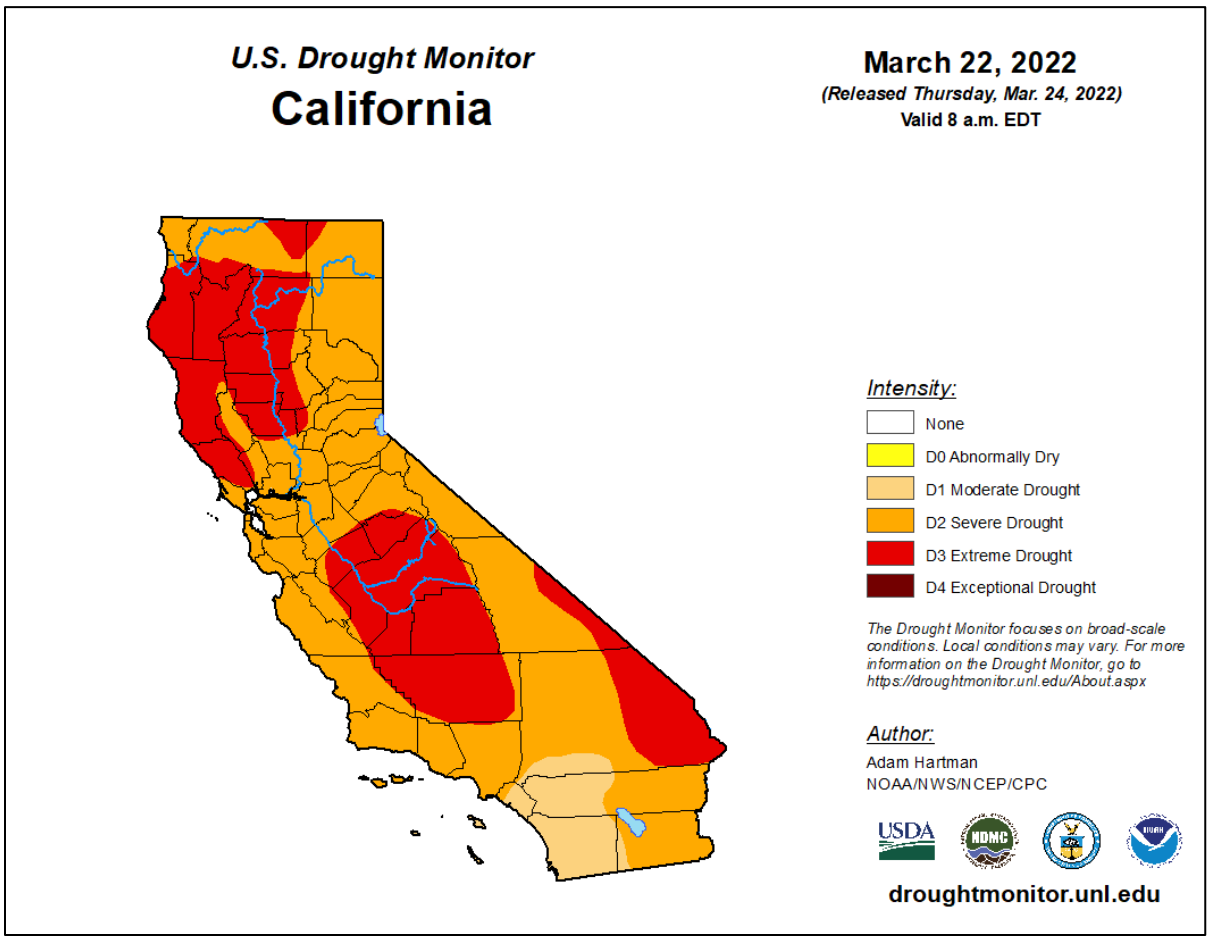
EXTREME HEAT

As extreme heat events are an occasional occurrence in the City of Anaheim, it can only be expected that they will continue into the future.

DROUGHT

Drought will continue to be a foreseeable event in the future of California, including Anaheim. Since most droughts are almost entirely contingent on global weather phenomena, which vary from year to year, it is impossible to predict the frequency or severity of future drought events in Anaheim. Droughts that result from infrastructure failure are equally impossible to predict since the circumstances that lead to infrastructure failure are unique to each situation.

FIGURE 3-7: U.S. DROUGHT MONITOR AND DROUGHT CONDITIONS IN CALIFORNIA



Climate Change Considerations

WINDSTORM

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 in intensity between 10 and 20 percent.[42] This increase in storm intensity may also bring more intense winds to the Southern California region, including Anaheim.

Studies indicate that Santa Ana wind events may be affected in varying ways by climate change, but it is unknown whether the frequency and intensity of events may be some of those 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.[43] 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.

[42] Oskin, B. (2014). Atmospheric Rivers to Soak California as Climate Warms. Live Science. https://www.livescience.com/49225-atmospheric-rivers-double-climate-change.html

[43] 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

Extreme Heat

The primary effect of climate change is warmer average temperatures. The warmest decade on record is 2011-2020, with the warmest three years on record occurring in 2016, 2019, and 2020. As climate change accelerates in the 21st century, it is anticipated that extreme heat events will become more frequent and intense in California. In Anaheim specifically, the projected average number of extreme heat days per year could increase from 4 to 24 (in 2100), assuming global greenhouse gas emissions peak around 2040, then decline. If global greenhouse gas emissions continue to rise until 2100, the number of extreme heat days could increase to as many as 40 days per year. The number of warm nights could increase from 4 to 30 (in 2100), assuming an emissions peak and decline in 2040 but could increase to as many as 72 if emissions continue to rise until 2100.[44]

Drought

Climate change is anticipated to abate drought in certain situations; however, projections suggest that future drought events could become more frequent and intense. In some cases, climate change-intensified weather patterns, like El Nino Southern Oscillation (ENSO), may bring more rain to California and Anaheim, reducing drought conditions. In other years, climate change may also prolong the La Niña phase of ENSO, which could lead to longer periods with no precipitation in California.

Climate change is also expected to increase the average temperature and cause more frequent and prolonged heatwaves in the region. During these events, water supplies may be affected within the City. Hotter temperatures may also lead to increased surface water evaporation, which could lead to greater water consumption. If a drought occurs coupled with heatwave events, additional strain could be placed on City infrastructure, including the water supply.

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. As the average temperature grows warmer with climate change, the precipitation that falls as snow is expected to shift towards rain. 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. While the City does not currently rely on water supplies from MWD, reductions in water availability could strain supplies for neighboring communities that do, impacting the quality and availability of water supplies within the Orange County Groundwater Basin.

Dam Failure

Description

Dam, reservoir, and levee failure can result from several causes such as earthquakes, rapidly rising floodwaters, and structural design flaws. These hazards 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, and result in other impacts, such as displacement of persons residing in the inundation path and loss of critical infrastructure.

[44] Extreme Heat Days & Warm Nights. CalAdapt. https://cal-adapt.org/tools/extreme-heat/

Location and Extent

Inundation from the following four dams could potentially result in flooding in Anaheim in the event of failure:

Carbon Canyon Dam is approximately 11 miles northeast of the City, located in the City of Brea. Inundation from this facility would affect areas north of SR-91. In the event of a failure, it would take 7.5 hours for the flood wave to reach Anaheim and would be about one foot deep.

Prado Dam is located approximately 2.5 miles east of the City limits, along the Santa Ana River in Riverside County. This dam facility poses the greatest risk to the City (and a majority of northern Orange County), due to its size and the amount of water impounded at full capacity. In the event of dam failure, the flood wave would take 6.5 hours to reach Anaheim and be around four feet deep. Inundation from this facility would affect the entire City.

Walnut Canyon Reservoir is in Anaheim Hills and is the primary water source to the Anaheim Hills and Canyon areas. It also provides a water source for helicopter-based firefighting, giving cause to monitor its water levels closely. It primarily would affect portions of Anaheim Hills in the event of a failure, as its inundation area extends down through a smaller area of Anaheim Hills, located in the northeast section of the city, and would flow down slope until it reached the Santa Ana River channel adjacent to SR-91.

Diamond Valley Lake is in Riverside County, approximately 40 miles southeast of the city limits, located in Hemet, CA. It is one of the largest and newest reservoirs (completed in 1999) in Southern California. It has a capacity of over 800,000 acre-feet. It serves as a crucial additional water supply for drought, peak summer, and emergency needs. According to ESRI GIS data, should this dam fail, it would travel along the inundation path until it reached the Prado Dam area. The assumption can be made that it would cause an overfill and inundate the reservoir, causing water to overflow down the spillway and travel toward the city. Inundation to the city would take approximately 54 hours after the initial dam failure event occurs.

Table 3-14 is the Dam Safety Action Classification scale, which identifies the relative safety ratings of these facilities. Dams that could impact Anaheim have been identified in bold within this table. **Figure 3-8** identifies the potential inundation areas that could impact the City of Anaheim. This figure shows the areas downstream that would be inundated by a breach from a dam's reservoir. The areas that could flood in the case of a dam breach are not necessarily the same areas that could be inundated by a 100-year or 500-year flood.

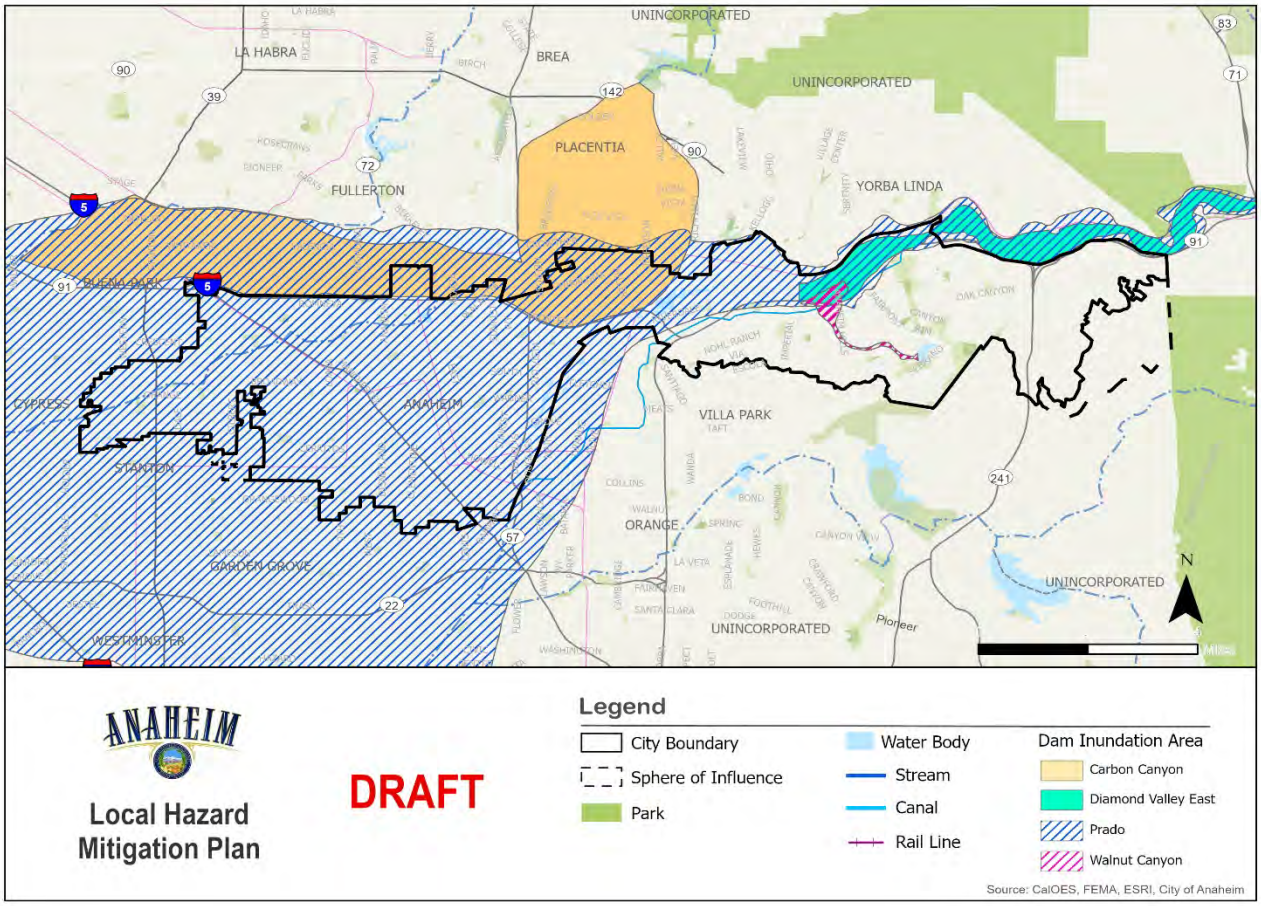
Past Events

California's dam infrastructure varies in age (some are decades old, while others are more recently constructed), type, and size. In California, there have been several catastrophic dam failure events:

San Francisquito Canyon Dam. One of the earliest dam failures in California history. The dam experienced a structural failure because of insufficient geotechnical engineering analysis, leading to inadequate construction by the then-Los Angeles Bureau of Water Works and Supply. At midnight on March 13, 1928, the 205-foot-tall structure failed catastrophically, unleashing a 120-foot-high wave of water traveling 18 miles per hour down the San Francisquito Canyon. By 5:30 AM, the wave had traveled 54 miles from the dam site to the Pacific Ocean, killing at least 438 people, razing towns, and destroying infrastructure. It was reported that victims' bodies were

recovered from the ocean as far south as the Mexican border. The disaster is considered one of the worst engineering failures in US history.[45]

FIGURE 3-8: DAM INUNDATION AREAS



Baldwin Hills Dam. December 14, 1963, a structural failure in the dam caused a breach that unleashed 250 million gallons of reservoir water. Diligent work by maintenance crews detected the developing failure in the dam four hours before it breached. With the cooperation of local law enforcement, they were able to successfully evacuate and save nearly 1,500 people downstream from the reservoir. Five lives were lost, 65 homes were destroyed, and nearly $11 million worth of property damage was incurred. The Baldwin Hills Dam was not rebuilt and is now a grassy basin in Kenneth Hahn Park, which is why it is not listed in **Table 3-14**.[46]

Oroville Dam. In February 2017, the collapse of concrete in the main spillway caused a 60-foot-deep hole to develop in the lower third of the spillway during normal operations undertaken to lower the reservoir before a moderately large storm. A subsequent storm and the inability to fully use the primary spillway led to the filling of the reservoir and its unlined (natural) emergency spillway for the first time. After two days of usage, erosion of the unlined hillside and head cutting (erosion upstream towards the earthen dam), concerns regarding the stability of the emergency

[45] Riley, K. March 2018. 90 Years Later, The St. Francis Dam Failure Remains A Vital Safety Lesson. Association of State Dam Safety Officials. https://damsafety.org/article/awareness/90-years-later-st-francis-dam-failure-remains-vital-safety-lesson

[46] The Center for Land Use Interpretation. *Baldwin Hills Dam Failure Site.* http://clui.org/section/baldwin-hills-dam-failure-site

spillway caused an evacuation of nearly 200,000 people downstream. This prompted immediate repairs and a re-evaluation of this dam facility and many others throughout the State of California.[47]

Brea Dam. The Brea Dam failed on February 22, 2005, following an extensive episode of winter rains, causing water to spill over its crest. The Fullerton Golf Course and sections of Bastanchury Road were flooded with water, but no lives were lost. The golf course was damaged, and the floodwaters eroded an adjacent storm channel.[48]

TABLE 3-14: DAM SAFETY ACTION CLASSIFICATION (DSAC) RATINGS

Numeral	Rating Name	Description	Los Angeles District Dams
I	Urgent and Compelling (Unsafe)	Dams where progression toward failure is confirmed to be taking place under normal operations, and the dam is almost certain to fail under normal operations within a time frame from immediately to within a few years without intervention; or the combination of life or economic consequences with probability of failure is extremely high.	Whittier Narrows Dam
II	Urgent (Unsafe or Potentially Unsafe)	Dams where failure could begin during normal operations or be initiated as the consequence of an event. The likelihood of failure from one of these occurrences before remediation is too high to assure public safety; or the combination of life or economic consequences with probability of failure is very high.	Carbon Canyon Dam, Lopez Dam, San Antonio Dam, Santa Fe Dam, Corona National Housing Dike and Corona Sewer Treatment Dike, and Prado Dam
III	High Priority (Conditionally Unsafe)	Dams that have issues where the dam is significantly inadequate or the combination of life, economic or environmental consequences with probability of failure is moderate to high.	Brea Dam, Haines Canyon Debris Dam, Hansen Dam, Painted Rock Dam, and Sepulveda Dam
IV	Priority (Marginally Safe)	Dams are inadequate with low risk such that the combination of life, economic or environmental consequences with a probability of failure is low, and the dam may not meet all essential USACE engineering guidelines.	Alamo Dam, Fullerton Dam, Mathews Canyon Dam, Mojave Dam, Pine Canyon Dam, and Whitlow Ranch Dam
V	Normal (Adequately Safe)	Dams considered adequately safe, meeting all essential agency guidelines, and the residual risk I considered tolerable.	None

Risk of Future Events

Due to the presence of several dams near Anaheim, areas of the City could be at risk of inundation in the case of significant dam failure. Dam failure's potential consequences are death or injury, people displaced from their homes, damage to existing public and private buildings, damage to infrastructure, loss of services from utilities, loss of government services, and economic losses. The U.S. Army Corps of Engineers (USACE) evaluates and rates dams based on confirmed or unconfirmed safety issues, probability of failure, and the potential consequences. The following are the ratings for USACE owned dams, as well as the reservoirs owned by Anaheim and the MWD, respectively, that may impact Anaheim:

[47] California Office of Emergency Services. 2018. California State Hazard Mitigation Plan. https://www.caloes.ca.gov/cal-oes-divisions/hazard-mitigation/hazard-mitigation-planning/state-hazard-mitigation-plan
[48] Rancho Santiago Community College District. nd. *Part IV-D – Dam Failure*. https://rsccd.edu/Departments/Risk-Management/Documents/Risk%20Management/IV-D%20Dam%20Failure.pdf

Prado Dam is an earth-filled dam built-in 1941 by the U.S. Army Corps of Engineers on the Santa Ana River near the City of Corona in Riverside County. It is the primary flood control facility of the Santa Ana River watershed and has an area of more than 11,500 acres. The Army Corps of Engineers Dam Safety Program has recently re-rated the dam to be a high urgency (DSAC Rating II); it is scheduled to undergo modification to the existing spillway in 2021 to address safety concerns; the project has not been completed. Another project currently underway behind the dam includes the Alcoa Aluminum Plant Dike, which is anticipated to protect several neighboring properties along Rincon Road in the City of Corona from a 190-year flood event. Generally, there is water impounded behind the dam during most of the year, but the reservoir can be empty during drought events.

Carbon Canyon Dam, which completed construction in 1961, is a flood risk management project operated by the Army Corps of Engineers, Los Angeles District. It is near the northern edge of Orange County in Yorba Linda. The Army Corps of Engineers Dam Safety Program has given the structure a DSAC II rating, which means it has a high risk of failure without remediation efforts. The dam has a high potential for failure due to erosion of the embankment. This dam and its reservoir are normally empty and intended to detain water from a rainstorm.

Walnut Canyon Reservoir, built in 1968, is a functioning water storage reservoir. It has served the community for over 50 years as a reservoir, emergency water source for firefighting and a water source should the ground basin or imported water supplies become interrupted. This reservoir serves as a primary emergency supply for the City of Anaheim.

Diamond Valley Lake, built in 1999, serves as one of the largest reservoirs in Southern California and is also one of the newest. The lake took four years to be filled via the Colorado River aqueduct and cost over $1.9 billion to construct. Should the dams fail, the water contained within the lake would make its way into the Santa River watershed and Prado Dam. The inundation threat to Anaheim would be caused by any of the displaced water already contained within Prado or further dam failure.

Climate Change Considerations

Climate change could increase the risk of dam failure in the future. More intense rainstorms may increase the likelihood of reservoir infrastructure becoming overwhelmed, including the dams that control floodwaters from inundating Anaheim and the rest of Orange County. Indirectly, increased climate change-induced rains may cause more erosion, which could compromise the dam's structural integrity of the foundation it sits on.

LANDSLIDE

Description

Landslides occur when slopes become destabilized, typically after heavy rains. If precipitation saturates soils, they can become unstable, or landslides can occur when significant erosion from rainfall destabilizes the ground. Slopes that have recently burned face a greater risk from rain-induced landslides, as the loss of vegetation can de-stabilize the earth. Earthquakes may also be a source of landslides as the shaking can destabilize steep hillsides covered in loose soils and weak rock layers.

Location and Extent

Landslides were identified as a concern for the City. Potential landslide areas include the Anaheim Hills and various parts along the SR-91 east of the City. **Figure 3-9** identifies areas mapped by the California Geological Survey (CGS) with Deep Seated Landslide Potential. These areas were most likely riverbanks for the historic Santa Ana River, which are now located behind the levees constructed along the current river margin. Anaheim Hills and the most eastern side of the City are susceptible to landslides, which could be induced by seismic activity if a significant earthquake were to occur.

Past Events

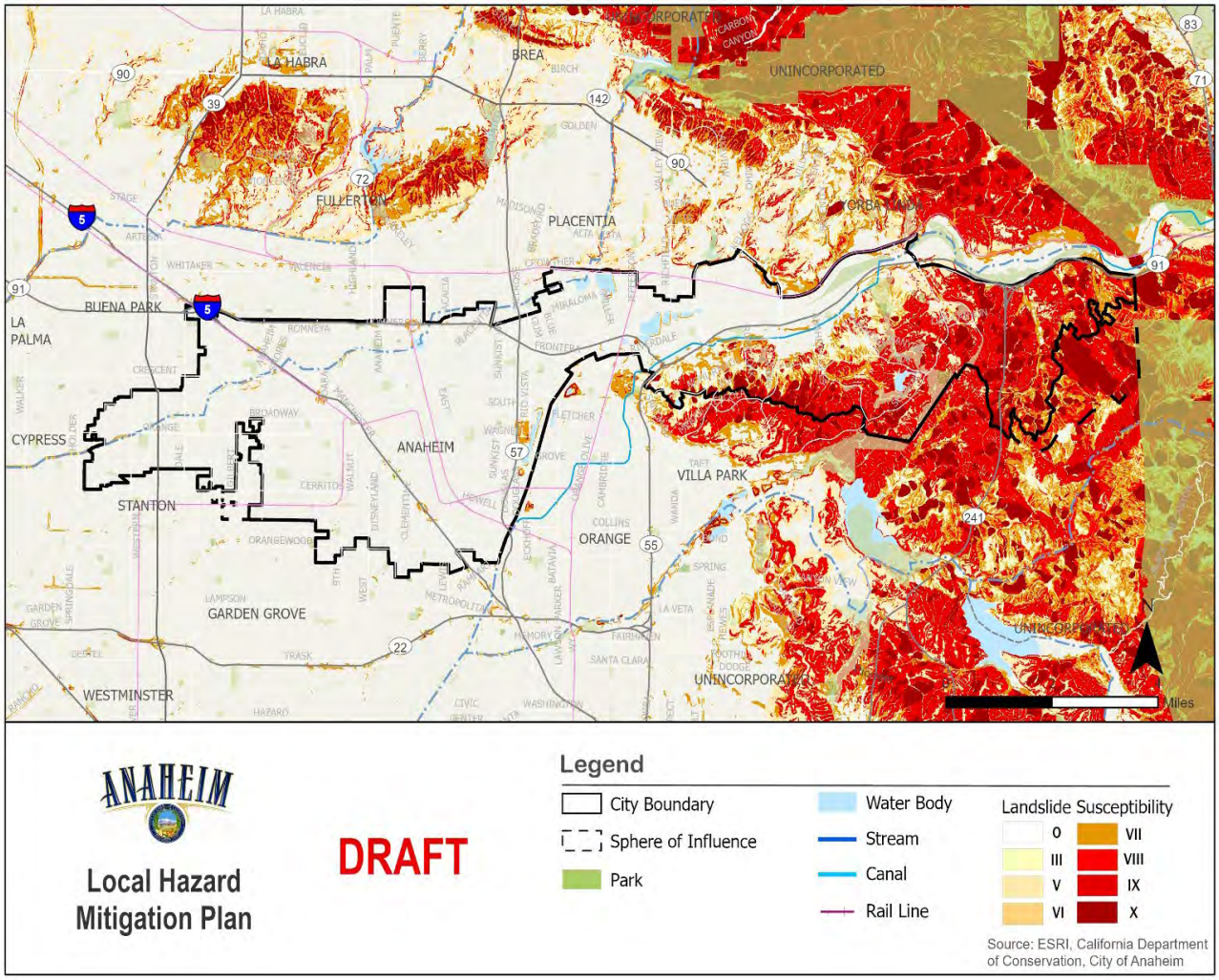
The topography of Anaheim is generally flat, except for the areas along the eastern part of the SR-91 and Anaheim Hills. As a result of this topography, there have been only a few major landslides within the City.

The Santiago Landslide - In 1993, following a major El Niño weather event, a bluff in east Anaheim Hills slid and prompted the evacuation of dozens of families, destroyed over 30 homes, and impacted over 200 other structures in the vicinity.[49]

[49] City of Anaheim, https://www.anaheim.net/5783/Santiago-GHAD

The Ramsgate Landslide - In 2005, following a twenty-day rain event in Orange County that led to flooding and caused a landslide along Ramsgate Dr in Anaheim, which destroyed three homes and a private street.[50]

FIGURE 3-9: DEEP SEATED LANDSLIDE AREAS



Risk of Future Events

The potential for landslides will continue to exist in areas of the city, especially those areas in Anaheim Hills located along the eastern part of the SR-91.

Climate Change Considerations

Due to the wide variety of factors that can lead to landslides, it is possible that climate change could indirectly affect the conditions for landslides. Increased frequency and more intense storms 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.

[50] Sever, Megan. Geo Times, "Natural Hazards: Dream Home Slips Away." http://www.geotimes.org/apr05/NN_CAlandslides.html

Disease and Pests (Public Health Emergencies, Vector Issues, Tree Mortality)

Description

Disease may affect an organism (trees, animals, humans, etc.) to the degree that normal activities can become impaired. In serious cases, diseases can result in significant damage or even death. Some diseases are not easily transmitted from person to person and are considered non-contagious. For example, a person may contract Lyme disease through the bite of an infected tick; however, the infected person will not spread the disease to other people. Diseases that are spread from person to person are considered contagious. While both non-contagious and contagious diseases can affect residents of the City, contagious diseases are particularly concerning because they can spread infection or illness if proper precautions are not taken.

Public Health Emergencies

The National Disaster Medical System Federal Partners Memorandum defines a public health emergency as "an emergency for health care [medical] services to respond to a disaster, a significant outbreak of an infectious disease, bioterrorist attack or other significant or catastrophic event." To activate the National Disaster Medical System (NDMS), "a public health emergency may include but is not limited to, public health emergencies declared by the Secretary of Health and Human Services (HHS) under 42 U.S.C. 247d, or a declaration of a major disaster or emergency under the Robert T, Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), 42 U.S.C. 5121-52906.[51, 52]

Vector Issues

Pests are organisms whose presence is generally considered a nuisance due to the effects on public health and property damage they can cause. Examples of pests include mice, rats, mosquitoes, and invasive insects that cause damage to natural assets like urban forests. These organisms can be vectors, or transmitters, of diseases that can spread to humans and other animals. Occasionally, the disease may spread first to an intermediary, like a domesticated animal, where it may evolve into a form that can survive in humans. These kinds of vector-borne diseases are known as zoonoses. In addition to posing risks to public health, pests can also damage property, such as trees or other landscaped areas, either by directly consuming plant material or spreading infectious diseases. In serious cases, pests can cause the death of the tree or plant specimen they are infesting.

There are two general classifications to describe the geographic spread of disease. An epidemic is an infectious disease that spreads beyond a localized area, reaching people throughout a large region. A pandemic is an infectious disease that spreads around the world. Both epidemic and pandemic diseases can be described as vector-borne if the infection occurs through a vector. The two main factors that influence the spread of disease are the speed at which the pathogen is transmitted from person to person in addition to human behaviors, both individual and societal.

The following are a few of the contagious diseases and vectors that could affect the population of Anaheim and, in some situations, become a public health emergency:

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[51] "A Public Health Emergency from the Perspective of the U.S. National Disaster Medical System (NDMS)". 2007-04-10.

[52] "National Disaster Medical System Memorandum Of Agreement Among The Departments Of Homeland Security, Health And Human Services, Veterans Affairs, And Defenses (PDF). 2005-09-26. Archived from the original (PDF) on 2009-01-06.

COVID–19 is the common name used for the Novel Coronavirus Disease 2019, first identified in Wuhan, China, in December 2019. The new coronavirus that causes COVID-19 is known as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2.) The COVID-19 pandemic is the most recent, detrimental, and rampant public health emergency in recent years. Coronaviruses are a large family of viruses 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, fever, chills, muscle pain, sore throat, and/or new loss of taste or smell.[53]

Influenza (the flu) is a virus that leads to illness in humans. Symptoms of the flu include fever, cough, headache, sore throat, muscle and joint pain, or runny nose. Given that the flu virus is constantly mutating, creating a vaccine that protects against all virus strains is exceptionally difficult. These variations of the flu can occasionally give rise to particularly deadly strains, such as the H1N1 strain that emerged in 2009. Currently, the flu is one of the most common diseases worldwide, leading to as many as 650,000 deaths per year.[54]

West Nile Virus is a virus that was first isolated in Africa, then first reported in the U.S. in 1999. West Nile virus is vector-borne – most commonly spread to people by the bite of infected mosquitoes. Most people who are infected do not display symptoms or feel sick. Those who display symptoms most often experience high fever, headache, neck stiffness, tiredness, or tremors. More severe symptoms include coma and paralysis. Vulnerable populations, primarily the elderly, may die because of their infections. There is currently no vaccine for the virus.[55]

Zika Virus is a virus first identified in Uganda that began spreading globally in 2016. The Zika virus infection is a vector-borne disease transmitted from person to person or through mosquito bites. Most infected people do not experience symptoms; however, mild symptoms may occur, including fever, headache, or muscle pain. Zika rarely results in death. Researchers have discovered that Zika virus infections in pregnant women can sometimes result in microcephaly, a condition where babies are born with small heads. Babies born with microcephaly may die because of their physical condition.[56]

Mosquitoes are parasitic insects that feed on the blood of mammals, including humans. They use a needle-like part of their mouth, called the proboscis, to breach the epidermis and reach the blood vessels beneath the skin. As mosquitoes withdraw the blood from their host, they can potentially transfer infectious diseases they are carrying to the host. Mosquitoes may transmit only some, but not all diseases. For example, the Human Immunodeficiency Virus (HIV) cannot be transferred from human to human since HIV cannot survive in mosquitoes. The Zika or West Nile viruses,

An Asian Tiger Mosquito, which may attack during the day, bites its host. Image from San Diego County News Center.

[53] Coronavirus Disease 2019 (COVID-19). https://wwwn.cdc.gov/nndss/conditions/coronavirus-disease-2019-covid-19/case-definition/2020/08/05/

[54] Hartl, G. December 2017. Up to 650,000 people die of respiratory diseases linked to seasonal flu each year. World Health Organization. https://www.who.int/news-room/detail/14-12-2017-up-to-650-000-people-die-of-respiratory-diseases-linked-to-seasonal-flu-each-year

[55] Center for Disease Control and Prevention. December 2018. West Nile Virus: https://www.cdc.gov/westnile/index.html

[56] Center for Disease Control and Prevention. March 2019. Zika Virushttps://www.cdc.gov/zika/about/overview.html

on the other hand, are highly transmissible infections via mosquitoes, and this is the most common form of transmission.[57]

Mice, rats, and small rodents can transmit disease or be a vector for infectious organisms. The most well-known historical example of this is the bubonic plague pandemic, also known as the Black Death. In the 14th Century, mice and rats infested with fleas were transported to Europe from Asia. The fleas were infected with the bubonic bacteria, *Yersinia pestis*. Humans contracted bubonic plague from the bites from infected fleas or by handling animals infected with the plague.[58]

Tree Mortality

The entirety of a city's trees is generally referred to as an urban forest. These trees may be publicly owned or maintained, such as trees in a public park or street median, or privately owned, such as the ornamental trees found in a property owner's landscaping. Urban forests represent important assets for a city as they provide shade, which helps keep the community cool. They also provide aesthetic beauty to a community and help humans feel calm and less stressed. Tree mortality refers to the death of numerous tree specimens in a forest, including urban forests. The death of a tree represents a significant loss since trees are expensive and require extensive time and care to be properly raised. Tree mortality may result from numerous causes, including but not limited to extreme heat, uprooting from severe weather, over-or under-irrigation, or chemical contamination. Like other living beings, trees are also subject to vector-borne diseases spread by pests. These diseases can cause the tree to produce misshapen fruit or discolored leaves. The disease can also kill the tree over an extended period. Pests that cause tree mortality are of concern since they may be difficult to detect and quarantine.

Pests that are currently afflicting trees in Orange County include the following:

Gold Spotted Oak Borer (GSOB): Burrow into oak trees, killing the tree over time.

Invasive Shot Hole Borer (ISHB): Burrow into all kinds of native trees in all kinds of settings, including urban areas. These insects carry the Fusarium Dieback fungus, which kills the tree. [59]

Asian Citrus Psyllid (ACP): Carries a plant disease known as Huanglongbing, or citrus greening disease, which kills citrus trees.

Invasive Shot Hole Borer. Image courtesy of Arborjet.com

Location and Extent

Public Health Emergencies

While any location in Anaheim is susceptible to experiencing the spread of disease, locations where many people gather are more likely to facilitate the spread of disease. These include large industrial and commercial employment centers, entertainment venues like Disneyland and The Grove, sports arenas like Anaheim Stadium and the Honda Center, educational institutions,

[57] Centers for Disease Control and Prevention. March 2016. *NIOSH: West Nile Virus.* https://www.cdc.gov/niosh/topics/outdoor/mosquito-borne/westnile.html
[58] Centers for Disease Control and Prevention. November 2018. History of Plague. https://www.cdc.gov/plague/history/index.html
[59] OrangeCountyFireAuthority.2018.Ready,SetGo,Newsflash! https://www.ocfa.org/Uploads/SafetyPrograms/OCFA%20Newsflash_Tree%20Pests_3-Page%20Version.pdf

medical facilities, and shopping centers. These diseases are more likely to spread when and where large groups of people work or congregate together in enclosed spaces.

Few diseases have a formal measuring scale to evaluate their severity or extent. Influenza, more commonly known as the flu, is measured by the Pandemic Influenza Phases scale established by the World Health Organization (WHO). **Table 3-15** describes the various phases of Influenza infection over time.

TABLE 3-15: PANDEMIC INFLUENZA PHASES

Phase	Description
Phase 1	No animal influenza virus is known to have caused infection in people.
Phase 2	An animal influenza virus has caused infection in people. There is a potential pandemic threat.
Phase 3	An animal influenza virus has caused occasional infections or infections in small groups. There may be limited human-to-human transmission, but nothing large enough to sustain community-level outbreaks.
Phase 4	Human-to-human transmission can sustain community-level outbreaks. There is a significantly higher risk of a pandemic.
Phase 5	Human-to-human transmission in at least two countries in the same region. A pandemic is likely imminent.
Phase 6	Human-to-human transmission in at least two countries in the same region and in at least one other country outside of the region. A pandemic is underway.
Post-peak	Transmission levels are declining below peak levels, although second waves may occur, and transmission could return to previous levels or higher.
Post-Pandemic	Transmission levels have returned to normal levels for seasonal influenza outbreaks.

Source: World Health Organization. 2019. WHO Pandemic Phase Descriptions and Main Actions by Phase. https://www.who.int/influenza/resources/documents/pandemic_phase_descriptions_and_actions.pdf

VECTOR ISSUES

Vector-borne diseases can only be spread where there is a link between the pest and the human population that could be infected. Areas where pests gather could pose a greater danger to humans who live nearby or visit regularly. Mosquitoes, for example, are known to congregate around pools of standing water as this is where they lay their eggs. Any pools or other bodies of standing water in Anaheim pose an increased risk to anyone near these locations of being bitten by a mosquito and potentially being infected by a mosquito-borne disease.

The Orange County Vector Control District routinely conducts field surveys to determine the presence of vector-borne diseases. The diseases of prime concern are those carried by mosquitoes, fleas, ticks, and rodents. Surveillance and detection programs are designed around each of these vectors. When routine surveillance activities detect a vector-borne disease, management evaluates the risk options. If it is determined that a risk to the public exists, then local and state health agencies are informed, including the public.[60]

TREE MORTALITY

Any tree has the potential to be infested by pests that could result in the tree's death. This means all areas of Anaheim that are landscaped with trees could experience tree mortality. These areas include parks, landscaped parkways, street medians, schools, and private homes or businesses. Trees could also die because of other hazards. For example, an exceptionally severe drought

[60] Section 16, Vector Issues, 2017 City of Anaheim Hazard Mitigation Plan, pg. 154 *General Situation*.

that dramatically reduces the amount of water available for landscaping in Anaheim could deprive trees of the irrigation they require for their survival. Non-native or non-drought adapted specimens would most likely be the first trees affected; however, native species could also be affected, depending on the severity of the conditions. Multiple hazards could also combine to cause tree mortality. For instance, a prolonged drought coupled with a significant windstorm could damage or destroy trees if their root systems could no longer withstand the windspeeds exerted.

There is no universally accepted scale for measuring tree mortality, but the U.S. Forest Service identifies a general model that compares the aggregate number of tree deaths in relation to the aggregate number of trees surviving over a specified period. Additionally, a meta-analysis of tree mortality studies reveals that most trees in urban forests have an average lifespan lasting between 19 to 28 years and that the mortality rate among these trees is 3.5% to 5.1% per year. If tree mortality rates occur at a higher rate than this or if newly planted specimens are dying before 19 years, it could indicate that the City's trees are afflicted by disease, pests, or other issues.

Past Events

Public Health Emergencies/Vector Issues

While local information on diseases and pests for the City of Anaheim specifically was not readily available, the Orange County Health Care Agency (OCHCA) has kept records for the entirety of Orange County, including data on the impact of the disease outbreaks. The following are notable instances of diseases and pests that have occurred within Orange County:

COVID-19: In December 2019, COVID -19 was identified in Wuhan, China. As of January 2022, COVID-19 has spread around the globe, with over 377 million confirmed cases and approximately 5.6 million deaths worldwide. There are over 74 million confirmed cases within the United States and over 886 thousand deaths resulting from the virus.[61] Orange County has reported over 517,000 cases and over 6,100 deaths due to COVID-19.[62]

H1N1 flu (Swine flu): The 2009 H1N1 influenza pandemic spread worldwide and caused deaths worldwide. Within the context of Orange County, there were 226 cases requiring intensive care and 57 cases where the infection resulted in the patient's death.[63]

Measles: A 2015 localized outbreak of measles began at Disneyland in Anaheim. Patient zero was not identified; however, the most likely cause of the outbreak was a visiting person who was a measles carrier (a person who may carry and spread an infection but not exhibit symptoms) who ed the theme park. This likely led to measles infections of other visitors who were not vaccinated against the measles virus, most of whom were minors. By the end of 2015, OCHCA reported 35 measles infections within the County. By 2016, all cases had been successfully treated, and the outbreak eradicated. There were zero reported cases in 2020.[64,65]

West Nile Virus: In 2014, California experienced a sudden outbreak of West Nile Virus infections, with most cases occurring within Orange County. By the end of the year, the California Department of Public Health (CDPH) reported more than 263 cases, though Orange County

[61] Johns Hopkins University & Medicine. 2020. "Coronavirus Resource Center". https://coronavirus.jhu.edu/map.html
[62] https://occovid19.ochealthinfo.com/coronavirus-in-oc
[63] Orange County Health Care Agency. 2009. "Summary Report of the Orange County Health Care Agency." http://www1.ochca.com/ochealthinfo.com/docs/public/h1n1/2009-H1N1-summary.pdf
[64] Center for Disease Control and Prevention. February 2015. *Measles Outbreak – California, December 2014-Feburary 2015.* https://www.cdc.gov/mmwr/preview/mmwrhtml/mm6406a5.htm
[65] Orange County Health Care Agency. 2017. Reportable Diseases & Conditions by Year, 2013-2017. http://www.ochealthinfo.com/civicax/filebank/blobdload.aspx?BlobID=76272

reported 280. One middle-aged man and two seniors died as a result of being infected. The number of cases decreased dramatically in 2015 to 97 cases, though this was still high compared to the rest of the 2013-2017 period. In 2017, the number of cases decreased further to 38, and by 2018, the number of cases fell to 12, the lowest number of West Nile Virus infections since 2012. The numbers increased slightly in 2020 to a total of 19 cases.[66]

Zika Virus: In 2016, there were 30 reported cases of Zika Virus infections and 12 cases in 2017, with an infection rate of 0.9% and 0.4%, respectively. All these cases resulted from residents traveling to foreign countries where the virus was active and then being diagnosed with the infection upon their return. No Zika infections have occurred within California itself. In 2020 there was only a single reported case of the Zika virus in Orange County.[67]

Tree Mortality

GSOB and ISHB were first reported active in Southern California in 2012 and quickly spread across several counties. The ISHB first emerged in coastal areas and then spread inland, with the first specimens at the University of California campus, Irvine, identified in 2015. By 2018, ISHB had spread throughout all of the County.

The ACP has also been an ongoing risk to citrus trees in Southern California, where more than 500 cases have been reported as of 2018. As of 2019, the California Department of Food and Agriculture maintains a quarantine zone throughout certain sections of Los Angeles and Orange counties for any citrus trees infected with Huanglongbing. The City falls within this quarantine zone. [68] The current hotspot for this disease is in Anaheim, and Garden Grove, with a combined 446 trees, confirmed positive for the disease. [69] According to City staff, invasive insect species such as the ISHB and GSOB have destroyed (9) sycamore trees and (22) Coast Live Oaks, which has forced the scheduled removal of these trees this year (2022).

Risk of Future Events

All viruses, including SARS-CoV-2, which causes COVID-19, change over time. Most changes have little to no impact on the properties of a virus. However, some changes may affect a virus' properties, such as how easily it spreads, the associated disease severity, or its response to vaccines, therapeutic medicines, diagnostic tools, or other public health and social measures.[70]

The SARS-CoV-2 (COVID-19) virus has evolved multiple times throughout the pandemic. The virus has spread worldwide and has mutated into numerous variants thus far, with Delta and Omicron considered by the Center for Disease Control (CDC) to be the variants of concern as of December 2021.[71] The most recent variant, Omicron, has become more transmissible and has already spread worldwide, increasing the number of people infected and placing a great demand and strain on medical services. With new vaccines and precautions such as masking and social

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[66] Westnile.ca.gov. 2014. 2014 WNV by County. http://westnile.ca.gov/case_counts.php?year=2014&option=print
[67] California Department of Public Health. 2019. *What Californians Need to Know: Don't Bring Zika Home*. https://www.cdph.ca.gov/Programs/CID/DCDC/pages/zika.aspx
[68] California Dept. of Food and Agriculture. 2021. 2021 Huanglongbing Quarantine Map Overview. https://www.cdfa.ca.gov/plant/hlb/regulation.html
[69] FarmProgress. 2020. "Huanglongbing continues to spread across southern California. https://www.farmprogress.com/crop-disease/huanglongbing-continues-spread-across-southern-california
[70] https://www.who.int/en/activities/tracking-SARS-CoV-2-variants/
[71] https://usafacts.org/articles/covid-variants-delta-alpha-common/?utm_source=google&utm_medium=cpc&utm_campaign=ND-COVID&gclid=Cj0KCQiA0eOPBhCGARIsAFIwTs6rTIy1Vzic85mc79O9GLTASQ4uK96A9cuSKtXv4-zazozgISXwQeYaArS5EALw_wcB

distancing, the goal is to decrease the severity and spread of the virus. As the COVID-19 pandemic unfolds and changes, Anaheim is expected to experience the effects of the pandemic similar to the rest of the world. As the transmission of the severe strains decreases, the effects on the City and residents are expected to diminish.

Public Health Emergencies

Anaheim is almost certain to continue experiencing influenza-type infections in the future. As this disease has no completely effective vaccine, it is impossible to eradicate the illness from recurring in the City. Other diseases, such as measles, can only be contained as far as the general population continues receiving vaccinations against the disease. If residents, workers, or visitors to Anaheim, were to stop receiving vaccinations against preventable diseases, it could cause a resurgence of such diseases within the City. Recent cultural trends in Southern California suggest that some members of the public are choosing not to vaccinate their children, which corroborates this scenario.[72] While it is impossible to predict whether this anti-vaccination trend will gain traction in Anaheim, there are no current indications that significant numbers of people living, working, or visiting the city are not taking the necessary precautions against the threat of preventable disease, including vaccinations.

Vector Issues

Vector-borne diseases of concern, like the West Nile or Zika viruses, are not native to California and thus are not expected to gain significant traction in the future. As all cases of Zika Virus infection have occurred among those who have traveled to countries where the risk of infection is high, it can be expected that there will always be some degree of Zika Virus infection in Anaheim if its residents, workers, and visitors travel to these countries. West Nile Virus infection rates tend to remain low, but there are periods when infection rates suddenly rise due to larger mosquito populations. If mosquito control measures are in place and effectively enforced, the infection rates in Anaheim are expected to remain low. If large numbers of residents or businesses do not follow proper procedures, West Nile Virus cases could rise.

Tree Mortality

Regarding invasive pests, the City is concerned about both ISHB and GSOB. While the likelihood of a large outbreak is small within the City, it is understood that the only effective mitigation is the removal of severely infected trees and managing and monitoring those that are still considered viable, and managing the spread of the infestation.

Climate Change Consideration

Public Health Emergencies/Vector Issues

Climate change generally will lead to the overall warming of the Southern California climate, which may cause insects, pests, and other vectors that carry disease to remain active for an extended part of the year. This possibility increases the threat of exposure to any infectious diseases that these pests carry. Additionally, vectors currently not active in Anaheim and Southern California-at-large may migrate into the area due to warmer temperatures. Mosquitoes carrying West Nile Virus and Zika Virus would have an extended range.[73] For more resources and information on the impact of climate change on vector-borne disease, read Climate Effects on Health | CDC.

[72] Karlamangla, S. July 2018. "Pushback against immunization laws leaves some California schools vulnerable to outbreaks." *Los Angeles Times*. https://www.latimes.com/local/lanow/la-me-ln-sears-vaccines-fight-20180713-story.html
[73] McKenna, M. April 2017. "Why the Menace of Mosquitoes Will Only Get Worse." The New York Times. https://www.nytimes.com/2017/04/20/magazine/why-the-menace-of-mosquitoes-will-only-get-worse.html

Tree Mortality

Tree Mortality is expected to increase under climate change conditions. Climate change will increase the likelihood of more severe and frequent episodes of drought, reducing the amount of water used for irrigation for Anaheim's urban forest. When trees are under-irrigated, they become weaker and more vulnerable to pest infestation. In this scenario, trees in Anaheim may be more susceptible to infestation by ISHB and GSOB, increasing the overall mortality rate of trees in the City. [74]

Flood / Storm

Description

Flooding occurs when an area becomes inundated with more water than it can drain in a specified period. This can range from a small, confined area, such as a grassy field in a park that floods for a few hours after a rainstorm, to whole city sections, such as streets becoming impassable because of floodwaters. When floods are small, they may only represent a minor inconvenience as some recreational pathways and curb cuts become flooded. These smaller instances of flooding where water collects into a pool of standing water are referred to as "ponding." On the other hand, larger flood events can hamper a city's operations. For example, if multiple streets flooded simultaneously, the results could prevent emergency workers from reaching victims in need of assistance. Flooding also has the destructive potential to damage critical infrastructure. For instance, unprotected electronic equipment can short-circuit if it becomes inundated by floodwaters. This could lead to outages in street lighting, traffic signals, and even city and government computer systems.

Flooding has the potential to occur from multiple sources. In Southern California, the primary cause of flooding is usually heavy rain occurring during the winter storm season. Most precipitation in California arrives either via atmospheric rivers or the ENSO cycle. Atmospheric rivers are channels of moist air located high in the atmosphere. The ENSO cycle is a regional meteorological phenomenon in the southern Pacific Ocean consisting of ocean water and air temperature variations. These variations give rise to two distinct phases known as El Niño, the warm and wet phase, or La Niña, the dry and cold phase. When the El Niño phase is active, California will likely receive higher than normal precipitation levels. These higher-than-normal levels of rainfall can quickly overwhelm the capacity of certain sections of land to drain the precipitation before the rainwater begins to pool effectively.

A failure in infrastructure may also cause flooding. For example, a water main or sewage pipeline that bursts could cause flooding if left uncontained for a significant period of time. A more serious infrastructure failure, such as the failure of dams, reservoirs, or levees, could cause extensive flooding. Please refer to the Dam / Reservoir / Levee Failure section of this chapter for more information on this type of hazard.

Location and Extent

The Federal Emergency Management Agency (FEMA) designates which areas in the United States are susceptible to flooding and how likely they are to experience flooding. FEMA uses a

[74] Southern California Oak Woodland Habitats. 2017. Climate change vulnerability assessment for the Southern California
ClimateAdaptationProject.
http://climate.calcommons.org/sites/default/files/EcoAdapt_SoCal%20VA%20Synthesis_Oak%20Woodlands_FINAL_10Mar2017.pdf

complex classification system to categorize the level of risk for each section of land. The two most well-known measures of flood event likelihood are known as the 100-year flood and 500-year flood zones. These designations do not refer to floods that occur every 100 or 500 years but instead to the likelihood of occurring each year. For example, a 100-year flood zone has a 1 in 100—or 1% chance—of occurring in any given year, while a 500-year zone has a 1 in 500—or 0.2% chance—of occurring in any given year. These likelihood measures are combined with each locale's specific geography to produce specific flood "zone" designations. **Table 3-16** shows a detailed list of all the flood zone categories used by FEMA.

FEMA also uses Base Flood Elevation (BFE) to determine the minimum depth of the floodwaters during one of these flood events. An area with a BFE of three feet, for example, means that area can expect to see a minimum floodwater depth of three feet with potentially additional depth in particularly severe flood events.

FEMA has designated the vast majority of Anaheim as lying within Zone "X," generally meaning the City is not in danger of a 500-year flood. The topography of the city is relatively flat, except for the eastern area and its sphere of influence (south of SR-91), comprised of hills and canyons. Given Anaheim's specific geography FEMA added additional stipulations about the level of flood risk in the City. The Santa Ana River channel and levee systems (which run along the northeastern portion of the city following the Santa Ana River and the eastern part of the City as the river flows to the coast) have effectively mitigated the risk of a 100-year flood. However, it is still possible that the channel and levee system could overflow its embankments in an exceptionally powerful rainstorm. Due to the elevated topography of the City's eastern portion, the majority of the area south of Santa Ana Canyon Road is outside of the 500-year flood zone. In addition to the Santa Ana River, the City is at risk of flooding due to surface drainage through the streets and storm drains. The drainage pattern in the City varies, with most runoff conveyed on street surfaces and local storm drain facilities to the regional facilities owned and maintained by the Orange County Flood Control District.[75] Ponding events occur on any flat surfaces where sufficient drainage is unavailable. These include parking lots, landscaped areas or lawns, or roadways. Since ponding is so small in scale, it is impossible to predict exactly where in the City they will occur or how severe they will be.

TABLE 3-16: FEMA FLOODPLAIN ZONES

Zone	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, protected by flood protection infrastructure 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, 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)

[75] 2017 Anaheim Hazard Mitigation Plan, Flood Hazards, pg. 94.

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.

Figure 3-10 shows the areas in Anaheim that are FEMA-designated flood zones, and **Table 3-17** identifies relevant data from the National Flood Insurance Program (NFIP) regarding Anaheim.

TABLE 3-17 NFIP DATA FOR ANAHEIM

Total Number of Policies:	**402**
Total Premiums:	$334,765
Insurance in Force:	$120,803,500
Total Number of Closed Paid Losses:	50
$ of Closed Paid Losses:	$152,610
# of Repetitive Loss (RL) Properties	0
# of Severe Repetitive Loss (SRL) Properties	0
CRS Class Rating	8

Source: FEMA, 2021

Past Events

Anaheim is no stranger to flooding during massive storm systems and has experienced the destructive effects that occur as a result. Some flooding events have caused significant damage in the past in the City of Anaheim.

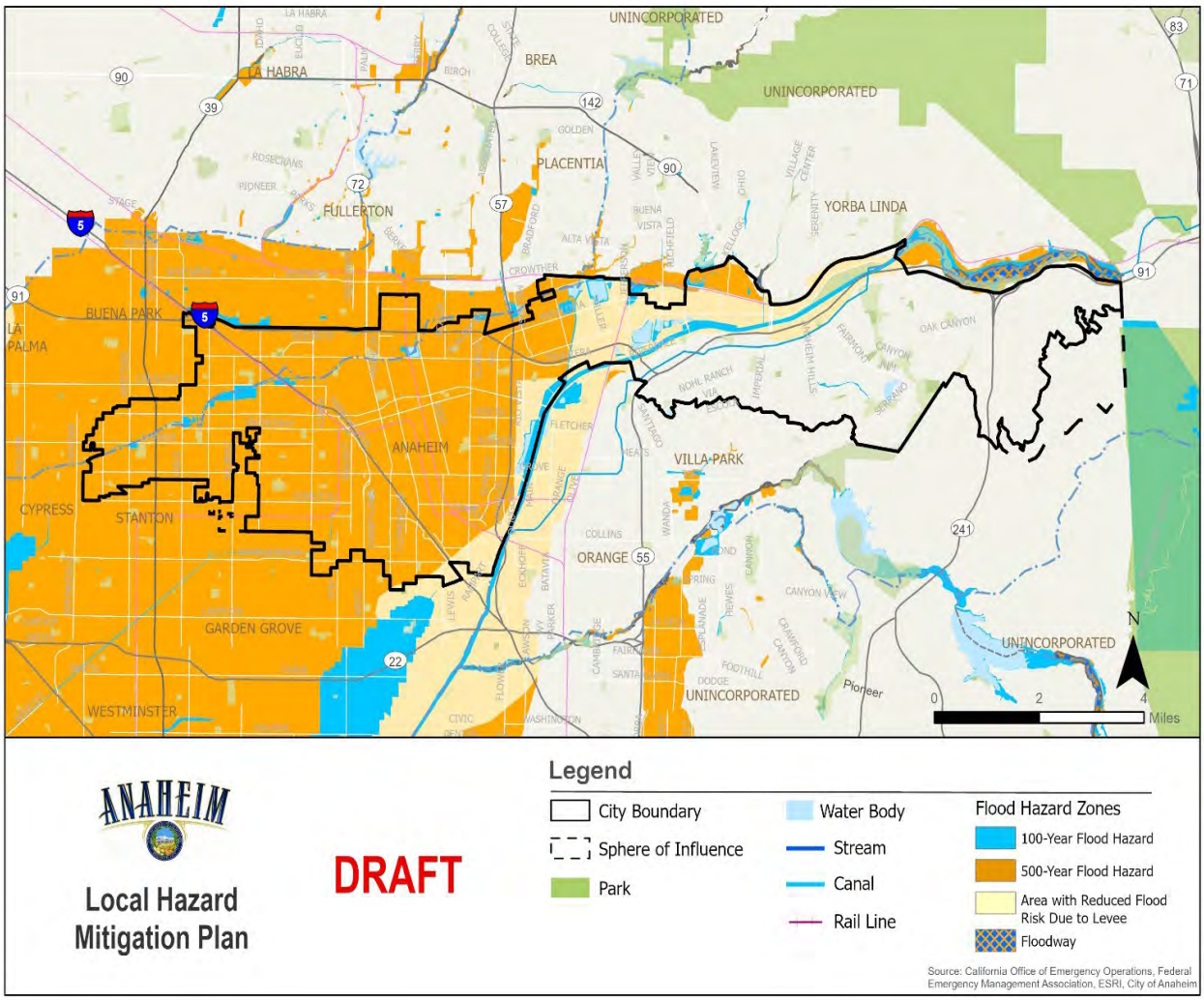
The following are examples of significant historic flooding in the region:[76]

December 1861 to January 1862 - There were 30 consecutive days of rain across Southern California from Los Angeles to San Diego. Thirty-five inches of rain fell in Los Angeles, causing mass flooding around the region's rivers. Some rivers even changed course, and the mouth of the Los Angeles River shifted from Venice to Long Beach. In Orange County, the Santa Ana River banks in Anaheim created a four-foot-deep layer of water that extended to the Coyote Hills in Fullerton. Twenty people were reported dead in Orange County.

February to March of 1938 - A weakened tropical storm reached Southern California and dropped 11 inches of rain in Los Angeles and 30 inches in some mountain areas. Flood control infrastructure was overwhelmed with the surge of water, and the Los Angeles, San Gabriel, and Santa Ana Rivers flooded their banks. Two hundred and ten people were reported as dead or missing, including 45 people in Orange County.

[76] Weather.gov. (2017)"A History of Significant Weather Events in Southern California." https://www.weather.gov/media/sgx/documents/weatherhistory.pdf

FIGURE 3-10: FEMA FLOOD HAZARDS ZONE MAP



February 1983 - Heavy rain fell in Orange County, leading to flooding of several streets. In Anaheim, 30 vehicles were damaged, along with a multi-family building.

April 1988 - Heavy rains led to flooding across Southern California, including Orange County. In Los Angeles, 26 motorists were injured in a major collision. Uprooted and felled trees brought down power lines that caused outages in the region.

Risk of Future Events

Localized instances of ponding occur at least annually or even multiple times a year in cities across Southern California. During periods of drought, precipitation levels may decrease and lower the likelihood of ponding. In most years, though, it is almost certain that Anaheim will experience some type of flood event. Larger-scale flood events are rare in Anaheim and will continue to be rare due to the City's protection by levee and other regional flood control infrastructure. However, during a particularly severe rainstorm or after a dam failure, Anaheim could experience some degree of large-scale flooding with inundation levels greater than one foot in depth.

Climate Change Considerations

Climate change is expected to exacerbate the conditions that lead to urban flooding in Anaheim. Climate change will cause more intense local, regional, and global weather patterns, intensifying atmospheric rivers. At this time, it is unknown exactly how climate change will impact ENSO frequency, but it is anticipated that its effects will become more intense. Winter storm precipitation amounts in Southern California will increase based on atmospheric rivers and ENSO changes. This increases the likelihood of an exceptional rain event could Anaheim that could overwhelm the capacity of the region's flood control system to contain and drain all the precipitation.

Droughts are also expected to increase in length and frequency due to climate change. Soils dried by extensive drought periods are less able to absorb and drain water, likely increasing flood possibility. Overall, climate change is expected to create conditions that will raise the likelihood of flooding in Anaheim.

Human-Caused Hazards (HazMat Release/Terrorism/Civil unrest/Cybersecurity)

Description

HazMat Release

Hazardous materials (HazMat) release occurs when any substance or combination of substances that, because of quantity, concentration, or characteristics, may cause or significantly contribute to an increase in death or serious injury or pose substantial hazards to humans and/or the environment. This can occur when storage containers of hazardous materials leak or fail. This can also happen in industrial accidents, vehicle crashes, as a direct result of other disasters (e.g., flood or earthquake), or as a deliberate act.

Hazardous waste is any material with properties that make it dangerous or potentially harmful to humans and/or the environment. The threat that hazardous materials pose to humans depends on the type of material, frequency, and duration of exposure, and whether chemicals are inhaled, penetrate the skin, or are ingested. 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 materials can also cause health risks if they contaminate soil, groundwater, and air, potentially posing a threat long after the initial release.

Terrorism

Terrorism is the use or threat of force to achieve a particular social or political outcome. The intent of terrorist attacks may be to overturn a government, reverse public policy, release political prisoners, 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 disrupt civil society by destroying property or infrastructure, attacking government operations at all levels, interrupting essential public services, creating chaos, or a combination of these actions. Firearms and explosives are the most common weapons used among terrorists. In extreme situations, terrorists may gain access to weapons of mass destruction, 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 in which emergency medical service resources, including personnel and equipment, are overwhelmed by the number and severity of casualties. Commonly recognized events of this type include building collapses, train and bus collisions,

plane crashes, earthquakes, and other large-scale emergencies. Events such as the Oklahoma City bombing in 1995 and the September 11 attacks in 2001 are well-publicized examples of mass casualty incidents.

Civil Unrest

A civil disturbance is an event when the normal operations of the city are either threatened or temporarily interrupted by violent protests, riots, shootings, or armed standoffs. A riot is a noisy, violent public disturbance caused by a group or a crowd (three or more people) usually protesting another group's actions or government policy in the streets. Multiple civil disturbances can occur simultaneously, or they may be a series of events. These types of events can lead to the destruction of private and public property, looting, arrests, and in extreme cases, even assault, injury, or death.

Cybersecurity

Cybersecurity can be defined as protecting the operations and functions of the computer systems, networks, and devices belonging to private citizens, religious groups, educational institutions, government agencies, or businesses against unauthorized access and malicious attacks. These threats or attacks can take the form of online harassment, hacking, or in-person tampering with electronic equipment. Cyber threats can cause service disruptions, infrastructure damage, theft and may lead to injury or death in severe instances.

Location and Extent

HazMat Release

Hazardous materials are used daily in households and businesses throughout Anaheim. In addition to large chemical and industrial factories, hazardous materials are also located in 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. Anaheim is also at risk of regional HazMat releases. With the right prevailing wind conditions, airborne toxic material could spread to and impact various parts of the City's air basin.

Table 3-18 summarizes reported HazMat releases. In 2021, there were 18 releases reported in the City of Anaheim and 29 in 2020. These reports are encouraging, as they indicate a potential sign of declining incidents compared to the previous decades in which there were nearly twice as many reported incidents. **Figure 3-11** identifies these locations. While there is no extent scale for hazardous materials release, the probability of an incident is anticipated to be occasional each year.

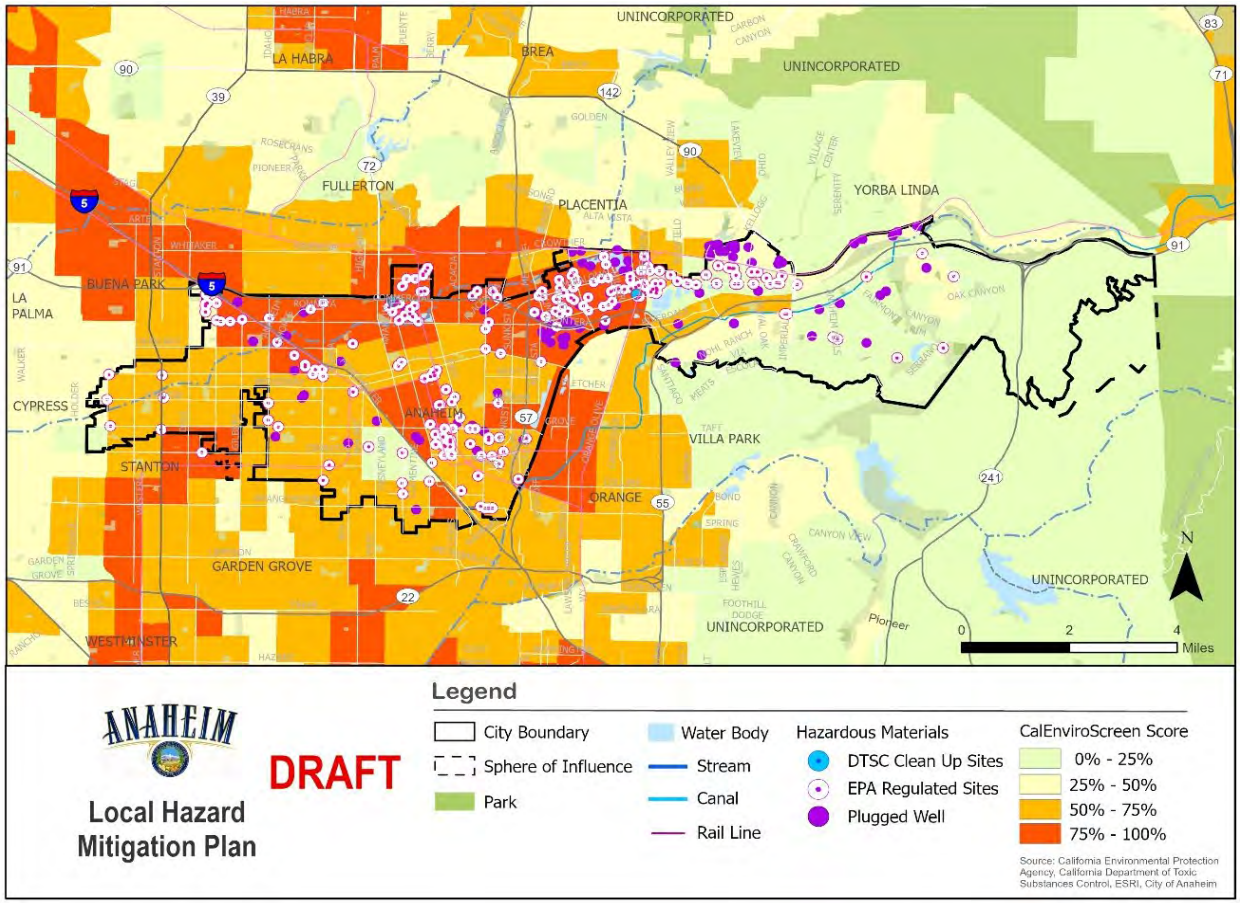
Terrorism

Terrorism can occur anywhere, although public spaces and locations where many people congregate are most common. Key locations in Anaheim may be large shopping centers (e.g., Downtown Disney, Garden Walk), governmental facilities (e.g., City Hall), schools, hospitals (e.g., West Anaheim Medical Center, Anaheim Reginal Medical Center), parks (e.g., Eucalyptus Park, Yorba Reginal Park), the Honda Center or Anaheim Stadium, and large employers such as The Disneyland Resort and the Convention Center. Acts of terrorism may also be directed at high-value targets such as electric substations, water treatment plants, levees or reservoirs, airports, highways, and other facilities that could impact governmental services. Mass casualty incidents and acts of terrorism are typically measured by the fatalities, injuries, and destruction they cause, but no universal scale is used to measure these events.

TABLE 3-18: ANAHEIM SPILL RELEASE REPORTING

2010	30
2011	33
2012	35
2013	35
2014	32
2015	33
2016	32
2017	32
2018	30
2019	45
2020	29
2021	18

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



CIVIL UNREST

Civil disturbances/riots can arise at any time and place for various reasons. These events are more likely to emerge in certain locations, including local, state, and federal government centers, jails, police stations, major businesses, university campuses, places of public assembly, or other locations listed in the Terrorism/Mass Casualty Incident description. No definitive scale for measuring civil disturbance events exists, but several metrics may be used to determine the impact of a civil disturbance event. These measures include:

- Number of facilities affected
- Number of fatalities
- Monetary loss
- Interruptions to communications infrastructure
- Number of people protesting
- Impacts on certain socioeconomic groups[77, 78]

CYBERSECURITY

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 cause computer systems to slow down or not respond for a few minutes. 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 governments.

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, etc.)
- 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.)[79]

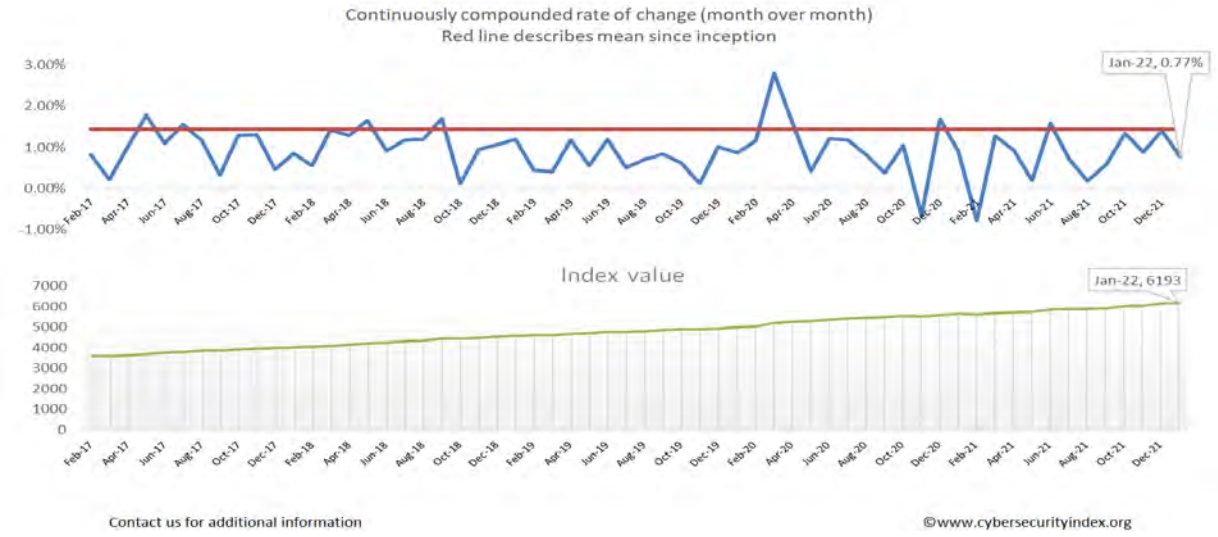
Globally, cyber threats are increasing and becoming more sophisticated. The most common types of attacks include:

- Phishing
- Ransomware
- Intellectual Property Theft
- Spyware/Malware
- Unpatched Software

To understand the status of cyber threats, reference the Index of Cyber Security (**Figure 3-12**), which identifies the measure of perceived risk. A higher index value indicates a perception of increasing risk. Since 2011 when this index began, the value indicating cybersecurity risk has increased from 1,000 to 6,193 in January 2022.

[77] Renn, O., et al. 2011. “Social Unrest.” Organization for Economic Co-operation on Development. 14 January.
[78]Cal OES (California Office of Emergency Services). 2018. 2018 State of California Multi-Hazard Mitigation Plan. http://www.caloes.ca.gov/HazardMitigationSite/Documents/016-
[79] 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.

FIGURE 3-12: INDEX OF CYBERSECURITY – JANUARY 2022



Past Occurrences

HAZMAT RELEASE

Anaheim has experienced 48 significant HazMat spills or releases of at least 200 gallons since 2010, the latest occurring in 2021. **Table 3-19** highlights these events. All but three appear to have occurred as the result of accidents or equipment malfunctioning.

TABLE 3-19: HAZARDOUS SPILL RELEASE EVENTS

Date	Location	Gallons	Incident Type
10/8/2010	321 East Orangewood Ave	1,800	Sewage: Pipe break on sewer line
12/1/2010	2950 W Ball Rd.	3,000	Other: Water main break
2/11/2011	1005 E Raymond Wy	360	Sewage: Blockage in sewer line
6/16/2011	Harbor & Vermont	1,260	Sewage: Grease blockage
9/1/2011	601 N Euclid Ave	810	Sewage: Blockage in a sewer line
11/21/2011	1169 N Knollwood Cir	720	Sewage: Grease blockage
12/23/2011	1131 N Blue Gum St	20(tons)	Radiological: Shipping container release
4/9/2012	1770 S Harbor Blvd	500	Sewage: Release due to blockage
4/12/2012	Santa Ana Canyon Rd	270	Sewage: Grease obstruction in private sewer line
4/18/2021	2150 S Gate College Blvd	1485	Sewage: Blockage in sewer line
6/5/2021	5555 E Santa Ana Canyon	600	Sewage: Grease blockage
6/17/2013	3250 E Frontera St	9,000lbs	Vapor: Fire caused material to burn
7/5/2013	1280 E La Palma Ave	350	Sewage: Blockage in main line
7/17/2013	145 S Bonnie Gene	1,125	Sewage: Roots blockage on sewer main line
10/17/2013	901 E South St	250	Sewage: City main blockage
11/6/2013	616 W La Palma Ave	9,600	Sewage: Cleanout leak due to blockage in line
4/17/2014	160 N Riverview Dr	1,590	Sewage: Rags clogged public sewer line
7/25/2014	260 Peralta Hills Dr	1,400	Sewage: Manhole overflowed due to root blockage
9/19/2014	2736 W Lincoln Ave	500	Sewage: Main line blockage
9/19/2014	2067 S Eugene St	1,450	Sewage: Sewer main overflow due to rags

10/20/2014	1773 W Lincoln Ave	1,280	Sewage: Blockage in private lateral
4/8/2015	5665 E Santa Ana Canyon	16,200	Sewage: Grease blockage in sewer line
8/8/2015	5449 Estate Ridge Rd	200	Sewage: Sewage overflowed through manhole
9/18/2015	1161 N Knollwood Cir	207	Sewage: Overflow from a city manhole
11/14/2015	1359 S Walnut Ave	1,680	Sewage: Blockage in private lateral
2/1/2016	1750 W Penhall Way	1,200	Vapor: Inadvertent discharge of Halon
2/7/2016	3140 E Coronado St	1,000	Chemical: Fire caused release of air fumes
3/9/2016	1400 E Blossom St	3,000	Sewage: Blockage in a sewer line
3/29/2016	131 Royal Oak Dr	300	Sewage: Main line blockage caused by roots
5/5/2016	Nohl Ranch Rd	1,350	Sewage: Sewage overflow from a manhole
6/25/2016	1400 Burton Ave	378	Sewage: Blockage in the main line
11/20/2016	6691 E Walnut Canyon Rd	2,300	Sewage: Overflow in a manhole
6/9/2017	3800 E Mariloma Ave	180,000	Other: Release of portable water from fire truck
9/6/2017	2381 W Broadway	450	Sewage: Grease blockage in public sewer line
9/16/2017	804 S Webster Ave	600	Sewage: Main line blockage
3/16/2018	124 N Tustin Ave	250	Sewage: Due to Blockage in private lateral
8/14/2018	SB SR 57 SO SR 91	2,000	Chemical: Big rig accident caused release
10/26/2019	1815 S Wayside Dr	250	Sewage: Blockage of grease and wipes in main line
11/21/2019	1978 W Blue Violet Ct	850	Sewage: Sewage released due to blockage
11/29/2019	1150 Magic Way	31,000	Chemical: Underground pipe leak
12/22/2019	1250 S Euclid Ave	480	Sewage: Apartment sewer lateral blockage
2/28/2020	Nohl Ranch Rd	540	Sewage: Blockage in main line
5/20/2020	1313 Harbor Blvd	1,600,000	Other: Valve was accidentally left in the open position
3/13/2021	I – 91	1,000	Petroleum: Semi-truck saddle tank was punctured
4/5/2021	State College at La Palma	500	Sewage: Contractor left a bypass plug in a sewer line
4/5/2021	State College at La Palma	720	Sewage: Plug was left in a sewage line
4/30/2021	Ball Rd at Webster Ave	1,000	Sewage: Blockage in a main line
5/17/2021	Orangethorpe & Kraemer	900	Chemical: Trash truck caught fire

Source: Data collected from https://www.caloes.ca.gov/cal-oes-divisions/fire-rescue/hazardous-materials/spill-release-reporting

According to City staff, there has also been an incident at Boysen Park. Traceable amounts of lead were found to be evident in nearby Theodore Roosevelt Elementary School (which sits along the northwest side of Boysen Park) after a major rehabilitation project was underway. During a routine soil testing, lead was discovered in the construction area. The City, out of caution, contacted the California Department of Toxic Substances Control, which conducted soil tests in the park as well. Upon the discovery of lead in the soil, Boysen Park was temporarily closed on October 8, 2021. On November 17, 2021, testing revealed that the majority of the park was clear of lead and allowed to reopen. The remainder of the park is being made safe to return to normal activities; only the baseball/softball fields remain closed to the public.[80]

[80] "Boysen Closure" http://anaheim.net/6027/Boysen-Park-Closure

Terrorism

The following mass casualty incidents/ terrorism events have occurred within Anaheim, or its vicinity, which may be relevant to the community:

1970 - The bombing of the Stanford Research Institute facility caused approximately $500,000 in property damage. No injuries or deaths occurred during this incident.[81]

1970 - The bombing of a Bank of America Branch caused approximately $500,000 in property damage. No injuries or deaths occurred during this incident.[82]

1983 - Unknown perpetrators planted nine bombs at the Golden Jack Bakery, a Middle Eastern bakery that sells Armenian and Lebanese bread, in Anaheim, California. Authorities were called to a fire at the bakery and discovered the pipe bombs made of highly volatile, smokeless powder strung together with wires, set off by a battery-powered device. It is suspected that the arson and the bombs were linked. All the bombs were removed and deactivated. There were no injuries in this incident, and the extent of property damage from the fire is unknown.[83]

2014 - A teenager who had reportedly threatened terrorist action against the attendees at a U.S. Open of Surfing event was arrested.[84]

May 2015 - Two Anaheim-based men, who had reportedly sworn allegiance to the Islamic State of Iraq and Syria (ISIS), were arrested at a Transportation Security Administration checkpoint at the Los Angeles International Airport. One of these men, Muhanad Badawi, was a student at Fullerton College.[85]

December 2015 - A married couple, who had reportedly sworn allegiance to ISIS, killed 14 people at a medical facility in San Bernardino in a mass shooting and terrorist attack.[86]

December 2019 - A man and girl were arrested after posting on social media that included possible threats against neighboring Costa Mesa's Estancia High School. Police identified two posts, one that showed what appeared to be a rifle with a caption that read, "don't go to school tomorrow." The second post indicated that there would be a mass shooting at the school. Police searched both homes and found the rifle, which was a BB gun. It was determined that there was no credible threat to the school. This led to heightened police presence at the school and more patrols in the surrounding area.[87]

Civil Unrest

The following is a list of recent civil disturbances/riots either in or in the vicinity of the City:

July 2012 - A crowd gathered at the crime scene after another in a series of police-involved shootings in Anaheim that resulted in the death of an individual. The crowd reportedly began to

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[81] Global Terrorism Database. 2020. "1970-10-18". https://www.start.umd.edu/gtd/search/IncidentSummary.aspx?gtdid=197010180001
[82] Global Terrorism Database. 2020. "1970-10-26". https://www.start.umd.edu/gtd/search/IncidentSummary.aspx?gtdid=197010260001
[83]Global Terrorism Database. 2022. "1983-01-21" https://www.start.umd.edu/gtd/search/IncidentSummary.aspx?gtdid=198301210006
[84] Connelly, L., and S. Emery. 2014. "Teen Arrested for Terrorist Threats Toward US Open." Orange County Register. July 26.
[85] Winton, R. 2016. "Two O.C. Men Convicted of Conspiring to Fight with Islamic State." Los Angeles Times. June 21.
[86] Global Terrorism Database. 2020. "2015-12-02." https://www.start.umd.edu/gtd/search/IncidentSummary.aspx?gtdid=201512020012
[87] Costa Mesa police investigate 'potential threat' against Estancia High School; 2 arrested, BB gun confiscated. Jessica De Nova and ABC7.com staff https://abc7.com/2-arrested-after-potential-threat-against-costa-mesa-school/5731455/

throw objects at the officers, who responded with non-lethal munitions (i.e., bean bag rounds and pepper spray balls). Several people were attacked when a police dog reportedly got loose, leaving one man with puncture wounds. This incident led to a series of smaller protests around the City that same day. The following day, another officer-involved shooting resulted in the death of an individual. A larger protest followed, with approximately 200 individuals walking from the Anaheim Police Department to Disneyland in a demonstration against escalating tensions between residents of Anaheim and the police. The crowd was stopped at Harbor Boulevard and Ball Road by a line of riot police and mounted officers on horseback. Two reporters were injured in the incident.[88]

July 2012 - At least 24 people were arrested and six injured in violent clashes between Anaheim protesters and police during demonstrations sparked by a series of officer-involved shootings. Officials said that three protesters, two reporters, and one police officer suffered injuries during the fourth day of protests. This incident occurred on one of the four days of protest in the city.[89] In a separate incident, approximately 1,000 people protested near Anaheim City Hall, becoming violent, looting, and vandalizing property resulting in additional arrests.

April 2016 - A rally for Donald Trump occurred at the Orange County Fairgrounds during his 2016 presidential campaign. A confrontation between a group of anti-Trump protestors and the attending crowd became violent. The protestors began to smash car windows, tried to flip a police cruiser, and one individual suffered a serious facial injury. Further down the street, protestors jumped on police cars, climbed streetlights, threw rocks at police lines, and scuffled with supporters leaving the event. Traffic was backed up for hours, and at least 20 people were arrested for multiple infractions of the law.[90]

February 2017 - Several teenage boys were involved in an altercation with an off-duty Los Angeles Police Department officer. The unnamed officer and one of the boys argued, which prompted another boy to threaten the officer. The officer drew his gun and shot away from the boys causing a fight between them and the officer. One unidentified 13-year-old was arrested and taken to the Orange County Juvenile under suspected criminal threat and battery allegations. The next evening, several protestors gathered in the neighborhood where the altercation and shooting occurred. The protests began calmly; however, chants expressing concerns over police brutality and child maltreatment started. The uprising led to damage to the officer's property, including his garage door and truck. Some protesters restrained other protesters before throwing garbage and bricks at Anaheim police officers.[91]

June 2020 - People protested in Anaheim, sharing their grief and grievance at the police brutality that claimed the life of George Floyd in Minneapolis one week prior. Nearly 700 people demonstrated against police brutality in Anaheim Monday evening. They took a knee in front of Anaheim City Hall with signs and chanting. At 6 p.m., the protest was declared over, and the curfew began; however, tensions remained high. Protest activity lasted in the area for about four hours. When mortars were thrown at officers, police declared an unlawful assembly. Over 20

[88] "Protest Erupts After Deadly Anaheim Deputy-Involved Shooting". 22 July 2012.

[89] Santa Cruz, Nicole; Vives, Ruben & Leu, Melissa (July 25, 2012). "Anaheim unrest: 24 arrested, 6 injured in night of violence". L.A. Now. Los Angeles Times. Retrieved 24 September 2016.

[90] Protest Turns Violent at Donald Trump Rally in Costa Mesa, Calif., Kenny, Steve NyTimes: https://www.nytimes.com/2016/04/30/us/donald-trump-rally-protest-costa-mesa.html

[91] Haire, Chris; Sudock, Joshua (February 23, 2017). "Protesters gather in Anaheim over LAPD officer firing gun during confrontation with teens". Orange County Register. Digital First Media. Retrieved February 23, 2017.

arrests were made, including a group who tried, and failed, to loot a store. Anaheim officials remained in the area overnight, protecting property through the curfew hours.[92]

Cybersecurity

The City of Anaheim has not experienced cyber incidents directly. However, several jurisdictions in southern California and across the country have. Several recent incidents local to the City include:

March 11, 2019 - The Orange County Sanitation District suffered a phishing data breach. Over 1,000 employee records were accessed through the district-deferred compensation plan as part of the breach.

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 accepts one-time credit card payments from customers.

December 2019 - The City of Seal Beach was the victim of a ransomware attack that affected city computer systems. The attack targeted the city's information technology service provider, allowing hackers to encrypt city computers with malware, primarily impacting city email and voicemail functions.

In addition to these, recent, notable cybersecurity threats in the U.S. include the Colonial Pipeline incident, JBS (the world's largest meatpacker), and the Washington DC Metropolitan Police Department. These attacks resulted in the shutdown or delay in critical services and functions, increased the cost of goods/services, caused financial losses, and led to operational delays.

Risk of Future Events

HazMat Release

The majority of the significant release events within Anaheim have occurred due to human error or malfunctioning equipment. Given this, it is anticipated that future events within Anaheim will include minor incidents like past occurrences identified above.

Terrorism

Given that mass casualty incidents and acts of terrorism stem from a variety of factors - economics, societal pressures, mental health, global geopolitics, warfare, religion, etc.—it is impossible to predict when an incident will occur. While Anaheim does not feature critical national or state facilities, it is home to large capacity venues, locations such as the Disneyland Resort, Anaheim Stadium, and the Honda Center, which attract visitors from around the world. These facilities receive international attention, potentially leading to the Resort and its guests becoming a target of opportunity for terrorist organizations wishing to create chaos and fear. Given the number of international visitors coming into the City, the possibility of foreign actors initiating an event does exist. Future incidents would likely originate domestically and are less likely to attract the attention of international terrorist groups. 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.

[92] Ludwig, Ashley, "Anaheim crowds gather in third night if protests," https://patch.com/california/losalamitos/curfews-hit-these-orange-county-cities-3rd-night-protests

Civil Unrest

While civil disturbance events may be rare, there is still a possibility that they could occur in the future. Given that several recent civil disturbance events have happened in the city, it is safe to say that locations like City Hall, the Convention Center, and other major locations that attract large crowds and visitors may be areas where such events could emerge in the future.

Cybersecurity

Due to the integrated nature of technology into the everyday lives of Anaheim's residents, businesses, and government operations, it is possible that a cyber threat could emerge in the future. While no cyber threats are publicly known to have disrupted the City's normal operations in the past, the likelihood of a cyber threat affecting the residents, businesses, and/or governmental operations in the future is increasing.

Climate Change Considerations

HazMat Release

Climate-related natural hazard events, such as an intense flood, could cause a hazardous materials release associated with transportation crashes or damage to storage containers or vessels containing these substances. Climate-related hazards could also exacerbate the effects and impacts of such events. For example, heavier rains could lead to more runoff from a contaminated site with hazardous materials.

Terrorism

The link between 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. For example, more prolonged, intense droughts may restrict food supply or limit economic growth for cities, regions, or even whole countries. Nevertheless, the likelihood of climate change impacting mass casualty incidents/acts of terrorism in Anaheim is negligible since these changes are more likely to impact developments on the national or international level.

Civil Unrest

Climate change is not likely to directly impact future civil disturbances in Anaheim.

Cybersecurity

Climate change is not likely to impact cybersecurity in the future within Anaheim.

CHAPTER 4 – THREAT AND VULNERABILITY

THREAT ASSESSMENT PROCESS

The threat assessment process evaluates the harm Anaheim may experience from a hazard event. Threat assessment does not consider a hazard's likelihood, so it gives equal consideration to hazards that are more likely (e.g., earthquakes, drought) as well as hazards that are less probable (e.g., urban fire, dam failure). The threat assessment examines three aspects of each hazard: the physical threat to Critical Facilities (CFs) and Facilities of Concern (FOCs), the social threat to vulnerable populations, and the threat to any other assets.

Critical Facilities and Facilities of Concern

Critical facilities 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. Facilities of concern are structures that play an important role in the City but are not critical to its function. These can be city-owned or privately owned facilities such as senior assisted living homes, parks, and storage facilities, to name a few.

The HMTF identified 74 CFs and 16 FOCs in Anaheim that fall into 3 different categories based on their function or characteristics. **Table 4-1** shows the number of CFs and FOCs 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 FOCs.

The potential loss value is the total insured value of the CFs that fall within the hazard zone. It is intended to provide an estimate of a replacement cost if the property is completely or severely damaged. The actual repair costs could be smaller or larger than the provided estimate. The data relies on the City's Insured Asset Values, and therefore, information for facilities not owned by the City is 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.

Based on the available data provided by the City, there is a minimum of $507,206,813 worth of City-owned assets. The greatest potential for loss among the city-owned assets comes from the Infrastructure Facilities category. The next category with the greatest potential for loss is the City Facilities, including City Hall, Fire, and Police Stations. To better understand the magnitude of impacts, this plan identifies representative percentages of potential impact based on the total valuation of City assets. For planning purposes, 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 - $5,072,068
5% Impact - $25,360,340
10% Impact - $50,720,681
20% Impact - $101,441,363
50% Impact - $253,603,407

The likelihood that all facilities are completely damaged simultaneously is extremely remote. Most impacts are anticipated to be isolated to specific 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.

TABLE 4-1: CRITICAL FACILITIES AND FACILITIES OF CONCERN

Category	Number of Facilities		Potential Loss
	Critical	Concern	
City Facilities (City Hall, Fire, Police)	19	2	$121,328,578
Community Centers	0	5	$8,997,129
Infrastructure Facilities	54	0	$316,155,897
Cooling Center	1	9	$60,725,209
Total	74	16	$507,206,813

* Potential loss data are estimates only, as replacement values for some facilities were not available. Actual losses may be greater than the estimate presented in this table.

Vulnerable Populations

Factors such as age, physical and/or mental condition, socioeconomic status, access to key services, and many other factors affect the ability of people to prepare for and protect themselves and their property from a hazard event. Even though some hazard events may equally impact all parts of Anaheim, people may experience the impacts differently. Higher-income households, for instance, are likely more 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, a higher-income household is less likely to experience significant damage during a flood event than a 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 Anaheim and where these different demographic populations live in the City. This 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 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 assistance from others.

Income levels: Lower-income households are less likely to have the financial resources to implement mitigation activities on their residences. Another challenge may be finding adequate time to research and access educational resources about hazard mitigation strategies. Furthermore, lower-income households are less likely to have the necessary resources to move to safer areas that are less at risk of being impacted by a hazard. The national poverty limit standard for the U.S. for a four-person family is approximately an income of $26,500 or less. For Orange County, the FY 2020 Low-Income Limit for a four-person family, according to Housing and Urban Development (HUD), is $102,450.

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.

Table 4-2 shows the metrics for Anaheim residents who meet at least one of the criteria for threatened, vulnerable populations.

TABLE 4-2: ANAHEIM THREATENED-POPULATION METRICS [93]

Threatened Population Metrix	Community-Wide Data
Population	365,257
Households	104,973
Median household income	$77,441
Renter Households	53.4%
Percentage of households with at least one person living with a disability	21.2%
Percentage of households living under the poverty limit	13.3%
Percentage of households with one member aged 65+	26.4%

The social threat analysis also shows the threat other populations may encounter. For example, people experiencing homelessness or people without access to lifelines (vehicles or communication networks) may experience greater hardship in evacuating or recovering from a disaster. Since data for these groups are not readily available, there is no definitive way to determine the number of persons in areas of elevated risk, so 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), and the hazard zone population data comes from ESRI's Business Analyst reports. As a result, there may be minor discrepancies in comparing the two data sets. The data relies on readily available 2021 US Census Survey Projections and 2015-2019 U.S. American Community Survey. **Chapter 2** identifies additional census-related information, which may be different from the data in this Chapter based on the data available for the analysis.

Other Assets

In addition to the City's designated inventory of CFs/FOCs and vulnerable populations, hazard events could threaten other important assets to Anaheim. 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.

[93] US Census Bureau, American Community Survey, 2021 Projections. "Table DP03: Selected Economic Characteristics in the United States." https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_17_5YR_DP03&prodType=table

THREAT PROFILES

Wildland/Urban Fires

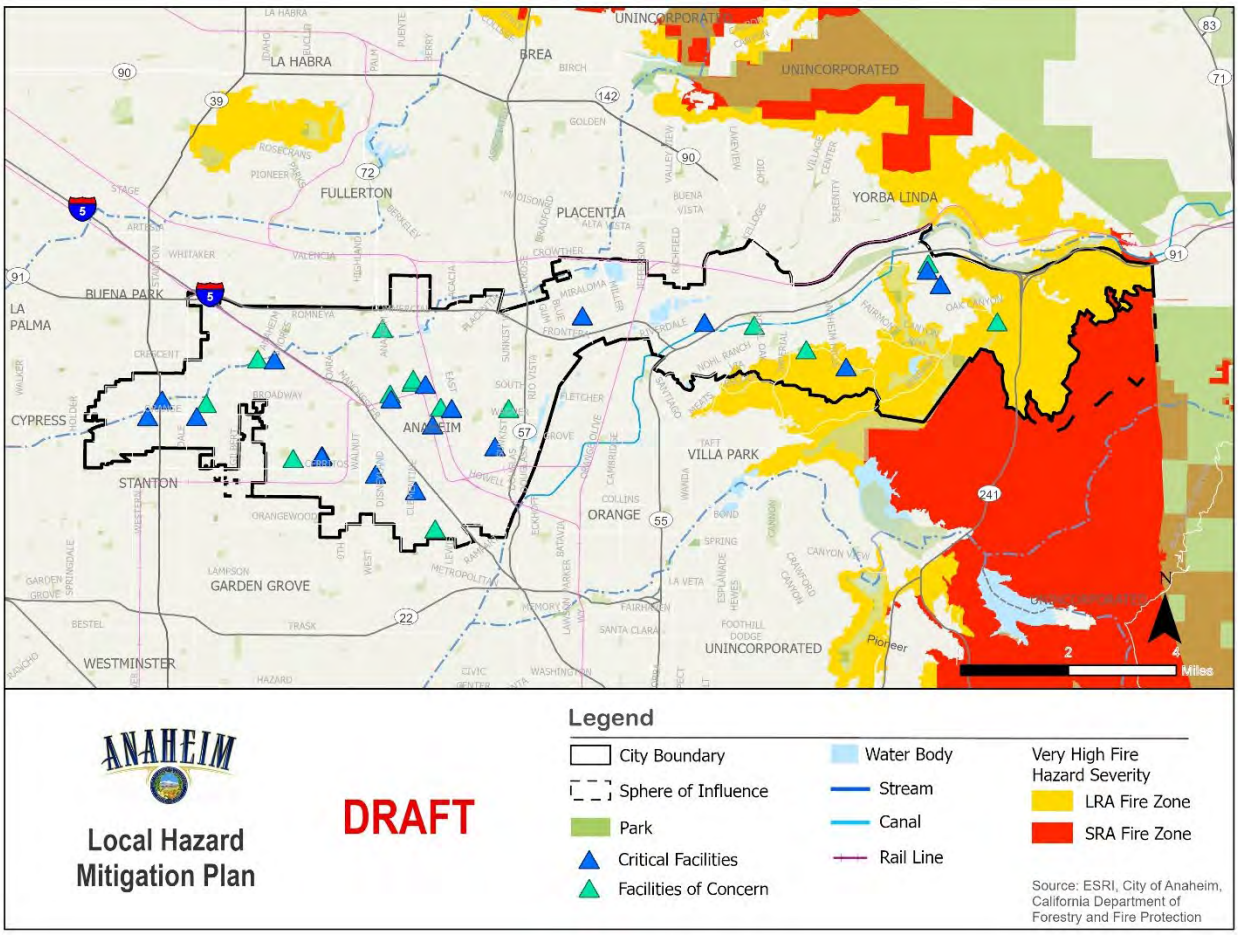
PHYSICAL THREAT

Structures and physical assets in Anaheim that are not equipped with fire suppression technology or design features that mitigate fire vulnerability are at risk of fire. Generally, these buildings are older, may not be well maintained, and may not meet current code requirements and regulations. While all structures can be impacted by either wildland or urban fire, older buildings may have increased vulnerability to these hazards.

WILDLAND FIRE

The California Department of Forestry and Fire Protection has mapped Very High Fire Hazard Severity Zones (VHFHSZ) within both the City's Local Responsibility Area (LRA) and the State Responsibility Area (SRA). The LRA is a government-designated area where a local agency, city, or county, NOT the State, is responsible for fire protection. An SRA is the opposite, where the State has responsibility for wildland fire protection. **Figure 4-1** identifies these zones along with the City's CFs and FOCs located within the area. All structures within this fire zone are at an elevated risk of wildfire impacts. **Table 4-3** identifies 10 CFs and two facilities of concern within this zone, which could result in a potential loss of approximately $45.12 million. While these areas have a high degree of vulnerability to wildfire, other areas of the City may also be susceptible due

FIGURE 4-1: CRITICAL FACILITIES AND FACILITIES OF CONCERN LOCATED IN VERY HIGH FIRE HAZARD SEVERITY ZONES



to ember cast. Sometimes the ignition of a wildfire may occur as a result of power lines located around overgrown trees, causing a spark and catching the tree on fire.

TABLE 4-3: CRITICAL FACILITIES AND FACILITIES OF CONCERN (VERY HIGH FIRE HAZARD SEVERITY ZONE)

Category	LRA - VHFHZ		Potential Loss*	SRA - VHFHZ		Potential Loss*
	Critical	Concern		Critical	Concern	
City Facilities (City Hall, Fire, Police)	1	1	$401,756.00	0	0	$0
Community Facilities	0	0	$0	0	0	$0
Infrastructure Facilities	9	0	$44,713,924.00	0	0	$0
Cooling Centers	0	1	$0	0	0	$0
Total	**10**	**2**	**$45,115,680.00**	**0**	**0**	**$0**

* Replacement Values Unavailable
** Based on the City of Anaheim insured replacement values

URBAN FIRE

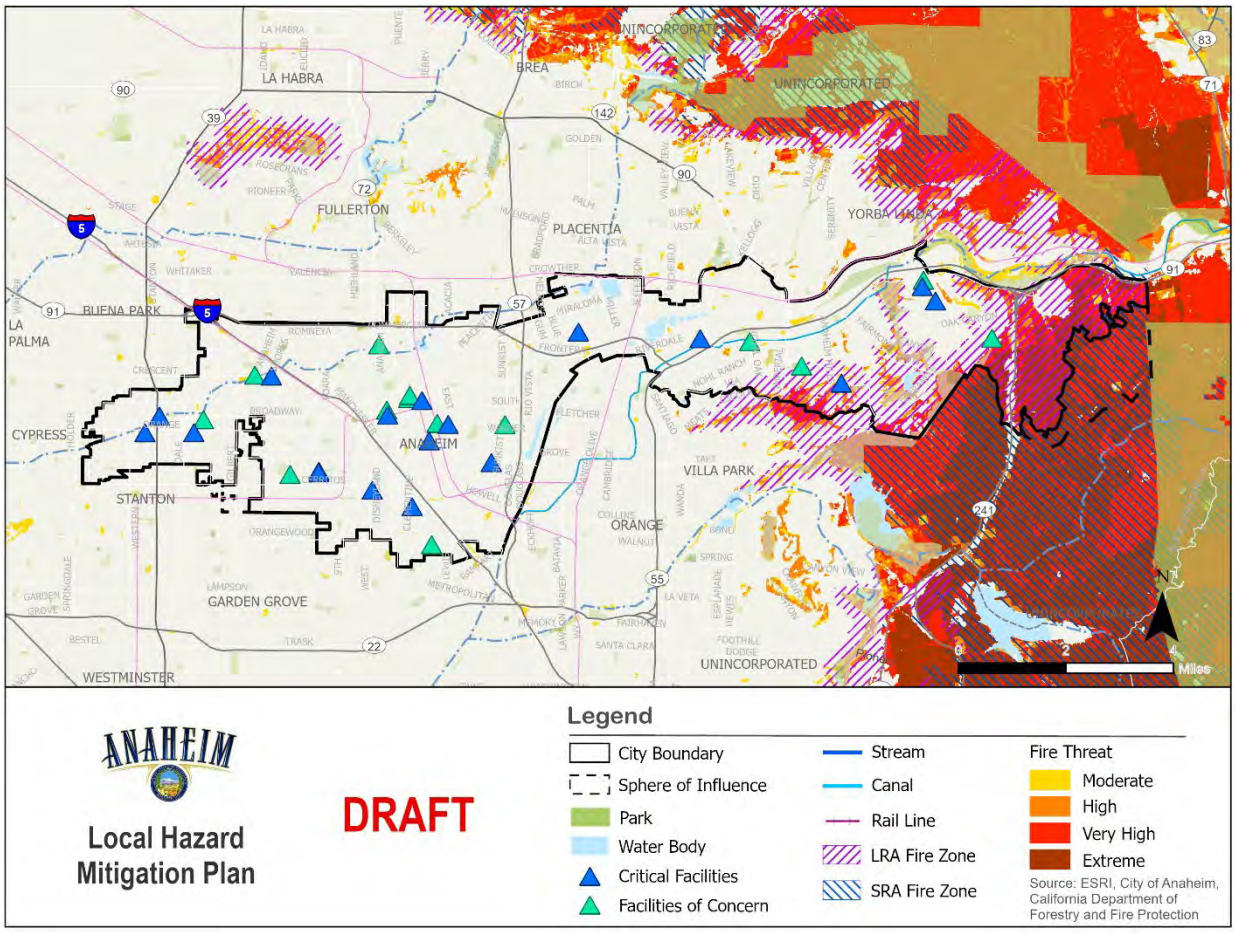
Power lines located around overgrown trees, where the tree crown envelops part or all the power lines, are also at risk of catching fire. When the wires overheat, they can ignite a fire in the tree, spread back to the power lines themselves, and burn the power line infrastructure. Underground utilities, like water delivery systems, residential electrical systems, or natural gas pipelines, are not threatened by fire since urban fires that emerge are likely to occur on the surface. According to Cal Fire, the City has moderate, high, very high, and extreme fire-threat areas, which are most prone to potential fire events. **Tables 4-4** identifies these fire hazard threat zones and depicts the three CFs and zero FOCs located within the moderate and high+ fire threat hazard zones. The combined potential loss totals $33.4 million. **Figure 4-2** displays these various fire threat level zones in Anaheim.

TABLE 4-4: CRITICAL FACILITIES AND FACILITIES OF CONCERN (FIRE HAZARD THREAT ZONE)

Category	Moderate Fire – Number of Facilities		Potential Loss*	High+ Fire – Number of Facilities		Potential Loss*
	Critical	Concern		Critical	Concern	
City Facilities (City Hall, Fire, Police)	0	0	$0	1	0	$289,152
Community Facilities	0	0	$0	0	0	$0
Infrastructure Facilities	2	0	$33,115,833	0	0	$0
Cooling Centers	0	0	$0	0	0	$0
Total	**2**	**0**	**$33,115,833**	**1**	**0**	**$289,152**

* Replacement Values Unavailable
** Based on the City of Anaheim insured replacement values

FIGURE 4-2: CRITICAL FACILITIES AND FACILITIES OF CONCERN LOCATED IN FIRE THREAT ZONES



SOCIAL THREAT

A fire hazard immediately threatens seniors and persons with disabilities. These groups may have limited mobility or diminished environmental awareness. For example, a senior who lives alone may not know if a fire ignites in their house until a room fills with smoke or a flashover occurs, at which point escape may be more difficult or impossible. Therefore, a fire that starts in or spreads to senior residences in Anaheim could be highly threatening to those populations. Persons with disabilities may require special mobility devices or caregiver assistance to evacuate, which may not be readily available when a fire occurs. Other groups with increased threat levels include lower-income persons and renters. These individuals may live in substandard housing with outdated materials that are known to be flammable. Renters and lower-income persons may also live in housing units with improperly designed or unmaintained electrical or heating systems that could cause a fire. These groups may not possess the financial resources to rebuild their homes or relocate to new homes after a wildland or urban fire.

WILDLAND FIRE

Anaheim has a sizable portion of its residents located in the LRA, primarily within the City's eastern portion in the Anaheim Hills community. **Table 4-5** shows us that approximately 5.4% of the City's population is located within Anaheim's LRA and the identified VHFHSZ. Of these households, the vulnerable populations represent approximately 19.4% of these households as

having at least one person living there with a disability, 4.7% of these households live under the poverty limit, and 33.5% of these households have one member aged over 65+; however, these households have a higher median income than the City as a whole.

TABLE 4-5: VERY HIGH FIRE HAZARD SEVERITY ZONE THREATENED POPULATIONS

Threatened Population Metrics	LRA - VHFHZ	City of Anaheim
Population	19,576	365,257
Households	7,315	104,973
Median household income	$136,186	$77,441
Renter Occupied Households	19.8%	53.4%
Percentage of households with at least one person living with a disability	19.4%	21.2%
Percentage of households living under the poverty limit	4.7%	13.1%
Percentage of households with one member aged 65+	33.5%	26.4%

URBAN FIRE

Residents of Anaheim live in all of the various levels of fire hazard threat zones. **Table 4-6** dataset tells us that within the moderate fire hazard threat zones, there are approximately 2,625 residents living there. Of that, approximately 18.4% of these households report having at least one person living there with a disability, 7.3% of these households live under the poverty limit, and 27.8% of these households have one member aged 65+. However, these households have a higher median income than the City as a whole. Within the high+ fire hazard threat zones, there are approximately 5,798 residents living there. Of that, approximately 16.9% of these households report having at least one person living there with a disability, 2.8% of these households live under the poverty limit, and 30.9% of these households have one member aged 65+; however, these households have one of the highest median incomes of the City.

TABLE 4-6: FIRE HAZARD THREAT ZONE THREATENED POPULATIONS

Threatened Population Metrics	Moderate Fire Hazard Threat Zone	High+ Fire Hazard Threat Zone	City of Anaheim
Population	2,625	5,798	365,257
Households	951	1,948	104,973
Median household income	$111,251	$140,214	$77,441
Renter Occupied Households	38.4%	17.2%	53.4%
Percentage of households with at least one person living with a disability	18.4%	16.9%	21.2%
Percentage of households living under the poverty limit	7.3%	2.8%	13.1%
Percentage of households with one member aged 65+	27.8%	30.9%	26.4%

OTHER THREATS

WILDLAND/URBAN FIRE

Urban fires can consume power lines and force utility operators to shut off electrical and gas transmission activity, leading to utility outages in Anaheim homes and businesses. Any streets surrounded by blazes or blocked by burning debris would hinder transportation, prevent victims from escaping, and block emergency response crews from reaching the source of the fire. Anyone living towards the end of a cul-de-sac faces an elevated threat of being trapped if the fire occurs

or spreads to the mouth of the street. Fires that destroy trees or vegetation (especially within parks and open space areas) could limit or prevent the use of these areas affecting recreational opportunities for residents. Public Safety Power Shutoffs (PSPS) are a significant issue for many communities throughout California. Although there are no designated PSPS circuits within Anaheim, the potential for large-scale events affecting residents and businesses is an ongoing concern. In the event of a PSPS outage in neighboring cities near Anaheim, the City's resources could be strained as residents of affected areas seek refuge in communities that have power. Outreach to residents and businesses to help them understand and prepare for these events will be an important aspect of the City's overall hazard mitigation strategy.

Seismic Hazards

Physical Threat

Fault Rupture

The City has numerous faults that have been mapped and identified within and without the surrounding region of the City. There are no Alquist-Priolo study zones within the City, meaning no *active* faults are located in the City, though the risk associated to residents and properties from fault rupture can still be present. **Table 4-7** identifies the CFs and FOC located within 500 feet of these mapped fault segments. Based on this table, potential losses associated with fault rupture could affect one CF and one FOC, totaling almost $700 thousand in potential losses. **Figure 4-3** displays the CFs and FOCs and the relation to the fault segments that affect the City.

Table 4-7: Critical Facilities and Facilities of Concern (Fault Rupture-Buffer 500 Feet)

Category	Number of Facilities		Potential Loss*
	Critical	Concern	
City Facilities (City Hall, Fire, Police)	0	1	$112,604
Community Facilities	0	0	$0
Infrastructure Facilities	1	0	$584,516
Cooling Centers	0	0	$0
Total	1	1	$697,120

* Based on the City of Anaheim insured replacement values

Seismic Shaking

Many physical assets in the City are estimated to experience the same seismic shaking intensity, ranging from 0.55 to 0.75g and 0.75+ to 1.05g (shaking intensity in relation to earth's gravity). Therefore, all facilities could potentially be damaged during a significant seismic event, which could be extremely costly for the City. If all facilities were damaged at the same time during a seismic shaking event, 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 $72 million. Underground physical assets, like pipelines or utilities, could be damaged if the intensity of the seismic shaking is severe enough. In such a scenario, natural gas and water delivery service to Anaheim homes and businesses would not be available until repairs are completed. **Table 4-8** and **Table 4-9** display these potential scenarios and losses that could incur should shaking reach the described threshold. **Figure 4-4** displays the CFs and FOCs located within the City's Seismic shaking potential hazard zones.

FIGURE 4-3: CRITICAL FACILITIES AND FACILITIES OF CONCERN (FAULT RUPTURE BUFFER-500 FEET)

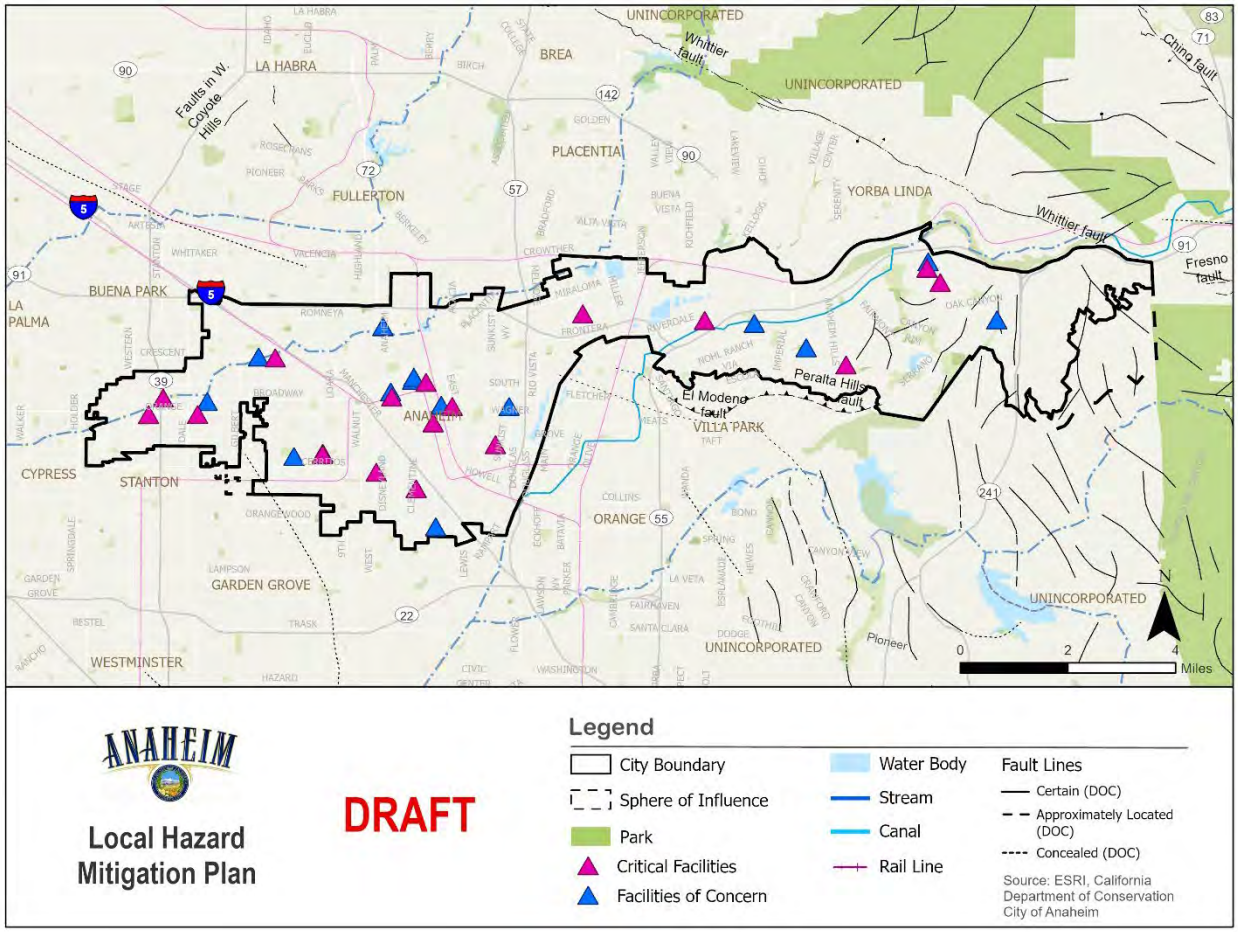


TABLE 4-8: CRITICAL FACILITIES & FACILITIES OF CONCERN (SEISMIC SHAKE 0.55 TO 0.75G)

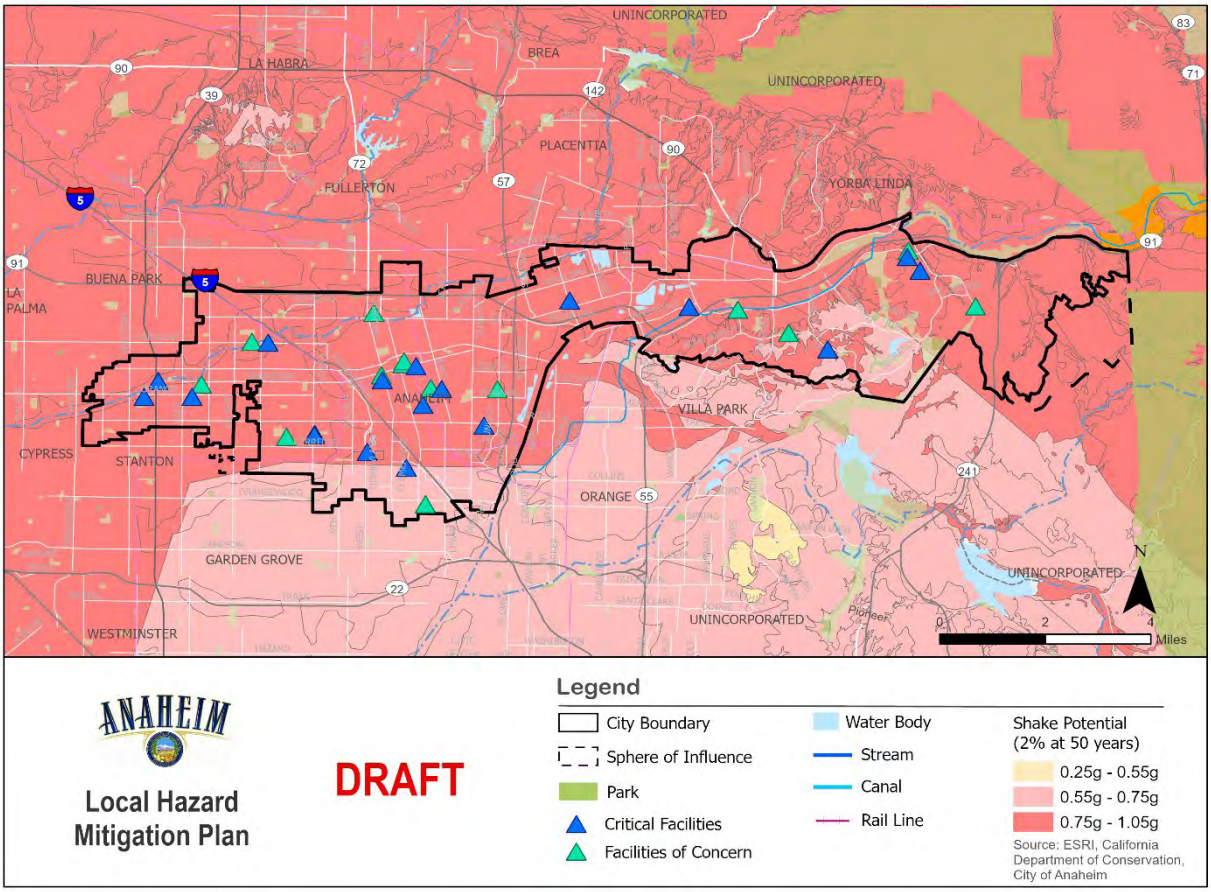
Category	Number of Facilities		Potential Loss*
	Critical	Concern	
City Facilities (City Hall, Fire, Police)	8	0	$4,757,619
Community Facilities	0	0	-
Infrastructure Facilities	0	0	$40,687,264
Cooling Centers	1	2	-
Total	9	2	$45,444,883

* Based on the City of Anaheim insured replacement values

TABLE 4-9: CRITICAL FACILITIES & FACILITIES OF CONCERN (SEISMIC SHAKE 0.75+ TO 1.05G)

	Critical	Concern	
City Facilities (City Hall, Fire, Police)	18	2	$116,570,959
Community Facilities	0	5	$8,997,129
Infrastructure Facilities	45	0	$129,034,001
Cooling Centers	1	7	$60,725,209
Total	64	14	$315,327,298

* Based on the City of Anaheim insured replacement values



LIQUEFACTION

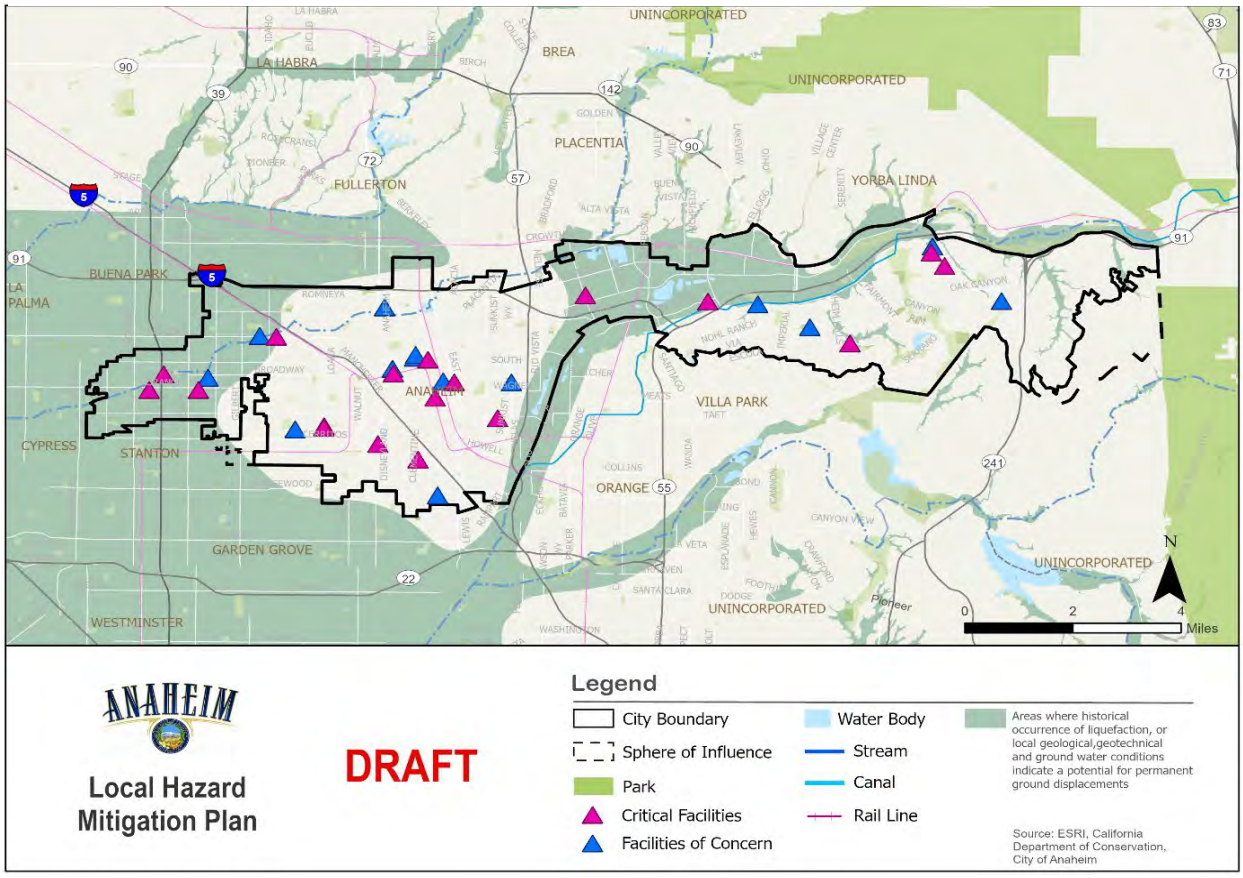
Due to the City's location near many potentially active faults capable of generating large earthquakes, the potential for CFs and FOCs to be affected by liquefaction is a concern. Like other northwestern cities in Orange County (Cypress, Los Alamitos, Seal Beach, Seal Beach, and La Palma), Anaheim is located in a geographical area where the soil makeup (sandy alluvial soils and sandy loams) is conducive to liquefaction hazards. **Table 4-10** identifies the CFs and FOC

located within these areas, accounting for over $68 million in potential losses affecting 24 CFs and 3 FOCs. **Figure 4-5** displays the CFs and the FOCs that are located in liquefaction susceptible hazard zones within the city

TABLE 4-10: CRITICAL FACILITIES AND FACILITIES OF CONCERN (LIQUEFACTION)

	Critical	**Concern**	
City Facilities (City Hall, Fire, Police)	7	0	$25,594,454
Community Centers	0	2	$5,362,330
Infrastructure Facilities	17	0	$30,416,167
Cooling Centers	0	1	$7,520,909
Total	24	3	$68,893,860

* Based on the City of Anaheim insured replacement values



SOCIAL THREAT

The risk of a seismic event is a danger to all Anaheim households and businesses; however, some populations are at higher risk than others.

Fault Rupture

Table 4-11 identifies the threatened populations within 500 feet of faults located within the City. These areas include over 7,100 residents with a median household income of approximately $55,000 higher than the City average. These areas also include a lower percentage of persons living with a disability and a slightly higher percentage of households with one member aged 65+.

Table 4-11: Fault Rupture Hazard Threatened Populations

Threatened Population Metrics	Fault Rupture	City of Anaheim
Population	7,167	365,257
Households	2,202	104,973
Median household income	$132,641	$77,441
Renter Occupied Households	17.5%	53.4%
Percentage of households with at least one person living with a disability	17.4%	21.2%
Percentage of households living under the poverty limit	5.6%	13.1%
Percentage of households with one member aged 65+	26.3%	26.4%

Seismic Shaking

Seniors, pregnant women, and persons with disabilities may be at higher risk in a seismic shaking event as they may have limited mobility, which could delay or prevent safe evacuation. Renters and persons with lower incomes are also more threatened by seismic shaking since they may live in homes that are not properly retrofitted to withstand the stresses of a seismic event. These groups may not have the financial resources to repair their homes or move to new housing if their existing home becomes uninhabitable.

Table 4-12 compares the populations within the seismic shaking hazard zones to the citywide population. Of the approximately 365,257 residents of Anaheim, 44,482 residents live within the 0.55 to 0.75g seismic shake zone, while the remaining 320,776 live within the 0.75+ to 1.05g seismic shake zone. **Table 4-12** also divides the population into two (2) groups: those within the Seismic Shake 0.55 to 0.75g threshold area and those within the Seismic Shake 0.75+ to 1.05g threshold area. Households located in these areas have a median household income of $84,948 (0.55 to 0.75g area) and $76,352 (0.75+ to 1.05g area). Households with at least one person with a disability in the 0.55 to 0.75g area (16.7%) are lower than the City average, while those living in the 0.75+ to 1.05g area are slightly higher (21.8%) than the City average of 21.2%. The same can be said for the percentages of households living with a member aged 65+, 0.55 to 0.75g area is slightly lower (26.1%) than the City percentage of (26.4%) while those in the 0.75+ to 1.05g area is slightly higher at 26.5%.

Liquefaction

The entire City's population is located within a designated zone of liquefaction, and over time, mitigation measures have been incorporated into most construction. Newer buildings constructed are anticipated to contain moderate and high-income tenants with greater amounts of disposable income, allowing them to recover after an incident. However, lower-income residents and residents located in areas of older construction may be more impacted, as they may not have the financial resources needed to make repairs and/or retrofit older buildings. **Table 4-13** compares threatened populations living within the liquefaction hazard zones to the citywide population.

TABLE 4-12: SEISMIC SHAKE HAZARD THREATENED POPULATIONS

Threatened Population Metrics	Seismic Shake Threshold 0.55 to 0.75g	Seismic Shake Threshold 0.75+ to 1.05g	City of Anaheim
Population	44,482	320,776	365,257
Households	17,724	90,249	104,973
Median household income	$84,948	$76,352	$77,441
Renter Occupied Households	59.0%	52.5%	53.4%
Percentage of households with at least one person living with a disability	16.7%	21.8%	21.2%
Percentage of households living under the poverty limit	12.9%	13.2%	13.1%
Percentage of households with one member aged 65+	26.1%	26.5%	26.4%

TABLE 4-13: LIQUEFACTION HAZARD THREATENED POPULATIONS

Threated Population Metrics	Living within Liquefaction Hazard Zones	City of Anaheim
Population	98,160	365,257
Households	29,042	104,973
Median household income	$76,267	$77,441
Renter Occupied Households	53.0%	53.4%
Percentage of households with at least one person living with a disability	23.5%	21.2%
Percentage of households living under the poverty limit	12.2%	13.1%
Percentage of households with one member aged 65+	26.6%	26.4%

OTHER THREATS

FAULT RUPTURE

Seismic events that cause surface fault rupture tend to damage roads and structures in impact areas. The length of rupture is typically a component of the seismic event's magnitude. The stronger the event, the greater distance that rupture can occur. Most of the fault segments identified within Anaheim are not considered active; therefore, they have a lower likelihood of rupturing. In addition, most of the fault movement occurring in the region is associated with the San Andreas, San Jacinto, Whittier Elsinore, Peralta Hills Fault, El Moderna, and Newport Inglewood fault zones. The faults within the City of Anaheim are less likely to rupture in comparison to these faults, and if a rupture were to occur, it would most likely impact small areas.

SEISMIC SHAKING

Using early earthquake warnings systems, utility providers may shut off gas, water, and power transmission to control potential leaks following the event. Authorities may have enough warning to halt the use of bridges or safely shelter or evacuate workers away from hazardous locations. Therefore, it can be expected that all services will be non-operational during the seismic shaking and remain inactive until authorities determine it is safe for employees to return and reactivate

utilities. The length of this time will vary depending on the event's magnitude. A significant earthquake would necessitate utilities to remain off for a few hours or several days. The City and the region could lose the economic activity that normally occurs. In addition, structures such as downed telephone poles or power transmission towers could block roadways and prevent first responders from reaching victims or evacuees who need assistance.

LIQUEFACTION

Services and mobility may be disrupted during and following a liquefaction event. Sidewalks, roadways, and pipelines may become fractured and disjointed because of the liquefying soils. Severe liquefaction events may render roads and sidewalks impassable until they are repaired. Broken gas and water pipelines could result in utility outages, with services delayed until the infrastructure is repaired or replaced. Damage to power lines is unlikely since they are not rigid structures and can move if any transmission towers experience slight leaning. Homes and mid-rise office buildings may be unsafe for occupancy if the soils lose substantial strength.

Severe Weather (Windstorm, Extreme Heat, and Drought)

PHYSICAL THREAT

WINDSTORM

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.

EXTREME HEAT

Very high temperatures can cause roads to deform and buckle as the concrete expands in the heat, especially weaker spots in the pavement, such as areas that have not been maintained. Power lines and other sections of the electrical grid are less effective in higher temperatures and may suffer damage due to stress during extreme heat events. Buildings with dark materials and pavements will absorb more heat than vegetated surfaces or lighter materials that better reflect the sun’s energy. This urban heat island effect is more likely to occur during the summer months when the sun is most intense.

DROUGHT

Since the primary threat from drought is reduced water supply and availability, there are no foreseeable threats to any of the physical assets in the City. Most of the City’s water comes from local groundwater sources, which are drought resilient. It is possible that any water delivery infrastructure that is 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.

SOCIAL THREAT

WINDSTORM

Severe wind events can harm people throughout Anaheim but have a greater effect on the safety of people experiencing homelessness and people who work outdoors. Lower-income residents, who may not have the financial resources to purchase homes built or retrofitted to withstand powerful winds, could also have difficulty recovering from wind events.

EXTREME HEAT

Certain population groups face higher risks of heat-related illness or death during a heat event. Young children, the elderly, or people with certain medical conditions are physiologically more vulnerable to heat exhaustion and heatstroke. Certain medications may inhibit heat-related illness signs and symptoms, creating an additional threat during heat events. Young children may be more vulnerable since they are less able to adapt to heat than adults, and they are not aware of the signs of dehydration or ways of protecting themselves from heatstroke.

People experiencing homelessness are at a high risk of health complications during heat waves, especially if they are unsheltered. According to the OC Homeless Management Information System data, in 2019, there were approximately 6,860 individuals experiencing homelessness in the county, with 57% unsheltered and 42% sheltered. These individuals are more vulnerable to heatstroke during a heatwave, especially if they cannot reach a cooling center.

A sudden heatwave can cause a shortage of fans, air-conditioning units, or drinking water in stores. Lower-income households or those with limited mobility may not have the time and resources to prepare for the high temperatures. During these events, extreme heat may impact a larger portion of the City's residents that would not be viewed as vulnerable under normal circumstances.

DROUGHT

Droughts are unlikely to cause serious social threats to households in Anaheim, although residents and business owners may experience financial impacts associated with water conservation efforts. Those with less access to financial resources, such as low-income households or seniors, may experience hardship if higher water rates or additional fees are imposed during a severe drought event.

OTHER THREATS

WINDSTORM

The potential for windstorms to create a financial strain on both the public and the City exists in the event of utility infrastructure damages or loss of power. These windstorms can uproot trees and landscaping, further burdening the owners to replace or repair the losses. Trees located in City parks may also be damaged or destroyed. Air quality can also be affected by these wind events, stirring up dust, pollen, debris, etc. Another threat associated with severe wind is wildfire impacts (discussed earlier) and the recent practice of electric utilities conducting Public Safety Power Shutoff activities. These shutoffs may affect electrical services during high wind events in parts of southern California. While the City does not have any identified PSPS circuits, other parts of southern California affected could impact the City in other ways (people relocating to Anaheim temporarily).

EXTREME HEAT

Extreme heat events can lead to increased water and energy demands within the City. This could lead to an increase in utility charges, strains on the current utility infrastructure, and increased spending by the City to support the community during these heat events.

DROUGHT

A typical drought is not anticipated to lead to any outages in service in Anaheim. However, an exceptional drought may lead to water restrictions for residents or businesses in the City. Trees that are not properly adapted to lower irrigation levels could perish, which would alter the city's aesthetic appearance. Expansive grassy areas may die or become dormant, turning brown during a drought which could discourage residents from using parks and open spaces.

Dam Failure

Physical Threats

Various factors, such as the amount of water released, the distance between the dam failure site, and the topography of the surrounding land, will influence the extent to which physical assets in Anaheim are threatened. Prado Dam has large storage capacities that could cause widespread inundation in Anaheim if the reservoir waters are released due to a dam breach. There are also three other dams/reservoirs that could potentially inundate the City in the event of a failure, Carbon Canyon Dam, Walnut Canyon Reservoir, and Diamond Valley East Reservoir. **Table 4-14** identifies the physical assets in Anaheim that are threatened by the potential failure of these dams and reservoirs. **Figure 4-6** shows the location of the identified CFs and FOCs within the inundation zones.

Table 4-14: Critical Facilities and Facilities of Concern (Dam Failure)

Category	Prado Dam		Potential Loss	Carbon Canyon Dam		Potential Loss
	Critical	Concern		Critical	Concern	
City Facilities (City Hall, Fire, Police)	16	1	$90,650,576	1	0	$874,694
Community Facilities	0	4	$8,723,962	0	0	$0
Infrastructure Facilities	36	0	$239,299,101	9	0	$9,516,926
Cooling Center	1	7	$60,151,021	0	0	$0
Total	53	12	$398,824,660	10	0	$10,391,620

*Neither Diamond Valley East or Walnut Canyon would affect any CFs or FOCs, therefore not included in the table.

Prado Dam and Carbon Canyon Dam pose the greatest threat to the CFs and FOCs in Anaheim. Based on this analysis, dam inundation would affect 53 CFs and 12 FOCs within the City, with the potential to cause an approximate $399 million in damages, based on available information. The inundation zone of Carbon Canyon overlays within the mapped inundation zone of Prado Dam; therefore, the total potential damages and affected facility numbers are combined when accounting for losses. Walnut Canyon and Diamond Valley East reservoirs do not affect any CFs or FOCs in Anaheim.

Social Threats

Dam failure hazards in the City would impact various downstream properties and the residents that live there. **Table 4-15** identifies these potential dam failure impacts caused by the Prado, Carbon Canyon, Walnut Canyon, and Diamond Valley East facilities. The greatest risk to the City and its population comes from the failure of Prado Dam, as it would affect almost 89% of the population and inundate 67% of the acreage in the City of Anaheim.

Other Threats

Dam failures are often triggered by other events (e.g., seismic shaking, intense rainstorms, etc.). There would most likely be service disruptions in Anaheim if this type of event occurred. Floodwaters could quickly inundate the City, disrupting utilities, such as water, power, heating, and other services such as communications or transportation infrastructure. Residents may find street lighting and traffic signals are temporarily disabled. Debris may be carried in the rapid inundation of water, blocking roads and impeding traffic flow. Water would most likely inundate roadways and other low-lying, flat areas, such as parking lots, open spaces, and schoolyards. In severe scenarios, people's mobility in these areas would likely be restricted or even impossible. Any unprotected or unhoused mechanical or electronic equipment that is not properly elevated would become waterlogged and inoperable until crews can conduct repairs or replacements.

Figure 4-6: Dam Inundation Areas in Anaheim

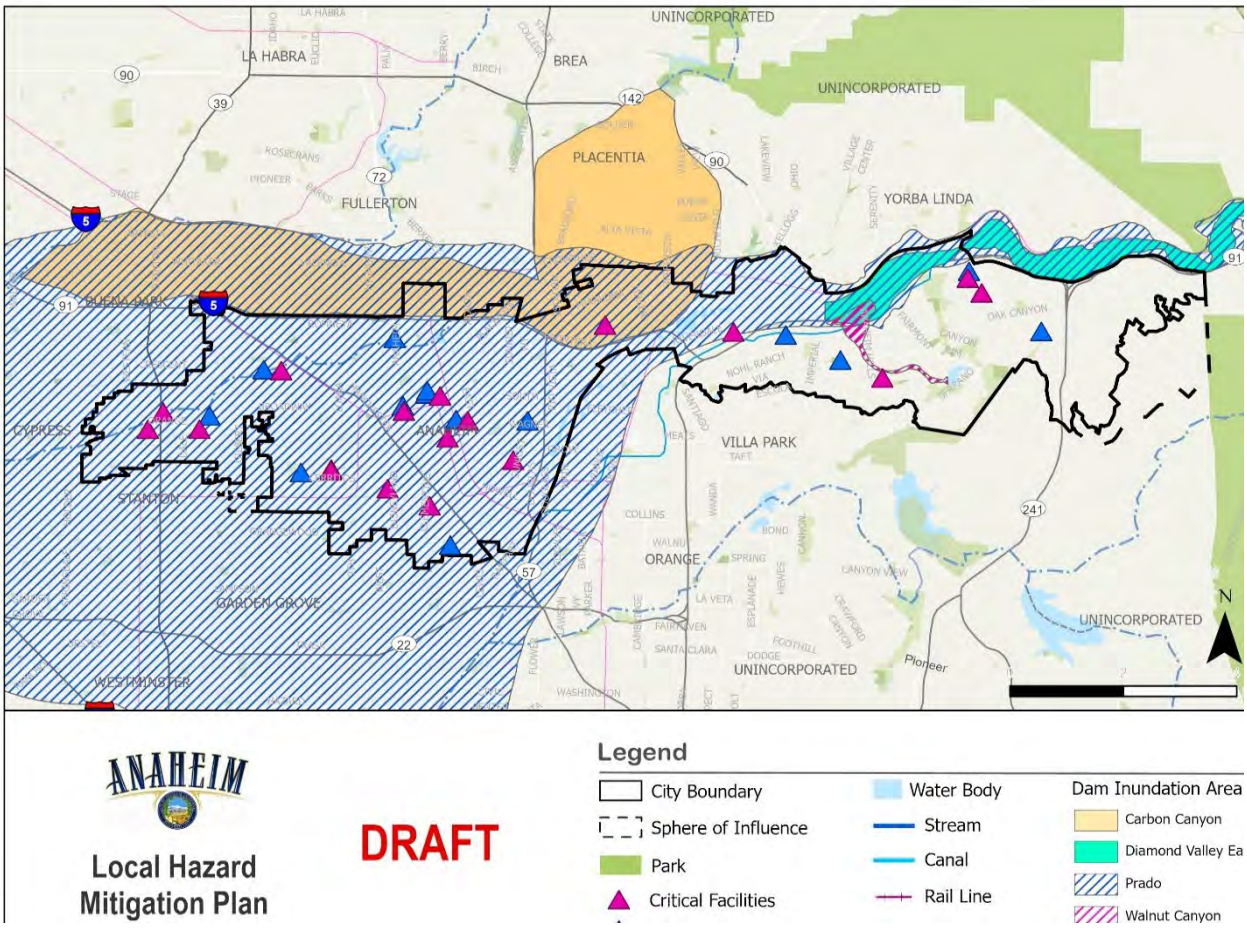


TABLE 4-15: DAM INUNDATION HAZARD THREATENED POPULATIONS

Threated Population Metric	Prado Dam	Carbon Canyon	Walnut Canyon	Diamond Valley East	City of Anaheim
Population	324,572	6,060	2,328	4,126	365,257
Households	90,324	1,760	750	1,301	104,973
Median household income	$70,414	$56,189	$120,977	$114,068	$77,441
Renter Occupied Households	58.6%	67.6%	14.1%	18.0%	53.4%
Percentage of households with at least one person living with a disability	21.6%	23.2%	16.8%	18.5%	21.2%
Percentage of households living under the poverty limit	14.5%	17.0%	5.2%	5.1%	13.1%
Percentage of households with one member aged 65+	25.4%	29.1%	42.7%	38.3%	26.4%
Percentage of Anaheim potentially inundated (acres)	67.1%	0.8%	6.4%	2.2%	67.1%

Landslide

PHYSICAL THREAT

Landslides pose a threat to a variety of City facilities. **Table 4-16** identifies the facilities located within the mapped deep-seated landslide hazard zones. Most of these areas are located in Anaheim Hills along the eastern portion of the City, characterized by steep slopes and canyons, which are vulnerable to a landslide during long periods of rainfall or seismic events. Deep-seated landslides could cause over $55 million in losses based on the 13 CFs and 1 FOC located in these zones. **Figure 4-7** displays these areas of the City along with the mapped CFs and FOCs that could potentially be damaged by landslide events.

TABLE 4-16: CRITICAL FACILITIES AND FACILITIES OF CONCERN (DEEP SEATED LANDSLIDE – CATEGORY 7+)

Category	Number of Facilities		Potential Loss*
	Critical	Concern	
City Facilities (City Hall, Fire, Police)	0	1	$112,604
Community Centers	0	0	$0
Infrastructure Facilities	13	0	$55,177,618
Cooling Centers	0	0	$0
Total	**13**	**1**	**$55,290,222**

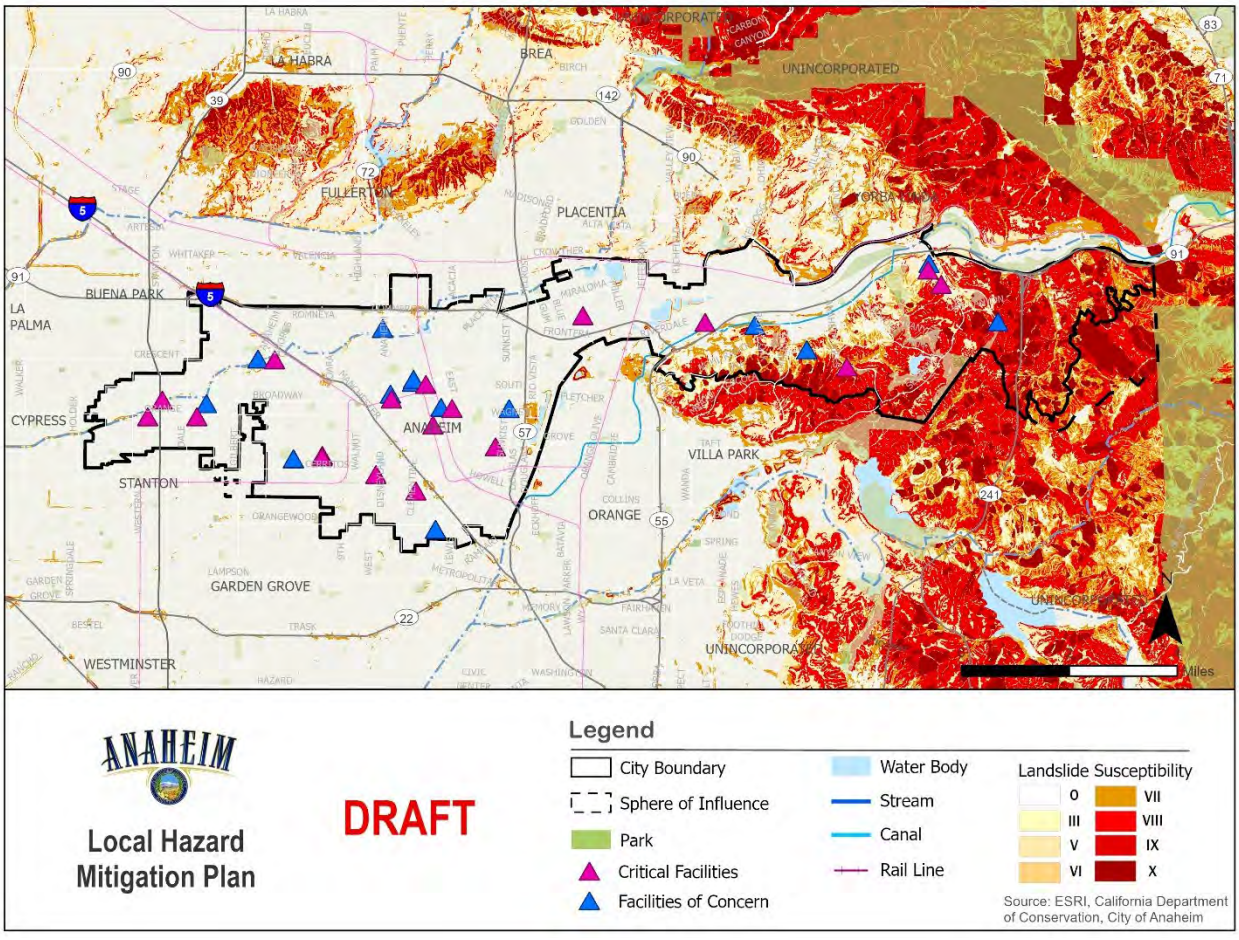
* Based on the City of Anaheim insured replacement values

SOCIAL THREAT

As shown in Table **4-17**, the dataset shows that 29,323 residents and 10,326 households are located within the deep-seated landslide hazard zone, which is approximately 8% of the city's population. The median household income is much higher in these zones, and the percentage of households living under the poverty limit is lower than the City overall. However, households with at least one person living with a disability is slightly lower, while the percentage of households with one member aged 65+ is higher when compared to the City overall.

TABLE 4-17: DEEP SEATED LANDSLIDE (CATEGORY 7+) HAZARD ZONE THREATENED POPULATIONS

Population	29,323	365,257
Households	10,326	104,973
Median household income	$138,667	$77,441
Renter Occupied Households	17.8%	53.4%
Percentage of households with at least one person living with a disability	18.9%	21.2%
Percentage of households living under the poverty limit	3.9%	13.1%
Percentage of households with one member aged 65+	32.0%	26.4%



Other Threats

Landslides may block roadways causing long-term disruptions to the roadway network, infrastructure systems, and city capabilities. Underground utility lines in slide-prone areas or above-ground lines built on or above them can be damaged in a landslide, causing service outages. Landslides could affect sensitive ecological areas around the community, causing localized harm to the region's ecosystem, although widespread disruptions are unlikely. Homes and businesses are typically damaged or destroyed by landslides. In addition to potentially causing significant injuries or fatalities, this can cause economic harm and create a need for long-term emergency sheltering and temporary housing until these buildings can be reconstructed. Utility lines, such as power lines or water pipes, may be broken by a landslide, interrupting important services.

Disease and Pests (Public Health Emergencies/Vector Issues, Tree Mortality)

Physical Threat

Public Health Emergencies/Vector Issues

Since diseases only affect the human body, a public health emergency or vector-borne disease could not directly threaten physical assets in Anaheim.

Tree Mortality

In Anaheim, a serious outbreak of pests, such as the Gold Spotted Oak Borer, Invasive Shot Hole Borer, or Asian Citrus Psyllid, could threaten the City's urban forest leading to an episode of intense tree mortality. The City's tree inventory includes identifying impacted trees that require monitoring and/or removal, which occurs during regularly scheduled trimming. The City regularly replaces trees that have been damaged due to either diseases or pests; however, if not done promptly, the threat to healthy trees increases. If dead trees located within the City are not felled immediately, they may threaten other physical assets when compounded with other hazards. For example, dead trees are more prone to dropping limbs or falling over during severe weather events, causing damage to any structures or property in their path.

Social Threat

Public Health Emergencies/Vector Issues

To some degree, diseases affect everyone in Anaheim, whether the impact is a mild inconvenience or death. There is no universally applicable social threat from diseases and pests since each disease affects the body differently. Generally, however, seniors, infants, pregnant women, and individuals with compromised immune defenses experience the greatest risk. Lower-income individuals could also be more threatened by diseases since they may not have the financial resources to access either medical insurance or medical treatment. Individuals with disabilities or those who live alone may experience greater vulnerability to illness caused by disease since they may be unable to access treatment. Pregnant women in Anaheim are at greater threat of the Zika virus since the virus may cause their infants to be born with microcephaly, which is shown to cause health problems for infants, including death.

Tree Mortality

Decreased property values may threaten Anaheim residents who experience tree mortality on their property. Healthy trees add aesthetic beauty to homes and businesses and dying or dead trees may detract from the property's worth. Higher-income property owners in Anaheim may be able to absorb the cost associated with tree loss and afford to replant any lost trees. In contrast,

lower-income property owners may be less likely to be able to afford the cost of replanting destroyed trees without assistance. Tree mortality also reduces the amount of shade generated in these areas, potentially increasing the impacts of the urban heat island effect. As a result, groups that are threatened by higher heat levels may be impacted by an onset of tree mortality. Such groups include seniors, children, families with pets, and laborers who spend long periods of time outside. Lower-income households who turn to active cooling methods, such as air conditioning, may become burdened by increased energy and water costs.

Other Threat

Public Health Emergencies/Vector Issues

A major outbreak of disease could overwhelm the capacity of medical facilities in Anaheim and the surrounding region/county, potentially leading to greater inaccessibility of medical services, including a potential shortage of medical personnel. A major outbreak could also be expected to incapacitate large amounts of the City's and region's workforce, inhibiting the regional economy of not only Anaheim but Orange County and Southern California. Services such as telecommunications, utilities, recreation, and commerce may become restricted or even entirely unavailable for a period. Since March 2020, the City and the rest of the world have had to deal with the COVID-19 pandemic, which impacted the state and many cities and counties. As a new and fairly unknown disease, it was critically important to effectively communicate the risk of infection and procedures to obtain medical help effectively and practices that help reduce the spread of the disease. In early 2021, a vaccine was approved by the FDA to combat the spread of COVID-19. The vaccine was designed to help the body develop immunity to the virus without having the illness and reduce the severity and effects of symptoms associated with COVID-19.[94]

Tree Mortality

Urban forestry has been demonstrated to increase mental health and reduce levels of depression and anxiety among residents.[95][96] If large sections of Anaheim's urban forest disappeared (due to drought, invasive pests, disease), residents and employees could experience higher stress and anxiety levels.

Flood/Storm

Physical Threat

All of Anaheim is 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 could 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. The City has several key underpasses beneath major freeways that, if flooded, could impact circulation throughout the city. **Table 4-18** identifies the physical assets in Anaheim located within the 100-year flood zone, 5 CFs that account for slightly over $12 million in assets exposed to flooding. **Table 4-19** identifies the

[94]Centers for Disease Control and Prevention, "Understanding How COVID-19 Vaccines Work", http://anaheim.net/6027/Boysen-Park-Closure

[95] Clayton, S., Manning, C. M., Krygsman, K., & Speiser, M. (2017). *Mental Health and Our Changing Climate: Impacts, Implications, and Guidance*. Washington, D.C.: American Psychological Association, and ecoAmerica. https://www.apa.org/news/press/releases/2017/03/mental-health-climate.pdf

[96] Daniel T. C. Cox, Danielle F. Shanahan, Hannah L. Hudson, Kate E. Plummer, Gavin M. Siriwardena, Richard A. Fuller, Karen Anderson, Steven Hancock, Kevin J. Gaston, Doses of Neighborhood Nature: The Benefits for Mental Health of Living with Nature, *BioScience*, Volume 67, Issue 2, February 2017, Pages 147–155, https://doi.org/10.1093/biosci/biw173

additional assets located within the 500-year flood zone, which account for 41 CFs, and 12 FOCs that account for over $364 million in additional assets exposed to flooding within the City.

Figure 4-8 depicts the CFs and FOCs located in FEMA designated flood zones, which include the 100-Year Flood Hazard (blue), 500-Year Flood Hazard (orange), Areas with Reduced Flood Risk Due to Levee (yellow), and Floodway (crosshatch).

TABLE 4-18: CRITICAL FACILITIES AND FACILITIES OF CONCERN (100-YEAR FLOOD ZONE)

Category	Number of Facilities		Potential Loss*
	Critical	Concern	
City Facilities (City Hall, Fire, Police)	0	0	$0
Community Facilities	0	0	$0
Infrastructure Facilities	5	0	$12,094,709
Cooling Centers	0	0	-
Total	**5**	**0**	**$12,094,709**

* Replacement Values Unavailable
** Based on the City of Anaheim insured replacement values

TABLE 4-19: CRITICAL FACILITIES AND FACILITIES OF CONCERN (500-YEAR FLOOD ZONE)

Category	Number of Facilities		Potential Loss*
	Critical	Concern	
City Facilities (City Hall, Fire, Police)	14	1	$83,117,153
Community Facilities	0	4	$8,723,962
Infrastructure Facilities	26	0	$212,449,445
Cooling Centers	1	7	$60,151,021
Total	41	12	$364,441,581

* Replacement Values Unavailable
** Based on the City of Anaheim insured replacement values

SOCIAL THREAT

Floodwaters in these areas, both the 100-year zone and the 500-year zone, are anticipated to rise to a depth of no more than one foot. Flooding of this type would likely inundate curb cuts and sidewalks to some extent. People who walk or bike as their primary form of transportation may encounter difficulties if they do not have access to an alternative means of transportation. Seniors, persons with disabilities, and low-income persons are also likely to be threatened. **Table 4-20** shows the proportions of Anaheim's vulnerable populations that face a greater threat from a flood event in the City. Based on the analysis in **Table 4-20**, the median household incomes in both the 100-year and 500-year flood zones are lower than the citywide average median income. The threat of flood hazards is especially a concern for those living in the 500-year floodplain, as this affects approximately 82% of the City population.

Additionally, persons experiencing homelessness who are outside during flood conditions may experience property damage or may not be able to access shelter. Though floodwaters in Anaheim are not expected to exceed a depth of one foot, six inches of floodwater may render any makeshift structures uninhabitable during the flood event. Possessions such as sleeping bags or electronic devices may be damaged or swept away by the floodwaters.

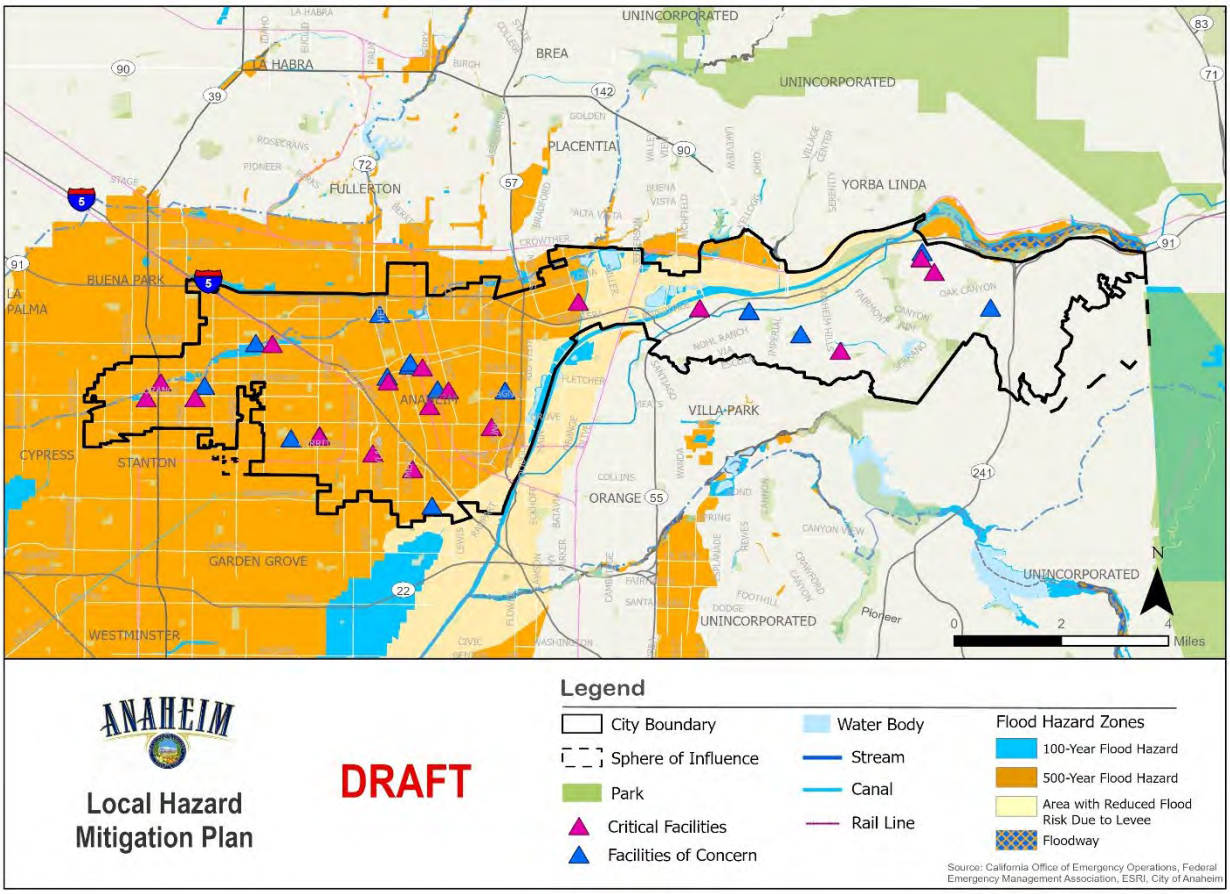


TABLE 4-20: FLOOD FAILURE HAZARD THREATENED POPULATIONS

Threatened Population Metrics	Flood Hazards (100 Years)	Flood Hazards (500 Years)	City of Anaheim
Population	2,405	299,501	365,257
Households	747	81,903	104,973
Median household income	$69,974	$68,016	$77,441
Renter Occupied Households	62.6%	59.9%	53.4%
Percentage of households with at least one person living with a disability	25.1%	21.9%	21.2%
Percentage of households living under the poverty limit	17.9%	15.2%	13.3%
Percentage of households with one member aged 65+	26.0%	25.1%	26.4%

OTHER THREATS

Flooding may temporarily stop any type of transportation in the City. Debris carried by floodwaters can block roadways, hinder access for vehicles, and potentially affect emergency response services. One foot of rushing water is enough to carry small vehicles. A severe flood situation 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.

Human-Caused Hazards (Hazardous Materials Release, Terrorism, Civil Unrest)

Physical Threat

Hazardous Materials Release

Hazardous materials can damage physical assets in Anaheim if they are released into the environment. Corrosive hazardous materials can damage building exteriors of CFs or FOCs. Flammable hazardous materials can potentially start fires and may cause any CFs or FOCs nearby to flashover. Generally, sites closer to the origin of the release of hazardous materials are more threatened than those further away. **Table 4-21** shows the numbers of physical assets in Anaheim threatened by a hazardous materials release within 500 feet of a site storing or using hazardous materials. Based on the analysis, 12 CFs and one FOC are located within 500 feet of these sites and could potentially result in a loss of over $78 million because of a hazardous materials incident.

Table 4-21: Critical Facilities and Facilities of Concern (HazMat Buffer 500 ft)

Category	Number of Facilities		Potential Loss*
	Critical	Concern	
City Facilities (City Hall, Fire, Police)	4	0	$9,914,080
Community Facilities	0	1	$1,013,753
Infrastructure Facilities	8	0	$67,442,510
Cooling Centers	0	0	$0
Total	**12**	**1**	**$78,370,343**

* Based on the City of Anaheim insured replacement values

Table 4-22 identifies the number of facilities located within areas of increased pollution (Census Tracts in the 50th percentile or greater), as indicated by Cal EPA's Cal Enviro Screen dataset. Based on this dataset, 49 CFs and 13 FOCs are located within these census tracts. Based on this analysis, potential losses of approximately $378 million could occur because of a hazardous materials incident.

Table 4-22: Critical Facilities and Facilities of Concern (Cal Enviro Screen – 50% or Above)

Category	Number of Facilities		Potential Loss*
	Critical	Concern	
City Facilities (City Hall, Fire, Police)	13	1	$78,557,940
Community Facilities	0	5	$8,997,129
Infrastructure Facilities	35	0	$230,801,341
Cooling Centers	1	7	$60,151,021
Total	**49**	**13**	**$378,507,431**

* Based on the City of Anaheim insured replacement values

Table 4-23 shows us the CFs and FOCs that are located within 500 feet of active wells. These wells are generally used to collect either oil or natural gas (methane). The analysis shows there are 2 CFs located near these active wells, potentially resulting in a loss of over $6 million.

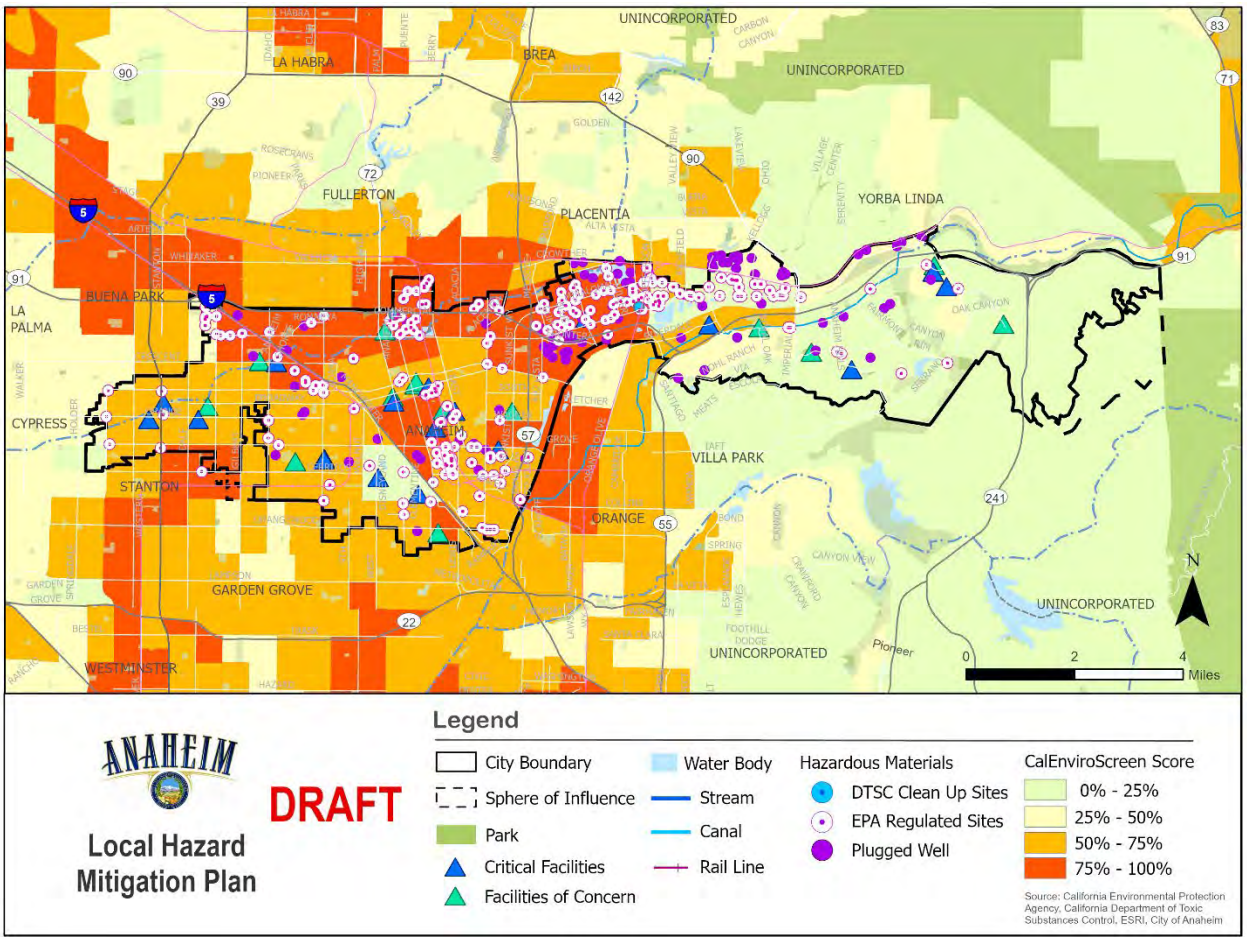
TABLE 4-23: CRITICAL FACILITIES AND FACILITIES OF CONCERN (WELLS BUFFER-500 FEET)

Category	Number of Facilities		Potential Loss*
	Critical	Concern	
City Facilities (City Hall, Fire, Police)	13	1	$78,557,940
Community Facilities	0	5	$8,997,129
Infrastructure Facilities	35	0	$230,801,341
Cooling Centers	1	7	$60,151,021
Total	**49**	**13**	**$378,507,431**

* Based on the City of Anaheim insured replacement values

Figure 4-9 displays both the location of CF's and FOC's in relation to the hazardous materials storage/usage sites, Cal Enviro Screen score, and their location as they relate to the presence of active and plugged oil and natural gas wells.

FIGURE 4-9: CRITICAL FACILITIES AND FACILITIES OF CONCERN (HAZ MAT BUFFER 500 FEET, CAL ENVIRO SCREEN SCORE, WELLS BUFFER 500 FEET)



TERRORISM

There is no way to predict which of Anaheim's facilities or assets may be impacted by an act of terrorism since the motivation behind the incident is often complex and not necessarily easily

understood. Generally, these incidents occur at places of political, economic, or cultural importance. If the perpetrator's motives are to shut down city or regional government activity for a period, they may instead target pieces of infrastructure, like water systems, utility delivery systems, or transportation networks. Anaheim has a unique situation as it is home to the globally renowned Disneyland Resort, the Anaheim Convention Center, Anaheim Stadium, and the Honda Center. The financial losses that may result from this type of incident would depend on the degree of destruction associated with the activity. If the incident involves the destruction of physical assets, the cost to the City or property owners in Anaheim could be significant.

Civil Unrest

Civil unrest threats to physical assets are hard to predict. Typically, these incidents involve protests, marches, or celebrations that can turn into destructive or violent incidents (i.e., riots), causing property damage. Impacts associated with these incidents would likely initiate at the site of origin, which usually occurs at places of political, economic, or cultural importance.

Cybersecurity

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

Social Threat

Hazardous Materials Release

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. **Table 4-24** shows the City's vulnerable populations living within 500 feet of a hazardous materials storage/waste site. The median household income is approximately $3,000 more than the rest of the City. This suggests that higher-income populations may be living near hazardous materials locations.

Table 4-24: Hazardous Materials Release Threatened Populations (Haz Mat Buffer 500 Feet)

Threatened Population Metrics	500 Feet from Hazardous Materials Site	City of Anaheim
Population	10,758	365,257
Households	3,362	104,973
Median household income	$80,752	$77,441
Renter Occupied Households	57.7%	53.4%
Percentage of households with at least one person living with a disability	21.4%	21.2%
Percentage of households living under the poverty limit	12.7%	13.1%
Percentage of households with one member aged 65+	24.7%	26.4%

Anaheim residents living next to major transportation infrastructures such as highways or major arterial streets face a greater risk of being affected by a hazardous materials release if vehicles transporting hazardous materials release their contents into the environment if involved in a collision.

Groups such as the elderly, low-income, and renters face a greater risk of exposure since they may not have the financial resources necessary to retrofit their homes against infiltration by hazardous materials or relocate to a home farther from the potential sources of hazardous materials. Analysis of **Table 4-25** shows the City's vulnerable populations living within the 500-feet buffer of well hazards. The median household income is higher than the rest of the City, and the percentage of vulnerable populations is universally lower than the rest of the City.

TABLE 4-25: THREATENED POPULATIONS (WELLS- 500 FEET BUFFER)

Threatened Population Metrics	Feet from Hazardous Materials Site	City of Anaheim
Population	10,758	365,257
Households	3,362	104,973
Median household income	$80,752	$77,441
Renter Occupied Households	57.7%	53.4%
Percentage of households with at least one person living with a disability	21.4%	21.2%
Percentage of households living under the poverty limit	12.7%	13.1%
Percentage of households with one member aged 65+	24.7%	26.4%

TERRORISM

Since mass casualty incidents/acts of terrorism could occur anywhere in Anaheim, all groups are potentially threatened by the impacts of these incidents; however, the extent of the threat would depend upon the type and magnitude of the event. 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, financial institutions, the Disneyland Resort, Anaheim Stadium, Honda Center, or the Anaheim Convention Center. Populations that frequently visit these areas may face a greater threat than the average person. Seniors, pregnant women, and persons with disabilities, for instance, are more likely to frequently visit the local hospitals than other subpopulations in the City. If an incident occurs at the Hospital 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. As such, their use of these in-person services may place them in harm's way. An incident at Anaheim City Hall or bank locations 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.

CIVIL UNREST

Since civil disturbance could occur anywhere in Anaheim, all groups are potentially threatened by the impacts of these incidents. While most residents affected by a civil disturbance would be able to recover from the incident, residents on fixed incomes or living below the poverty limit may have difficulty doing so if damage to their residence or property were to occur.

CYBERSECURITY

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 government agencies, all residents could become victims of cyber threats. If services affected by cyber incidents become delayed or are impacted, populations that rely on those services may be negatively impacted if no alternatives exist.

OTHER THREATS

HAZARDOUS MATERIALS

Hazardous materials release could threaten the city and regional transportation networks. Large areas of the local road or rail systems may be closed to prevent people from entering 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 homes or businesses in the area surrounding the release. Hazardous materials could also harm the City's urban forest, resulting in the premature death of vegetation in the affected areas.

CHAPTER 5 – HAZARD MITIGATION STRATEGY

STRATEGY DEVELOPMENT PROCESS

Anaheim's hazard mitigation strategy is a comprehensive set of actions intended to reduce the impact of hazard events. These hazard mitigation actions will help protect the safety and well-being of residents, visitors, CFs and FOCs, 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 HMTF chose to include them as part of the overall hazard mitigation strategy.

Use of Hazard and Threat Assessment

The HMTF relied partly on the hazard profiles and threat assessments in this Plan to develop the mitigation strategy's actions. A comprehensive set of mitigation actions was prepared to respond to the relevant hazard situations and protect residents, businesses, and community assets in Anaheim. The HMTF ensured that the mitigation actions would 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 HMTF 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 Anaheim. 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

Table 5-1 shows the capabilities assessment for Anaheim

TABLE 5-1: CITY OF ANAHEIM CAPABILITIES ASSESSMENT

Resource	Resource Description	Connection to Mitigation (Last Updated)
Planning and Regulatory Capabilities		
Capital Improvement Program FY 2021 - 26	The Capital Improvement Program (CIP) is a projection of the City's capital investments over five years. The CIP is a fiscal and planning tool that allows the City to monitor all capital project costs, funding sources, departmental responsibilities, and timing. Each year, the CIP is reviewed within the context of ongoing city, county, state, and federal planning programs and policies. Capital investments involve major City projects that produce outputs	Integration of this Plan into the CIP can assist in mitigation efforts by identifying new funding sources for future improvements.

	having long and useful life spans. The minimum threshold for capital projects is $50,000.	
General Plan	State law requires every city and county to adopt a comprehensive, long-term General Plan. A General Plan represents the community's view of its future and is often referred to as a blueprint for growth and development. As a result, local decision-makers oftentimes use the goals and policies of the General Plan as a basis on which to formulate land-use decisions. The City's General Plan is considered "comprehensive" since it addresses many land use-related issues. It is also considered "long-term" since it is designed to provide policy guidance for the next 20 years and beyond.	The General Plan assists in mitigation by providing a guide for the city to use for progress.
Zoning Ordinance	The purpose is to promote the growth of the City in an orderly manner and to promote and protect public health, safety, peace, comfort, and the general welfare in conformance with the General Plan. The zoning effectuated by this title includes the establishment of various districts that include all the territory within the boundaries of the City, within which the use of land and buildings, the space for buildings, and the height and bulk of buildings are regulated.	The Zoning ordinance allows for regulations to be put in place to best mitigate the City's building codes.
Building Code	Used to conduct plan review and inspections to ensure new buildings, alterations, electrical, plumbing, and mechanical systems are constructed and installed in compliance with all adopted codes and City ordinances.	The building code allows for buildings to be constructed properly and in compliance with building requirements and regulations in the City.
Public Works	The Public Works Department provides a wide range of comprehensive services to meet the City's infrastructure, construction, development, and maintenance needs.	The Department also manages the Anaheim Resort Maintenance District, which assists with mitigation.
Code Enforcement	Enforcement of Anaheim's Municipal Code and other applicable and related CA state codes. Duties would include (but not limited to): Conducting business license inspections, enforcing City parking regulations, investigating and conducting housing, nuisance, and zoning code inspections within residential, industrial, and commercial areas, overseeing the City's graffiti removal and prevention programs, conducting anti-scavenging enforcement, overseeing street vendor and taxicab enforcement, as well as the promoting and distribution of free "Dusk to Dawn" security lights to all City of Anaheim property owners.	Mitigation activities could include the identification of violations then implementing the necessary correction to reduce vulnerability and mitigate damage.
Orange County Hazard Mitigation Plan	Mitigation actions for Anaheim that require coordination with the county may be integrated into the County of Orange & Orange County Fire Authority Local Hazard Mitigation Plan. Similar mitigation actions in both the counties and Anaheim's hazard mitigation plans can lead to a more regionally unified hazard mitigation strategy, improving effectiveness.	Orange County's 2020 Hazard Mitigation Plan identifies and describes the hazard events that may occur in the unincorporated areas of Orange County and provides a suite of mitigation actions to help decrease the potential damage from these hazards.
California State Hazard Mitigation Plan	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 City can use the 2018 State Hazard Mitigation Plan as a source of information to refine the hazard profiles and vulnerability assessments in future Anaheim LHMPs.

Administrative and Political Capabilities		
City Council	The City Council represents residents and businesses in Anaheim. The City Council is made up of Anaheim's mayor, who is elected at large, and six City Council members elected by voters in their districts. The City Council addresses the current and future needs of the City through the adoption of policies that promote the best interests of the community and the City's relationships with citizens, businesses, community organizations, and other governmental agencies.	The City Council supports mitigation through strategic planning and goal setting for the City.
City Clerk	The Office of the City Clerk is responsible for a myriad of functions and comprises three core functions: official records, elections, and passport services. Responsibilities include maintenance of the city's legislative history, City Charter and Municipal Code; administering special and general municipal elections; coordinating and administering all activities of Council meetings in compliance with the Brown Act and related Government Codes; administering the city-wide Records Management Program; managing and coordinating Council appointed boards and commissions; and ensuring compliance with the Political Reform Act and AB1234. The City Clerk is also the custodian of the City seal and is appointed by and reports to the City Council.	Mitigation activities implemented by this office may include direction setting with the City Council and City Departments and prioritizing new initiatives that support mitigation activities within the City.
Records Management	The City Clerk's Office administers the records management program for the City of Anaheim. To facilitate efficient retrieval and transparency, certain City records are readily available to the public online by clicking here. The records available through the Public Portal include City Council minutes, resolutions, and ordinances; Boards and Commissions minutes; Investment Portfolio Reports; Building Permits; Planning Commission records; Public Works Grading Plans; and Public Works Improvement Plans.	Mitigation support from the records management program would rely on record keeping and document support during mitigation project implementation and grant reporting.
City Manager's Office	The City Manager is responsible for the daily operations of one of California's largest cities with a $1.9 billion annual budget, nearly 360,000 residents, 20,000 businesses, and 25 million yearly visitors. The City Manager works directly with Anaheim's Mayor and City Council to implement their policy direction for the City while overseeing 11 city departments, including Anaheim Public Utilities, the Anaheim Police Department, Anaheim Fire & Rescue and Convention, Sports & Entertainment, operator of the Anaheim Convention Center.	Mitigation activities implemented by this office may include direction setting with the City Council and City departments and prioritizing new initiatives and ordinances that will support mitigation projects and activities within the city.
Finance Department	The Finance Department assists other departments in the city in meeting their service objectives and is responsible for maintaining the City's financial health and monitoring and reporting on the City's financial position. The department directs and manages the City's financial activities and manages services provided to other city departments.	Financial management and strategic planning functions (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 budget operations and maintenance, and capital improvements.
Budget, Investment, & Technology Commission (BIT)	The Budget, Investment, and Technology Commission (BIT) is appointed by and acts as an advisory body to the City Council in matters pertaining to the short and long-range financial planning and funding of City activities.	The investment of City funds invested by the City Treasurer and the use of information technology will assist in accomplishing the City's goals and objectives.

California Governor's Office of Emergency Services	The California Governor's Office of Emergency Services (Cal OES) is the state agency responsible for reducing hazards 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 City can work with Cal OES to obtain funding to implement LHMP mitigation strategies and receive future updates.
Federal Emergency Management Agency	The Federal Emergency Management Agency (FEMA) is 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.
Human Resources	Human Resources partners with City departments to hire, compensate, support, and create a workforce dedicated to delivering high-quality services, making Anaheim a special place to live, work and play.	The Human Resources Department consists of four collaborative and cross-functional teams focused on employment, benefits and wellness, employee relations, and risk management, which can play key role in understanding risks to employees within the City.
Community Development Department &	The Community Development Department is responsible for the implementation of various programs to foster a better quality of life in the City of Anaheim. These programs create new residential opportunities, revitalize neighborhoods, and create job training opportunities.	Mitigation actions implemented by this department can assist in the dissemination of hazard awareness information, provide insight into the unique conditions hazards may impose to the various elements within the community, and create programs intended to increase overall life quality in the City. ,
Economic Development Department	The City of Anaheim offers Economic Development support through its dedicated Economic Development Team, which is an interdepartmental team of staff that serves as a one-stop business resource. Collective business services and resources include site selection assistance, utility rebates and incentives, workforce hiring and training assistance, and streamlined development processes. Anaheim's Economic Development Department remains committed to providing helpful resources and information to assist our business community.	Mitigation actions implemented by this department will assist in economic stabilization and recovery for local business, all while fostering growth following disasters related to the hazards faced in the City of Anaheim.
Community Services Board	The Community Services Board is appointed by and acts as an advisory body to the City Council in matters of the social service needs of the citizens of the City. The goal of the Community Services Department is to enrich individuals, families, and the community through the provision of services, facilities, and programs that improve the quality of life in Anaheim.	The Community Services Board'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.
Planning and Building Department - Building Division	The Building Division of the City of Anaheim is a team of professional engineers, inspectors, and friendly support staff, dedicated to providing the highest level of plan review and inspection services to our community. The goal of our staff is to help our customers build safe and sustainable buildings that comply with applicable codes and regulations.	Mitigation actions related to the construction of new structures or retrofits or improvements to existing structures may be implemented through future plan-processing.
Planning and Building Department -	Provides information and assistance to those developing property in Anaheim and businesses locating or expanding in the City; supports the Planning Commission; processes discretionary and	Mitigation actions implemented by the planning department would be successfully integrating the LHMP, general plan safety element, and

Planning Services Division	regulatory applications; maintains and implements the City's General Plan and Zoning Code; participates in regional planning activities; facilitates growth and expansion of businesses; administers the City's historic preservation programs.	zoning code. Department staff would also implement the plans focusing on projects that reduce residents' and businesses' risks associated with natural and human-caused hazards.
Traffic and Engineering Services	Provides for mobility and safety of people and goods. Services range from increasing arterial street capacity by operating Intelligent Transportation Systems infrastructure to reducing vehicle demand with commuter programs to place more people in fewer vehicles.	Mitigation activities include the input, design, creation, and implementation of new designs, improving current infrastructure as identified in the LHMP or City Council meetings.
Anaheim Fire & Rescue Department	Responsible for developing, administering, and coordinating the emergency planning preparedness program in conformity with local, state, and federal requirements. The comprehensive emergency management program fosters a disaster-resilient community through emergency planning and preparedness training and education of City staff, businesses, and residents to help reduce the loss of life and property resulting from a disaster. This Emergency Management & Preparedness (EMP) Division also works with and coordinates the efforts of volunteer organizations.	Fire-related mitigation actions that require coordination with the county may be implemented in collaboration with the Anaheim Fire & Rescue Department. In addition, the EMP Division maintains the Hazard Mitigation Plan and facilitates federal and state funded mitigation projects.
Anaheim Police Department	The Police Department delivers professional and responsive public safety and police services to the City's residents, visitors, schools, and businesses. These services include emergency and non-emergency response to crimes, incidents, and events; crime prevention; proactive enforcement of laws, ordinances, and codes; traffic-related services including collision investigation, enforcement, traffic safety education, and traffic control; criminal investigation; community policing to reduce crime and improve quality of life in neighborhoods; and youth services to engage local children in positive activities and civic engagement.	As emergency planning and preparedness are also within the scope of the Police Department, mitigation actions can be implemented or coordinated with other departments and agencies.
Technical Capabilities		
Cal-Adapt	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.
Online Services (Anaheim Website)	Over the past several years, the City of Anaheim has provided 24/7 access to a wide range of online services. The website includes featured City services from Anaheim Anytime, where one can submit any question or concern or pay a utility bill online.	This service allows the public to ask questions and access information to know what's going on within the city and better prepare for a hazard.
California Department of Transportation	The California Department of Transportation (Caltrans) is the state agency with jurisdiction over designated highways, including State routes SR-91, SR-55, SR-57, SR-22, and interstate I-5.	Mitigation measures related to ensuring the resiliency of state-designated routes will be implemented through coordination with Caltrans.
Anaheim Public Utilities Water Services	Anaheim Public Utilities Water Services began in 1879 when the leaders of Anaheim took responsibility for operating the water production and distribution system and continue to provide residents and businesses of Anaheim with the water they need to succeed.	As the city has grown, this service has responded by developing new water systems to meet the future needs of Anaheim.
Anaheim Public Utilities Electrical Services	Anaheim Public Utilities operates the only municipal electric system in Orange County. That means that the ratepayers of this community own their utility, and therefore, the key decisions concerning its operation can be made in Anaheim.	Since APU operates the only municipal electric service in Orange County, this allows for mitigation actions.

Renewable Energy Resource	In 1894, the City built the first municipal electric utility in Southern California. Anaheim Public Utilities provides customers with increasing amounts of energy from renewable resources while reducing the consumption of non-renewable energy resources such as nuclear, coal, and natural gas.	This resource provides electricity to customers from multiple renewable energy projects across the western United States.
Republic Services of Anaheim	Republic Services partners with the City of Anaheim to provide waste, recycling and compost collection, and disposal services. They also support local communities, education, and sustainability initiatives.	Republic Services provides the City with a waste and disposal service that allows mitigation actions to occur.
Street and Sanitation Services	This division is responsible for citywide asphalt and concrete maintenance of local streets, storm drain and sewer maintenance, street sweeping, parking control, and right-of-way landscape maintenance.	This service helps with mitigation by updating and improving the City's streets and sanitation.
Fiscal Capabilities		
Adopted FY 2021 / 22 Budget	Through sound fiscal management, the City of Anaheim provides a positive atmosphere for economic development and the flexibility to strategically address budgetary challenges that result from fluctuations in the local, national, and global markets. The FY 2021/22 adopted budget totals $1.8 billion. This represents a 3% change from the FY 2020/21 adopted budget. The FY 2021/22 General Fund budget totals $379.8 million, an increase of less than <1% from the 2020/21 adopted budget before Departmental Placeholder Reductions.	This budget is a key location where future mitigation projects can be identified from a funding perspective.
Education and Outreach Capabilities		
Community Engagement	The Community Engagement Team provides fire safety and injury prevention education and information, promotes safety campaign messaging, and manages the Department's social media platforms through Facebook, Twitter, YouTube, and Instagram.	This can aid in mitigation activities by promoting the various mitigation projects and programs by becoming a source of information and direction during emergencies and evacuations.

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

FEMA requires local governments to evaluate potential mitigation actions' monetary and non-monetary costs and benefits. 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 HMTF 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 HMTF 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 HMTF did not formally assess every potential mitigation action under all STAPLE/E criteria but used the criteria to guide and inform the discussion. The HMTF also discussed how the criteria might evaluate grant applications the City may submit to receive funding for LHMP implementation.

TABLE 5-2: STAPLE/E CRITERIA

Issues	Criteria
Social	Is the action socially acceptable to Anaheim 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 Anaheim 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 Anaheim 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?

PRIORITIZATION

As part of the mitigation actions development and review, the HMTF 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. HMTF members were asked to identify their priority actions through a voting exercise. Items are prioritized based on the number of votes the

HMTF members receive. These quantitative scores were then converted to qualitative categories of low, medium, and high priority.

Cost Estimates

The HMTF identified relative cost estimates to meet the hazard mitigation planning process's cost estimation requirements 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 HMTF prepared a prioritized list of mitigation actions to improve Anaheim's resilience to hazard events. In addition to mitigation action and strategies, several" Preparedness Activities" were identified and denoted with the letter "P." **Table 5-3** lists the mitigation actions, prioritization of each action, and other details related to implementation, including potential FEMA funding sources such as:

Building Resilient Infrastructure and Communities (BRIC): A competitive FEMA grant program to support states, local communities, tribes and territories.

Flood Mitigation Assistance Program (FMA): A competitive grant program that provides funding to states, local communities, federally recognized tribes and territories. Funds can be used for projects that reduce or eliminate the risk of repetitive flood damage to buildings insured by the National Flood Insurance Program.

Hazard Mitigation Grant Program (HMGP): Provides funding to state, local, tribal and territorial governments so they can rebuild in a way that reduces, or mitigates, future disaster losses in their communities. This grant funding is available after a presidentially declared disaster.

TABLE 5-3: MITIGATION ACTIONS IMPLEMENTATION PLAN

Action #	Action Item	Coordinating Organization	Timing	Priority Ranking	Cost	Funding Opportunities
Multi–Hazard Action Items						
MH-1	Integrate the goals and action items from the City of Anaheim Hazard Mitigation Plan into existing regulatory documents and programs, where appropriate.	Planning, Public Works	Ongoing	Low	$	General Fund, BRIC, FMA, HMGP
MH-2	Identify and pursue funding opportunities to develop and implement mitigation activities.	All Departments	Ongoing	Low	$	General Fund, Enterprise Fund, BRIC, FMA, HMGP
MH-3	Design and retrofit water facilities to resist damage from earthquakes	Public Utilities - Water Services	Ongoing	Medium	$$	Enterprise Funds, BRIC, FMA, HMGP, Bonds
MH-4	Develop, enhance, and implement education programs to educate and mitigate natural hazards and reduce the risk to residents, public agencies, private property owners, businesses, and schools. **Hazard Focus:** Geologic Hazards (Landslide, Erosion) Extreme Weather (Wind, Drought, Heat) Seismic Hazards (Fault Rupture, Seismic Shaking, Liquefaction) Wildland/Urban Fire Flooding Dam Failure	Fire & Rescue Department, Public Works, Public Utilities – Water and Electrical Services, Community Services	Ongoing	Low	$	General Fund, BRIC, FMA, HMGP, Bonds
MH-5	Continue the City of Anaheim Hazard Mitigation Task Force in maintaining a sustainable process for implementing, monitoring, and evaluating citywide mitigation issues.	Hazard Mitigation Planning Task Force (Quarterly EOC Personnel Task Force)	Ongoing	Low	$	General Fund, BRIC, FMA, HMGP
MH-6	Inventory alternative firefighting water sources.	Fire & Rescue Department	Ongoing	Low	$$	General Fund, BRIC, FMA, HMGP
MH-7	Prioritize enhancements to bridges and flood control facilities, especially along evacuation routes within the city limits.	Public Works	TBD	Low	$$	Enterprise Funds, BRIC, FMA, HMGP
MH-8	Install solid walls around each existing electrical substation (where applicable) and evaluate the need for bollards or other	Public Utilities - Electrical Services	Implement one substation every two years starting FY22/23	Medium	$$$	Enterprise Funds, BRIC, FMA, HMGP

	protection items. (e.g., Dowling SS, Southwest SS).					
MH-9	Continue to monitor and update the City's Buildings and Housing Code to address updated requirements and emerging issues.	Planning, Public Works	Ongoing	Low	$	General Fund, Enterprise Funds, BRIC, FMA, HMGP
MH-10	Purchase stand-by emergency generator or battery system for all city facilities designated as cooling centers.	Community Services	By 2025	Low	$$$	General Fund, BRIC, FMA, HMGP
MH-11	Increase redundancy and reliability to deliver water during an emergency through the following: 1. Evaluate existing communication systems and implement upgrades, as time and budget are available. 2. Improve/expand existing facilities to move water more efficiently from one portion of the system to another. 3. Add additional water facilities to the system to add redundancy/reliability as necessary.	Public Utilities - Water Services	Ongoing	Medium	$$$	Enterprise Funds, BRIC, FMA, HMGP
MH-12	Maintain/rehabilitate existing water storage facilities to maintain adequate water pressure and ensure adequate water supply.	Public Utilities - Water Services	Ongoing	Medium	$$	Enterprise Funds, BRIC, FMA, HMGP, Bonds
MH-13	Prioritize water main replacements throughout the City to improve water quality, improve the system's capability to meet fire flow requirements, raise water pressures, and increase service reliability. Install new transmission and distribution mains where necessary.	Public Utilities - Water Services	Ongoing	Low	$$$	Enterprise Funds, BRIC, FMA, HMGP, Bonds
MH-14	Conduct well upgrades and enhancements to ensure reliable and safe water supplies, addressing potential contaminant concerns, where needed.	Public Utilities - Water Services	FY21/22- FY23/24	Medium	$$$	Enterprise Funds, BRIC, FMA, HMGP, Bonds
MH-15	Replace, upgrade, or install new pumping stations and pressure regulating stations to improve water system supply and service reliability.	Public Utilities - Water Services	Ongoing	Low	$$$	Enterprise Funds, BRIC, FMA, HMGP, Bonds
MH-16	Ensure Water Services staff conduct inspection activities associated with customer-contributed capital facilities.	Public Utilities - Water Services	Ongoing	Medium	$$	Enterprise Funds, Grants, Bonds

MH-17	Conduct other capital improvement that may include replacement, upgrades, or new installation of miscellaneous water facilities such as treatment devices, security equipment, and SCADA equipment.	Public Utilities - Water Services	Ongoing	Low	$$	Enterprise Funds, BRIC, FMA, HMGP, Bonds
MH-18	Conduct water service enhancement projects that may include automatic meter reading; improvements in Ecommerce; computer equipment replacement; document imaging; field mobile data; work management system projects.	Public Utilities - Water Services	Ongoing	Low	$$$	Enterprise Funds, BRIC, FMA, HMGP, Bonds
MH-19	Conduct roadway improvement projects that may include improvements to intersections, arterial, streets and freeway ramp interchanges that provides for the rehabilitation/ reconstruction to restore the structural integrity and extend the service life of the street. In addition, corridor beautification, street trees, signage, historic street lighting, parkway landscaping and public easement enhancements.	Public Works	Ongoing	Low	$$$	Enterprise Funds, General Fund
MH-20	Conduct traffic signal modification that may include undergrounding of existing overhead interconnect cables in conjunction with utilities undergrounding efforts. Additional signal modification projects are identified throughout the year as needs arise and funding becomes available.	Public Works	TBD/Ongoing	Low	$$	Enterprise Funds, BRIC, FMA, HMGP
MH-21	Install traffic controls that could manipulate intersections after a disaster, which may include improvements in traffic signal system operations by installing system detectors, Split Cycle Offset Optimization Technique (SCOOT) loops, video detection, CCTV cameras, controllers, and controller cabinet upgrades, fiber optics, electrical service cabinet upgrades, communication hubs, signal interconnect upgrades, and pullboxes.	Public Works	TBD	Low	$$	Enterprise Funds

MH-22	Identify sewer lines that are seismically vulnerable and conduct major repairs or reconstruction of lines to reduce future outages. Conduct studies assessing the physical condition of lines within the city to determine priority projects in the CIP.	Public Works	TBD	Low	$$$	Enterprise Funds, BRIC, FMA, HMGP
MH-23	Conduct system undergrounding that converts overhead power and communication lines to new underground lines along major thoroughfares, evacuation routes, and areas that are prone to wildfires. The Underground Conversion Program was amended in 2016 to expand the types of eligible projects that include reliability improvements such as wildfire safety. Under the current APU's Wildfire Mitigation Plan, there are seven remaining segments of overhead lines that are located within/adjacent to the various Fire Threat Zones.	Public Utilities - Electric Services	Underground projects' schedule is included in the Program's 5-Year Plan approved by Council annually. FEMA approved Phase 1 (Design) of the Wildfire Mitigation UG project and is estimated to be completed by late 2022. Phase 2 Construction will be contingent on additional grant approvals.	Medium	$$$	Enterprise Funds, BRIC, FMA, HMGP
MH-24	Incorporate the Anaheim Hills evacuation plan and evacuation routes into appropriate planning documents (CIP, Safety Element, Circulation Element).	Police Department, Public Works- Traffic Management	2023-2025	Medium	$	General Fund
MH-25	Install larger generator and switchgear for East Anaheim Police Substation and East Anaheim Gymnasium. to ensure the location supports public safety and cooling center/ emergency shelter needs.	Public Works, Police, and Community Services	2023-2024	High	$$$	Enterprise Funds, BRIC, FMA, HMGP
MH-26	Conduct inspections and assessments of utility poles for hazard vulnerabilities (seismic, wildfire, and wind) and incorporate mitigation into future improvements.	Public Utilities - Electric Services	Wood utility poles are inspected under GO165 guidelines with the next cycle scheduled for start by 1Q 2023.	Low	$$	Enterprise Funds, BRIC, FMA, HMGP
Seismic Hazards						
EQ -1	Explore options for including seismic retrofitting in existing programs such as low-income housing, insurance reimbursements, and pre-and post-disaster repairs.	Community Development, Planning	TBD	Low	$	General Fund, BRIC, FMA, HMGP

EQ -2	Identify funding sources for structural and nonstructural retrofitting for City-owned facilities identified as seismically vulnerable.	Public Works	Ongoing	Low	$	Enterprise Fund, BRIC, FMA, HMGP
EQ -3	Pursue a new location and funding for a new primary Emergency Operations Center	Fire & Rescue Department	2022-2023	High	$$$	General Fund, BRIC, FMA, HMGP
EQ -4	Pursue funding and conduct seismic retrofits to all Anaheim libraries.	Community Services, Public Works	Ongoing	Low	$$$	General Fund, BRIC, FMA, HMGP
EQ -5	Pursue funding and conduct seismic retrofits to the Pearson Park Amphitheater.	Community Services, Public Works	2024-2025	Low	$$$	General Fund, BRIC, FMA, HMGP
Wildland/Urban Fire						
WF-1	Identify updated equipment and training to enhance emergency services and increase the efficiency of wildfire response and recovery activities.	Fire & Rescue Department	2023-2025	Medium	$	General Fund, BRIC, HMGP
WF-2	Increase communication, coordination, and collaboration between wildland/urban interface property owners, City planners, and fire prevention crews and officials to address risks, existing mitigation strategies, and federal assistance programs.	Fire & Rescue Department	Ongoing	Low	$	General Fund, BRIC, HMGP
WF-3	Implement recommendations from the Utilities Department Wildfire Mitigation Plan.	Public Utilities-Water Services, Fire & Rescue Department	Ongoing	Low	$$	Enterprise Fund, BRIC, HMGP, Bonds
WF-4	Maintain and update the Wildfire Preparedness Plan for Public Utilities Department that includes: Identification of existing conditions, short-term improvements, and long-term improvements for City facilities. Annual updates for submittal to the Wildfire Safety Advisory Board (WSAB). Engineered and operational mitigation measures to address potential wildfire hazards	Public Utilities - Water and Electric Services	Ongoing	Low	$	Enterprise Fund, Bonds

	Feedback from public outreach and WSAB members.					
WF-5	Conduct vegetation management (brush clearance) in City maintained parks, Anaheim Golf Course, Canyon Hills Library, and Walnut Canyon Reservoir.	Community Services, Fire & Rescue	2022-2023	High	$$	General Fund, BRIC, HMGP
WF-6	Encourage and conduct retrofits on City facilities, to include: 1. Fire retrofits (roofing, building materials, other improvements) on all facilities. 2. Install smoke detection units to HVAC systems in all libraries. 3. Retrofit sprinkler systems with smoke detection units in all libraries.	Fire & Rescue Department Community Services	2023-2025	Medium	$$$	General Fund, BRIC, HMGP
WF-7	Continue to work with Public Works on the Fuel Modification Program.	Fire & Rescue Department, Public Works	2023-2025	Medium	$	General Fund, BRIC, HMGP
WF-8	Park Rangers will go on 24-hour patrols of 3 natural parks- Pelanconi, Deer Canyon, Oak Canyon Nature Center) with high possibilities of fire danger. Patrols to keep out trespassers and watch for fire spots during Red-Flag warnings	Community Services – Park Ranger Program, Fire and Rescue Department	Ongoing	Low	$	General Fund
Industrial Accidents/ Hazardous Materials Release						
IND-1	Establish and maintain railroad buffer zones that limit new residential uses along these corridors.	Fire & Rescue Department, Planning	Ongoing	Low	$	General Fund, BRIC, HMGP
IND-2	Above Ground Fuel Storage Tanks - Removal of existing underground fuel storage tanks and installing new above-ground tanks due to EPA requirements in place of constant repair and monitoring.	Convention Center	TBD	Low	$$	General Fund, BRIC, FMA, HMGP
Flood/Storm						
FLD-1	Continue development and management strategies to preserve open space for flood mitigation and water quality in the floodplain.	Community Services, Public Works, Planning	Ongoing	Low	$	BRIC, FMA, HMGP
FLD-2	Identify surface water drainage obstructions for all parts of the City using FEMA Firm Maps.	Public Works	Ongoing	Low	$$	BRIC, FMA, HMGP
FLD-3	Conduct a study to determine the need for Public Utilities facilities near flood	Fire & Rescue Department	TBD	Low	$$	Enterprise Fund, BRIC, FMA, HMGP

	channels to be less susceptible to damage from floods.					
FLD-4	Install water detection alarm for basement book storage in the Central Library.	Community Services	TBD	Low	$$	BRIC, FMA, HMGP
FLD-5	Install new or reconstruct existing storm drains to enhance flood control capabilities throughout the City, prioritizing facilities in the Anaheim Golf Course and flood control channels in West Anaheim.	Public Works	TBD	High	$$$	BRIC, FMA, HMGP
			Drought			
DRT-1	Continue to raise public awareness of drought conditions, water supply restrictions, and potential conservation incentives.	Public Utilities -Water Services	Ongoing	Low	$	Enterprise Fund, Grants, Bonds
DRT-2	Ensure City has sufficient water supplies through the following programs: 1. Evaluate and recommend to City Council (where appropriate) water rate revisions to promote water use reduction. 2. Increase groundwater recharge and production to supplement supplies. 3. Adopt higher response levels as presented in the Water Reduction Ordinance Plan (Municipal Code Ch. 10.18). 4. Monitor and Maintain compliance with State Water Use Efficiency Standards to reduce water waste and ensure sufficient water supplies. 5. Investigate possible recycled and/or grey water supply sources.	Public Utilities -Water Services	Ongoing	Low	$	Enterprise Fund, BRIC, FMA, HMGP, Bonds
DRT-3	Research funding and installation of Synthetic Turf where appropriate, to reduce water consumption and eliminate the need for fertilizer that can contaminate water tables in parks and other areas of the City using grass.	Community Services	TBD	Low	$$	General Fund, BRIC, FMA, HMGP
DRT-4	Install irrigation controller upgrade at all parks in the City which will utilize Smart irrigation controllers and provide automatic irrigation valve shut-off when breaks are detected.	Community Services	2022-2024	Medium	$$$	General Fund, HMGP

Vectors						
V-1	Coordinate with Orange County Vector Control - Monitor efforts of Orange County and assist in disseminating information to the Anaheim community.	City Administration Communications, All Departments	Ongoing	Low	$	Enterprise Fund
Landslide						
LS-1	Improve knowledge of landslide hazard areas and understanding of vulnerability and risk to life and property in hazard-prone areas.	Public Works	Ongoing	Low	$$	BRIC, FMA, HMGP
LS-2	Encourage construction and subdivision design that can be applied to steep slopes to effectively reduce the potential adverse impacts of development.	Public Works, Planning	Ongoing	Low	$	General Fund, BRIC, FMA, HMGP
LS-3	Maintain and update local regulations regarding building and development as needed in landslide-prone areas.	Public Works	2023-2025	Medium	$	General Fund, BRIC, FMA, HMGP
LS-4	Mitigate activities in identified potential and historical landslide areas through regulation and public education.	Public Works, Planning	Ongoing	Low	$	General Fund, BRIC, FMA, HMGP
LS-5	Hillside Stabilization and Monitoring. - Mitigation efforts to stabilize the impacted area should include groundwater withdrawal from numerous wells scattered throughout the area.	Public Works, Public Utilities - Water	2023-2025	Medium	$$$	Enterprise Fund, BRIC, FMA, HMGP
Preparedness Activities						
PA-1	Main Station -Current DOC needs to be remodeled and updated.	Police Department	TBD	Low	$	General Fund
PA-2	Develop and distribute shelter in place protocols for vulnerable populations.	Fire & Rescue Department	Ongoing	Low	$	General Fund
PA-3	Educate agency personnel on federal costs- share and grant programs, Fire Protection Agreements, and other related federal programs, so the full array of assistance available to local agencies is understood.	Fire & Rescue Department	Ongoing	Low	$	General Fund
PA-4	Update and maintain plans for community Point of Dispensing (POD) sites.	Orange County Health Care Agency, Fire & Rescue Department	Ongoing	Low	$	General Fund

National Flood Insurance Program

Anaheim 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. Anaheim has participated in NFIP since September of 1974.[97]

Although participation is not a dedicated hazard mitigation action, Anaheim will continue to participate in the NFIP and comply with the program's requirements through continued enforcement of the City's Floodplain Management Regulations.[98] 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, Anaheim will make updates and revisions to the Floodplain Management regulations to minimize the threat of harm from flood events. 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 incorporating any changes to mapped flood plains' locations and designations into future planning documents, including future updates to this Plan.

The City of Anaheim contains Special Flood Hazard Areas (SFHA) and participates in the National Flood Insurance Program (NFIP), which currently includes 402 policies in force, amounting to roughly $334,765 in premiums paid. Total insurance coverage for these policies amounts to $120,803,500. Anaheim has no repetitive loss properties that FEMA identified; however, they have had a total of 50 closed Paid Losses cases totaling some $152,610 in damages paid out. Anaheim is currently at a CRS (Community Rating System) rating of 8,[99] which entitles property owners to a 10% discount should their property be located within an SFHA and 5% if it is not. The City's most current FIRM (Flood Insurance Rate Map) was adopted on September 2, 2016.

[97] Community Status Book Report – California: Communities Participating in the National Flood Program. https://www.fema.gov/cis/CA.pdf
[98] Anaheim Municipal Code. Title 17 Land Development and Resources, 17.28 Flood Hazard Reduction. https://codelibrary.amlegal.com/codes/anaheim/latest/anaheim_ca/0-0-0-65056
[99] FEMA, Sr. Hazard Mitigation Planner, Xing Liu, 2/1/2022

CHAPTER 6 – PLAN MAINTENANCE

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

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

- City Clerk
- City Administration
- City Attorney
- Community Services
- Convention, Sports, and Entertainment
- Economic Development
- Finance
- Fire & Rescue
- Housing and Community Development
- Planning and Building
- Police Department
- Public Works
- Public Utilities

The staff member currently serving as the HMTF leader (the person responsible for coordinating future updates) is in the Fire & Rescue Department. They will serve as the project manager during the update process or designate this role to another staff member. The HMTF 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 HMTF 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 Plan's effectiveness 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. HMTF 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 facilitating meetings and coordinating activities related to Plan implementation and maintenance.

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

Anaheim 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.

Anaheim Emergency Operations Plan – The EOP focuses on the effective preparedness and response to hazard events within the City. Incorporating relevant content from this plan into the EOP ensures consistency regarding the hazards addressed in both plans.

Anaheim Capital Improvements Program – The CIP identifies key infrastructure investments throughout the City, including hazard mitigation elements. Incorporating this plan into the CIP may enhance infrastructure investment through additional funding and/or modification of improvements to include hazard mitigation elements.

This integration of the LHMP into the Anaheim 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 Anaheim 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 Department staff to implement and maintain the Plan. A key component is the specific mechanisms that the City can use to integrate this plan into the other City planning mechanisms.

Plan Monitoring and Evaluation

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

- What hazard events, if any, have occurred in Anaheim 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 Anaheim?

Plan Updates

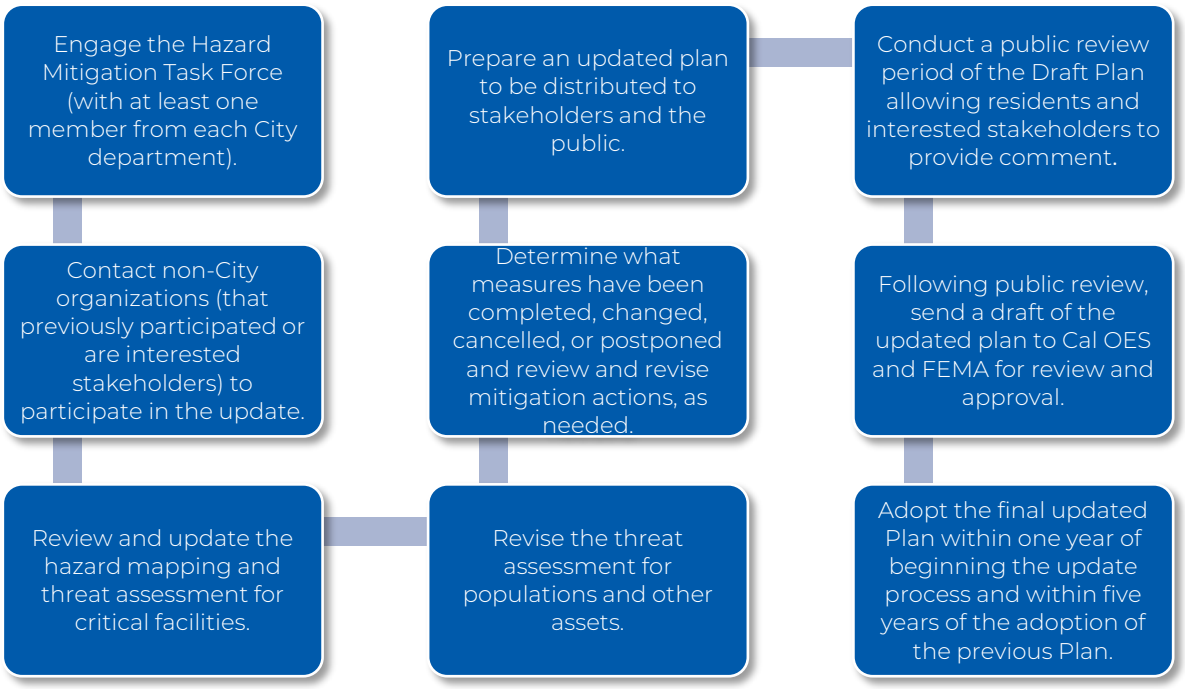
The information in this Plan, including the hazard profiles, threat assessments, and mitigation actions, is based on the best available information, practices, technology, and methods available to the City and HMTF when this Plan was prepared. As factors change, including technologies, community demographics 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. Depending on the circumstances, the LHMP project manager or their designee may also choose to begin the update process sooner. Some reasons for accelerating the update process may include:

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

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 HMTF will determine the best process for updating the Plan, which should include the following steps:



Update Adoption

The Anaheim City Council is responsible for adopting this Plan and all future updates. As previously mentioned, adoption should occur every five years. The City should begin the update process at least one year before expiration to ensure the plan remains active. 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 keep the public informed about the HMTF's actions to review and update the LHMP. The HMTF 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 using the City's website and social media accounts, and content for public outreach documentation. The HMTF will also distribute information annually through the most appropriate method to ensure the most significant information dissemination to residents and businesses. These updates are anticipated to occur after the City's annual HMTF meeting.

Point of Contact

The Hazard Mitigation Plan leader for Anaheim is the primary point of contact for this Plan and future updates. At the time of production, the LHMP project coordinator is Dr. Jannine Wilmoth, City of Anaheim Emergency Manager, available at JWilmoth@anaheim.net | 714-765-4000.

APPENDIX A – HMTF MEETING MATERIALS

2022 Anaheim Hazard Mitigation Plan Task Force Attendees

Name	Title	Department	HMTF Meeting 1	HMTF Meeting 2	HMTF Meeting 3
Greg Garcia	Assistant City Manager	City Administrative Services			
Indhira Gagnon	Law Office Administrator	City Attorney		X	
Stephen Stoewer	Senior Project Manager	Housing and Community Development Dept			
Julie Parker	Sr. Administrative Analyst	Community Services	X	X	X
Randy Howser	Operations Manager	Convention, Sports & Entertainment	X	X	
Jennifer Sorenson	Senior Accountant	Finance	X		
Dr. Jannine Wilmoth	Emergency Manager	Fire & Rescue	X	X	X
Deputy Chief Mike Molloy*	Deputy Fire Chief	Fire & Rescue			
Susan Kim*	Principal Planner	Planning & Building			
Heather Allen	Principal Planner	Planning & Building			
Christine Nguyen	Associate Planner	Planning & Building	X		
Lt. Rich LaRochelle	Police Lieutenant	Police	X		
Kyle Bernard	Police Sergeant	Police	X	X	X
Janis Lehman	Interim AGM Admin & Risk Services	Public Utilities			
Agustin Torres	Utilities Analyst II	Public Utilities	X	X	X
Eddie De La Torre	Street and Sanitation Manager	Public Works	X	X	X
Jonathan Heffernan	Operations Supervisor	Public Works	X	X	X
Cody Allman	Assistant Emergency Manager	Fire & Rescue	X	X	X
Patricia Alvarez	Management Assistant	Fire & Rescue	X	X	X

* City staff left during the plan preparation process

City of Anaheim

LOCAL HAZARD MITIGATION PLAN UPDATE
HMPC MEETING #1 AGENDA

I. **City of Anaheim Project Overview (10 minutes)**

II. **Local Hazard Mitigation Plan Overview (10 minutes)**

III. **Project Goals and Expectations (10 minutes)**

IV. **Hazard Mitigation Planning Team Roster (10 minutes)**

V. **Communication Protocols (5 minutes)**

VI. **Break (5 minutes)**

VII. **(Date of Project) City of Anaheim LHMP (15 minutes)**

VIII. **Data Needs (Critical Facilities List, vulnerable populations, recent/past hazards, GIS) (10 minutes)**

IX. **Community Engagement and Outreach Strategy (10 minutes)**

X. **Hazard Identification/Prioritization (20 minutes)**

XI. **Next Steps and To-Do List (5 minutes)**

Hazard Mitigation Planning Update Process	**August 2021 – June 2022**
Community Outreach	August 2021 - Ongoing
Administrative Draft LHMP	February 2022
Public Review Draft LHMP Document	Spring 2022
Cal OES/FEMA Review Draft Document	Summer 2022

City of Anaheim

LOCAL HAZARD MITIGATION PLAN UPDATE
HMPC MEETING #2 AGENDA

I. **Introductions (5 minutes)**

II. **Review of Project Goals (5 minutes)**

III. **Review of Hazard Prioritization (5 minutes)**

IV. **Review of Critical Facilities (5 minutes)**

V. **Review of Hazard Profiles/Mapping Discussion/Threat Assessment (75 minutes)**

VI. **Introduction to Mitigation Strategies (5 minutes)**

VII. **Next Steps (5 minutes)**

Hazard Mitigation Planning Process	**August 2021 - June 2022**
HMPC Meeting #3 – Mitigation Action Review/Prioritization	February 16, 2022
Community Outreach	Ongoing
Administrative Draft LHMP	End of February 2022
Public Review Draft LHMP Document	March 2022
Cal OES/FEMA Review Draft Document	April-May 2022

City of Anaheim

LOCAL HAZARD MITIGATION PLAN UPDATE
HMPC MEETING #3 AGENDA

I. Introductions (5 minutes)

II. Review of Project Goals (5 minutes)

III. Overview of Mitigation Strategies

Plans and Regulations	• Ordinances, Regulations
Structural Projects	• Utility Undergrounding, Structural Retrofits
Natural Systems Protection	• Stream restoration, erosion control
Education Programs	• Outreach materials, websites, presentations
Preparedness and Response Actions	• Mutual aid agreements, equipment purchases, notification protocols

IV. Discussion of STAPLE/E Criteria

Issue	Criteria

Social	• Is the action socially acceptable to Anaheim community members? • Would the action treat some individuals unfairly? • 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 effects of the hazard? • Will the action create new hazards or make existing hazards worse? • Is the action the most useful approach for Anaheim to take, given the City's goals and community members?
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 carry out implementation? • 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 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 economic 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 Anaheim 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?

V. Discussion of Relative Cost Estimates

Cost Categories	
$	Less than $50,000
$$	$50,001 to $999,999
$$$	Greater than $1,000,000

VI. Review and Discussion of Draft Mitigation Strategies

VII. Next Steps (5 minutes)

Hazard Mitigation Planning Process	**August 2021 - June 2022**
HMPC Meeting #3 – Mitigation Action Review/Prioritization	February 16, 2022
Community Outreach	Ongoing
Administrative Draft LHMP	End of February 2022
Public Review Draft LHMP Document	March 2022
Cal OES/FEMA Review Draft Document	April-May 2022

Typical Mitigation Categories

Plans and Regulations

- **Ordinances, Regulations**

Structural Projects

- **Utility Undergrounding, Structural Retrofits**

Natural Systems Protection

- **Stream restoration, erosion control**

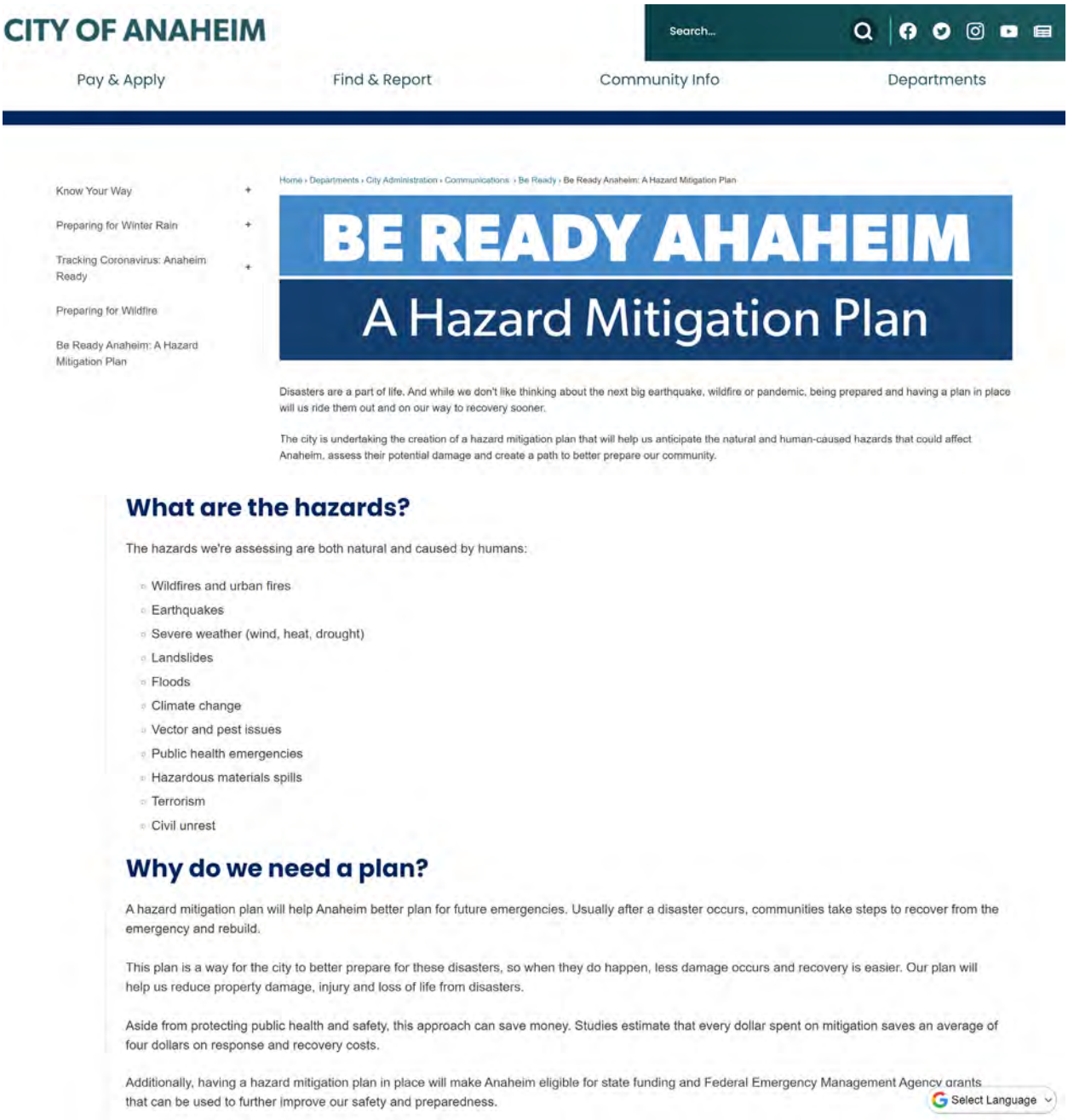
Education Programs

- **Outreach materials, websites, presentations**

Preparedness and Response Actions

- **Mutual aid agreements, equipment purchases, notification protocols**

APPENDIX B – OUTREACH ENGAGEMENT MATERIALS



https://www.anaheim.net/6102/Be-Ready-Anaheim-A-Hazard-Mitigation-Pla

City of Anaheim- Municipal Government
February 9 ·

West Anaheim residents, this is for you!

Anaheim Community Services
February 4 ·

Get involved and join your neighbors at the Neighborhood Services District 1 & 2 Community Meetings being held virtually via Zoom this Wednesday, February 9! Meet City staff, receive information and updates, and share questions, concerns, or ideas to help improve your neighborhood.

Topics will include the Redistricting Process, Community Care Response Team, Hazard Mitigation Plan, Emergency Preparedness, and more.

The meeting begins at 7:00 PM

Districts 1 & 2
Wednesday, February 9, 2022
https://us06web.zoom.us/j/89810092725
Call-in Option: (253) 215-8782
Webinar ID: 898 1009 2725

City of Anaheim- Municipal Government
February 10 ·

Tonight!

Anaheim Community Services
February 7 ·

Join us for the Neighborhood Services District 3 & 4 Community Meetings being held virtually this week, on Thursday, February 10!

You'll meet City staff and learn about the Redistricting Process, Community Care Response Team, Hazard Mitigation Plan, Emergency Preparedness, and more.

The meeting begins at 7:00 PM

Districts 3 & 4
Thursday, February 10, 2022
https://us06web.zoom.us/j/82612317576
Call-in Option: (253) 215-8782
Webinar ID: 826 1231 7576

See you there!

https://www.facebook.com/profile/100067061222530/search/?q=Hazard%20MItigation

To: Hazard Mitigation Task Force

From: Jannine Wilmoth, Emergency Manager

Date: March 29, 2022

RE: **SUMMARY OF COMMUNITY OUTREACH EVENTS WHERE HAZARD MITIGATION PLAN UPDATE SURVEY WAS PROMOTED AS OF MARCH 2022**

City of Anaheim Community Neighborhood Meetings (Virtual)
- February 9, 2022
- February 10, 2022
- February 16, 2022

City of Anaheim Farmers Market – Emergency Preparedness Booth
- February 17, 2022
- February 24, 2022

Anaheim Community Emergency Response Team Meeting
- February 23, 2022

Anaheim Fire & Rescue Emergency Preparedness Symposium
- March 5, 2022

NEIGHBORHOOD SERVICES DISTRICT 1 & 2 COMMUNITY MEETING

Wednesday, February 9, 2022
7:00 p.m.
Zoom Webinar

A G E N D A

1. Welcome	Jason Perez, Neighborhood Services
2. Community Policing Updates	Sgt. Brian Paqua, West Community Policing
3. Community Care Response Team & Code Enforcement Updates	Sandra Lozeau, Code Enforcement
4. Redistricting Process Update	City Clerk's Office
5. Hazard Mitigation Plan & Emergency Preparedness	Dr. Jannine Wilmoth, Fire & Rescue
6. Circulation Element – Anaheim General Plan	Joseph Alcock, Public Works
7. Adjournment	Jason Perez, Neighborhood Services

Neighborhood Services District Community Meetings

District Meetings provide useful information and help you find ways to participate in your community. Get involved and join us at the upcoming ***District Community Meetings****!*

Neighborhood Services District Community Meetings are part of the Anaheim Neighborhood Improvement Program that assists Anaheim residents to improve the livability of their neighborhoods – where each department is committed to participating through a coordinated, inter-departmental approach.

For more information please call (714) 765-4456 or visit us at
www.anaheim.net/neighborhoods

REUNION COMUNITARIA DEL DISTRITO 1 & 2 DE SERVICIOS VECINDARIOS
Miércoles, 9 de febrero del 2022
7:00 p.m.
Zoom Webinar

A G E N D A

1.	Bienvenida	Jason Perez, Servicios Vecindarios
2.	Actualizaciones de Policía Comunitaria	Sgt. Brian Paqua, Policía Comunitaria Oeste
3.	Actualizaciones del Equipo Respuesta de Atención Comunitario y Cumplimiento de Códigos	Sandra Lozeau, Cumplimiento de Códigos
4.	Redistribución de Distritos	Oficina de Secretaria Municipal
5.	Plan de Mitigación de Riesgos y Actualizaciones de Preparación para Desastres	Dr. Jannine Wilmoth, Fuego y Rescate
6.	Plan de Circulación – Plan General de la Ciudad	Joseph Alcock, Obras Publicas
7.	Despedida	Jason Perez, Servicios Vecindarios

Reuniones Comunitarias de Distritos de Servicios Vecindarios

Las Reuniones de Distritos proporcionan información útil y le ayudan a encontrar maneras de participar en su comunidad. ¡Participe y acompáñenos en las próximas ***Reuniones Comunitarias de Distritos de Servicios Vecindarios***!

Las ***Reuniones Comunitarias de Distritos de Servicios Vecindarios*** son parte del Programa de Mejoramiento de Vecindarios de Anaheim que ayuda a los residentes de Anaheim a mejorar la habitabilidad de sus vecindarios, donde cada departamento está comprometido a participar a través de un enfoque interdepartamental coordinado.

Para las próximas reuniones o más información por favor llame al (714) 765-4456
o visítenos en la página www.anaheim.net/neighborhoods

NEIGHBORHOOD SERVICES DISTRICT 3 & 4 COMMUNITY MEETING

Thursday, February 10, 2022
7:00 p.m.
Zoom Webinar

A G E N D A

1. Welcome	Carlos Urquiza, Neighborhood Services
2. Community Policing Updates	Sgt. Mark Lillemoen, Central Community Policing
3. Community Care Response Team & Code Enforcement Updates	Sandra Lozeau, Code Enforcement
4. Redistricting Process Update	City Clerk's Office
5. Hazard Mitigation Plan & Emergency Preparedness Updates	Dr. Jannine Wilmoth, Fire & Rescue
6. Circulation Element – Anaheim General Plan	Joseph Alcock, Public Works
7. Adjournment	Jason Perez, Neighborhood Services

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REUNION COMUNITARIA DEL DISTRITO 3 & 4 DE SERVICIOS VECINDARIOS
Jueves, 10 de febrero del 2022
7:00 p.m.
Zoom Webinar

A G E N D A

1.	Bienvenida	Carlos Urquiza, Servicios Vecindarios
2.	Tendencias de Crimen y Prevención del Crimen	Sgt. Mark Lillemoen, Policía Comunitaria Central
3.	Actualizaciones del Equipo Respuesta de Atención Comunitario y Cumplimiento de Códigos	Sandra Lozeau, Cumplimiento de Códigos
4.	Redistribución de Distritos	Oficina de Secretaria Municipal
5.	Plan de Mitigación de Riesgos y Actualizaciones de Preparación para Desastres	Dr. Jannine Wilmoth, Fuego y Rescate
6.	Plan de Circulación – Plan General de la Ciudad	Joseph Alcock, Obras Publicas
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NEIGHBORHOOD SERVICES DISTRICT 5 & 6 COMMUNITY MEETING

Wednesday, February 16, 2022
7:00 p.m.
Zoom Webinar

A G E N D A

1. Welcome	Jason Perez, Neighborhood Services
2. La Palma Bridge Improvements	Orange County Transportation Authority Staff
3. Community Policing Updates	Sgt. Brian Paqua & PERT Team
4. Community Care Response Team & Code Enforcement Updates	Sandra Lozeau, Code Enforcement
5. Redistricting Process Update	City Clerk's Office
6. Hazard Mitigation Plan & Emergency Preparedness Updates	Dr. Jannine Wilmoth, Fire & Rescue
7. Circulation Element – Anaheim General Plan	Joseph Alcock, Public Works
8. Adjournment	Jason Perez, Neighborhood Services

Neighborhood Services District Community Meetings

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www.anaheim.net/neighborhoods

REUNION COMUNITARIA DEL DISTRITO 5 & 6 DE SERVICIOS VECINDARIOS
Miércoles, 16 de febrero del 2022
7:00 p.m.

A G E N D A

1.	Bienvenida	Jason Perez, Servicios Vecindarios
2.	Mejoras al Puente de la Avenida La Palma	Personal de la Autoridad de Transportación del Condado de Orange.
3.	Actualizaciones de Policía Comunitaria	Sgt. Brian Paqua y el Equipo de PERT
4.	Actualizaciones del Equipo Respuesta de Atención Comunitario y Cumplimiento de Códigos	Sandra Lozeau, Cumplimiento de Códigos
5.	Redistribución de Distritos	Oficina de la Secretaria Municipal
6.	Plan de Mitigación de Riesgos y Actualizaciones de Preparación para Desastres	Dr. Jannine Wilmoth, Fuego y Rescate
7.	Plan de Circulación – Plan General de la Ciudad	Joseph Alcock, Obras Publicas
8.	Despedida	Jason Perez, Servicios Vecindarios

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o visítenos en la página www.anaheim.net/neighborhoods

CITY OF ANAHEIM

LOCAL HAZARD MITIGATION PLAN UPDATE PROJECT

WHAT IS HAZARD MITIGATION?

- Sustained actions taken to reduce or eliminate long-term risk to life and property from hazards

Actions that make the community less vulnerable to natural hazards before disasters strike

- Communities reduce their vulnerability through the development of a Local Hazard Mitigation Plan (LHMP)

WHAT DOES AN LHMP DO?

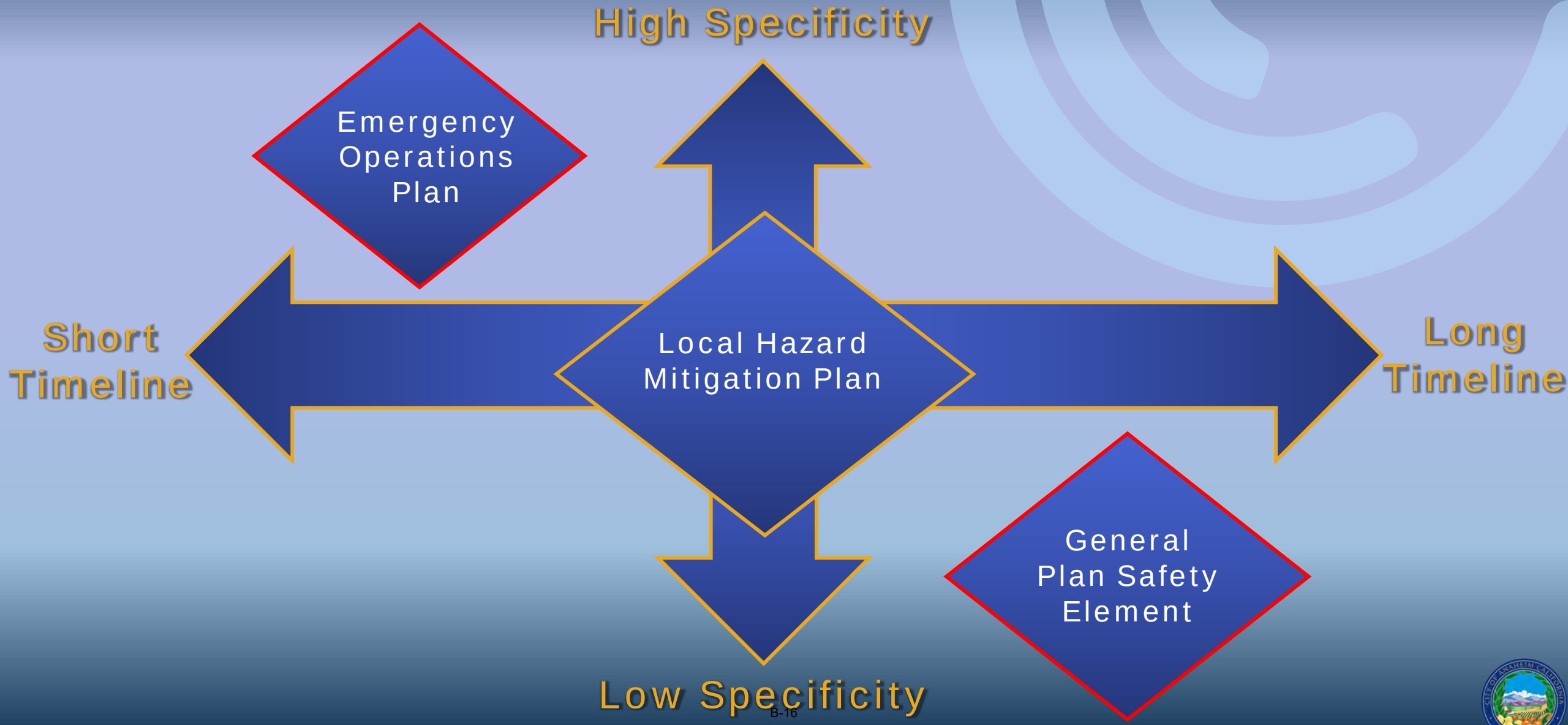
DISCUSS COMMUNITY HAZARDS

ANALYZES HAZARD RISKS

IDENTIFIES POLICIES / PROJECTS TO REDUCE RISK

PROVIDES DIRECTION TO IMPLEMENT AND MONITOR

FITTING THE PIECES TOGETHER



WHY PREPARE AN LHMP?

Reduces injury, loss of life, property damage, and loss of services from natural disasters.

AB 2140 Compliance

Eligibility for FEMA Grants:
Building Resilient Infrastructure and Communities (BRIC)*
Flood Mitigation Assistance (FMA)
Hazard Mitigation Grant Program (HMGP)

* Replaces the Pre-Disaster Mitigation (PDM) Grant Program

WHAT IS THE LHMP PROCESS?

HOW CAN YOU GET INVOLVED?

Take our Online Survey

- Survey Link

Comment on the Draft Plan

- Expected to be released in Spring 2022

Check Out the LHMP Webpage

- Web address

QUESTIONS?

Dr. Jannine Wilmoth
Emergency Manager
jwilmoth@anaheim.net

Aaron Pfannenstiel
Hazard Mitigation Planning Consultant
aaron@atlasplanning.org

BE READY AHAHEIM

A Hazard Mitigation Plan

What is a Hazard Mitigation Plan?

This plan helps the City to anticipate the natural and human-caused hazards that could affect Anaheim, assess their potential damage and create a path to better prepare our community.

What are hazards in Anaheim?

- *Wildfires and urban fires*
- *Earthquakes*
- *Severe weather (wind, heat, drought)*
- *Landslides*
- *Floods*
- *Climate change*
- *Vector and pest issues*
- *Public health emergencies*
- *Hazardous materials spills*
- *Terrorism*
- *Civil unrest*

Why do we need a plan?

- To help Anaheim better plan for future emergencies
- Reduce property damage, injury and loss of life from disasters
- To save money on response and recovery costs
- To be eligible for state and federal funding to improve our safety and preparedness
- To update Anaheim's General Plan Safety Element

How can I get involved?

Visit our website to take a quick survey about hazards in your neighborhood and learn more about the Hazard Mitigation Plan

www.anaheim.net/hazard

To go directly to our survey, use this QR Code!

To learn more about how to prepare for a disaster

www.anaheim.net/BeReady

@ANAHEIMFIREANDRESCUE **@ANAHEIMFIRE**

City of Anaheim Hazard Mitigation Plan Survey

Top of Form

I. Local Hazard Mitigation Plan Survey
Dear Community Member,

The City of Anaheim is preparing a Local Hazard Mitigation Plan or LHMP. Like all other communities, Anaheim could potentially face widespread devastation in the event of a natural disaster. While no community can completely protect itself against all potential hazardous situations, this plan will help identify those situations, assess our current provisions, and outline a strategy to lessen the vulnerability and severity of future disasters. Your responses to this survey will inform the preparation of the plan. Thank you for your time and cooperation.

II. Hazard Awareness

Question Title

1. Please indicate whether you live or work in the City of Anaheim.

- (●) I live in the City of Anaheim.
- ( ) I work in the City of Anaheim.
- ( ) I live and work in the City of Anaheim.
- ( ) Neither applies to me, but I am interested in the City's resiliency.

Question Title

2. What is the ZIP code of your home?

Question Title

3. For your current residence or place of work, please identify if you have been affected by any of the hazards below (select all that apply).

- [ ] Wildland / Urban Fire
- [ ] Earthquake
- [ ] Severe Weather (windstorms/extreme heat/drought)
- [ ] Dam Failure
- [ ] Landslide
- [ ] Disease and Pests (public health emergencies/vector issues)
- [ ] Flood/Storm
- [ ] Human-Caused Hazards (hazardous materials, terrorism, civil unrest)
- [ ] Other

Question Title

4. If you selected “Other” above, please list any additional hazards that have previously impacted your neighborhood or home.

Question Title

5. The following hazards could potentially impact the City. Please mark the THREE (3) hazards that are of most concern to your neighborhood or home.

- ☐ Wildland / Urban Fire
- ☐ Earthquake
- ☐ Severe Weather (windstorms/extreme heat/drought)
- ☐ Dam Failure
- ☐ Landslide
- ☐ Disease and Pests (public health emergencies/vector issues)
- ☐ Flood/Storm
- ☐ Human-Caused Hazards (hazardous materials, terrorism, civil unrest)
- ☐ Other

Question Title

6. If you selected “Other” above, please list any additional hazards that have previously impacted your neighborhood or home.

Question Title

7. The planning team is using various data sources to identify hazards in your community; however, some of these data sources do not provide data at a general citywide level. Are there any small-scale

issues, such as ponding at a specific intersection during rain, that you would like the planning team to consider?

- I am not aware of local hazards
- I am aware of local hazards

Question Title

8. If you indicated “I am aware of local hazards” above, please provide as much detail as possible, including the location and type of hazard.

Question Title

9. How concerned are you that climate change may create new hazardous situations in Anaheim or make existing natural hazards worse?

- Very concerned.
- Somewhat concerned.
- Somewhat unconcerned.
- Not at all concerned.
- Unsure.

Question Title

10. When do you think climate change will pose a threat to your health, property, livelihood, or overall wellbeing?

- It already is.
- Within the next five years.
- In five to twenty years.
- Not for at least another twenty years.
- Never, or not in my lifetime.

Question Title

11. If you have taken any action to protect yourself against natural hazards, how confident are you that these actions will be sufficient to protect against more severe hazards that are expected because of climate change?

- Very confident.
- Somewhat confident.
- Somewhat unconfident.
- Not at all confident.
- Unsure.

Question Title

12. If you are a homeowner, do you have adequate homeowners insurance to cover the hazards that could impact your home?

- Yes, my insurance coverage should be adequate.
- No, I don't believe my insurance coverage would be adequate for a major disaster.
- Unsure.
- I do not have an insurance policy.
- Not applicable; I rent my current residence.

Question Title

13. If you rent your residence, do you have renters insurance?

- Yes
- No
- Not applicable; I own my residence.

Question Title

14. Do you have flood insurance for your home?

- Yes, I own my home and have flood insurance.
- Yes, I rent my home and have flood insurance.

- No, but I am interested in reviewing flood insurance options (http://www.floodsmart.gov/floodsmart/).

Question Title

15. If your home or business is prone to flooding, did you know you can get free sandbags from the city?

- Yes
- No

For more information regarding the city provided sand bags, please visit: https://www.anaheim.net/458/Sandbag-Information

Question Title

16. Have you done anything to your home to make it less vulnerable to hazards such as earthquakes, floods, and fires?

- Yes
- No
- Not applicable; I rent my residence.

Question Title

17. If a severe hazard event occurred today such that all services were cut off from your home (power, gas, water, sewer) and you were unable to leave or access a store for 72 hours, which of these items do you have readily available?

- [ ] Potable water (3 gallons per person)
- [ ] Cooking and eating utensils
- [ ] Can opener
- [ ] Canned / nonperishable foods (ready to eat)
- [ ] Gas grill / camping stove
- [ ] Extra medications and contact lenses (if applicable)
- [ ] First aid kit / supplies
- [ ] Portable AM/FM radio (solar powered, hand crank, or batteries)
- [ ] Handheld "walkie-talkie" radios (with batteries)

- [ ] Important family photos / documentation in a water- and fireproof container
- [ ] Extra clothes and shoes
- [ ] Blanket(s) / sleeping bag(s)
- [ ] Cash
- [ ] Flashlight (with batteries)
- [ ] Gasoline
- [ ] Telephone (with batteries)
- [ ] Pet supplies
- [ ] Secondary source of heat

For more information on emergency kits, visit: https://www.ready.gov/kit

Question Title

18. Are you familiar with the special needs of your neighbors in the event of a disaster situation (special needs may include limited mobility, severe medical conditions, memory impairments)?

- ○ Yes
- ○ No

Question Title

19. Are you a trained member of your Community Emergency Response Team (CERT)?

- ○ Yes
- ○ No, but I would like to learn more about CERT.
- ○ No, I am not interested in being a trained CERT member.

For more information about CERT, please visit:

Anaheim.net/CERT

Question Title

20. If you live in east Anaheim, do you know your evacuation route and zone as part our Know Your Way campaign?

- ○ Yes
- ○ No

For more information regarding the city's evacuation zones and "Know Your Way" campaign, please visit: http://www.anaheim.net/6063/Know-Your-Way-Evacuation-Zones

Question Title

21. How can the City help you become better prepared for a disaster? (choose all that apply)

- ☐ Provide effective emergency notifications and communication.
- ☐ Provide training and education to residents and business owners on how to reduce future damage.
- ☐ Provide community outreach regarding emergency preparedness.
- ☐ Create awareness of special needs and vulnerable populations.
- ☐ Other (please specify)

If you answered “Other please specify below.

If you do NOT work in the City of Anaheim, please skip to section 3, question 25*.

Question Title

22. What is the ZIP code of your workplace?

Question Title

23. Does your employer have a plan for disaster recovery in place?

- ○ Yes
- ○ No
- ○ I don't know

Question Title

25. Does your employer have a workforce communications plan to implement following a disaster, so they can contact you?

- ○ Yes

No

III. Recommendations and Future Participation

Question Title

25. Would you like to be contacted when the Draft 2022 Anaheim Hazard Mitigation Plan is available for review?

Yes; please notify me using my contact information in the next question.

No

If you would like to be notified of future opportunities to participate in hazard mitigation and resiliency planning, please provide your name and e-mail address. If you do not have an e-mail address, please provide your mailing address.

Please provide us with any additional comments/suggestions/questions regarding your risk of future hazard events.

Thank You!

City of Anaheim Hazard Mitigation Plan Survey

11 responses

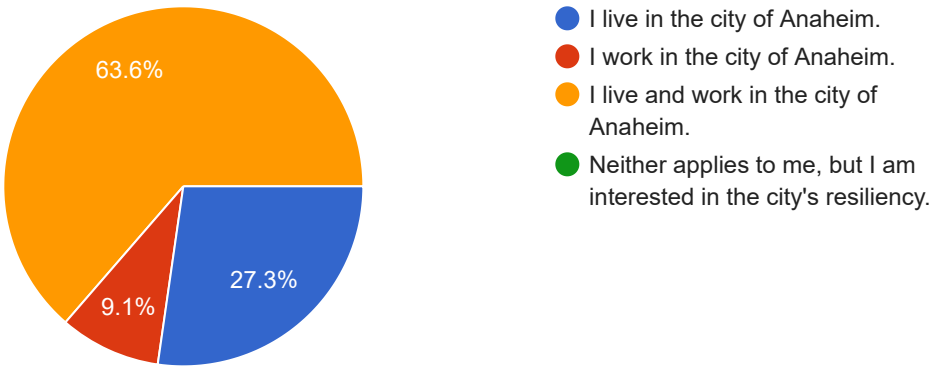
Publish analytics

Hazard Awareness

1. Please indicate whether you live or work in the City of Anaheim.

Copy

11 responses



2. What is the ZIP code of your home?

Copy

11 responses

3. For your current residence or place of work, please identify if you have been affected by any of the hazards below (select all that apply).

Copy

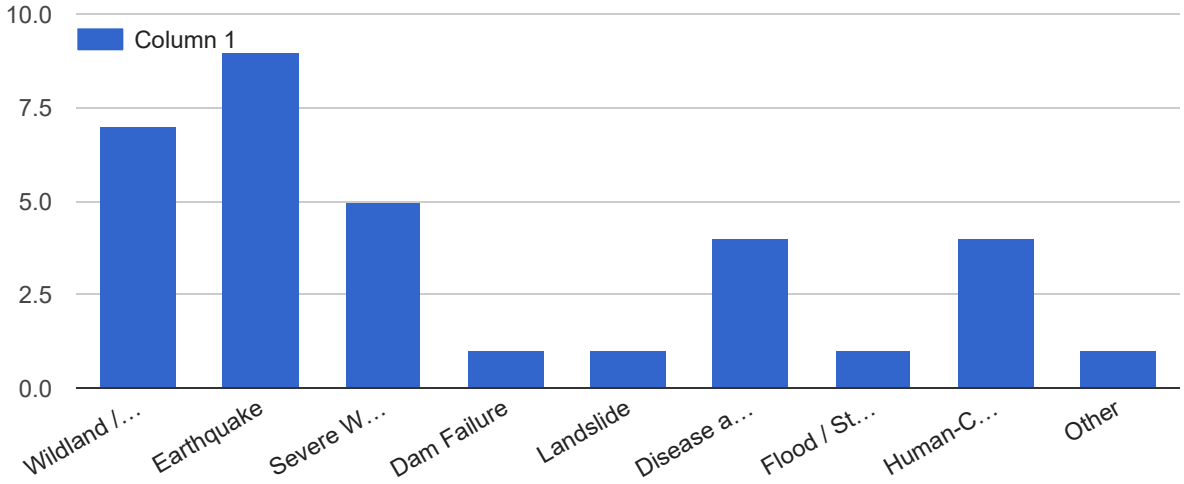
4. If you selected “Other” above, please list any additional hazards that have previously impacted your neighborhood or home.

0 responses

No responses yet for this question.

5. The following hazards could potentially impact the city. Please mark the three (3) hazards that are of most concern to your neighborhood or home.

Copy



6. If you selected “Other” above, please list any additional hazards that have previously impacted your neighborhood or home.

1 response

Air quality issues from proximity to 91 freeway

7. The planning team is using various data sources to identify hazards in your community. Unfortunately, some of these data sources do not provide data at a general citywide level. Are there any small-scale issues, such as ponding at a specific intersection during rain, that you would like the planning team to consider?

Copy

11 responses

8. If you indicated “I am aware of local hazards” above, please provide as much detail as possible, including the location and type of hazard.

3 responses

Railroad grade crossing incursions at South Street and Santa Ana Street that could lead to a train derailment.

1. Extreme lack of awareness of evacuation routes in Anaheim Hills despite the installation of new signage since the last wildfire threat which required mandatory evacuation orders. When speaking to neighbors who live further up in the Hills, they were still unaware of where their evacuation routes are. 2. Extreme ponding on the walking trail along Santa Ana Canyon Road & Imperial Hwy during heavy rains. 3. There could be greater emphasis on home hardening for wildfire mitigation particularly for those residing along Weir Canyon.

Flooding on Santa Ana Canyon Rd.

9. How concerned are you that climate change may create new hazardous situations in Anaheim or make existing natural hazards worse?

Copy

11 responses

10. When do you think climate change will pose a threat to your health, property, livelihood, or overall wellbeing?

Copy

11 responses

11. If you have taken any action to protect yourself against natural hazards, how confident are you that these actions will be sufficient to protect against more severe hazards that are expected due to climate change?

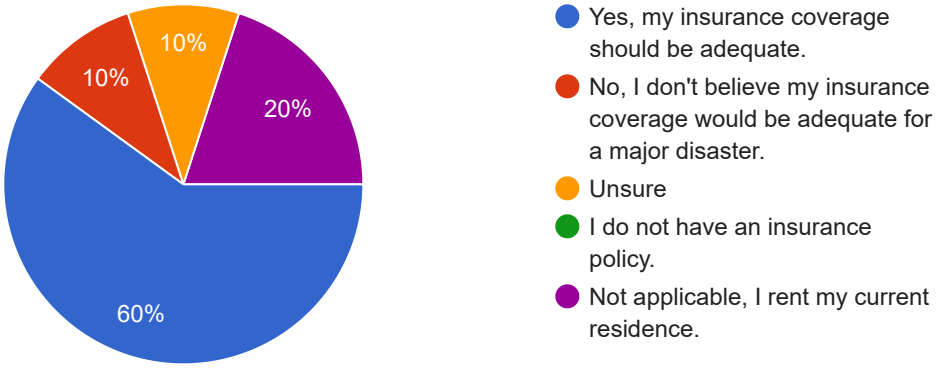
Copy

11 responses

12. If you are a homeowner, do you have adequate homeowners' insurance to cover the hazards that could impact your home?

Copy

10 responses



13. If you rent your residence, do you have renters' insurance?

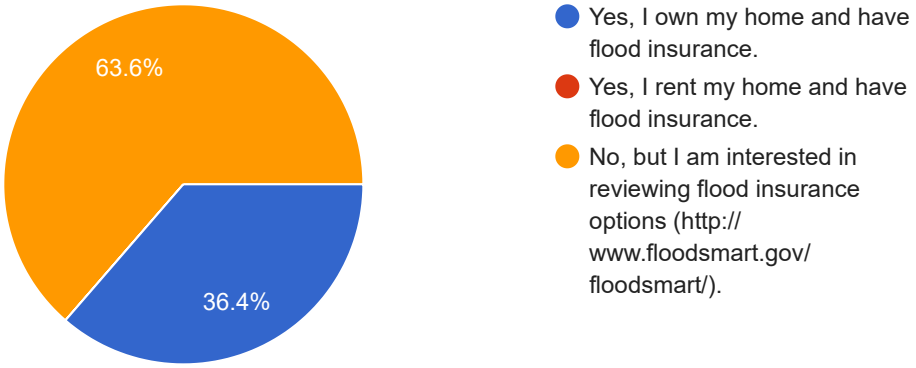
Copy

3 responses

14. Do you have flood insurance for your home?

Copy

11 responses



15. If your home or business is prone to flooding, did you know you can get free sandbags from the city?

Copy

10 responses

For more information regarding the city provided sand bags, please visit:

16. Have you done anything to your home to make it less vulnerable to hazards such as earthquakes, floods, and fires?

Copy

11 responses

17. If a severe hazard event occurred today such that all services were cut off from your home (power, gas, water, sewer) and you were unable to leave or access a store for 72 hours, which of these items do you have readily available?

Copy

For more information on emergency kits, visit:

18. Are you familiar with the special needs of your neighbors in the event of a disaster situation (special needs may include limited mobility, severe medical conditions, memory impairments)?

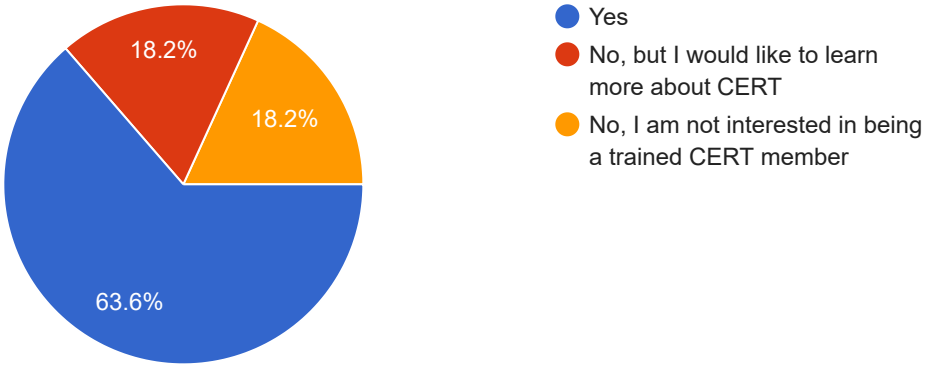
Copy

11 responses

19. Are you a trained member of your Community Emergency Response Team (CERT)?

Copy

11 responses



For more information about CERT, please visit:

20. If you live in east Anaheim, do you know your evacuation route and zone as part our Know Your Way campaign?

Copy

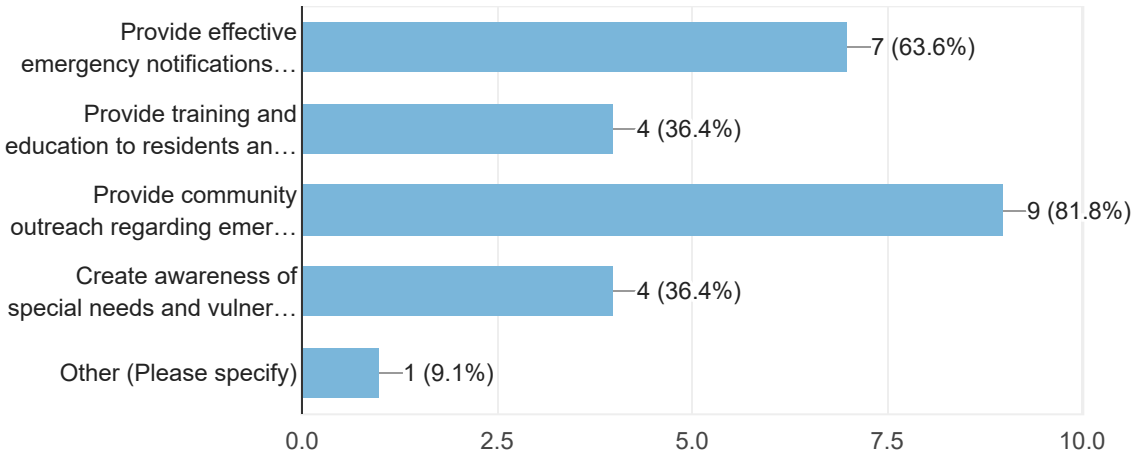
5 responses

For more information regarding the city's evacuation zones and "Know Your Way" campaign, please visit:

21. How can the city help you become better prepared for a disaster? (choose all that apply)

Copy

11 responses



If you answered "Other" above, please specify below.

1 response

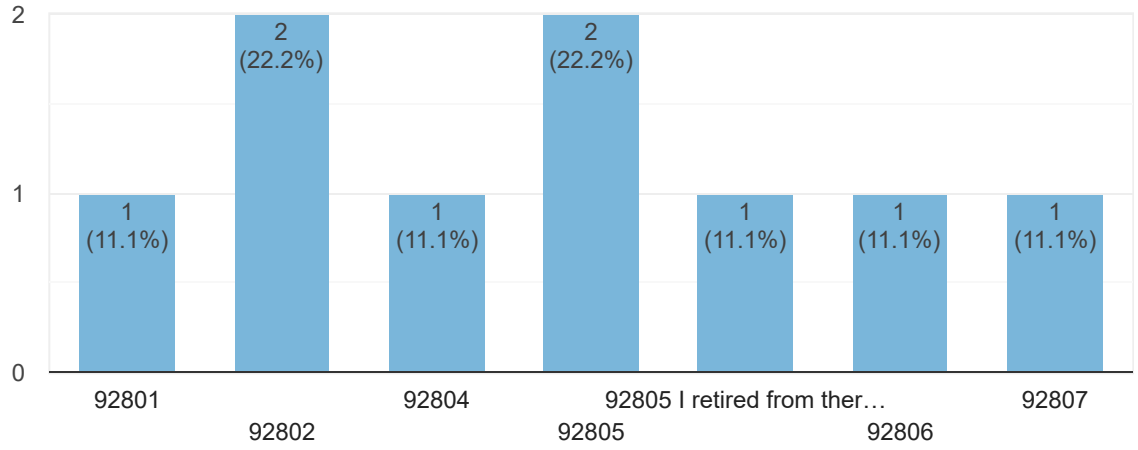
assign my area an evacuation gathering area as the streets and alleys are too close (25ft or less) to the residences/cottages

If you do NOT work in the city if Anaheim please skip to section 3, question 25

22. What is the ZIP code of your workplace?

Copy

9 responses



23. Does your employer have a plan for disaster recovery in place?

Copy

9 responses

24. Does your employer have a communications plan to implement following a disaster, so they can contact you?

Copy

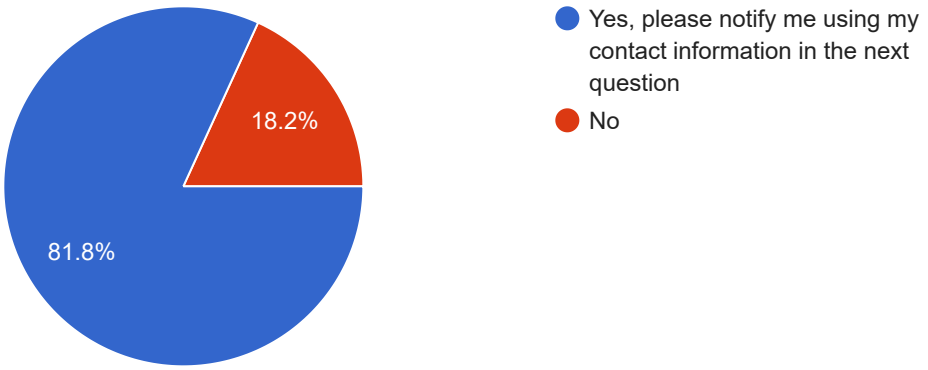
9 responses

Recommendations and Future Participation

25. Would you like to be contacted when the Draft 2022 Anaheim Hazard Mitigation Plan is available for review?

Copy

11 responses



If you would like to be notified of future opportunities to participate in hazard mitigation and resiliency planning, please provide your name and e-mail address. If you do not have an e-mail address, please provide your mailing address. This information will be kept confidential.

7 responses

Please provide us with any additional comments/suggestions/questions that you have regarding your risk of future hazard events.

2 responses

Although I know people usually don't think about hazard mitigation until a disaster happens, I would be interested in helping to find a way to promote resiliency in my community and throughout the city.

If Prado fails is my only true concern when it rains a lot.

Thank you!

Appendix C - Resolution of Adoption
(to be inserted after City Council approval)

Appendix D- List of Key Facilities

City of Anaheim Critical Facilities and Facilities of Concern

Asset Name	Critical Facility / Facility of Concern	Asset Type Category	Asset Type	Address
Fire Station 5	X	City Facilities	City Sites	1154 N Kraemer Blvd
Fire Station 6	X	City Facilities	City Sites	1330 S Euclid St
Police Disney Substation	X	City Facilities	City Sites	1520 S Disneyland Dr
Fire Station 3	X	City Facilities	City Sites	1717 S Clementine St
Fire Station 2	X	City Facilities	City Sites	2141 W Crescent Ave
Fire Station 7	X	City Facilities	City Sites	2222 E Ball Rd
Fire Station 4	X	City Facilities	City Sites	2736 W Orange Ave
Fire Station 11	X	City Facilities	City Sites	3078 W Orange Ave
Police West Substation	X	City Facilities	City Sites	320 S Beach Blvd
Public Works Administration: Central Staging Area	X	City Facilities	City Sites	400 E Vermont Ave
Anaheim PD: Police HQ Facility	X	City Facilities	City Sites	425 S Harbor Blvd
Fire Station 8	X	City Facilities	City Sites	4555 E Riverdale Ave
Fire Station 1	X	City Facilities	City Sites	500 E Broadway
Fire Station 9	X	City Facilities	City Sites	6300 E Nohl Ranch Rd
East Anaheim Police Library	X	City Facilities	City Sites	8200 E Santa Ana Canyon Rd
Fire Station 10	X	City Facilities	City Sites	8270 E Monte Vista Rd
USC EOP Modular BLDG: Emergency Operations Center	X	City Facilities	City Sites	841 S East St
East Staging Area: Ronald Reagan Park	X	City Facilities	City Sites	945 S Weir Canyon Rd
Peralta Canyon Park	X	Community Facilities	City Sites	115 N Pinney St
La Palma Park	X	Community Facilities	City Sites	1151 N La Palma Way

Modjeska Park	X	Community Facilities	City Sites	1331 S Nutwood St
CARE & Shelter Trailer #327: Parks Central Yard BLDG	X	Community Facilities	City Sites	900 E South St
Boysen/Central Yard Crew Quarters BLDG: Parks Central Yard BLDG	X	Community Facilities	City Sites	900 E South St
CARE & Shelter Trailer #328: Ronald Reagan Park	X	Community Facilities	City Sites	945 S Weir Canyon Rd
Anaheim Independencia	X	Cooling Centers	Community Centers	10841 Garza Ave
Euclid Branch Library	X	Cooling Centers	Community Centers	1340 S. Euclid St
Downtown Anaheim Youth Center	X	Cooling Centers	Community Centers	225 S Philadelphia St
Brookhurst Community Center	X	Cooling Centers	Community Centers	2271 W Crescent Ave
Ponderosa Joint Use Library	X	Cooling Centers	Community Centers	240 E. Orangewood Ave
Downtown Anaheim Community Center (Anaheim Senior Center)	X	Cooling Centers	Community Centers	250 East Center Street
Haskett Branch Library	X	Cooling Centers	Community Centers	2650 West Broadway
Canyon Hills Branch Library	X	Cooling Centers	Community Centers	400 Scout Trail
Central Branch Library	X	Cooling Centers	Community Centers	500 W Broadway
Branch Library: East Anaheim Community Center	X	Cooling Centers	Community Centers	8201 E Santa Ana Canyon Rd
Community Center: East Anaheim Community Center	X	Cooling Centers	Community Centers	8201 E Santa Ana Canyon Rd
Gymnasium: East Anaheim Community Center	X	Cooling Centers	Community Centers	8201 E Santa Ana Canyon Rd
Sunkist Branch Library	X	Cooling Centers	Community Centers	901 S Sunkist

Not all critical facility locations are listed here. Only those locations that have been made accessible to public records have been listed to maintain facility site integrity and security.

Appendix E – Hazard Mitigation Implementation Handbook

City of Anaheim

Local Hazard Mitigation Plan Implementation Handbook

April 2022

What Is This Handbook?

The Local Hazard Mitigation Plan (LHMP) for the City of Anaheim features an evaluation of the City's hazards as well as a variety of corresponding mitigation actions. These actions are intended to preserve public safety, maintain critical municipal government operations and services when hazard events emerge, and empower community members to take on hazard mitigation at an individual level. This Implementation Handbook (Handbook) is intended for use by City staff and decision makers after the LHMP is adopted. It will:

- Give clear instructions as to what to do following adoption of the LHMP.
- Simplify future updates to the LHMP.
- Assist the City in preparing grant funding applications related to hazard mitigation.
- Guide annual plan review actions.

How do I Use This Handbook?

This Handbook can help City staff and decision makers in several different situations. If and when the events listed below occur, consult the respective sections of this Handbook for advice on how best to proceed:

- A disaster proclamation has been issued by the Anaheim City Council
- A disaster proclamation has been issued by the State of California
- A disaster declaration has been signed by the Federal Government
- I want to apply for mitigation grant funding
- Anaheim is undergoing its budgeting process
- Anaheim is holding its annual meeting of the Hazard Mitigation Task Force
- Anaheim is updating the following policy and regulatory documents:
- The Local Hazard Mitigation Plan
- The Safety Element of the General Plan
- The Housing Element of the General Plan
- The Zoning Code

Who Maintains This Handbook?

The leader of the Hazard Mitigation Task Force (HMTF) is the one responsible for maintaining this Handbook. At the time of writing, the current HMTF leader is Jason Dempsey from the Anaheim Police Department. The HMTF may delegate this responsibility to someone else should they so choose.

What to do when a disaster has been proclaimed or declared

Disasters may be proclaimed or declared by the Anaheim City Council, the State of California, or the federal government. Responsibilities may differ depending on who proclaims or declares the disaster. If multiple organizations proclaim or declare a disaster, consult all applicable lists.

The Anaheim City Council

If the Anaheim City Council (or the Director of Emergency Services, if the City Council is not in session) proclaims a Local Emergency, take the following steps:

- ☐ Update **Attachment** 1 with information about the disaster. Include information about cumulative damage, including any damage outside of Anaheim.
- ☐ Discuss opportunities for local assistance with the representatives from the California Office of Emergency Services (Cal OES).
- ☐ If the disaster damages local infrastructure or City-owned facilities, repair or rebuild the structure to be more resilient, following applicable hazard mitigation actions. A list of actions, organized by hazards, is included as **Attachment 4**.
- ☐ **Chapter 6** of the Anaheim LHMP states that the City should consider updating the LHMP if a disaster causes a loss of life in the community, even if there is no state disaster proclamation or federal disaster declaration that includes part or all of the City. If there is a loss of life in Anaheim, consider updating the LHMP. Consult the section on updating the LHMP in this Handbook for details.

The State of California

If the State of California proclaims a disaster for Anaheim, or an area that includes part or all of Anaheim, take the following steps:

- ☐ Update **Attachment 1** with information about the disaster. Include information about cumulative damage, including any damage outside of Anaheim.
- ☐ Collaborate with representatives from Cal OES to assess the damage from the event.
- ☐ Discuss opportunities for local assistance with representatives from Cal OES.
- ☐ If the disaster damages local infrastructure or City-owned facilities, repair or rebuild the structure to be more resilient, following applicable hazard mitigation actions. A list of actions, organized by hazards, is included as **Attachment 4.**
- ☐ If the disaster may escalate into a federal disaster declaration, begin any necessary coordination with representatives from the Federal Emergency Management Agency (FEMA).
- ☐ **Chapter 6** of the Anaheim LHMP states that the City should consider updating the LHMP if a disaster leads to a state disaster proclamation or federal disaster declaration that includes part or all of Anaheim, even if there is no loss of life. Consider updating the LHMP. Consult the section on updating the LHMP in this Handbook for details.

The Federal Government

If the federal government declares a disaster for Anaheim, or any area that includes part or all of Anaheim, take the following steps:

- ☐ Update **Attachment 1** with information about the disaster. Include information about cumulative damage, including any damage outside of Anaheim.
- ☐ Collaborate with representatives from Cal OES and FEMA to assess the damage from the event.
- ☐ Determine if Anaheim will be eligible for public assistance funds related to the federal disaster declaration. These funds can be used to reimburse the City for response and recovery activities. If the City is eligible, work with FEMA and Cal OES representatives to enact the necessary requirements and receive funding.
- ☐ If the disaster damages local infrastructure or City-owned facilities, repair or rebuild the structure to be more resilient, following applicable hazard mitigation actions. A list of actions, organized by hazards, is included as **Attachment 4**.
- ☐ The Hazard Mitigation Grant Program (HMGP) is a FEMA program that helps fund hazard mitigation activities after a disaster event. Anaheim may be eligible for funding because of the federal disaster declaration, although not all activities may meet the program's requirements. If Anaheim is eligible, work with FEMA to apply for this funding.
- ☐ **Chapter 6** of the Anaheim LHMP states that the City should consider updating the LHMP if a disaster leads to a state disaster proclamation or federal disaster declaration that includes part or all of Anaheim, even if there is no loss of life. Consider updating the LHMP. Consult the section on updating the LHMP in this Handbook for details.

I Want to Apply for Mitigation Grant Funding

There are three potential grant funding programs that FEMA administers for hazard mitigation activities. Two of these programs, the Building Resilient Infrastructure and Communities (BRIC) and Flood Mitigation Assistance (FMA) funding sources, are available to communities with an LHMP that complies with FEMA guidelines and has been adopted within the past five years. The third funding program is the Hazard Mitigation Grant Program (HMGP), which is available for communities that are part of a federal disaster declaration. This section discusses the BRIC and FMA programs, and how to apply for them. The HMGP is discussed under the "Federal Government" subsection of the above "What to Do When a Disaster Has Been Proclaimed or Declared" section.

Building Resilient Infrastructure and Communities (BRIC)

Building Resilient Infrastructure and Communities (BRIC) will support states, local communities, tribes and territories as they undertake hazard mitigation projects, reducing the risks they face from disasters and natural hazards. BRIC is a new FEMA pre-disaster hazard mitigation program that replaces the existing Pre-Disaster Mitigation (PDM) program.

The BRIC program guiding principles are supporting communities through capability- and capacity-building; encouraging and enabling innovation; promoting partnerships; enabling large projects; maintaining flexibility; and providing consistency.

Development projects must be identified in a hazard mitigation plan that meets FEMA guidelines and was adopted within the past five years. When applying to this program, review the list of hazard mitigation actions in **Attachment 4** to see which projects may be eligible. Planning efforts for communities that lack a valid hazard mitigation plan may be eligible for funding if the

effort would create a valid hazard mitigation plan. All BRIC grant applications are processed through the State. To learn more, consult with Cal OES representatives or visit the FEMA webpage on the program. At time of writing, this webpage is available at https://www.fema.gov/pre-disaster-mitigation-grant-program.

TAKE THE FOLLOWING STEPS TO APPLY FOR BRIC FUNDING:

- ☐ Confirm that the program is currently accepting funding applications. Check with representatives from Cal OES or consult the Cal OES webpage on the BRIC program. At time of writing, this webpage is available at http://www.caloes.ca.gov/cal-oes-divisions/hazard-mitigation/pre-disaster-flood-mitigation.
- ☐ Identify the actions from the hazard mitigation strategy (see Attachment 4) that call on the City to pursue funding or list grants as a potential funding source. Confirm that the actions are consistent with the requirements of the BRIC grant.
- ☐ Coordinate with Cal OES representatives to compile and submit materials for the grant application.

Flood Mitigation Assistance

The FMA grant program is a competitive, national program that awards funding for physical development projects and planning efforts that mitigate against long-term damage from flooding. The funding is only available to communities that participate in the National Flood Insurance Program (NFIP), which Anaheim currently does. Communities must also have a valid hazard mitigation plan that meets FEMA guidelines in order to be eligible, and all projects must be consistent with the list of actions in the hazard mitigation strategy. When applying to this program, review the list of hazard mitigation actions in **Attachment 4** to see which projects may be eligible. As with the BRIC program, applications for the FMA program must be processed through the State. To view more information, consult with Cal OES representatives or visit the FEMA webpage on the program. At time of writing, this webpage is available at https://www.fema.gov/flood-mitigation-assistance-grant-program.

TAKE THE FOLLOWING STEPS TO APPLY FOR FMA FUNDING:

- ☐ Confirm that the program is currently accepting funding applications. Check with representatives from Cal OES or consult the Cal OES webpage on the FMA program. At time of writing, this webpage is available at http://www.caloes.ca.gov/cal-oes-divisions/hazard-mitigation/pre-disaster-flood-mitigation.
- ☐ Identify the actions from the hazard mitigation strategy (**see Attachment 4**) that call on the City to pursue funding or list grants as a potential funding source. Confirm that the actions are consistent with the requirements of the FMA grant.
- ☐ Coordinate with Cal OES representatives to compile and submit materials for the grant application

Anaheim is going through the budgeting process

Anaheim's budget process is an ideal opportunity to secure funding for hazard mitigation actions, and to ensure that hazard mitigation efforts are incorporated into the City's fiscal priorities. Anaheim currently operates on an annual budget cycle that runs from July 1 to June

30. During this process, City staff should take the following steps to incorporate hazard mitigation into Anaheim's annual budget:

- ☐ Include hazard mitigation activities into Anaheim's list of Capital Improvement Projects (CIP). Review the list of hazard mitigation actions in Attachment 4 and identify the projects that can be included into the CIP or can support efforts within the CIP.
- ☐ Review the risk and threat assessments in the LHMP (Chapter 3 and Chapter 4) to ensure that all items in the list of CIP are being planned, designed, and constructed so as to minimize the threat from hazard events.
- ☐ Identify opportunities to identify state-alone hazard mitigation actions through the annual budget process. Include appropriate items from Attachment 4 in the budget as stand-alone line items, particularly items that the Hazard Mitigation Planning Committee (Task Force) considered a high priority.
- ☐ Set aside staff to conduct hazard mitigation activities, including time to participate in Task Force meeting and time to research, prepare, and submit BRIC and FMA grant opportunities (consult the "I Want to Apply for Mitigation Grant Funding" section above).
- ☐ Ensure that hazard mitigation activities are reflected in each department's priorities and earmarked time for specific goals.

Anaheim is Conducting its Annual meeting of the Hazard Mitigation Task Force

The hazard mitigation planning process brings together representatives from multiple City departments, as well as other relevant stakeholders, and provides a forum to discuss the hazards in Anaheim and how to mitigate them effectively. As mentioned in **Chapter 6** of the LHMP, the Task Force should meet at least once each year, beginning a year after the LHMP is adopted. During these meetings, the Task Force should discuss implementation progress and integration of hazard mitigation actions in other City documents. At these meetings, the Task Force can review the status of the hazard mitigation actions and discuss whether completed or in-progress actions are working as expected. These meetings also allow the Task Force to strategically plan for the upcoming year.

It may help for the Task Force to meet early in the year, in advance of annual budget activities. **Attachment 3** contains an example of a Task Force Meeting Agenda.

The annual meeting should include representatives from City departments and other organizations that originally prepared the LHMP. Representatives from other relevant organizations should also be invited. During the preparation of the LHMP, the following individuals were part of the Task Force:

Anaheim Hazard Mitigation Task Force

Name	Title	Department
Greg Garcia	Assistant City Manager	City Administrative Services
Indhira Gagnon	City Attorney	Law Office Administrator
Stephen Stoewer	Senior Project Manager	Housing and Community Development Dept
Julie Parker	Sr. Administrative Analyst	Community Services
Randy Howser	Operations Manager	Convention, Sports & Entertainment
Jennifer Sorenson	Senior Accountant	Finance
Dr. Jannine Wilmoth	Emergency Manager	Fire & Rescue
Heather Allen	Principal Planner	Planning & Building
Christine Nguyen	Associate Planner	Planning & Building
Lt. Rich LaRochelle	Police Lieutenant	Police
Kyle Bernard	Police Sergeant	Police
Janis Lehman	Interim AGM Admin & Risk Services	Public Utilities
Agustin Torres	Utilities Analyst II	Public Utilities
Eddie De La Torre	Street and Sanitation Manager	Public Works
Jonathan Heffernan	Operations Supervisor	Public Works
Cody Allman	Assistant Emergency Manager	Fire & Rescue
Patricia Alvarez	Management Assistant	Fire & Rescue

In advance of Task Force meetings, consider using **Attachment 1** to maintain an accurate list of recent disaster events that have occurred in and around Anaheim since the LHMP was adopted. At the Task Force meeting, review the Plan Maintenance Table **(Attachment 2**) to identify any gaps in the LHMP or any other component of the Plan that needs updating. This also allows Task Force members the opportunity to review the actions in the hazard mitigation strategy **(Attachment 4)** and ensure that they are implemented as intended.

Anaheim is updating its policy and regulatory documents

If Anaheim is updating the LHMP, the Safety Element or Housing Element of the General Plan, or the Zoning Code, consult the following applicable section.

Local Hazard Mitigation Plan

All LHMPs should be updated every five years. This helps keep the plan up to date and ensures that it reflects the most recent guidance, requirements, science, and best practices. An updated LHMP also helps keep Anaheim eligible for hazard mitigation grants that require a valid, recent LHMP (see "I Want to Apply for Mitigation Grant Funding"), along with an increased amount of post-disaster recovery funds.

The update process for the LHMP takes approximately one year. To ensure that a new LHMP comes into effect before the previous one expires, the update process should begin no later than four years after the plan is adopted. Updates may occur sooner at the City's discretion. Potential reasons for updating the LHMP sooner may include a state disaster proclamation or federal disaster declaration that covers part or all of Anaheim, or if a disaster leads to a loss of life in Anaheim (see the "What to Do When a Disaster Has Been Proclaimed or Declared" section), as discussed in **Chapter 6** of the LHMP.

Take the following steps to update the LHMP:

Assemble the Hazard Mitigation Task Force

- ☐ Convene a Task Force meeting no later than four years after the LHMP is adopted. Invite the regular Task Force members, along with representatives from other organizations that may have a role to play in the update process.
- ☐ Review the current status of mitigation actions, including if there are any that are not being implemented as planned or are not working as expected. Determine if there have been any changes in hazard events, regulations, best practices, or other items that should be incorporated into an updated LHMP.
- ☐ Decide if there is a need for a technical consultant to assist with the LHMP update, and conduct consultant selection activities if needed. If a consultant is desired, the selection process should begin a few months before the update gets underway.
- ☐ Create and implement a community engagement strategy, building off of the strategy prepared for the existing LHMP. Describe in-person and online engagement strategies and materials, including ideas for meetings and workshops, draft community surveys, content for websites and press releases, and other materials that may be useful.

Update the Risk and Threat Assessments

- ☐ Review and update the risk assessment to reflect the most recent conditions in Anaheim. Consider recent hazard events, new science associated with hazards and climate change, new development and land use patterns, and other recent changes on local conditions.

- ☐ Evaluate the status of all key facilities. Update this list if new facilities have been constructed, or if existing facilities have been decommissioned. Re-assess the threat to key facilities.
- ☐ Review the demographics of community residents and update the threat assessment for vulnerable populations and other community members.
- ☐ Assess any changes to the threat to all other community assets, including key services, other facilities, and economic drivers.

UPDATE THE MITIGATION ACTIONS

- ☐ Update the existing hazard mitigation actions to reflect actions in progress. Remove actions that have been completed; or revise them to increase their effectiveness. Revise actions that have been abandoned or delayed so as to make them more feasible; or remove them from the list of mitigation actions if they are no longer appropriate for Anaheim.
- ☐ Develop mitigation actions to improve the status of hazard mitigation activities in Anaheim by addressing any issues not covered by the existing LHMP.
- ☐ Ensure that the feedback from the community engagement activities are reflected in the new and updated mitigation actions.

REVIEW AND ADOPT THE UPDATED PLAN

- ☐ Review the other chapters and appendices of the LHMP to reflect any changes made through the update process.
- ☐ Release the updated Plan to Task Force member; and revise the Plan to reflect any comments by Task Force members.
- ☐ Distribute the updated Plan to any appropriate external agencies not included in the Task Force; and revise the plan as appropriate in response to any comments.
- ☐ Release the updated Plan publicly for review; and make revisions to the Plan to reflect public comments.
- ☐ Submit the plan to Cal OES and FEMA for approval, and make any revisions as needed.
- ☐ Submit the plan to the Anaheim City Council for adoption.

The Safety Element of the General Plan

The Safety Element is a required component of Anaheim's General Plan. It can be updated as a stand-alone activity, or as part of a more comprehensive process to update multiple sections or all of the General Plan. The Safety Element does not need to be updated on any set schedule, but updates should be frequent enough for the element to remain current and applicable to the community.

Local communities can incorporate their LHMP into their Safety Element as allowed under Section 65302.6 of the California Government Code, as long as the LHMP meets minimum federal guidelines. This allows communities to be eligible for an increased share of post-disaster relief funding from the State if a hazard situation occurs, as per Section 8685.9 of the California Government Code.

Take the following steps to incorporate the LHMP into the Safety Element:

INCORPORATE NEW REQUIREMENTS INTO THE SAFETY ELEMENT, AND ENSURE THAT THE LHMP IS CONSISTENT WITH THE SAFETY ELEMENT

- ☐ Review the requirements for Safety Elements in Section 65302(g) of the California Government Code, and for LHMPs in Section 65302.6 of the California Government Code. Ensure that both documents meet all state requirements.
- ☐ Ensure that the information in both plans do not contradict each other, and that any inconsistencies are corrected to use the most accurate and appropriate information. This information should include community descriptions, a risk assessment, and a threat assessment.
- ☐ Ensure that the policies in the Safety Element support the LHMP and provide a planning framework for specific hazard mitigation actions.

The Housing Element of the General Plan

The Housing Element is a required component of Anaheim's General Plan. Section 65583 of the California Government Code requires a Housing Element to analyze and plan for new residential growth in a community, including residential growth for households with an annual income below the area median. Similar to an LHMP, state regulations require that the Housing Elements be updated regularly to remain current and valid.

The Housing Element is not required to contain any information or policies that relate to hazards, although it may include policies that address retrofitting homes to improve resiliency. However, state law links the regular schedule of Housing Element updates to mandatory revisions to other General Plan elements. For example, Section 65302(g)(2) of the California Government Code requires that communities that update their Housing Element on or after January 1, 2009 also update their Safety Element to include specific information and policies related to flood protection. As the LHMP is incorporated into the Safety Element, updates to the Housing Element may indirectly trigger updates to the LHMP.

To update the LHMP concurrent with updates to the Housing Element, take the following steps:

ENSURE THAT THE LHMP MEETS ANY NEW REQUIREMENTS FOR THE SAFETY ELEMENT THAT MAY BE TRIGGERED BY A HOUSING ELEMENT UPDATE

- ☐ Section 65302(g) of the California Government Code lists a number of requirements for the Safety Element of the General Plan. Some of these requirements are triggered by updates to the Housing Element. Check to see if there are any new requirements of this nature. Note that the requirement is linked to the date of adoption of the new Housing Element, not the date the update process begins.
- ☐ Because the LHMP is incorporated into the Safety Element, any amendments or revisions to the Safety Element triggered by the Housing Element update may be made directly in the LHMP. Requirements triggered by the Housing Element are unlikely to require a full rewrite of the LHMP, but the process should fully involve the Task Force and include appropriate community engagement.

- ☐ Adopt the updated LHMP and incorporate it into the Safety Element. If necessary, amend the Safety Element to ensure the two documents are consistent (review the "Incorporate New Requirements Into the Safety Element, and Ensure that the LHMP is Consistent with the Safety Element" subsection above).

The Anaheim Municipal Code

Anaheim's Municipal Code contains a set of standards that guide land uses and development in the community. These standards include where different types of buildings and land use activities may be located, how these structures must be built, and how they must be operated or maintained. The Municipal Code may include requirements that structures (particularly new structures or those undergoing substantial renovations) incorporate hazard-resistant features, be located outside of the most hazard-prone areas or take other steps to reduce hazard vulnerability.

All communities in California are required to adopt the minimum state Building Standard Code (BSC), which includes some hazard mitigation requirements for new or significantly renovated structures. The BSC is generally updated every three years, with supplemental code updates halfway into each update cycle. Title 5 "Buildings and Structures", of Anaheim's Municipal Code contains building regulations and incorporates the BSC. Other sections of the Code adopt additional standards as desired by the City that adapt the BSC to Anaheim's local context.

As a participant in the National Flood Insurance Program (NFIP), Anaheim is required to incorporate Floodplain Management Requirements in its Zoning Code, which is located in Title 13– Planning, Zoning and Development, Chapter V, Article 10 Floodway and Floodplain Districts. These regulations establish standards for development and operation of facilities within mapped flood-prone areas. Other sections of the Anaheim Municipal Code may include additional standards related to hazard mitigation activities.

With the exception of the Floodplain Management Regulations and the minimum standards in the BSC, Anaheim is not required to incorporate hazard-related requirements in the Municipal Code. However, the Municipal Code is an effective tool for implementing hazard mitigation measures that relate to the siting, construction, and operation of new buildings and other structures. Substantial updates to the Municipal Code, including the Buildings and Construction and Zoning Code sections, should be done in a way that is consistent with the LHMP.

Include Hazard-Related Requirements in Applicable Sections of the Anaheim Code of Ordinances

- ☐ If the BSC is being updated, evaluate the hazard-related requirements of all sections in the new BSC. Identify any areas where it may be feasible to add or revise standards to help reduce the threat from hazard events. Ensure that these standards are consistent with the LHMP. Consider whether standards should be applied to all structures, or to specific types of structures or to structures in a limited area (such as a flood plain).
- ☐ If the Zoning Code is being updated, ensure that all requirements do not expose community members or community assets to an excessive risk of harm. Where feasible, use the requirements to strengthen community resiliency to hazard events. Ensure that these standards are consistent with the LHMP. Consider possible

standards such as overlay zones that strengthen zoning requirements in hazard-prone areas, landscaping and grading requirements that buffer development from hazards, siting and design standards that make structures more resilient, and other strategies as appropriate.

Attachment 1: Disaster Information Table

Use this table to fill out information about any disaster events that have occurred in Anaheim or nearby and have had an effect on the community. Include the date and location of the disaster event, the damages associated with the event, and any information about disaster proclamations or declarations resulting from the event.

Date	Location	Damages *	Declaration Details †

* Includes number and type of injuries, number of deaths, and cost of physical damage
† If the disaster was proclaimed or declared by the local, state, and/or federal government

Attachment 2: Plan Maintenance Table

Use this table when reviewing the LHMP as part of the Task Force's annual activities. For each section of the LHMP, note if any changes should be made to make the Plan more effective for the community. This includes noting if anything in the LHMP is incorrect or if any important information is missing. Make revisions that are consistent with these notes as part of the next update to the LHMP.

Section	Is Anything Incorrect?	Is Anything Missing?	Should Any Other Changes Be Made?
Multiple sections or throughout			
Chapter 1: Introduction			
Chapter 2: Community Profile			
Chapter 3: Risk Assessment			
Chapter 4: Threat Assessment			
Chapter 5: Mitigation Strategy			
Chapter 6: Plan Maintenance			
Appendices			

Attachment 3: Sample Agenda and Topics for the Hazard Mitigation Task Force

This attachment includes a sample agenda and discussion topics for the annual meeting of the Task Force. Meetings do not have to follow this order or structure, but the items included in this attachment should be addressed as part of the annual meeting. During the update process for the LHMP, it is likely that the Task Force will meet more frequently. The meetings of the Task Force during the update process will involve different discussion topics.

ITEM 1: RECENT HAZARD EVENTS

1.1. What hazard events have occurred this past year in Anaheim, or nearby in a way that affected the community?
- Identify events that caused loss of life or significant injury to Anaheim community members, significant property damage in Anaheim, or widespread disruption to Anaheim.
- More minor events should also be identified if there is a need for a community response to mitigate against future such events.

1.2. What are the basic facts and details behind any such hazard events?
- Consider the size and location of the affected area, any measurements of severity, any injuries and deaths, the cost of any damage, the number of people displaced or otherwise impacted, and other relevant summary information.
- Ensure that these facts and details are clearly recorded for future Plan updates, including through use of the Disaster Information Table (**Attachment 1**).

ITEMS 2: MITIGATION ACTION ACTIVITIES

2.1. What mitigation actions have been fully implemented? Are they working as expected, or do they need to be revised?

2.2. What mitigation actions have started to be implemented since the Task Force last met? Is implementation of these actions proceeding as expected, or are there any barriers or delays? If there are barriers or delays, how can they be removed?

2.3. What mitigation actions are scheduled to begin implementation in the next year? Are there any factors that could delay implementation, or weaken the effectiveness of the actions? How can these factors be addressed?

2.4. What resources are needed to support planned, in-process, or ongoing mitigation actions? Does the City have access to these resources? If not, how can the City obtain access to these resources?

ITEM 3: INFORMATION SHARING

3.1. Is the City communicating with all appropriate local jurisdictions, including neighboring communities, Orange County, and special districts? This should include information on district-specific hazard situations, mitigation actions, and other relevant information.

3.2. Is the City communicating with the appropriate state and federal agencies? Is the City receiving information about new regulations, best practices, and data that relates to hazard mitigation activities?

3.3. Are there opportunities for the City to improve coordination with local, state, and federal jurisdictions and agencies?

ITEM 4: BUDGETARY PLANNING

4.1. What are the financial needs for Anaheim to support implementation of planned and in-process mitigation actions, including ongoing items? Is there sufficient funding for all measures in the LHMP that are planned for the next year, including in-process and ongoing items? If sufficient funding is not available, how can the City obtain these funds?

4.2. If it is not feasible for the City to support all planned, in-process, or ongoing mitigation actions, which ones should be prioritized?

4.3. Are there hazard-related activities not included in the LHMP that should be budget for? Can the City obtain the necessary funding for these activities?

ITEM 5: STRATEGIC PLANNING

5.1. Which grants are available for hazard mitigation activities, and which activities are best positioned to secure funding?

5.2. How should the agencies and other organizations represented on the Task Force coordinate to maximize the chances of receiving funding?

5.3. Are there any scheduled or anticipated updates to other City documents that could relate to hazard mitigation activities? How can the Task Force share information with staff and any technical consultants responsible for these updates, and ensure that the updates will enhance community resiliency?

5.4. What capital projects are scheduled or anticipated? Are these capital projects being designed and built to be resistant to hazard events? Are there opportunities for these projects to support hazard mitigation activities?

5.5. How can Task Force members coordinate efforts with those responsible for capital projects to take advantage of economies of scale that will make hazard mitigation activities easier to implement?

5.6. Has it been four years since the adoption of the LHMP? If so, lay out a timeline for Plan update activities, including additional meetings of the Task Force. Identify if a technical consultant is needed and begin the contracting process if so.

5.7. Are there any other opportunities for Task Force members and the organizations they represent to coordinate efforts?

ITEMS 6: NEW BUSINESS

6.1. Are there any other items related to the Task Force's mission?

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Attachment 4: Hazard Mitigation Strategy

MITIGATION ACTIONS IMPLEMENTATION PLAN

Action #	Action Item	Coordinating Organization	Timing	Priority Ranking	Cost	Funding Opportunities
Multi–Hazard Action Items						
MH-1	Integrate the goals and action items from the City of Anaheim Hazard Mitigation Plan into existing regulatory documents and programs, where appropriate.	Planning, Public Works	Ongoing	Low	$	General Fund, BRIC, FMA, HMGP
MH-2	Identify and pursue funding opportunities to develop and implement mitigation activities.	All Departments	Ongoing	Low	$	General Fund, Enterprise Fund, BRIC, FMA, HMGP
MH-3	Design and retrofit water facilities to resist damage from earthquakes	Public Utilities - Water Services	Ongoing	Medium	$$	Enterprise Funds, BRIC, FMA, HMGP, Bonds
MH-4	Develop, enhance, and implement education programs to educate and mitigate natural hazards and reduce the risk to residents, public agencies, private property owners, businesses, and schools. **Hazard Focus:** Geologic Hazards (Landslide, Erosion) Extreme Weather (Wind, Drought, Heat) Seismic Hazards (Fault Rupture, Seismic Shaking, Liquefaction) Wildland/Urban Fire Flooding Dam Failure	Fire & Rescue Department, Public Works, Public Utilities – Water and Electrical Services, Community Services	Ongoing	Low	$	General Fund, BRIC, FMA, HMGP, Bonds
MH-5	Continue the City of Anaheim Hazard Mitigation Task Force in maintaining a sustainable process for implementing, monitoring, and evaluating citywide mitigation issues.	Hazard Mitigation Planning Task Force (Quarterly EOC Personnel Task Force)	Ongoing	Low	$	General Fund, BRIC, FMA, HMGP
MH-6	Inventory alternative firefighting water sources.	Fire & Rescue Department	Ongoing	Low	$$	General Fund, BRIC, FMA, HMGP

MH-7	Prioritize enhancements to bridges and flood control facilities, especially along evacuation routes within the city limits.	Public Works	TBD	Low	$$	Enterprise Funds, BRIC, FMA, HMGP
MH-8	Install solid walls around each existing electrical substation (where applicable) and evaluate the need for bollards or other protection items. (e.g., Dowling SS, Southwest SS).	Public Utilities - Electrical Services	Implement one substation every two years starting FY22/23	Medium	$$$	Enterprise Funds, BRIC, FMA, HMGP
MH-9	Continue to monitor and update the City's Buildings and Housing Code to address updated requirements and emerging issues.	Planning, Public Works	Ongoing	Low	$	General Fund, Enterprise Funds, BRIC, FMA, HMGP
MH-10	Purchase stand-by emergency generator or battery system for all city facilities designated as cooling centers.	Community Services	By 2025	Low	$$$	General Fund, BRIC, FMA, HMGP
MH-11	Increase redundancy and reliability to deliver water during an emergency through the following: 1. Evaluate existing communication systems and implement upgrades, as time and budget are available. 2. Improve/expand existing facilities to move water more efficiently from one portion of the system to another. 3. Add additional water facilities to the system to add redundancy/reliability as necessary.	Public Utilities - Water Services	Ongoing	Medium	$$$	Enterprise Funds, BRIC, FMA, HMGP
MH-12	Maintain/rehabilitate existing water storage facilities to maintain adequate water pressure and ensure adequate water supply.	Public Utilities - Water Services	Ongoing	Medium	$$	Enterprise Funds, BRIC, FMA, HMGP, Bonds
MH-13	Prioritize water main replacements throughout the City to improve water quality, improve the system's capability to meet fire flow requirements, raise water pressures, and increase service reliability. Install new transmission and distribution mains where necessary.	Public Utilities - Water Services	Ongoing	Low	$$$	Enterprise Funds, BRIC, FMA, HMGP, Bonds
MH-14	Conduct well upgrades and enhancements to ensure reliable and safe water supplies, addressing potential contaminant concerns, where needed.	Public Utilities - Water Services	FY21/22- FY23/24	Medium	$$$	Enterprise Funds, BRIC, FMA, HMGP, Bonds

MH-15	Replace, upgrade, or install new pumping stations and pressure regulating stations to improve water system supply and service reliability.	Public Utilities - Water Services	Ongoing	Low	$$$	Enterprise Funds, BRIC, FMA, HMGP, Bonds
MH-16	Ensure Water Services staff conduct inspection activities associated with customer-contributed capital facilities.	Public Utilities - Water Services	Ongoing	Medium	$$	Enterprise Funds, Grants, Bonds
MH-17	Conduct other capital improvement that may include replacement, upgrades, or new installation of miscellaneous water facilities such as treatment devices, security equipment, and SCADA equipment.	Public Utilities - Water Services	Ongoing	Low	$$	Enterprise Funds, BRIC, FMA, HMGP, Bonds
MH-18	Conduct water service enhancement projects that may include automatic meter reading; improvements in Ecommerce; computer equipment replacement; document imaging; field mobile data; work management system projects.	Public Utilities - Water Services	Ongoing	Low	$$$	Enterprise Funds, BRIC, FMA, HMGP, Bonds
MH-19	Conduct roadway improvement projects that may include improvements to intersections, arterial, streets and freeway ramp interchanges that provides for the rehabilitation/ reconstruction to restore the structural integrity and extend the service life of the street. In addition, corridor beautification, street trees, signage, historic street lighting, parkway landscaping and public easement enhancements.	Public Works	Ongoing	Low	$$$	Enterprise Funds, General Fund
MH-20	Conduct traffic signal modification that may include undergrounding of existing overhead interconnect cables in conjunction with utilities undergrounding efforts. Additional signal modification projects are identified throughout the year as needs arise and funding becomes available.	Public Works	TBD/Ongoing	Low	$$	Enterprise Funds, BRIC, FMA, HMGP
MH-21	Install traffic controls that could manipulate intersections after a disaster, which may include improvements in traffic signal system operations by installing system detectors, Split Cycle	Public Works	TBD	Low	$$	Enterprise Funds

	Offset Optimization Technique (SCOOT) loops, video detection, CCTV cameras, controllers, and controller cabinet upgrades, fiber optics, electrical service cabinet upgrades, communication hubs, signal interconnect upgrades, and pullboxes.					
MH-22	Identify sewer lines that are seismically vulnerable and conduct major repairs or reconstruction of lines to reduce future outages. Conduct studies assessing the physical condition of lines within the city to determine priority projects in the CIP.	Public Works	TBD	Low	$$$	Enterprise Funds, BRIC, FMA, HMGP
MH-23	Conduct system undergrounding that converts overhead power and communication lines to new underground lines along major thoroughfares, evacuation routes, and areas that are prone to wildfires. The Underground Conversion Program was amended in 2016 to expand the types of eligible projects that include reliability improvements such as wildfire safety. Under the current APU's Wildfire Mitigation Plan, there are seven remaining segments of overhead lines that are located within/adjacent to the various Fire Threat Zones.	Public Utilities - Electric Services	Underground projects' schedule is included in the Program's 5-Year Plan approved by Council annually. FEMA approved Phase 1 (Design) of the Wildfire Mitigation UG project and is estimated to be completed by late 2022. Phase 2 Construction will be contingent on additional grant approvals.	Medium	$$$	Enterprise Funds, BRIC, FMA, HMGP
MH-24	Incorporate the Anaheim Hills evacuation plan and evacuation routes into appropriate planning documents (CIP, Safety Element, Circulation Element).	Police Department, Public Works- Traffic Management	2023-2025	Medium	$	General Fund
MH-25	Install larger generator and switchgear for East Anaheim Police Substation and East Anaheim Gymnasium. to ensure the location supports public safety and cooling center/ emergency shelter needs.	Public Works, Police, and Community Services	2023-2024	High	$$$	Enterprise Funds, BRIC, FMA, HMGP
MH-26	Conduct inspections and assessments of utility poles for hazard vulnerabilities (seismic, wildfire, and wind) and incorporate mitigation into future improvements.	Public Utilities - Electric Services	Wood utility poles are inspected under GO165 guidelines with the next cycle scheduled for start by 1Q 2023.	Low	$$	Enterprise Funds, BRIC, FMA, HMGP

Seismic Hazards						
EQ -1	Explore options for including seismic retrofitting in existing programs such as low-income housing, insurance reimbursements, and pre-and post-disaster repairs.	Community Development, Planning	TBD	Low	$	General Fund, BRIC, FMA, HMGP
EQ -2	Identify funding sources for structural and nonstructural retrofitting for City-owned facilities identified as seismically vulnerable.	Public Works	Ongoing	Low	$	Enterprise Fund, BRIC, FMA, HMGP
EQ -3	Pursue a new location and funding for a new primary Emergency Operations Center	Fire & Rescue Department	2022-2023	High	$$$	General Fund, BRIC, FMA, HMGP
EQ -4	Pursue funding and conduct seismic retrofits to all Anaheim libraries.	Community Services, Public Works	Ongoing	Low	$$$	General Fund, BRIC, FMA, HMGP
EQ -5	Pursue funding and conduct seismic retrofits to the Pearson Park Amphitheater.	Community Services, Public Works	2024-2025	Low	$$$	General Fund, BRIC, FMA, HMGP
Wildland/Urban Fire						
WF-1	Identify updated equipment and training to enhance emergency services and increase the efficiency of wildfire response and recovery activities.	Fire & Rescue Department	2023-2025	Medium	$	General Fund, BRIC, HMGP
WF-2	Increase communication, coordination, and collaboration between wildland/urban interface property owners, City planners, and fire prevention crews and officials to address risks, existing mitigation strategies, and federal assistance programs.	Fire & Rescue Department	Ongoing	Low	$	General Fund, BRIC, HMGP
WF-3	Implement recommendations from the Utilities Department Wildfire Mitigation Plan.	Public Utilities-Water Services, Fire & Rescue Department	Ongoing	Low	$$	Enterprise Fund, BRIC, HMGP, Bonds
WF-4	Maintain and update the Wildfire Preparedness Plan for Public Utilities Department that includes: Identification of existing conditions, short-term improvements, and long-term improvements for City facilities.	Public Utilities - Water and Electric Services	Ongoing	Low	$	Enterprise Fund, Bonds

	Annual updates for submittal to the Wildfire Safety Advisory Board (WSAB). Engineered and operational mitigation measures to address potential wildfire hazards Feedback from public outreach and WSAB members.					
WF-5	Conduct vegetation management (brush clearance) in City maintained parks, Anaheim Golf Course, Canyon Hills Library, and Walnut Canyon Reservoir.	Community Services, Fire & Rescue	2022-2023	High	$$	General Fund, BRIC, HMGP
WF-6	Encourage and conduct retrofits on City facilities, to include: 1. Fire retrofits (roofing, building materials, other improvements) on all facilities. 2. Install smoke detection units to HVAC systems in all libraries. 3. Retrofit sprinkler systems with smoke detection units in all libraries.	Fire & Rescue Department Community Services	2023-2025	Medium	$$$	General Fund, BRIC, HMGP
WF-7	Continue to work with Public Works on the Fuel Modification Program.	Fire & Rescue Department, Public Works	2023-2025	Medium	$	General Fund, BRIC, HMGP
WF-8	Park Rangers will go on 24-hour patrols of 3 natural parks- Pelanconi, Deer Canyon, Oak Canyon Nature Center) with high possibilities of fire danger. Patrols to keep out trespassers and watch for fire spots during Red-Flag warnings	Community Services – Park Ranger Program, Fire and Rescue Department	Ongoing	Low	$	General Fund
Industrial Accidents/ Hazardous Materials Release						
IND-1	Establish and maintain railroad buffer zones that limit new residential uses along these corridors. **(Check with Planning)**	Fire & Rescue Department, Planning	Ongoing	Low	$	General Fund, BRIC, HMGP
IND-2	Above Ground Fuel Storage Tanks - Removal of existing underground fuel storage tanks and installing new above-ground tanks due to EPA requirements in place of constant repair and monitoring.	Convention Center	TBD	Low	$$	General Fund, BRIC, FMA, HMGP

Flood/Storm						
FLD-1	Continue development and management strategies to preserve open space for flood mitigation and water quality in the floodplain.	Community Services, Public Works, Planning	Ongoing	Low	$	BRIC, FMA, HMGP
FLD-2	Identify surface water drainage obstructions for all parts of the City using FEMA Firm Maps.	Public Works	Ongoing	Low	$$	BRIC, FMA, HMGP
FLD-3	Conduct a study to determine the need for Public Utilities facilities near flood channels to be less susceptible to damage from floods.	Fire & Rescue Department	TBD	Low	$$	Enterprise Fund, BRIC, FMA, HMGP
FLD-4	Install water detection alarm for basement book storage in the Central Library.	Community Services	TBD	Low	$$	BRIC, FMA, HMGP
FLD-5	Install new or reconstruct existing storm drains to enhance flood control capabilities throughout the City, prioritizing facilities in the Anaheim Golf Course and flood control channels in West Anaheim.	Public Works	TBD	High	$$$	BRIC, FMA, HMGP
Drought						
DRT-1	Continue to raise public awareness of drought conditions, water supply restrictions, and potential conservation incentives.	Public Utilities -Water Services	Ongoing	Low	$	Enterprise Fund, Grants, Bonds
DRT-2	Ensure City has sufficient water supplies through the following programs: 1. Evaluate and recommend to City Council (where appropriate) water rate revisions to promote water use reduction. 2. Increase groundwater recharge and production to supplement supplies. 3. Adopt higher response levels as presented in the Water Reduction Ordinance Plan (Municipal Code Ch. 10.18). 4. Monitor and Maintain compliance with State Water Use Efficiency Standards to reduce water waste and ensure sufficient water supplies. 5. Investigate possible recycled and/or grey water supply sources.	Public Utilities -Water Services	Ongoing	Low	$	Enterprise Fund, BRIC, FMA, HMGP, Bonds

DRT-3	Research funding and installation of Synthetic Turf where appropriate, to reduce water consumption and eliminate the need for fertilizer that can contaminate water tables in parks and other areas of the City using grass.	Community Services	TBD	Low	$$	General Fund, BRIC, FMA, HMGP
DRT-4	Install irrigation controller upgrade at all parks in the City which will utilize Smart irrigation controllers and provide automatic irrigation valve shut-off when breaks are detected.	Community Services	2022-2024	Medium	$$$	General Fund, HMGP
Vectors						
V-1	Coordinate with Orange County Vector Control - Monitor efforts of Orange County and assist in disseminating information to the Anaheim community.	City Administration Communications, All Departments	Ongoing	Low	$	Enterprise Fund
Landslide						
LS-1	Improve knowledge of landslide hazard areas and understanding of vulnerability and risk to life and property in hazard-prone areas.	Public Works	Ongoing	Low	$$	BRIC, FMA, HMGP
LS-2	Encourage construction and subdivision design that can be applied to steep slopes to effectively reduce the potential adverse impacts of development.	Public Works, Planning	Ongoing	Low	$	General Fund, BRIC, FMA, HMGP
LS-3	Maintain and update local regulations regarding building and development as needed in landslide-prone areas.	Public Works	2023-2025	Medium	$	General Fund, BRIC, FMA, HMGP
LS-4	Mitigate activities in identified potential and historical landslide areas through regulation and public education.	Public Works, Planning	Ongoing	Low	$	General Fund, BRIC, FMA, HMGP
LS-5	Hillside Stabilization and Monitoring. - Mitigation efforts to stabilize the impacted area should include groundwater withdrawal from numerous wells scattered throughout the area.	Public Works, Public Utilities - Water	2023-2025	Medium	$$$	Enterprise Fund, BRIC, FMA, HMGP
Preparedness Activities						
PA-1	Main Station -Current DOC needs to be remodeled and updated.	Police Department	TBD	Low	$	General Fund

PA-2	Develop and distribute shelter in place protocols for vulnerable populations.	Fire & Rescue Department	Ongoing	Low	$	General Fund
PA-3	Educate agency personnel on federal costs- share and grant programs, Fire Protection Agreements, and other related federal programs, so the full array of assistance available to local agencies is understood.	Fire & Rescue Department	Ongoing	Low	$	General Fund
PA-4	Update and maintain plans for community Point of Dispensing (POD) sites.	Orange County Health Care Agency, Fire & Rescue Department	Ongoing	Low	$	General Fund