CITY of BREA

2024 Local Hazard Mitigation Plan

City Council Adopted Version

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CHAPTER 1 – INTRODUCTION

PLAN PURPOSE AND AUTHORITY

Hazard events can lead to injuries or death, affect the overall health and safety of a community, damage or destroy public and private property, harm ecosystems, and disrupt key services. Although the hazard event 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 Brea 2024 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 experiences 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]

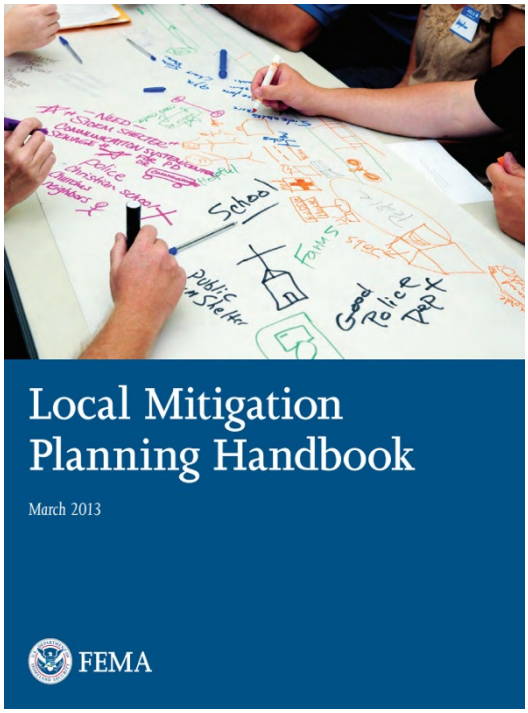
The City of Brea (City), like other communities, could potentially suffer severe harm from hazard events. Although large disasters may cause widespread devastation, minor disasters can have more substantial effects. The City cannot make itself completely immune to hazard events, but this LHMP can help 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 over 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. As the City is currently working on a Focused General Plan Update project, this LHMP, once adopted, will be integrated into the City's General Plan Safety Element. Any future updates to the LHMP will also 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

3 also known as Assembly Bill (AB) 2140

4 also known as Senate Bill (SB) 379

safety element must identify how climate change is expected to affect the community's hazard conditions and include measures to adapt and be more resilient to these anticipated changes.

Because the LHMP can be incorporated into the safety element, including these items in the LHMP can satisfy the state requirement. SB 379 requires that climate change be addressed in the safety element when the LHMP is updated after January 1, 2017, for communities that already have an LHMP or by January 1, 2022, for communities without one. This LHMP is consistent with current standards and regulations, as outlined by the California Office of Emergency Services (Cal OES) and FEMA. It uses the best available science, and its mitigation actions/strategies reflect best practices and community values. It meets the requirements of the current state and federal guidelines and makes the city eligible for all appropriate benefits under state and federal law and practices. Note that while FEMA is responsible for reviewing and certifying this LHMP, and Cal OES is responsible for conducting a preliminary review, it does not grant FEMA or Cal OES an 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 Brea 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, as well as 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 Brea'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 Brea and discusses past and future events and the effects of climate change.

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

Chapter 5: Mitigation Strategy. This chapter lists the mitigation actions to reduce Brea'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 City of Brea LHMP

This is the City of Brea's first LHMP, which will open up the eligibility, once approved and adopted by the City Council, to apply for FEMA grants for hazard mitigation projects and monetary relief during emergency situations.

Previous Plan Integration

Integration of the 2024 LHMP into other city planning mechanisms did not occur during the previous planning period as the plan had not been completed and adopted. In an effort to ensure future integration between the LHMP and other documents, **Chapter 6** of this plan includes additional guidance on how to best integrate the LHMP into the General Plan Safety Element and other planning mechanisms used by the City.

Disaster Declaration Connections

Since 2018, the FEMA issued the following major disasters, emergency declarations, and fire management events (**Table 1-1**). Past events identified in this plan have been identified in connection with these events in the "Past Events" sections within each Hazard Profile.

TABLE 1-1: DISASTER DECLARATION - ORANGE COUNTY (2018-2023)

Year	Declaration Number	Declaration Title	Incident Type	Affected the City	Activated EOC / Requested PA
2023	EM-3591-CA	Severe Winter Storms, Flooding, and Mudslides	Flood	No	No
2023	EM-3592-CA	Severe Winter Storms, Flooding, Landslides, and Mudslides	Flood	No	No
2022	FM-5439-CA	Coastal Fire	Fire	No	No
2021	FM-5383-CA	Bond Fire	Fire	No	No
2021	FM-5381-CA	Blue Ridge Fire	Fire	Yes	Yes
2021	FM-5380-CA	Silverado Fire	Fire	No	No
2020	EM-3428-CA	Covid-19	Biological	No	No
2020	DR-4482-CA	Covid-19 Pandemic	Biological	Yes	Yes
2018	FM-5223-CA	Canyon 2 Fire	Fire	No	No
2018	DR-4344-CA	Wildfires	Fire	No	No

DR	Major Disaster
EM	Emergency Declaration
FM	Fire Management

PLAN GOALS

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

GOAL-1: Protect against threats from natural hazards to life, injury, and property damage within the Brea Community.

GOAL-2: Increase public awareness of potential hazard events.

GOAL-3: Preserve critical services and functions by protecting key facilities and infrastructure for the community.

GOAL-4: Protect natural systems from current and future conditions.

GOAL-5: Coordinate mitigation activities among City departments, neighboring jurisdictions, and with state and federal agencies.

GOAL-6: Prepare for long-term changes in hazard conditions

As this is the City's first LHMP, these goals shall serve as the foundation for all subsequent versions of this plan as it is updated every five years to remain in force to maintain FEMA grant eligibility and maintain alignment with the City and its residents' focus. These newly established goals and priorities are anticipated to help inform and ensure greater consistency with the City's General Plan Safety Element 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 Brea is described below.

Hazard Mitigation Planning Committee

The City established a Hazard Mitigation Planning Committee (hereafter referred to as the HMPC). The HMPC comprises representatives from key city departments and stakeholders from local and regional agencies and companies that are key to hazard mitigation activities. **Table 1-2** identifies the members who were invited and/or attended HMPC meetings.

TABLE 1-2: BREA HAZARD MITIGATION PLANNING COMMITTEE		
Name	Title	Department
Lisa Keyworth	Emergency Preparedness Coordinator	Brea Fire Department
Mark Terrill	Fire Chief	Brea Fire Department
Scott Wiedensohler	Division Chief District 4	OCFA
Rudy Correa	Superintendent	Water Division
Michael Ho	Public Works Director	Public Works
Jason Killbrew	Community Development Director	Community Development
Jimmy Dao	GIS Specialist	Administrative Services
Liz Pharis	Communications & Marketing Manager/PIO	City Manager's Office
Joanne Hwang	City Planner	Planning Division
Jessica Newton	Senior Planner	Planning Division
Cristal Nava	Assistant Planner	Planning Division
Aaron Pfannenstiel	LHMP Project Manager	Atlas Planning Solutions
Crystal Stueve	LHMP Planner	Atlas Planning Solutions
Robert Jackson	LHMP Planner	Atlas Planning Solutions

The HMPC 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.

HMPC Meeting #1 (May 18, 2023): The HMPC members confirmed the project goals and responsibilities. They revised the community engagement and outreach strategy, confirmed and prioritized the hazards included in the Plan, and identified critical threat assessment facilities.

HMPC Meeting #2 (August 17, 2023): Members held a detailed discussion about 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.

HMPC Meeting #3 (November 30, 2023): The HMPC discussed and reviewed mitigation actions and strategies, made revisions, and assigned priorities.

Invitations to HMPC 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 policy changes in the post-COVID-19 pandemic world, 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:

Stakeholder Engagement

As part of the plan update process, the City invited stakeholders to review and comment on the Public Review Draft of the LHMP. These stakeholders included neighboring jurisdictions, utility

providers, local school districts, energy producers, water districts, and County agencies. Information regarding this engagement opportunity can also be located in **Appendix B** of the document. All jurisdictions and stakeholders were invited via email and/or direct communication via telephone from the Brea Fire Department Emergency Preparedness Coordinator. The following is a list of those stakeholders invited to participate in the plan development process and review.

- Orange County
- City of La Habra
- City of Yorba Linda
- City of Anaheim
- Municipal Water District of Orange County
- Yorba Linda Water District
- Brea CERT Team
- Southern California Edison
- Orange County Transportation Authority
- Orange County Waste & Recycling
- LA County Emergency Operations
- Hills for Everyone
- LA County Unincorporated County (Rowland Heights)
- City of Diamond Bar
- City of Fullerton
- City of Placentia
- City of Buena Park
- Cal Domestic Water Company
- Brea Olinda Unified School District
- SoCal Gas
- Republic Services CAL Trans
- ERA Oil Company
- Orange County Emergency Operations
- Private Schools
- Chino Hills State Park

Vulnerable Populations Outreach

Based on demographics, the City recognizes that Brea residents are relatively affluent, well educated, and not as linguistically isolated as other parts of the County. However in some areas of the community residents are either older than other parts of the City and County or more isolated, which should be taken into consideration during the planning process.

To address vulnerable population needs as part of outreach and engagement during the planning process, the City contacted the following locations that contain vulnerable populations:

- Hollydale Mobile Home Park at 5700 Carbon Canyon Road, Brea, CA
- Brea Woods Senior Apartments at 195 W. Central Ave, Brea, CA

The purpose of this contact was to inform the residents in these locations about the LHMP update and provide an opportunity to participate in the planning process. Residents were invited to review the public review draft LHMP and provided access to an online form to submit feedback.

In addition, City staff also placed hard copies of the plan (in addition to the electronic copies) and information at their Senior Center. This allowed Senior Center staff to help residents using this facility with accessing the plan and answering any questions, residents had.

Aside from these key populations within the City, Brea also relied on the Orange County Emergency Management Organization (OCEMO) for assistance with outreach. OCEMO includes all Cities, Special Districts, School Districts, Non-profits, State OES, Colleges/Universities, Utilities, Volunteer Organizations, etc. from throughout all of Orange County. Use of this organization for outreach was intended to inform as many stakeholders as possible of the City's plan update, since there is no key stakeholder or community based organization operating in Brea that the City could engage with. This strategy recognized that key members of OCEMO focus on assisting vulnerable populations throughout Orange County, some of which may be located in the City.

Future Outreach Opportunities

Recognizing that other vulnerable populations do exist in the City, this update focused on the one of greatest concern. For the next update, the City intends to focus on expanding outreach to daily

workers employed within the City who do not live in the City to better inform them of the risks and challenges that could impact their lives.

Public Engagement Opportunities

The City regularly conducts community meetings and events intended to provide useful information to participants/ attendees. In-person engagement opportunities were a central component of the City's engagement efforts. These meetings allowed members of the public to learn about the hazards of concern identified by the HMPC during this update. Atlas Planning Solutions and City staff presented the LHMP planning process and relevant information at two public engagement meetings early on in the process. Additionally, City staff advertised the public survey at various public events and through e-blasts and alerts shared throughout the city.

- *August 15, 2023* - Brea City Council Meeting: The City's consultant**,** Atlas Planning Solutions (APS), presented The City of Brea 2024 Local Hazard Mitigation Plan Update Project and planning process to the members of the Brea City Council and residents of the City as part of the public outreach process. There were approximately 30 residents of the city in attendance at the meeting. No direct feedback was provided to APS or to HMPC members at the time of the presentation.
- *November 9, 2023* – Public Outreach Workshop: The City's consultant, Atlas, Planning Solutions, presented the City of Brea 2024 Local Hazard Mitigation Plan Update Project and planning process to the residents of the City as a part of the public outreach process. There were residents in attendance. In addition to answering questions and feedback, a QR code linked to a comment card was shared to record feedback from attendees.

Appendix B includes a copy of the materials shared at the outreach meetings.

Online Engagement

The City recognized that not all community members are able to attend public meetings and conducted public engagement through social media and online platforms. To assist with engagement, the City set up a project website as a simple, one-stop location for community members to learn about the LHMP. The website included information about what an LHMP is and why the City prepared one. It had links to materials and Plan documents as they became available and allowed members of the public to receive notifications about upcoming events.

The City also promoted the planning process through the following online methods:

LHMP Project Webpage

The City created a page on the City's website dedicated to the Local Hazard Mitigation Plan development to reach a broad audience and increase public engagement and participation. The webpage is a simple, one-stop location where community members can learn about the LHMP. The webpage explains what an LHMP is, why the City should have one, how it is developed, and how the public can participate in the planning process. It also includes a link to the LHMP survey described in the next section. The webpage can be found at https://www.ci.brea.ca.us/1760/Local-Hazard-Mitigation-Plan.

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 92 responses from community members and stakeholders during the survey period. Responses were received from all zip codes and areas within Brea, ensuring that the entire City was represented geographically. Based on these responses, the following information was shared with the City:

- About 80% of respondents live in the city of Brea, while approximately 12% of respondents live *and* work in the city of Brea.
- According to respondents, the top (3) hazards of concern for the City are Seismic Hazards (Seismic Shaking, Fault Rupture, and Liquefaction), Wildland Fire, and Power Failure.
- Approximately 79% of respondents are concerned about how climate change may create new hazardous situations in the City or could make existing natural hazards worse.
- Approximately 46% of respondents believe climate change already threatens their health, property, livelihood, and overall well-being.
- Approximately 35% of respondents are familiar with the special needs of their neighbors in the event of a disaster situation (special needs may include limited mobility, severe medical conditions, or memory impairment)

As part of the outreach strategy, a QR code was created for promotional materials and handouts at fairs and booths used by City staff at community events. This QR Code provided quick access to the City's Online Survey.

The results from the survey were provided to the HMPC. The data was then analyzed, reviewed, and incorporated by the HMPC within the LHMP content. The data provided by the survey presented unique local insight into hazard concerns and assessed the public's overall opinion and perception of the hazards that affect Brea. The survey results are also provided in **Appendix B** of the LHMP, including the survey questions and answers.

Social Media Outreach

The City promoted and provided information on both the Hazard Mitigation Survey and the LHMP Public Review Draft on multiple social media platforms.

- The City of Brea – Brea Line Newsletter provided information on multiple occasions.
- City of Brea X (formerly known as Twitter) account has 8,900 followers.
- City of Brea's Instagram account (10,200 followers).
- City of Brea – Brea City Hall Facebook account with 6,200 followers.
- City of Brea – Government Administration LinkedIn account with 2,554 followers
- City of Brea YouTube account with 290 followers

Public Review Draft

On June 18, 2024, the City released a draft copy of the LHMP for public review and comment. The document was posted electronically on the City's LHMP project website and shared on the Fire Department and City social media accounts. A physical copy of the LHMP was placed at the Senior Center, and copies were emailed to the Orange County Emergency Managers Organization group email and the Hollydale Mobile Home Park. The public review period extended from June 18, 2024, through July 2, 2024.

Plan Revision and Adoption

The City received several public comments on the plan; however, the comments required minimal edits or modifications to the plan content. Following public comment, the City submitted the plan to Cal OES and FEMA. The City then made additional revisions to incorporate comments from state and federal agencies, as appropriate, and submitted the final draft to City decision-makers. The Brea City Council adopted the final LHMP on October 15, 2024. 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 1-3** provides some of the HMPC's primary resources to prepare this Plan.

TABLE 1-3: 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 Brea General Plan • FEMA Local Hazard Mitigation Plan Guidance • National Oceanic and Atmospheric Administration • National Weather Service • US Geological Survey • US Census Bureau 2017-2021 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 Brea • Current and anticipated climate conditions in and around Brea • Projections of future seismic conditions and events
Community Profile	• US Census Bureau 2017-2021 American Community Survey • California Energy Commission	• Demographic information for Brea and Orange County • History of the region • Economic trends in Brea • Commute patterns in Brea • Local land-use patterns • Background information on utilities serving Brea • Current Climate information in Brea
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 Brea • Locations of flood-prone areas in Brea • Mapping of dam failure inundation areas • Profiles and conditions of dams in and around Brea
Human-Caused Hazards - Hazardous Materials Release	• Department of Toxic Substances and Control • Environmental Protection Agency • Cal OES Spill Reporting Database	• Location and dates of past hazardous materials release • Effects of hazardous materials release
Seismic and Geologic Hazards	• Southern California Earthquake Data Center • The Third California Earthquake Rupture Forecast (UCERF3) • California Geological Survey	• Location of fault zones • Records of past earthquakes • Probability of future earthquake events • Location of seismically vulnerable areas

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 Brea
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 Brea

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

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CHAPTER 2 – COMMUNITY PROFILE

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

SETTING AND LOCATION

Brea is a city located in northern Orange County, California. Comprised of approximately 12.43 square miles, the City is roughly bisected by State Route 57, with the cities of La Habra bordering to the west, Unincorporated Los Angeles County to the north, Chino Hills to the east, and the cities of Yorba Linda, Placentia, and Fullerton to the south. As a reasonably diversified community, Brea offers various housing opportunities and adequate schools, employment, parks, and open space for recreation, entertainment, and shopping.

The City experiences an average of 283 sunny days per year, compared to a national average of 205 days. There is rarely any recorded snowfall in Brea, ranking it as one of the least snowy places in California. Brea experiences about 15 inches of rain yearly, compared to the national average of 38 inches annually. The average temperature in Brea ranges between 70-85°F for most of the year. Like most of Southern California, Summers in Brea are hotter on average.

HISTORY

The area where Brea is located began as part of the homelands and territory of the Tongva people. They were the stewards of the land for thousands of years, connecting the various peoples and villages within the area via trade and travel. With the arrival of the Spanish in 1769, exploration, and discovery of “black gold” (petroleum), the village of Olinda was founded in the early 1800s in what is known today as Carbon Canyon. With the discovery of oil in the Brea-Olinda Oil Field, the area began to be settled and developed, and in 1894, the Union Oil Company purchased some 1,200 acres of land west of Olinda. By 1898, wooden oil drilling towers had dotted the area's landscape within the oil fields. 1908 brought about the founding of the village of Randolph (just south of the canyon), where many of the oil field workers and their families lived. Oil production became the driving force of commerce in the area.

The economy and the villages of Olinda and Randolph flourished; the economy did so well that the two villages decided to merge and become one. On January 19, 1911, the town’s map was filed under the new name of Brea (Spanish for tar). Six years later, on February 23, 1917, Brea was incorporated as the eighth official city in Orange County. Gradually, oil production began to decline, and commerce shifted towards citrus agriculture, particularly oranges and lemons. In the 1920s, the Brea Chamber of Commerce created the city slogan “Oil, Oranges, and Opportunity.” By the 1950s, agriculture in the area had started disappearing and being replaced by residential development and industrial parks. The year 1990 saw the redevelopment of some 50 acres in the city's downtown area, anchored along Brea Blvd, transforming it into a shopping, eating, and entertainment destination, officially opening in 2000 as “Downtown Brea.” Brea was named one of the best five suburbs to live in the Western United States in 2006 by Sunset Magazine. The population has grown steadily since the city’s humble beginnings to almost 47,000 residents and almost 17,500 households (2017-2021 ACS Estimate).

DEMOGRAPHICS

The data used in this section comes from the most comprehensive American Community Survey 2017 – 2022 (ACS), administered by the United States Census Bureau (U.S. Census) completed in 2022, and the California Department of Finance (DOF). Based on this dataset, Brea's projected population is 46,912, with a median age of 37.4. This median age is approximately 1.8 years younger than the average median age in Orange County (39.2). The percentage of children under the age of 10 is slightly higher at 11.6% compared to the rest of Orange County, which is 11.2%. The percentage of senior residents (aged 65 and older) in the city is 15.5%, slightly lower than the rest of Orange County (15.7%). Brea residents have a higher median income than the rest of Orange County. In addition, a lower proportion of Brea's residents rent their homes (37.5%) than the rest of Orange County residents (43.5%).

Table 2-1 identifies the basic demographics for Brea and Orange County according to the 2022 ACS 5-year projections. Note that these statistics may vary from the demographic information in Chapter 4, Threat Profiles, as that data set comes directly from ESRI's Business Analyst Tool.

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

Demographics	Brea	Orange County
Total Population	46,912	3,182,923
Percent of residents who are less than 10 years old (i.e., children)	11.6%	11.2%
Percent of residents who are senior citizens (65+)	15.5%	15.7%
Median Age	37.4	39.2
Total households	16,584	1,057,592
Median household income	$108,721	$100,559
Percent of rental households	37.5%	43.5%

Source: American Community Survey, 2017-2022 ACS 2022 5-Year Projections

* 2023 Census projections identify an estimated population of 48,159, used in Chapter 4 of this plan.

Regarding its racial and ethnic composition, Brea is a white-majority city, with 55.8% of all Brea residents identifying as white. According to the ACS, this population makeup is similar to Orange County as a region, with some variations in the overall percentages. **Table 2-2** shows the racial and ethnic composition of all Brea and Orange County groups.

Brea residents have attained higher education levels than Orange County residents. For example, a higher percentage of the city's population has earned a bachelor's degree (30.5%) compared to the rest of Orange County (26.6%). Similarly, a higher percentage of the city has attained a graduate or professional degree (19.1%) compared to Orange County (15.5%). Other categories also differ, such as a lower percentage of people not having education past ninth grade and a lower percentage of people not graduating high school. However, a lower 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 Brea and Orange County, according to the American Community Survey as of 2021.

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

Race & Ethnicity	Brea		Orange County	
	Population	Percentage	Population	Percentage
White	26,160	55.8%	1,985,424	62.4%
Black	570	1.2%	85,503	2.7%
American Indian & Alaskan Native	199	0.4%	47,596	1.5%
Asian	11,975	25.5%	767,609	24.1%
Native Hawaiian & other Pacific Islander	100	0.2%	22,695	0.7%
Some other race alone	2,710	5.8%	596,021	18.7%
Two or more races, non-Hispanic	5,198	11.1%	302,089	9.5%
Hispanic or Latino (of any race) *	13,980	29.8%	1,083,093	34.0%
Total	**46,912**	**100%**	**3,182,923**	**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, 2021 American Community Survey (ACS) – Brea and Orange County

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

Level of Education Completed	Brea		Orange County	
	Number	Percentage	Number	Percentage
Less than 9th grade	991	3.0%	159,612	7.3%
9th grade to 12th grade (no diploma)	1,164	3.6%	134,568	6.1%
High school graduate or equivalent	49,96	15.3%	378,888	17.2%
Some college (no degree)	6,919	21.1%	428,349	19.5%
Associate degree	2,465	7.5%	170,409	7.8%
Bachelor's degree	9,978	30.5%	585,008	26.6%
Graduate or professional degree	6,247	19.1%	340,356	15.5%
Total	**32,760**	**100%**	**2,197,190**	**100%**

Source: U.S. Census Bureau, 2022 American Community Survey (ACS) – Brea and Orange County

Percentage values are rounded to the nearest tenth decimal.

Brea has a wide range of non-English languages spoken at home among its residents, with varying proficiency levels. Generally, Asian and Pacific Islander languages are the second most spoken language in Brea, with approximately 45.7% of the population speaking English less than "very well." Spanish is Brea's third most spoken language, with slightly over 27.1% of the population speaking 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 Brea and Orange County.

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

Languages	Brea			Orange County		
	Number of speakers	Speak English "less than very well"	% not fluent in English	Number of speakers	Speak English "less than very well"	% not fluent in English
English	29,070	_	_	1,648,709	-	-
Spanish	6,457	1,752	27.1%	729,471	272,633	37.4%
Indo-European*	1,599	245	15.3%	132,979	32,815	24.7%
Asian & Pacific Islander*	6,904	3,152	45.7%	453,867	227,226	50.1%
All other languages	359	85	23.7%	35,912	10,929	30.4%
Total	**44,389**	**5,234**	**34.2%****	**3,000,938**	**543,603**	**40.2%****

*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, 2022 American Community Survey (ACS) – Brea and Orange County

ECONOMY AND COMMUTE PATTERNS

Brea has a diverse economy of employers from various sectors, including medical services, logistics, emergency responders, and warehouses. With a total employment base of 23,600 jobs for employees, the top 10 employers in the City include Mercury Insurance Group, Albertson's Inc., Beckman Coulter Inc., Brea Olinda Unified School District, Kirkhill – TA Company, Nationwide (formerly Veterinary Pet Ins.), Service Champions Plumbing HVAC, Bristol Industries, Peterson Brothers Construction, and Nordstrom Department Store.[5] These employers account for a little over 28% of the workforce within the city. **Table 2-5** shows the top ten employers in Brea according to the City's 2021/2022 Comprehensive Annual Financial Report.

As of 2021, over 25,748 Brea residents are employed, with approximately 2,180 (8.5%) working within the city. This local workforce accounts for 4.1% of the entire workforce, with the remaining workforce coming from surrounding cities throughout the region. **Table 2-6** shows the top five cities contributing to Brea's workforce, accounting for approximately 28.5% of those employed within the city.

While most of Brea's residents commute outside the city for work, most commuting residents (44.0%) travel between 10 and 24 miles to reach their place of employment. Approximately 6.2% of commuters traveled 50 miles or more, with most of those trips heading into the Los Angeles or San Diego areas. The City has convenient access to train stations in neighboring Fullerton and Anaheim, access to regional airports (Orange County Airport is approximately 17 miles away), and freeway access with routes that connect to Los Angeles, San Diego, Riverside, and San

5 City of Brea, 2021/2022 Annual Comprehensive Financial Report

Bernardino Counties. **Table 2-7** shows the outflow of workers from Brea to other regional worksites.

TABLE 2-5: 10 LARGEST EMPLOYERS IN BREA, AS OF 2022

Employer	Number of Employees	Percentage of Total City Employment
Mercury Insurance Group	1,440	6.10%
Albertson's Inc	1,334	5,65%
Beckman Coulter Inc	837	3.55%
Brea Olinda Unified School District	621	2.63%
Kirkhill – TA Company	535	2.27%
Nationwide (formerly Veterinary Pet Ins.)	460	1.95%
Service Champions Plumbing, HVAC	407	1.72%
Bristol Industries	405	1.72%
Peterson Brothers Construction	338	1.43%
Nordstrom Department Store	250	1.06%
Total	**6,627**	**28.08%**

Source: City of Brea, Comprehensive Annual Financial Report for FY Ending 2022.
Percentage rounded to the nearest tenth percentage.

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

Employee City-of-Origin	Number of Employees	Percentage of Total City Employment
Los Angeles	2,551	9.9%
Brea	2,180	8.5%
Anaheim	1,640	6.4%
Fullerton	1,254	4.9%
Irvine	1,170	4.5%
Total	**5,708**	**28.5%**

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

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

Work Destination for Brea Residents	Number	Percentage
Less than 10 miles	8,911	34.6%
10 to 24 miles	11,319	44.0%
25 to 50 miles	3,920	15.2%
Greater than 50 miles	1,598	6.2%
Total	**25,748**	**100%**

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

DEVELOPMENT TRENDS

Brea is located within a dense part of northern Orange County that has experienced significant growth and development over the past 105 years since it was officially incorporated in 1917; the population at the time was approximately 752. The city's population has grown by approximately 28,435 residents (18,447 in 1970) to 46,912 residents in the past 50+ years. Since 2010, the City has experienced a 14.4% increase in the housing stock (steadily increasing each year since 1990), from roughly 14,785 (2010) to 16,911 (2020), over twice the rate experienced in Orange County as a whole 6.2%. Of the approximately 17,000 current residential units within the City,

66% are single-family, 27% are multi-family, and 7% are mobile homes. Most of these residences are in good physical condition; the City has a housing rehabilitation program to assist income-qualified households in improving their homes, further increasing the resilience of the housing stock. While growth within the City is anticipated to increase, the number of viable parcels to build on continues to shrink as the community expands and approaches buildout.

According to the 2021-2029 City of Brea Housing Element, the city has a state-mandated regional housing needs allocation (RHNA), residential development requirement, and housing allocation of 2,365 units. The RHNA process is part of the Housing Element Law used to determine how many new homes and the affordability of those homes each local government must plan for in its Housing Element. Currently, the City has enough residential sites that are appropriately zoned to accommodate all income categories of the RHNA requirement. To meet their RHNA allotment, the city currently has multiple large residential projects in various stages of development. The city has other strategies outlined in the Housing Programs section of the 2021-2029 Housing Element, which can be accessed on the City of Brea website here.

Vulnerability and Risk Reduction

All new development and redevelopment occurring in the amended zoning areas will provide the city with hazard vulnerability and risk reduction. This reduction will occur due to the anticipated improvements and investments implemented in these older parts of the City due to these amendments to the General Plan and zoning regulations. In addition, the new developments that will be built will comply with the most up-to-date building codes and use the latest techniques, further reducing vulnerabilities throughout the City.

Major Community Components

Brea Mall

Initially opened in 1977, it is a 1,281,794 sq ft facility, home to over 170 specialty shops, boutiques, and a food court. Anchored by Macy's, Nordstrom, and JCPenney. The Simon group, which has owned the property since 1998, was recently approved by the City Council to redevelop the 15.5-acre vacancy left by the closing of Sears, with a mixed-use designation to allow for new retail space, commercial, and residential (apartment) homes. Construction on this project is currently underway.

Brea Downtown

Brea Downtown is a unique dining, entertainment, and shopping district with a vibrant mix of trendy restaurants and outdoor cafes, various shops and boutiques, eclectic buildings, and sunny public plazas. There's something for everyone in a convenient location with ample parking and a friendly neighborhood environment.

Open Space and City Parks

The City of Brea prides itself on its beautiful scenery, open spaces, immaculate neighborhood, school, community, and several regional parks, including a municipal golf course. The City owns and manages 13 park facilities, while the county owns and maintains the Carbon Canyon Regional Park, Ted Craig Regional Park, and Chino Hills Regional Park.

Carbon Canyon Regional Park

Carbon Canyon Regional Park covers 124 acres, with 60 acres designed for recreational uses. The remaining acreage is maintained as natural open space, including a grove of Coastal Redwoods. The park features tennis courts, children's play areas, volleyball nets, a baseball diamond, multipurpose fields, picnic areas, and biking trails. The park offers hiking and equestrian

trails, guided nature walks, and fishing. This open space area provides a transition to the adjacent Chino Hills State Park.

Craig Regional Park

Located between the SR-57 freeway and College State Boulevard, has 129 acres of rolling hills, baseball fields, open space, and a formal rose garden. The park features restrooms, barbecues, a children's play area, picnic tables, baseball diamonds, soccer fields, tennis courts, volleyball nets, racquetball courts, an amphitheater, concession stands, bicycle trails, a football field, basketball courts, and fishing. The park is partially in Brea (14 acres), while the remaining portion lies within the City of Fullerton.

Chino Hills State Park

Chino Hills State Park covers approximately 14,000 acres in Orange, Riverside, and San Bernardino counties. The park largely consists of natural open space and thus provides wildlife habitat value and open space for people. Over 90 miles of trails allow hikers, equestrians, and bicyclists to enjoy native Southern California oak woodlands, grasslands, and riparian areas, as well as views of the surrounding urban areas and mountains.

The Tracks at Brea Trail

What was once a railroad and train depot has transformed into a 50-acre linear park that traverses the City across four miles. "The Tracks" features a two-way bike trail with a separate pedestrian path, nine fitness stations, two bike repair stations, seating areas with shade structures, benches, drinking fountains, and restrooms. Interpretive signs along the trail offer information and photographs on the area's history, butterfly gardens, and low-water landscaping.

Olinda Oil Museum and Trail

Located off Santa Fe Road in the Olinda Ranch neighborhood, features the original Olinda Oil Well Number One, the former field office building, a jackline pump, records vault, and assorted antique oil operation tools. A centennial celebration was held on October 6, 2012, at the Olinda Oil Museum and Trail to mark the 100th anniversary of the Field House. Once the office and headquarters of the bustling Olinda oil operation, the Field House is now filled with artifacts, and the original safe and warehouse are where parts were once stored and organized. The Field House is the centerpiece of the 12-acre Olinda Oil Museum and Trail, a historic park that recaptures the sights, sounds, smells, and the vital role Olinda played in the development of Brea. The park also serves as the entry point for a loop trail open to the public.

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

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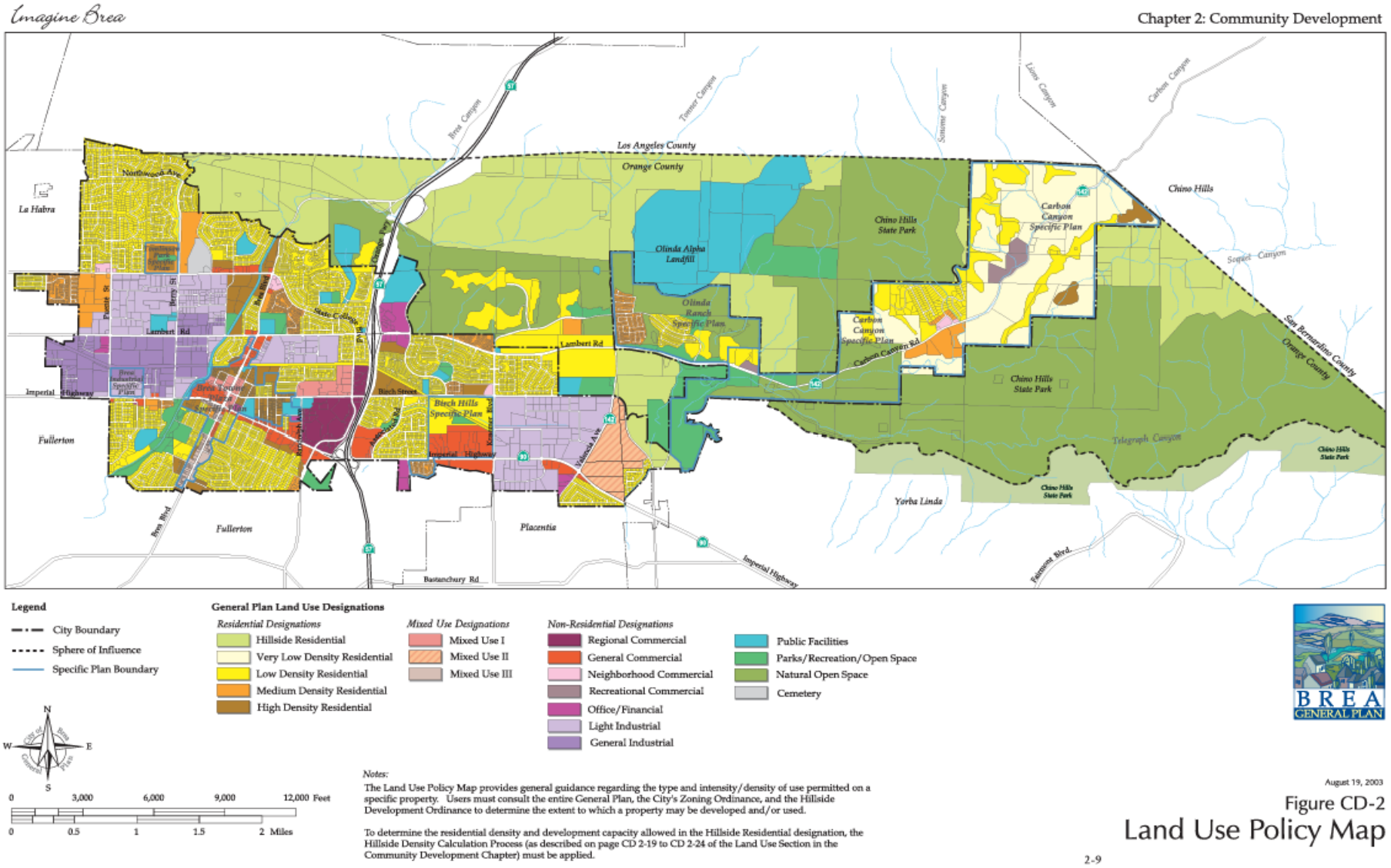

It should be noted that this map was last updated in 2003 during the City of Brea General Plan (GPA) update, and that there have been several GPA updates since then. More information can be obtained by contacting the City of Brea Planning Division.

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ELECTRICITY SERVICE

Electricity is provided to the City by Southern California Edison (SCE). SCE sources electricity from power plants throughout California and neighboring states and delivers it through large-scale power lines and substations. They are committed to delivering power reliably every day of the year, even during unusual events like heat waves. The threat of wildfires in California is real and growing. One critical tool used to prevent wildfires is the Public Safety Power Shutoff (PSPS) circuits, in which power providers may temporarily shut off power to circuits during dangerous weather conditions to prevent their electric system from becoming a source of ignition, resulting in a wildfire. These safety shutoffs are a measure of last resort for keeping residents and the community safe. One PSPS circuit (Vera Cruz) can affect the flow of power to the city, which sees activation multiple times each year, especially during the severe wind events (Santa Ana Winds) that frequent the Southern California areas during the fall and winter months.

NATURAL GAS

The Southern California Gas Company (SoCalGas) provides natural gas to Brea and surrounding jurisdictions. SoCalGas owns and operates transmission lines throughout Orange County to ensure sufficient natural gas throughout the region. If these lines are damaged, there is potential for interrupting natural gas flow and delivery throughout the region. Additionally, natural gas ignites easily. Any rupture in a transmission line could cause additional damage to properties near 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. Including hazards associated with damage to this infrastructure is an important element of an effective response to future incidents involving natural gas use and transmission.

WATER SERVICE

The City is a retail water supplier that provides water to its residents and other customers using the imported potable water supply obtained from its regional wholesaler, Municipal Water District of Orange County (MWDOC), imported groundwater supply from Main San Gabriel Basin, which is provided by California Domestic Water Company (CDWC), a mutual water company and the local groundwater from the La Habra Basin. The City's Water Division is responsible for the city's potable water system, including backflow prevention and water quality issues. The Water Division's goal is to achieve conservation and efficient use of urban water supplies to protect the people of the City and their water sources and ensure that sufficient water supplies will be available for further beneficial use. The City Water Division serves all of the City's area except part of the Vesuvius track at the eastern end, which is served by the Yorba Linda Water District (YLWD). As with sewer lines, water transmission, pumping, and storage facilities are expanded as necessary to accommodate future growth. Domestic water supply is not expected to limit development during the planning period.

WASTEWATER TREATMENT

The City does not provide wastewater services within its service area but relies on Orange County Sanitation District (OC San) for collection and treatment at their plants located in the Cities of Huntington Beach and Fountain Valley. Additionally, the City does not own or operate wastewater treatment facilities. The wastewater collected in the City's system is conveyed to OC San's extensive system of gravity flow sewers, pump stations, and pressurized sewers. Ultimately, the wastewater is treated at OC San treatment plants in Fountain Valley (Plant No. 1) and Huntington Beach (Plant No. 2). Recycled water is wastewater that is treated through primary, secondary, and tertiary processes and is acceptable for most non-potable water purposes such as irrigation, and commercial and industrial process water per Title 22 requirements. Recycled water opportunities have continued to grow in Southern California as public acceptance, and the need

to expand local water resources continues to be a priority. Recycled water also provides flexibility and added reliability during drought conditions when imported water supplies are restricted.[6]

TRANSPORTATION SYSTEM

Private automobiles are the dominant means of transportation in Southern California and the City of Brea. However, the City of Brea meets its public transportation needs through a mixture of a regional transit system (OCTA) and various city-contracted transportation services for seniors and access and functional needs patrons. According to the U.S. Census Bureau, about 92% of employed Brea residents worked in Orange County and the surrounding region, and approximately 8% of the city's workforce are employed and living within the city limits. City infrastructure accommodates regional traffic originating in other communities along SR-57 and other major regional parkways like SR-90 (Imperial Highway) and SR-142 (Carbon Canyon Rd), all three of which are under the authority of Caltrans. In addition, a healthy local economy depends on the ability of businesses to move their goods and the ability of employees living throughout the region to get to and from employment locations within the City.

MUNICIPAL SOLID WASTE MANAGEMENT

Although not part of the City's infrastructure inventory, solid waste management, such as waste collection via private city contracts, materials recovery and recycling, and landfill disposal, is a critical component of City operations. The Olinda landfill located in the Olinda neighborhood of Brea is an example of this. Recognizing the importance of solid waste management, the Department of Homeland Security's Cybersecurity and Infrastructure Security Agency has recognized solid waste collection workers as part of the Essential Critical Infrastructure Workforce.[7]

6 Brea 2020 Urban Water Management Plan

7 "DHS Designates Waste Collection as 'Essential Critical Infrastructure.'" Waste 360, December 13, 2023. https://www.waste360.com/design-construction/dhs-designates-waste-collection-as-essential-critical-infrastructure-.

CHAPTER 3 – HAZARD ASSESSMENT

HAZARD PROFILES

This chapter discusses the types of hazards that might reasonably occur in Brea. It describes these hazards and how they are measured, where they may occur, their history in and around the city, and the future risks 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 HMPC selected and prioritized the hazards of this plan.

Hazard Identification

FEMA guidance identifies several hazards that communities should evaluate for inclusion in a hazard mitigation plan. Communities may also consider additional hazards for their plans. The HMPC reviewed an extensive list of hazards and excluded those that do not pose a significant threat to Brea. **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 2023 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 Brea. As a result, some hazards like war or foreign invasion are better addressed at the Federal level.

TABLE 3-1: HAZARD EVALUATION FOR BREA LHMP

Hazard	Recommended for Consideration	Included in this LHMP?	Reason for Inclusion or Exclusion
Agricultural Pests	SHMP	No	Brea 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 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 24 miles from John Wayne Airport and approximately 16 miles from Long Beach 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 bodies of water within the City, which would create a concern regarding aquatic invasive species. This was not deemed a concern by the City.
Avalanche	FEMA guidance SHMP	No	There is no potential for avalanches to occur within the City.
Civil Disturbance or Riot	SHMP	No	The city does not have any major tourist destinations or facilities that allow large crowds of people to gather. This is not a concern for the City.
Climate Change	SHMP OC HMP	Yes	Climate change is a concern identified by the HMPC 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	No	The growing threat of cyber security and data breaches has increasingly become a potential

			hazard of concern for cities. Given the lack of past occurrences, this was not a concern for the City.
Dam Failure	FEMA guidance SHMP OC HMP	Yes	There are several dams and reservoirs that could affect the city in the event of failure. The HMPC identified dam failure as a potential hazard of concern.
Drought	SHMP OC HMP	No	Droughts are a recurring hazard in Brea and Southern California and can affect city water supplies. The City's Water Division is responsible for the distribution of water to its residents. The City's water supply is purchased from multiple water districts, including MWDOC and CDWC. Drought is addressed in the Urban Water Management Plans and Hazard Mitigation Plans of both water districts and the city. The City of Brea Municipal Code Chapter 13.20 Water Conservation Water Supply Shortage Program (WCWSS Program) outlines the water efficient regulations put in place by the City to aid in drought mitigation. As the water supply for the city is out of their control, and current policies are in place by the both the city and the water districts', drought was not identified as a hazard that should be addressed in the City's Hazard Mitigation Plan.
Energy Shortage	SHMP	No	Brea's electrical power is provided by Southern California Edison, which has a long history of reliability, and therefore the HMPC decided that this is not a concern for the City.
Epidemic, Pandemic, Vector-Borne Disease	SHMP	No	Being a largely residential community and lack of tourism, The HMPC did not identify this as a hazard of concern for the City.
Erosion	FEMA guidance SHMP	No	The City has not experienced many major cases of erosion; the HMPC 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 Brea rarely fall to a level that would be considered a danger to public safety; however the winter of 2022 saw snow and temperatures plummet during a series of storms over the course of several weeks. This was not identified as a hazard of concern in the City.
Extreme Heat	FEMA guidance SHMP	Yes	Extreme heat conditions have occurred in the city and are expected to be a future recurring issue. The City identified this as a concern.
Fault Rupture	FEMA guidance SHMP OC HMP	Yes	There is one known active fault located within the city; however, because of this the HMPC identified fault rupture as a potential hazard of concern.
Flooding	FEMA guidance SHMP	Yes	The City experiences periods of heavy rainfall between October and April, combined with the hilly topography these flood zones are focused and a recurring concern in the City.
Fracking	SHMP	No	Fracking does not occur in Brea.
Hail	FEMA guidance	No	Hail that is severe enough to pose a threat to people and property is not a concern identified by the HMPC.
Hazardous Materials release	SHMP	Yes	The threat posed by hazardous materials release incidents occurring is low, given the presence of commercial centers and businesses however, the potential does exist. This is a hazard of concern for the City.
Hurricane	FEMA guidance SHMP	No	Hurricanes do not occur in Brea.

Infrastructure Failure	SHMP	Yes	Infrastructure failure poses a threat to people and property in Brea. As a result the HMPC identified this a s a hazard of concern within the plan.
Landslide	FEMA guidance SHMP	Yes	Areas of the city have varying degrees of landslide potential. As a result, the HMPC identified this as a hazard of concern within the plan.
Levee Failure	SHMP	No	The HMPC identified flooding as a hazard of concern, given the lack of levees within the city however, this was not identified as a hazard of concern.
Lightning	FEMA guidance	No	Although lightning occasionally occurs in Brea, 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 HMPC identified liquefaction as a hazard of concern.
Methane-containing Soils	OC HMP	Yes	A large portion of the City is classified as being located within a methane zone. The presence of methane within the soils in these areas creates the potential for exposure.
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 HMPC did not identify this as a hazard of concern to the city.
Oil Spills	SHMP	Yes	The City owns mineral rights to active wells located on City owned property adjacent to public parks and schools. There are also multiple active oil wells in the surrounding hills, in close proximity to neighborhoods. It is discussed under the hazardous materials profile.
Power Failure	SHMP	Yes	Brea's electrical power is provided by Southern California Edison which has a long history of reliability, however due to the presence of a PSPS circuit, therefore the HMPC decided that this is a concern for the city. This is discussed within the Infrastructure Failure profile.
Radiological Accidents	SHMP	No	There are no known major radiation sources in Brea or the immediate surrounding area that could seriously threaten the community.
Sea-level Rise	FEMA guidance SHMP	No	Brea is not located within close proximity to the ocean.
Seiche	FEMA guidance SHMP	No	There are large bodies of water in Brea that could be subjected to seiche though they are not identified as a concern by the HMPC.
Seismic Shaking	FEMA guidance SHMP OC HMP	Yes	Brea is in a seismically active area where shaking can be severe enough to damage property or cause loss of life. For this reason, the HMPC determined it should be addressed in this plan.
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. Windstorms events typically occur during Santa Ana wind conditions.
Severe Weather and Storms	FEMA guidance SHMP OC HMP	Yes	Severe Weather includes discussions regarding severe wind (windstorms), extreme heat, and winter storm, which are weather-related hazards that are most common in Brea.
Storm Surge	FEMA guidance	No	The HMPC did not identify this as a hazard of concern since the city is not located near the California coastline.

Subsidence	FEMA guidance	No	The HMPC did not identify subsidence as a hazard of concern for the city.
Mass-Casualty Incident (Terrorism)	SHMP	Yes	The HMPC identified mass casualty/active shooter incidents/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 in Brea have occurred as the result of a severe storm; however, were not considered a hazard of concern to the City. Tornadoes that have affected the city are discussed in the Winter Storms category of the Severe Weather hazard profile.
Transportation Accidents	SHMP	No	The lack of major transportation routes through the city, the HMPC did not identify this hazard as a concern for this plan.
Tree Mortality	SHMP	No	While the city's tree inventory is a significant asset at risk, it was not identified as a hazard of concern by the HMPC.
Tsunami	FEMA guidance SHMP	No	The HMPC 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 HMPC identified urban fires as a risk to property and life in Brea, and therefore was included in this plan as a part of the wildfire hazard discussion.
Volcano	SHMP	No	There are no volcanoes near Brea to pose a reasonable threat.
Wildfire	FEMA guidance SHMP	Yes	The HMPC identified wildfire as a major threat to the city, especially the north and eastern portions of Brea, and therefore was included in this plan.

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

Hazard Type	Sub-Categories
Seismic Hazards	Seismic Shaking, Fault Rupture, Liquefaction
Wildland Fires	Urban Fires
Severe Weather	Windstorms, Extreme Heat
Infrastructure Failure	Power Failure (PSPS Event)
Geologic Hazards	Landslide, Soil Erosion
Flood	Dam Failure
Human-Caused Hazards	Hazardous Materials Release, Oil Spill, Mass Casualty Incident (Terrorism)
Climate Change	Discussed in each relevant Hazard Profile

Hazard Scoring and Prioritization

Once the hazards for Brea have been identified, they are given a priority ranking. As shown in the Hazard Prioritization Table (**Table 3-3**), the two hazards considered the greatest threat to the City of Brea are wildfire and windstorms, followed closely by seismic hazard events (seismic shaking and liquefaction). The hazard profiles and risk assessments that follow describe these hazards in-depth, the danger imposed on the Brea community, review the exposure of assets to these hazards and estimate losses or assess the risk of significant events associated with these hazards.

In addition to the simple prioritization exercise, the HMPC followed FEMA guidance for hazard mitigation plans and prioritized each hazard identified. 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 Brea in the future.
- Location: The size of the area that the hazard would affect.
- Maximum probable extent: The severity of the direct damage of the hazard to Brea.
- Secondary impacts: The severity of indirect damage to Brea caused by the hazard.

The HMPC 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 to determine the overall score for each criterion. FEMA recommended these weighting values:

- Probability: 2.0
- Location: 0.8
- Maximum Probable Extent (Primary Impact): 0.7
- Secondary Impacts: 0.5

After calculating the total impact score for each hazard (sum of the location, maximum probable extent, and the secondary impact). FEMA guidance recommends multiplying the total impact score by the overall probability to determine the final score for each hazard. A final score between 0 and 12 is considered a low-threat hazard, 12.1 to 42 is a medium-threat hazard, and a score above 42 is considered a high-threat hazard. This final score determines the prioritization of the hazards. **Table 3-2** depicts the criterion for the scoring for each hazard as previously discussed, including probability, location, primary impact, and secondary impacts.

In compliance with the Disaster Mitigation Act (and as further specified by Interim Final Rule 44 CFR Section 206.401(c)(2)(i)), this LHMP addresses, in substantial detail, the primary hazards facing the City. Lower-priority hazards are addressed at a lesser level of detail due to their relatively reduced impacts, as identified in the hazard assessment discussion. **Table 3-3** shows each hazard's criterion scores, final score, and threat level based on the above prioritization process.

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	

TABLE 3-3: HAZARD PRIORITIZATION SCORES AND THREAT LEVEL

Hazard Type	Probability (1-4)	Impact			Total Score	Hazard Planning Consideration
		Location (1-4)	Primary Impact (1-4)	Secondary Impacts (1-4)		
Wildfire	4	4	4	4	**64.00**	High
Severe Weather: Windstorms	4	4	2	2	**44.80**	High
Seismic Hazards: Shaking	3	4	3	3	**40.80**	Medium
Seismic Hazards: Liquefaction	3	3	4	3	**40.20**	Medium
Geologic Hazards: Landslide, Erosion	4	2	2	3	**36.00**	Medium
Infrastructure Failure	2	2	2	2	**16.00**	Medium
Human-Caused Hazards: Hazardous Materials Release	2	2	2	2	**16.00**	Medium
Human-Caused Hazards: Mass Casualty Incident	1	4	4	3	**15.00**	Medium
Flood: Dam Failure	1	2	4	4	**12.80**	Medium
Seismic Hazards: Fault Rupture	1	2	2	2	**8.00**	Low
Flood	1	2	2	2	**8.00**	Low

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 the built-up tension is eventually 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. 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. A fourth kind of fault, called a “blind” fault, produces virtually no visible land displacement.

Some faults have emerged recently in geologic history. Quaternary faults have developed 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 and 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. Liquefaction occurs when loosely packed, water-logged sediments at or near the ground surface lose their strength in response to strong ground shaking[8]. 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

FAULT RUPTURE

Earthquakes are considered a major threat to the City of Brea due to the proximity of several major regional fault zones, notably the San Andreas Fault Zone and the San Joaquin Hills Fault Zones. Brea has two known faults that traverse the City: the Whittier Fault and the Elysian Park Thrust fault. The Whittier fault cuts across the hills and through the eastern half of the City in a northwesterly direction, which is considered active and contains an Alquist Priolo special study zone. The Elysian Park Thrust fault is buried approximately 6 to 10 miles below the surface, representing the greater threat potential of a large-magnitude earthquake. 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 the release of hazardous materials and flooding if water lines are breached.

Depending on the magnitude and duration of an earthquake along one of the faults in the region, Brea can expect to see varying degrees of damage citywide. The city's natural topography means there are areas of the community constructed on slopes, meaning these areas may be subject to earthquake-induced landslides (reference the landslide hazard profile for further discussion).

SEISMIC SHAKING

Southern California, including Brea, is a highly seismic area due to the major faults that run through the region and are subject to 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 3-4** shows the MMI scale, while **Table 3-5** lists the earthquake faults that can impact the City.

Another scale for measuring seismic shaking is the moment magnitude scale (MMS, denoted Mw or simply M). The MMS measures the energy the fault rupture releases, which begins at 1.0 and increases 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

8 USGS Definition of Liquefaction

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.

TABLE 3-4: 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, including bridges, are destroyed. 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://www.usgs.gov/media/images/modified-mercalli-intensity-mmi-scale-assigns-intensities

TABLE 3-5: EARTHQUAKE FAULTS THAT IMPACT THE CITY OF BREA

Fault Name	Magnitude	Modified Mercalli Ranking	Perceived Shaking	Potential Damage	Threat Issues
Whittier	6.98	VIII	Destructive	Moderate to Heavy	**Major Threat** due to: (1) proximity to the fault, (2) severe shaking and moderate to heavy damage, (3) heavy impact on public safety and resource shortages, (4) prediction of up to 91 dead and 3,491 injured in Orange County (OC), (5) extensive fires, (6) up to 3,200 displaced households in OC, (7) 35% of households no water, and (8) potential for structural damage over $14 Billion in OC
San Andreas	7.8	VI	Strong	Light	**Moderate Threat** to all of Southern CA due to (1) earthquake probability, (2) impacts most of southern CA, (3) extensive population impact of 10 million people, (4) catastrophic fires in OC & LA, (5) major infrastructure disruptions inland which will impact supply lines for months to years.
Newport-Inglewood	7.02	VI	Strong	Light	**Moderate Threat** due to: (1) the catastrophic and deadly impact to coastal and north Orange County (2) heavy impact on OC public safety causing resources shortages, (3) prediction of up to 45 dead and 1,950 injured in OC, (4) extensive fires, (5) up to 3,300 displaced households, (6) 20% of households no water and (7) potential for structural damage of over $8.3 Billion in OC plus severe damage to LA.
Elsinore	6.8	VI	Strong	Light	**Moderate Threat**
Puente Hills	7.1	VI	Strong	Light	**Moderate Threat**
Palos Verde	7.1	VI	Strong	Light	**Moderate Threat**
Whittier	6.8	VI	Strong	Light	**Moderate Threat**
San Jacinto	6.7	V	Moderate	Very Light	**Minor Threat**

This table uses county-wide data which includes the City of Brea. The estimates for deaths, injuries, fires, displaced households, households with no water, and structural damage are Orange County estimates.

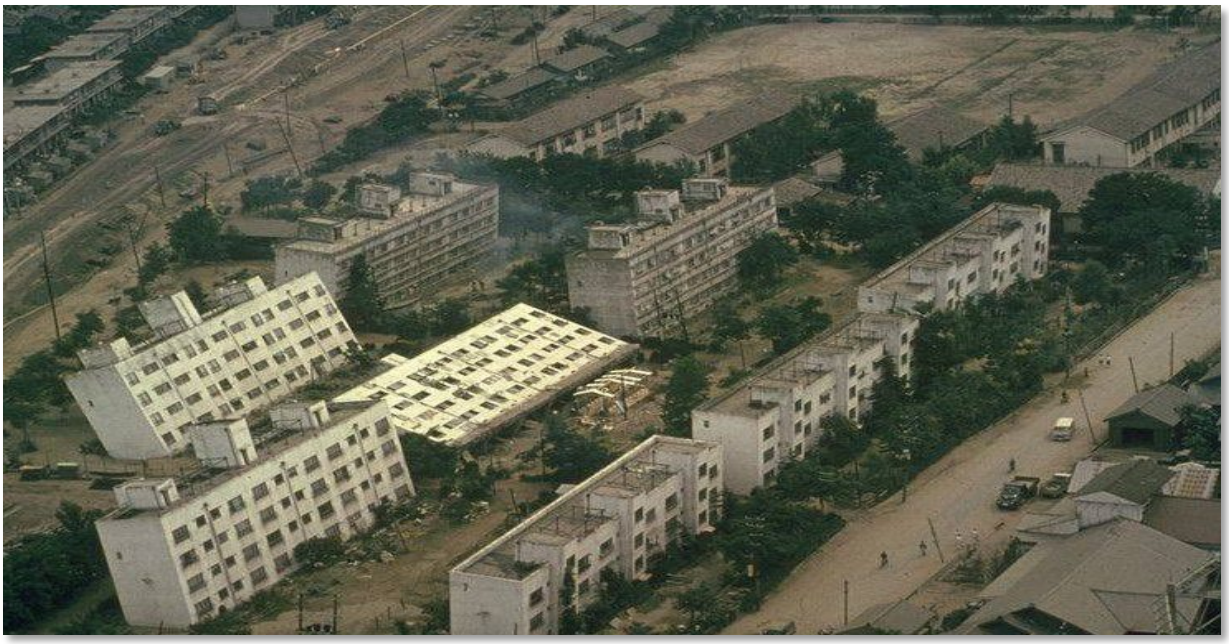
Seismic shaking can also be measured in relationship to the force of Earth's gravity (g) or percent g. This method is useful for geographically displaying areas of seismic shaking potential. Percent g is computed by determining the acceleration of the earthquake's motion relative to the force of gravity. 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 765/980, or .781 g (78.1% g). **Figure 3-1** shows the seismic hazard zones and associated faults in and around Brea, while **Figure 3-2** shows the seismic shaking potential in the City.

LIQUEFACTION

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 3-3** shows the liquefaction zones in Brea as designated by the California Geological Survey.

Liquefaction zones are generally located along areas of the city, such as stream beds and drainage channels. These areas include Tonner Canyon Creek, Brea Canyon, and areas around the Carbon Canyon Dam. As seen in **Figure 3-3**, the liquefaction threat is generally located within these portions of the City, and the threat is ranked as having high liquefaction potential in these areas. In contrast, the rest of the city generally has a minimal liquefaction potential.



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

FIGURE 3-1: FAULT SYSTEMS IN AND AROUND BREA

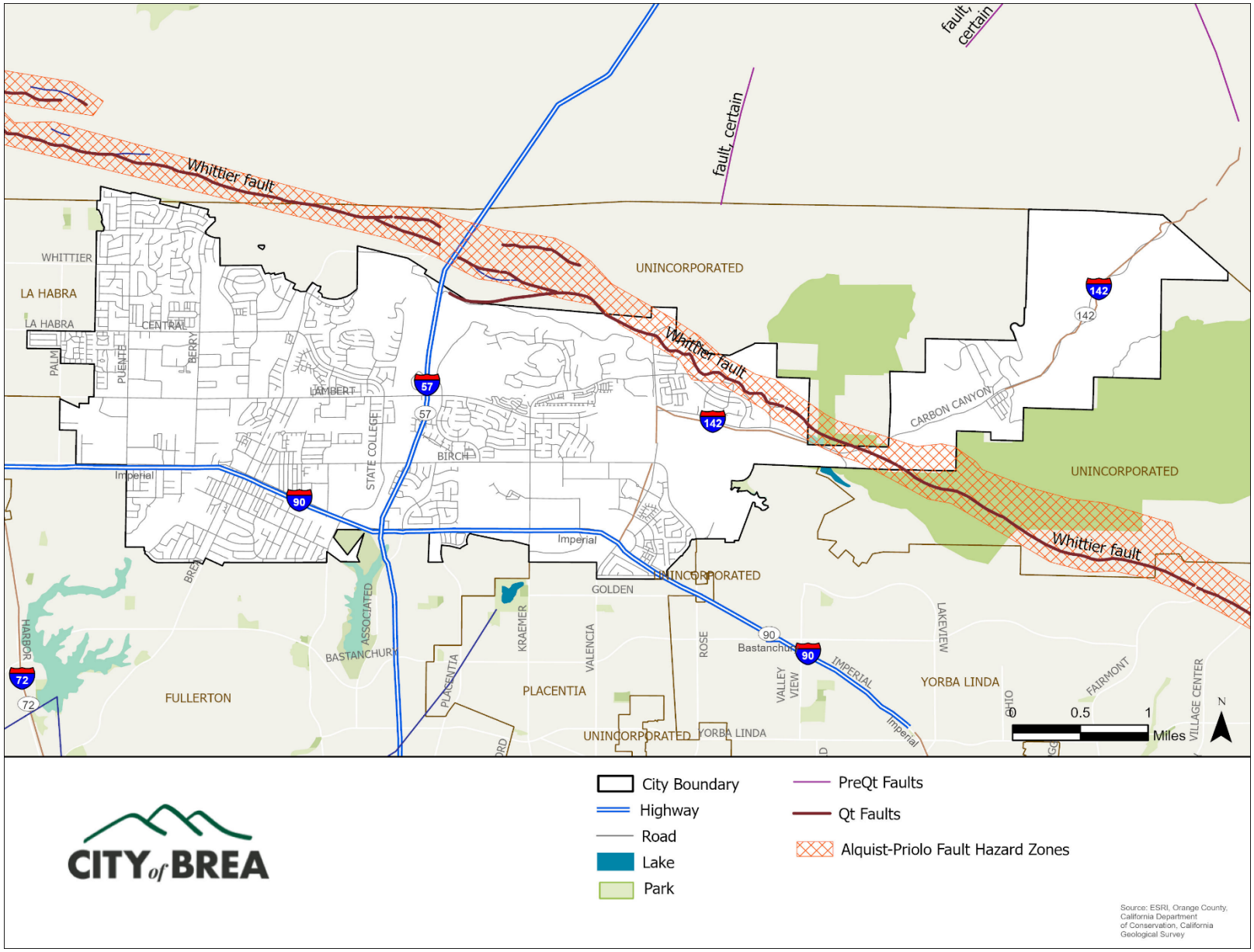


FIGURE 3-2: SEISMIC SHAKING POTENTIAL IN BREA

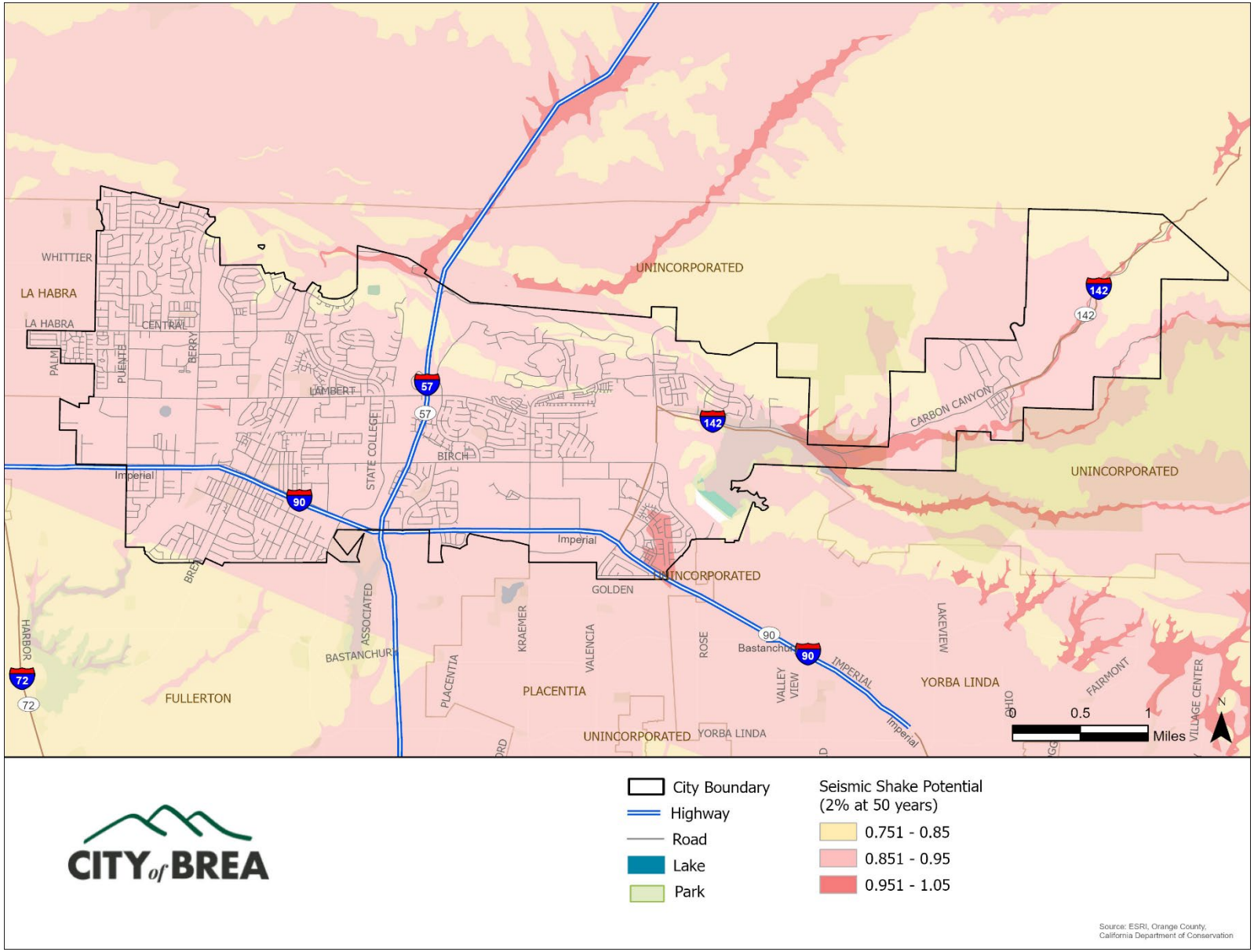
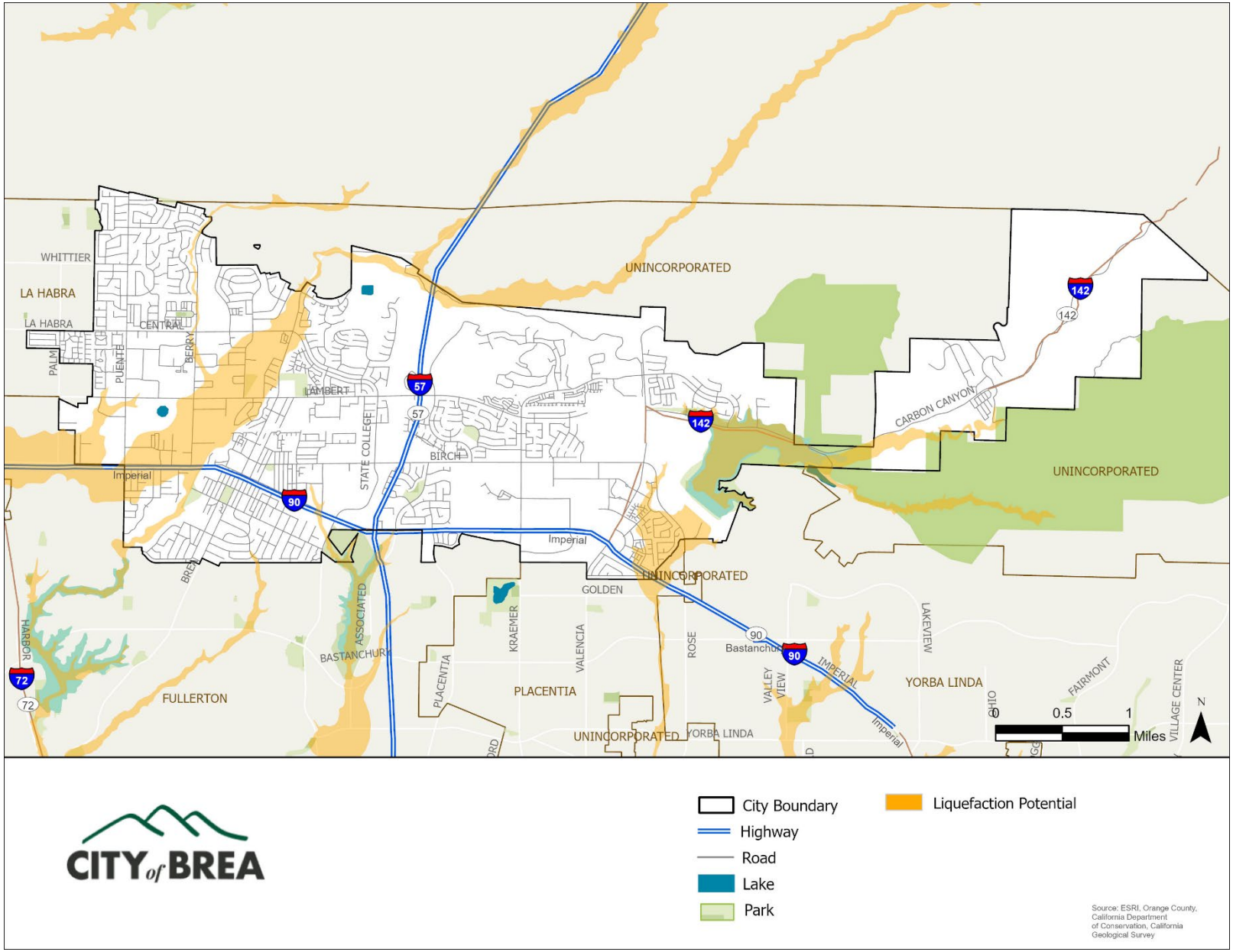


FIGURE 3-3: POTENTIAL LIQUEFACTION ZONES IN BREA



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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

There haven't been any recorded instances of fault rupture within Brea despite the occurrence of earthquakes.

SEISMIC SHAKING

Brea has experienced two earthquakes in the last 15 years of a magnitude greater than 5.0.

- **July 29, 2008** - A magnitude 5.4 earthquake centered in neighboring Chino Hills caused injuries to 8 people and considerable damage to numerous structures throughout the area. The quake was reported to have caused multiple amusement parks to evacuate rides and withhold admission until repairs could be made. Minor injuries were reported in the City of Brea at a medical facility when ceiling tiles fell onto unsuspecting people inside the building.
- **March 28, 2014** - The 2014 La Habra earthquake was a magnitude 5.1 earthquake that occurred at 9:09 p.m. PDT. Although the earthquake was named "La Habra," it was centered in the City of Brea. The Mercalli intensity was a IIV (very strong) in the City. The earthquake caused damage to the Brea Civic Center; a rockslide caused a car to be overturned, resulting in minor injuries and the closure of a street in Brea. Falcon Academy in Brea incurred some $250,000 in damages; 13 water mains were damaged or broken in nearby Fullerton, resulting in the temporary displacement of some 70 families. Fortunately, no fatalities were reported. Approximately $2.6 million in total damages occurred in the three cities of Brea, Fullerton, and La Habra.

Other strong regional earthquakes have occurred in Southern California, but their epicenters have been so distant from Brea that seismic shaking generated by the event did not cause significant property damage or harm to the City. The most recent significant earthquake affecting the Southern California region was the Northridge Earthquake in 1994. At 4:31 A.M. on Monday, January 17, a 6.7 earthquake struck the San Fernando Valley. Thousands of aftershocks occurred in the following days and weeks, causing additional damage to affected structures. Fifty-seven people were killed, and more than 1,500 people were seriously injured. For days afterward, thousands of homes and businesses were without electricity; tens of thousands had no gas, and nearly 50,000 people 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 Brea since the beginning of the 20th century. Brea had no significant reported incidents of damage; authorities made disaster declarations in Orange County for the 1994 Northridge Earthquake and the 1987 Whittier Narrows Earthquake.

LIQUEFACTION

Limited information is available on the occurrence of past liquefaction events in Brea. 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.[9]

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

Event Name	Distance (Miles)*	Magnitude
1812 San Juan Capistrano	35	6.9
1855 Los Angeles	34	6.0
1899 Lake Elsinore Earthquake	51	6.4
1918 San Jacinto Earthquake	66	6.8
1933 Long Beach Earthquake	32	6.3
1971 San Fernando Earthquake	60	6.5
1986 North Palm Springs Earthquake	86	6.0
1992 Joshua Tree Earthquake	100	6.3
1992 Big Bear Earthquake	83	6.7
1992 Yucca Valley	100	7.6
1994 Northridge Earthquake	62	6.7

***Approximate distance between the epicenter and Brea City Hall**

Source: Southern California Earthquake Data Center. 2021. Earthquake Catalogs SCSN Catalog Search (1932-Present). http://service.scedc.caltech.edu/eq-catalogs/radius.php

9 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

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, as further study of the Whittier Fault system occurs, it will be easier to understand the potential effects of future rupture episodes. As depicted in **Table 3-2** and **Table 3-3,** fault rupture is extremely rare, with no documented history of occurrences in the city and an annual probability of less than 0.001% percent.

Seismic Shaking

Historical and geological records show 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 and 2044. **Table 3-8** shows the results for Brea's nearby and regional fault lines.

Table 3-8: Earthquake Probabilities for Key Faults near Brea (2015–2044)

Fault	Distance (Miles)*	Estimated Probabilities			
		6.7+ Mw	7.0+ Mw	7.5+ Mw	8.0+ Mw
San Joaquin Hills	35.08	0.75%	0.34%	0.14%	Negligible
San Andreas	33.98	20.95%	18.69%	15.85%	6.61%
Newport- Inglewood	18.34	0.75%	0.67%	0.19%	Negligible
Elsinore	18.25	3.21%	1.81%	1.01%	<0.01%
Elysian Park	15.88	1.75%	0.61%	0.28%	<0.01%
Puente Hills (Coyote Hills)	2.05	0.95%	0.65%	0.19%	Negligible
Puente Hills (Santa Fe Springs)	7.53	0.96%	0.76%	0.29%	<0.01%
Palos Verde	24.31	2.67%	2.32%	0.90%	Negligible
Whittier	1.22	1.29%	1.06%	0.59%	<0.01%
Santa Susana	48.05	4.20%	2.71%	0.77%	<0.01%
San Jacinto	35.08	4.12%	4.11%	4.06%	2.21%

*** Distance between Brea 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). https://wgcep.org/UCERF3

The U.S. Geological Survey scenarios show that the San Joaquin Fault could cause the strongest seismic shaking in Brea, followed by San Andreas and the Newport-Inglewood faults. The more distant faults, likely the San Jacinto and San Andreas faults, can produce more intense earthquakes but are less likely to cause damage in Brea due to their greater distance from the City. However, as Table 3-8 noted, the likelihood of a powerful earthquake occurring along most of these faults within the next 25 years is generally very low (excluding the San Andreas). As

depicted in **Table 3-2 and Table 3-3**, seismic shaking will remain an occasional occurrence with an annual probability of between 1% and 10% percent chance.

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 Brea, typically in valley regions, stream and river watersheds, and alluvial floodplains.

For liquefaction to occur, three general conditions must be met. The first condition – strong ground shaking for a relatively long duration – can be expected to occur in the Brea 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 many 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 Brea. As depicted in **Table 3-2** and **Table 3-3**, liquefaction events are believed to remain an occasional occurrence with an annual probability of between a 1% and 10% percent chance.

Climate Change Considerations

FAULT RUPTURE

Generally, there is no known direct connection between earthquake fault rupture 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. Still, little indicates 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.[10]

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 more

10 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

precipitation will likely occur during rainy periods, and drought is expected to last longer. As a result, the water table along the creeks and canyons in Brea 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 Brea, depending on the circumstances. Prolonged droughts can decrease groundwater levels if additional water extraction occurs, decreasing the liquefaction potential. Increasing precipitation intensity and frequency could increase groundwater levels, potentially increasing liquefaction potential.

WILDFIRE/URBAN FIRE

Description

WILDFIRE

Wildfires are fires that burn in largely undeveloped and natural areas and 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 cycles. However, since the early twentieth century, the common practice was to suppress naturally occurring fires in wildland areas, allowing dry plant matter and other fuels to build up.

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

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.[11] 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.[12] 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.[13]

11 Cal OES. 2016. https://webservices.caloes.ca.gov/wp-content/uploads/sites/10/2016/10/Top20_Deadliest.pdf

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

13 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/

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, and the fire is contained within a short amount of time by firefighting teams or the building's fire suppression systems. In severe cases, the fire leads to the complete 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. Breaches in gas pipelines may cause larger urban fires, large transportation accidents, or downed electrical transmission wires. Arsonists may 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 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 with 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 topography in and around Carbon Canyon (including neighboring Chino Hills State Park), Brea is in an area susceptible to wildfires, and portions of the community are within 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 in or near the WUI, as it has 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 and canyons' susceptibility to wildfire. Fire threat assessment and Geographic Information System (GIS) mapping for Brea identifies the WUI as the area within the city with the highest fire risk. **Figure 3-4** identifies portions of the City located within the WUI and historic fire perimeters in the City.

According to Cal Fire FHSZ mapping of the city, the northern and eastern borders of the city are located within a Very High Fire Hazard Severity Zone (VHFHSZ), which falls under the jurisdictional responsibility of the city as it is located in the LRA. The potential for wildfire is even greater, considering that these same northern and eastern borders are also adjacent to the VHFHSZs of the SRA along the city limits. The potential for a wildfire to begin in the SRA and spread into the city's LRA is highly probable if the fire cannot be contained with the SRA. **Figure 3-5** 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 partially located in unincorporated Orange County (bordering unincorporated Los Angeles and San Bernardino Counties), which falls under the jurisdiction of CAL Fire, while the LRA is under the control of the Brea Fire Department. 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.

A fire can only ignite if three elements are present: heat, fuel, and oxygen. If any of these elements is removed, the fire will extinguish itself. In Brea, copious amounts of fuel are 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 Standards and Technology, Fire Research Division, has developed a scale that measures the increase in temperature and the kind of fire response that develops. **Table 3-9** shows the progression of temperature relative to fire response.

Once a fire has been ignited, it could conceivably grow indefinitely 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 3-9: 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 firefighter.
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.

URBAN FIRE

Most of Brea's buildings are constructed of wooden frames, which are susceptible to catching fire. Even structures that do not have wooden frames, such as large medical facilities or office towers, are at risk of urban fires. These locations contain furniture, papers, plant material, textiles, and other objects that can be ignited. Given that a significant portion of Brea is developed, urban fires can occur at any location in the City since any of these structures can potentially burn.

Fires are also likely to occur where significant pieces of infrastructure are located, such as gas pipelines, power lines, or highways. SoCalGas operates large high-pressure gas pipelines that run underneath the city's streets and sidewalks. If a pipeline were to breach and the released gas ignites, any structures located along the extent of the breach would likely catch fire. 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, several trees and an extensive lawn could ignite if a downed power line encountered

them. If this landscaped space caught fire, it could spread to surrounding homes and buildings if hot cinders from the fire came in contact with the buildings. SR-142 (Carbon Canyon Rd) also runs through the City and carries thousands of vehicles daily. If a major transportation accident were to occur on this highway, it could potentially cause a fire.

FIGURE 3-4: WILDLAND URBAN INTERFACE (WUI) AND HISTORICAL WILDFIRE PERIMETERS

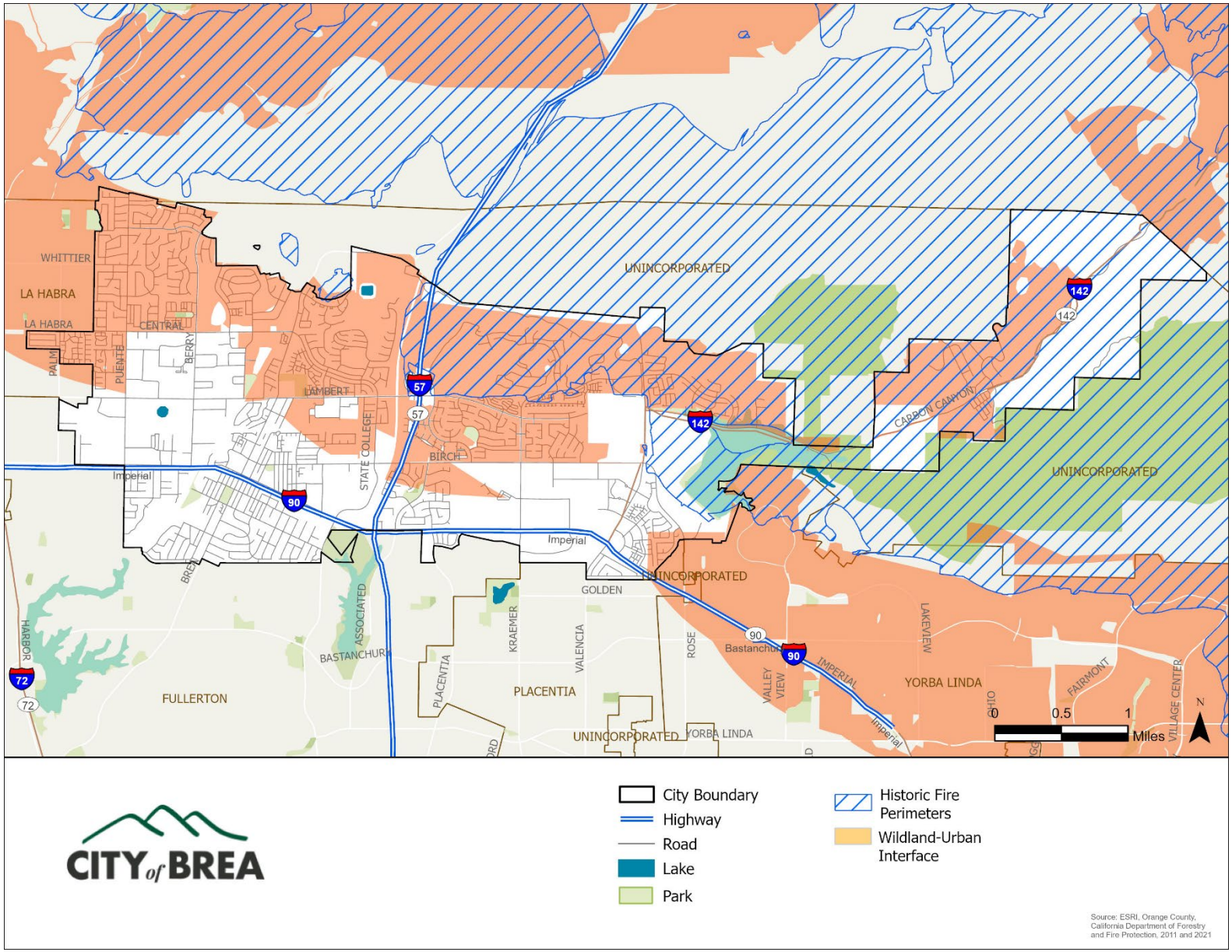
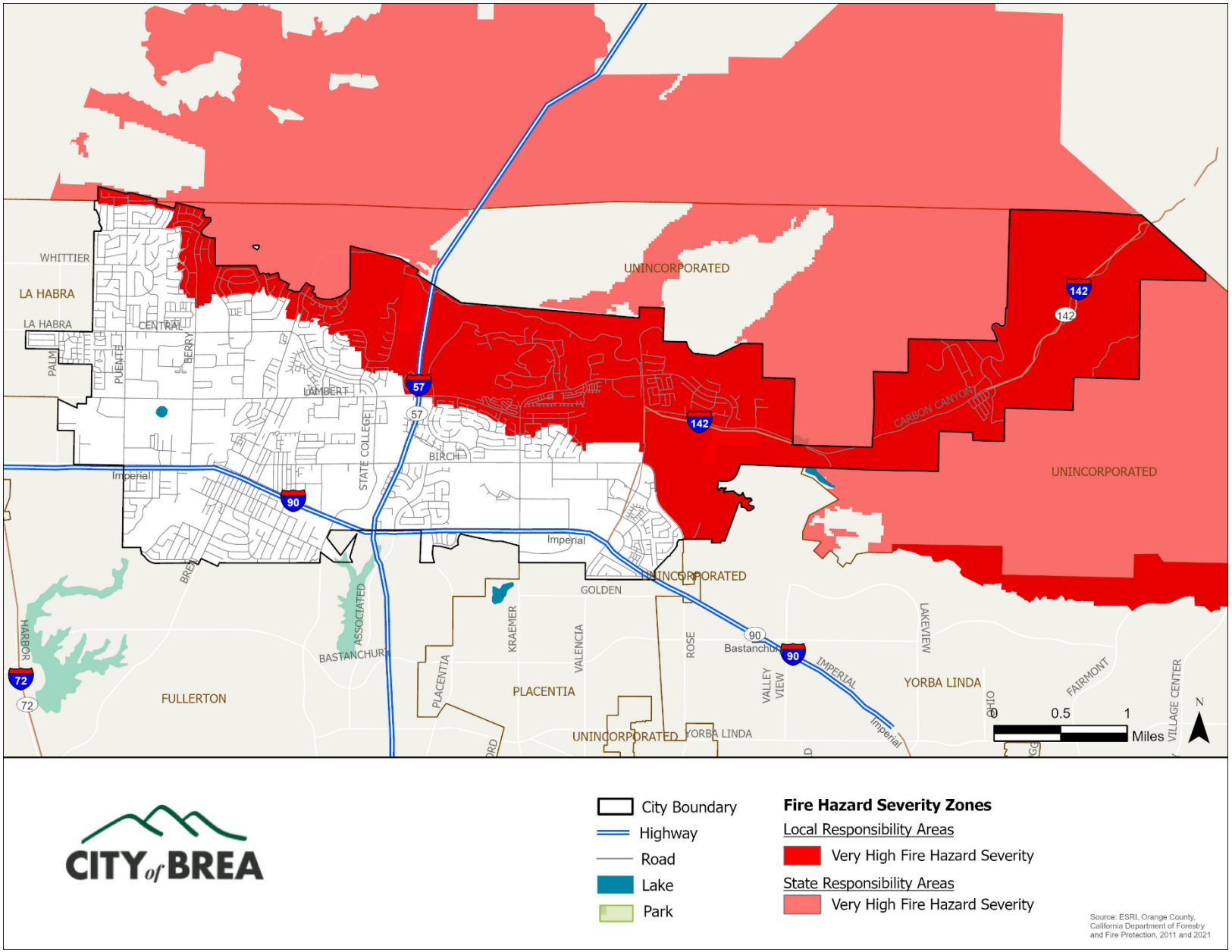


FIGURE 3-5: VERY HIGH FIRE HAZARD SEVERITY ZONES (LRA & SRA)



Given that the highway is non-flammable, it is anticipated that a fire that begins on the highway would most likely be contained to the highway. It is possible that an intense fire on this highway could spread to nearby homes, businesses, and landscaping that runs along SR-142 (Carbon Canyon Rd).

Past Events

WILDLAND FIRE

- **April 8, 1926** - Lightning strikes hit an oil tank farm of the Union Oil Company, igniting multiple reservoirs storing an estimated 2.5 million barrels of crude oil (42 gallons per barrel, totaling approximately 105 million gallons of oil). The resulting explosion was seen, heard, and felt for miles. Reportedly, some 3,000 workers battled the blaze and erected sheets of iron and earth around the area to stem the fire's spread to other areas of the facility. The damage caused at the time was over $3,000,000, destroying three reservoirs, a small oil refinery, 700 acres of agricultural land, 3 large ranch homes, and several houses on the facility property. Reportedly, over 3 miles of galvanized iron barricades were used to pool the blazing oil and allow it to burn itself out.
- **November 15, 2008** - 2008 Freeway Complex Fire. Freeway Fire begins on 11/15/08 in the Santa Ana Riverbed along the SR-91, spreads north and west into Yorba Linda and Anaheim Hills, joins up with the Landfill Fire (Brea Fire) also ignites 11/15/08 just south of the Olinda Landfill, spreading west and jumping the SR 57 merging with the Freeway Fire on 11/16/08, renamed the Freeway Complex Fire. Burned over 30,305 acres, destroyed 314 homes, 43 outbuildings, and 4 commercial properties, 14 firefighters were injured. A faulty catalytic converter caused the Freeway Fire, and faulty power lines and poor maintenance in the Brea-Olinda Oil Field caused the Landfill Fire.
- **March 12, 2014** - A 2-acre brush fire was quickly contained in Tonner Canyon near Lambert Rd and the SR-57; the fire department's helicopter made a significant number of water drops and kept it from spreading to the homes in the area. Drought-resistant vegetation planted by the homeowner’s association was also credited with helping to prevent the spread as well.
- **June 10, 2014** - A small brush fire was contained in Carbon Canyon near the Discovery Center, and the nearby regional park was closed. Officials with OCFA credited the barrier landscaping composed of green, heavily watered, drought-resistant vegetation, acted as a buffer zone helping to prevent the fire from spreading to homes.
- **October 30, 2019** - The Brea Fire was a 16-acre brush fire along Brea Canyon Rd and the SR-57 between Diamond Bar and Brea, causing closures along the SR-57. Four helicopters, two Super Scoopers, and more than 100 firefighters responded and quickly contained the blaze before it could spread any further.
- **December 13, 2020** - A 6-acre brush fire started in Brea Canyon; responding crews from the Brea Fire Department quickly contained the blaze, and no structure damage or injuries were reported.
- **December 14, 2020** - A spot fire broke out in the Olinda Alpha Landfill area in Brea (on the border between Orange and Los Angeles counties) and was contained in a joint response from Brea Fire Department, OCFA, and Los Angeles County Fire. Fortunately, it was a slow-burning fire and was contained quickly before significant damage could occur.
- **October 3, 2021** - Roughly 21 acres of brush burned in northern Brea before the Brea Fire Department contained it and support crews from OCFA, Anaheim Fire and Rescue, and Los Angeles County Fire Department. No homes were damaged.
- **March 23, 2023** - A vehicle fire was reported on East Carbon Canyon Road and North Olinda Drive, and the vehicle was found engulfed in flames in the brush next to the road. Once the blaze was extinguished, a body was found in the vehicle.

URBAN FIRE

- **December 3, 2019** - An Edison power transformer near Imperial Highway at Associated Rd caught fire and resulted in power loss to over 15,000 residents in Brea, Placentia, and Fullerton. The Brea Civic Center lost power, as did the Brea Mall, where holiday shoppers had to be escorted from the premises for their safety. Edison reported that the fire occurred at one substation.
- **June 5, 2021** - A house fire on the 1100 block of W Fern St broke out and was upgraded to a 2-alarm fire. Firefighters searched the home when it was reported that a resident may still be inside it. Upon searching, no persons were found; however, the pet cat was found having succumbed to smoke inhalation.
- **August 18, 2021** - A two-alarm apartment fire on the 600 block of Birch St was contained to only one unit, thanks to a quick response from the fire department. Police were able to evacuate the residence, and only one resident was transported and treated at the nearest hospital for smoke inhalation.

Risk of Future Events

WILDLAND FIRE

The history of wildfires in Orange County, Carbon Canyon, and the adjacent Chino Foothills, and continued 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 2008, several wildfire events have affected the city, equating to a return interval of approximately one fire every 2 years. This risk is expected to remain highest in the undeveloped land in the foothills and canyons within the city and the county's unincorporated areas, as well as the city's wilderness parks. According to **Table 3-2** and **Table 3-3**, the probability of a wildfire occurring will be frequent, with an annual probability of greater than 10 percent.

URBAN FIRE

If the conditions for an urban fire exist in Brea, the City will forever be at risk of experiencing an urban fire event. Given that each fire event has a unique origin, it is impossible to predict the precise likelihood of an urban fire emerging in the city. Some areas, however, are at an increased risk of an urban fire igniting, including the buildings along the SoCalGas pipeline's course through the City, in addition to the landscaping and properties along SR-142.

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 Carbon Canyon and Chino Foothills areas, 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 Brea and other surrounding communities.

URBAN FIRE

While climate change has been linked to a potential increase in wildfire events, it is unclear exactly how climate change could influence the ignition or behavior of urban fires in Brea.

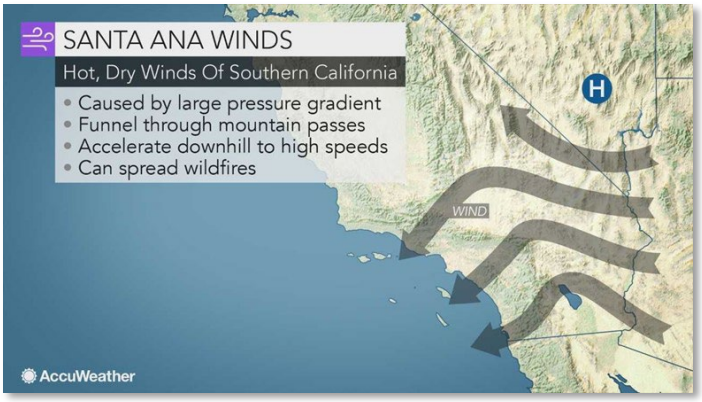
SEVERE WEATHER (WINDSTORM, EXTREME HEAT, WINTER STORMS)

Description

WINDSTORMS

Windstorms and severe weather pose a risk to life and property in the region by creating conditions that disrupt essential systems such as public utilities, telecommunications, and transportation routes. High winds can and do occasionally cause tornado-like damage to local homes and businesses. Severe windstorms can present a very destabilizing effect on the dry brush that covers local hillsides and urban-wildland interface areas. High winds can have destructive impacts, especially on trees, power lines, and other utility services. In Brea, severe weather patterns, such as Santa Ana Wind conditions, are recognized hazards.

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, these low- and high-pressure zones may occasionally 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.



Santa Ana Wind event description

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 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 the normal temperature range. There are generally three types of extreme heat events:

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

WINTER STORMS

Winter storms are also known as thunderstorms. A thunderstorm is a storm with lightning and thunder produced by a cumulonimbus cloud, usually producing gusty winds, heavy rain, and

sometimes hail. A typical thunderstorm is 15 miles in diameter and lasts an average of 30 minutes. A thunderstorm is formed from a combination of moisture, rapidly rising warm air, and a force capable of lifting air, such as a warm and cold front, a sea breeze, or a mountain. During severe weather events such as thunderstorms, rain can fall at such a high rate that it cannot drain away fast enough. The resulting heavy rain can cause flooding, leading to inundation and potential damage to buildings, road networks, public areas, utilities, and other critical pieces of infrastructure. In California, heavy rainfall events are often short, intense bursts of rain, but in some cases, heavy rain can persist for multiple days.

All thunderstorms are dangerous. About 10% of the thunderstorms that occur each year in the United States are classified as severe (a thunderstorm is considered severe if it produces hail at least 3/4 inch in diameter, winds 58mph or greater, or tornadoes.) Heavy rain from thunderstorms can lead to flash flooding (which is the number one thunderstorm killer.) Strong winds, hail, and tornadoes are also dangers associated with some thunderstorms.

Location and Extent

WINDSTORM

In Southern California, the most common type of windstorm 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 with allergies.[14]

The entirety of the City can be affected by windstorms. Usually, they cause minimal damage; however, severe storms can cause massive damage to the City and personal property. Brea is often affected by Santa Ana winds blowing through the San Joaquin Hills. 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 classified as force nine or above is generally considered a windstorm event. **Table 3-10** details how the Beaufort scale classifies wind events.

EXTREME HEAT

Extreme heat events will differ from region to region since different areas have historically high temperatures. For example, an extreme heat day on the coast will feel different than an extreme heat day in the High Desert. The reason for this is how humidity affects the perceived heat that people feel. Humid conditions will make a day feel hotter than non-humid conditions, even though the temperature may be the same. The difference between the perceived and actual temperatures is known as the “heat index.” To illustrate the effect of the heat index, a 90-degree day with 50 percent humidity feels like 95°F, whereas a 90°F Day with 90 percent humidity feels like 122°F. **Figure 3-6** illustrates the National Oceanic and Atmospheric Administration's (NOAA) National Weather Service Heat Index.

Extreme heat events are not limited to any part of the city. They occur with the same intensity and duration at the same time across all locations in Brea. For Brea, an extreme heat day involves a

14 Means, Tiffany. “What Are the Santa Ana Winds?” Farmers’ Almanac - Plan Your Day. Grow Your Life., June 5, 2024. https://www.farmersalmanac.com/what-are-the-santa-ana-winds.

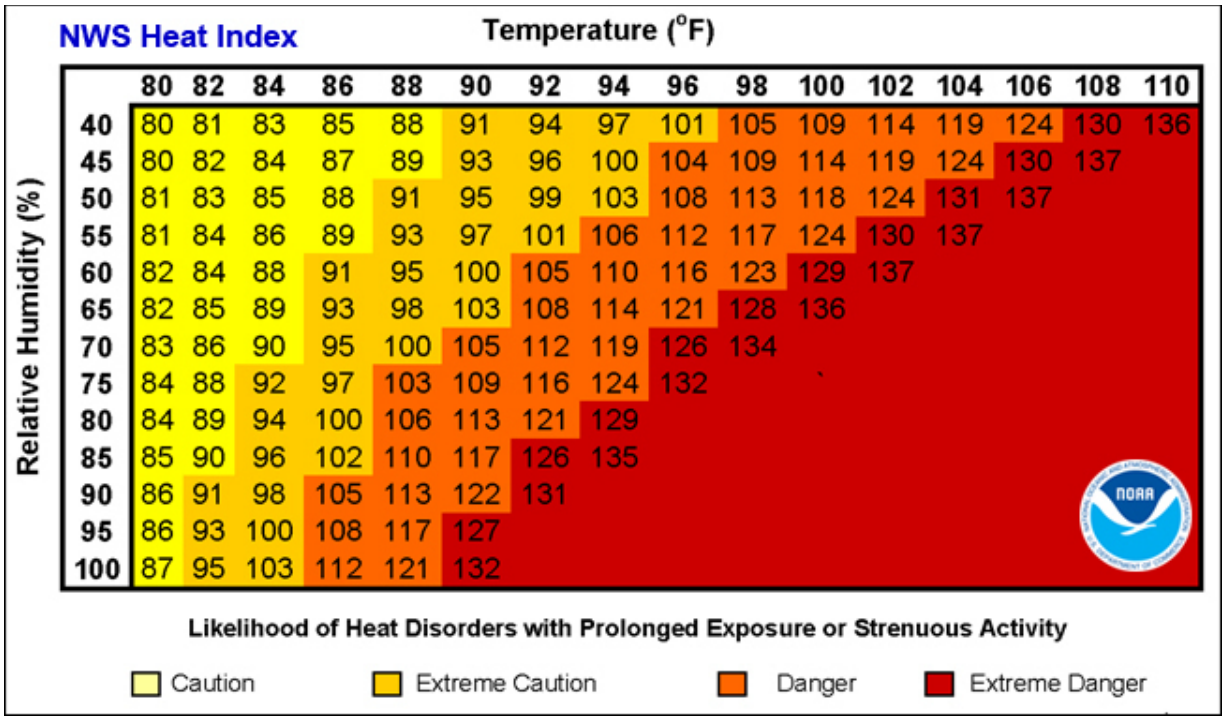
temperature that exceeds 99.3°F, and a warm night involves a temperature that exceeds 66.5°F.[15] These thresholds are based on a 2% probability event.

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.

FIGURE 3-6: NOAA'S NATIONAL WEATHER SERVICE HEAT INDEX



[15] https://cal-adapt.org/tools/local-climate-change-snapshot

WINTER STORMS

The location and size of a rain event vary depending on regional geography and regional and global weather events. For example, small precipitation events may occur in only one section of Brea. In contrast, a large rain event could inundate most of Orange County and other parts of Southern California. Understanding this, any part of the City could become inundated by rain, and there isn't one part of the City that is more susceptible to rainfall than another.

California's precipitation varies yearly, depending on how much moisture the state receives from atmospheric rivers. Atmospheric rivers are corridors along which wet air travels from the tropics to continents. When the moisture arrives in California, it may precipitate as rain or snow. One of California's most known atmospheric rivers is the "Pineapple Express," which brings moist air from the ocean surrounding Hawaii to California. An immense amount of moisture may be transported along the atmospheric rivers that cross over California during certain years, leading to severe rains.[16]

Another weather phenomenon influencing rainfall in Southern California is "El Niño," officially referred to as the "Southern Oscillation" or "El Niño-Southern Oscillation (ENSO)." ENSO can cause increased rainfall, particularly during the winter months, caused by the warming of the surface of the eastern tropical Pacific Ocean, leading to the evaporation of warm, moist air into the atmosphere. Winds bring this moisture to the eastern Pacific and the American continents, where it falls as rain. ENSO does not always lead to increased rainfall by default, but in general, it can increase the chances of winter with higher-than-usual precipitation.[17,18]

Rain events are usually measured by the amount of precipitation that falls.[19] **Table 3-11** categorizes rain events by the amount of precipitation per hour.

TABLE 3-11: RAIN EVENTS CATEGORIZED BY PRECIPITATION PER HOUR

Rain Type	Description
Heavy Rain	More than 4 mm per hour but less than 8 mm per hour
Very Heavy Rain	Greater than 8 mm per hour
Moderate Shower	Greater than 2 mm, but less than 10 mm per hour
Heavy Shower	Greater than 10 mm per hour, but less than 50 mm per hour
Violent Shower	Greater than 50 mm per hour

Source: https://water.usgs.gov/edu/activity-howmuchrain-metric.html

mm = millimeter

Past Events

WINDSTORM

There have been several strong wind events recorded around the City of Brea. The following depicts some of these Santa Ana winds and other major windstorm events in the city, neighboring

16 NOAA. 2023. "Atmospheric Rivers: What are they and how does NOAA study them?" https://research.noaa.gov/2023/01/11/atmospheric-rivers-what-are-they-and-how-does-noaa-study them/#:~:text=Atmospheric%20rivers%20are%20long%2C%20concentrated,landfall%2C%20especially%20over%20 mountainous%20terrain.

17 NOAA. 2014. "What Is the El Niño–Southern Oscillation (ENSO) in a Nutshell? https://www.climate.gov/news-features/blogs/enso/what-el-ni%C3%B1o%E2%80%93southern-oscillation-enso-nutshell

18 NOAA. 2016. "El Niño and La Niña: Frequently Asked Questions." https://www.climate.gov/news-features/understanding-climate/el-ni%C3%B1o-and-la-ni%C3%B1a-frequently-asked-questions/

19 NOAA. 2024. "El Niño & La Niña (El Niño – Southern Oscillation) https://www.climate.gov/enso

communities, Orange County, and the surrounding region. Santa Ana Wind events have been and will continue to be a hazard of concern for the city.[20]

- **January 6, 1997** – A major storm system brings winds that gust 99 mph in Fremont Canyon and 58 mph throughout the region. Tree damage was widespread, destroying thousands of trees, and a regional power grid took a hit, resulting in some 900,000 people losing power, the largest interruption of service since 1983. Several TV and radio stations were knocked off the air.
- **March 31 – April 1, 2000** – Santa Ana winds blow through the Inland Empire and Orange County, gusts of 93 mph reported in Mission Viejo, 67 mph in Anaheim Hills, property damages and downed trees reported.
- **January 6, 2003** – One of the strongest Santa Ana Windstorms in over a decade. Power transmission poles were toppled in Orange, leaving thousands without power.
- **January 21, 2010** – Severe windstorms, 90 mph winds, and a tornado struck much of Orange County, with damage reported countywide. Damage to property and trees was extensive.
- **December 2010/January 2011** – Massive winter storms struck the region, and wind and rain caused extensive damage throughout Southern California and Orange County. The storm was destructive enough to result in a Presidential Disaster Declaration (DR 1952).
- **October 16, 2018** – Gusts of over 66 mph in parts of Orange County in a massive windstorm caused toppled trees to down power lines, disrupting power to some 16,000 customers, fatally injuring a woman in her car when eucalyptus tree toppled in Tustin.
- **January 29, 2020** – High winds and warm temperatures were expected across Orange County. Winds, blowing at a sustained 20 to 30 miles per hour, gusting at up to 60 miles per hour countywide. Property damage and toppled trees were reported throughout the County.
- **November 24, 2021** – In Orange County, gusts of 40 to 50 mph, occasionally reaching 60 mph in mountain canyons. PSPS circuits were powered off to avoid potential wildfire complications, leaving thousands without power.
- **November 23, 2022** – Orange County reports 30-40 mph winds with gusts from 60-70 mph throughout the Orange County foothills. This caused power to be lost to thousands in some cities in the County.[21]

EXTREME HEAT

Based on Cal Adapt's historical information (1950 through 2005), the city experiences three extreme heat days yearly. The city experienced a 4-day heatwave during this same period, approximately every four years. In 2022, California experienced one of the worst heatwaves it has ever experienced. From September 1st through September 9th, 2022, temperature records for September were shattered across the western portion of the United States, including Brea, where temperatures were reported as reaching 108° F. Prior to this, a heat wave in 1997 affected Southern California, causing 5 deaths. Temperatures in Brea reached 113° F during this event.

20 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

WINTER STORMS

Brea and Orange County as a region are no strangers to severe weather and thunderstorms. The following lists some recent major storm events in the surrounding communities and Orange County.

- **March 16, 1977** – A tornado that was caused by a severe storm skipped from the City of Fullerton to the City of Brea; damage to 80 homes and injuries to 4 people was reported.
- **November 9, 1982** – Seven tornadoes touched down in the LA Basin. Three of the tornadoes began as waterspouts at Pt. Mugu, Malibu, and Long Beach. The Long Beach waterspout moved ten miles inland, becoming an F2 tornado. Another tornado reached F2 strength in Van Nuys. Two other tornadoes were in Garden Grove and Mission Viejo. Damage to properties and trees being toppled was reported.
- **August 22, 1988** – A strong thunderstorm (a rare event for summer) rolled through Orange County. Power was knocked out to 40,000 people.
- **February 8, 1993** – Tornado touched down in Brea, property damage was reported.
- **December 6, 1997** – A stationary line of thunderstorms brought the heaviest rain in 70 years to portions of Orange County, with widespread 4" to 8" rainfall totals. Widespread flooding in Orange County, mudslides, and coastal erosion occurred.
- **September 2, 1998** – Strong winds from thunderstorms in Orange County with gusts to 40 mph.
- **February 11, 2001** – A heavy winter storm produced 2.5" of rainfall in Orange County and the City. Extensive urban flooding and mudslides occurred. Trees and powerlines were knocked down throughout the County.
- **May 22, 2008** - Heavy rains from thunderstorms were produced by a very cold and unstable front from the north. Several debris flows occurred in the Santiago burn area of eastern Orange County; damage was done to homes and businesses.
- **January 15, 2019** – A winter storm brought a band of very heavy rain to Orange County. Beach communities reported 2" of rain in two hours. The intense rain produced flash flooding; water levels rose high enough to cause the Pacific Coast Highway to close for over a day in Huntington Beach.
- **April 8-10, 2020** – A warm front moved through the region and brought waves of showers from south to north in the County. Following the warm front, an upper low moved into the region, bringing 3" to 5" of rain to Orange County. Numerous flash floods and floods in the region resulted.
- **January 29, 2021** – A powerful winter storm and atmospheric river brought heavy rain. Approximately 1.5" of rain fell across Santiago Canyon in northeastern Orange County.
- **January 11, 2023** – A large storm battered Southern California, flooding parts of Orange County. Fullerton and Brea both saw more than 2" of rain.
- **August 20, 2023** – Once a Category 4 hurricane, Tropical Storm Hilary tore through Southern California with historic rainfall, flooding roads and knocking out power throughout the region. Over 2.6" of rain fell in Brea; no injuries or serious damage were reported.

Risk of Future Events

WINDSTORM

Given the region's history of windstorm 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 of windstorm events occurring again in the future is highly likely. As discussed in **Tables 3-2 and 3-**

3, a "highly likely" probability indicates a greater than ten percent chance of windstorms occurring annually.

EXTREME HEAT

As temperatures rise throughout California, the number of extreme heat days will also increase. According to Cal-Adapt data, which relies on NOAA data sources, Brea experiences extreme heat days. The city historically (1950-2005) experienced, on average, four extreme heat days annually based on this historic period. That number of days increased to 14 days annually from 2035-2064. According to Cal-Adapt, the city is projected to experience an annual average of 31 extreme heat days by 2100.

WINTER/COASTAL STORMS

There is no indication that rainfall or severe rain hazards will abate either in Brea or the greater region of Southern California in the future. While Brea may experience prolonged periods of dry or wet years, all expectations are that the probability they will occur again in the future is highly likely and anticipated to increase in the future is highly likely. As identified in **Tables 3-2** and **Table 3-3**, the future probability for this hazard is more than ten percent chance each year.

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.[22] This increase in storm intensity may also bring more intense winds to the Southern California region, including Brea.

Studies indicate that climate change may affect Santa Ana wind events in varying ways, 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.[23] 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.

EXTREME HEAT

The primary effect of climate change is warmer average temperatures. The hottest years on record have occurred since 2000, with 2016 and 2020 being tied.[24] As climate change accelerates in the 21st century, extreme heat events are anticipated to become more frequent and intense in the city. The projection is that extreme heat days could increase between 15 and 31 days annually

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

23 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

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

by 2100, and the city can expect a shift in residential and business needs for cooling and addressing heat-related issues.

WINTER STORMS

Climate change is expected to alter rainfall patterns in Southern California, including Brea. As the climate warms, rain events are predicted to become more intense. Brea will likely experience more rain inundation events that lead to flooding and erosion and increase the threat of dam failure, landslides, and other potential hazards within the community and surrounding area.

INFRASTRUCTURE FAILURE (POWER FAILURE)

Description

INFRASTRUCTURE FAILURE

Infrastructure failure is when a piece of infrastructure fails in such a way that it threatens people, property, or other community assets. Generally, infrastructure failure is categorized into two threats: active and passive. During an active threat, infrastructure fails, releasing a harmful or potentially harmful substance, such as a broken wastewater line that releases untreated sewage. A passive threat involves infrastructure that cannot perform its function. The failure itself is not dangerous, but under the right circumstances, the failure can increase the risks to people or property. For example, a clogged storm drain is not directly dangerous but can lead to flooding during a storm. Some infrastructure failures may be both active and passive. For example, a broken power line is directly dangerous (it creates a threat of electrocution, and the wires may spark a wildfire) and creates an indirect risk (the loss of electricity service can be harmful during hot weather).

Infrastructure failures often occur due to natural hazards like floods or high winds. Failures can also occur because of human error, deliberate action, or improper infrastructure maintenance and failure due to overuse or wear and tear. Some infrastructure failures can directly cause other hazardous situations. Utility lines (power lines, water and wastewater pipes, natural gas lines, etc.), flood control and drainage infrastructure, erosion control measures, and other forms of infrastructure can all create hazardous situations in the event of failure.

POWER FAILURE

An energy/power failure is an event that occurs within an electric power system when the total real or reactive power of the power plants in the system is insufficient to supply all consumers with electric power of the required quality. These events are considered a lifeline system failure. These failures or outages can be the primary hazard, or these events can directly result from another hazard, such as an earthquake, extreme weather event, or flood. These failures can also be in conjunction with other lifeline system failures such as natural gas, communication, drinking water, wastewater disposal, or transportation. Power failure can exacerbate and or create detrimental effects on these various operational and lifeline systems. For this hazard profile discussion, energy/power failure incidents are the primary hazard of concern; however, power failure associated with other hazard events is a concern for many of the other hazards profiled in this plan.

Generally, these power failure events are the direct result of events beyond the control of the City. These events often occur during a time of extreme demand/need for power, such as an extreme heatwave that creates an enormous strain on the power grid as residents try to stay cool. Most of these energy outages are short-term but can last for weeks if the situation is dire. There are three

(3) types of power/energy failures or outages; each of them is categorized based on duration and the actual effect of the failure/outage event:

- *Permanent* - a massive loss of power typically caused by a fault on a powerline; however, power is restored automatically once the fault has been cleared.
- *Brownout* - a sag (or drop) in voltage in an electrical power supply. They can cause equipment or various operational systems to perform poorly.
- *Blackout* - a total loss of power in an area; the worst form of a power outage. Blackouts can last from a few minutes to multiple weeks, depending on the nature of the causing event and the configuration of the actual electric network.

A Public Safety Power Shutoff (PSPS) is a practice that Southern California Edison (SCE, provider of electricity for Brea) and other utility companies may use to preemptively shut off power in high fire hazard areas to reduce fire risk during extreme and potentially dangerous weather conditions (hot, dry, and windy). According to the SCE[25], PSPS events are the last resort option in a line of operational procedures employed to mitigate fire risk when conditions warrant. In considering whether to shut off power to lines in affected areas, SCE considers the following factors, which may include, but are not limited to:

- The National Weather Service has issued Red Flag Warnings for counties with SCE circuits in High Fire Risk Areas.
- Ongoing assessments from the SCE in-house meteorologists regarding the local wind speed, humidity, and temperature conditions are informed by strategically deployed weather stations.
- Real-time situational awareness information from highly trained personnel positioned locally in High Fire Risk Areas identified as at risk for extreme weather conditions.
- Input from SCE fire management experts regarding any ongoing firefighting efforts.
- Specific concerns from local and state fire authorities regarding the potential consequences of wildfires in select locations.
- Awareness of mandatory or voluntary evacuation orders in place.
- Expected impact of de-energizing circuits on essential services such as public safety agencies, water pumps, traffic controls, etc.
- Other operational considerations to minimize potential wildfire ignitions.

In advance of PSPS events, SCE will inform local governments about the PSPS protocol, including the location of circuits in their jurisdictions that may be shut off during an event. Notification is provided to residents 48 hours before the potential PSPS event, with follow-up notification occurring 24 hours before the power is shut off. Communication notifications will be made throughout the outage when power has been shut off and then finally again when it is restored. However, as extreme weather can be unpredictable, sometimes advance notification

25 Wildfire and PSPS Fact Sheets. https://www.sce.com/wildfire/psps

and coordination do not conform to this protocol. Notification may occur by phone call, text, the SCE.com website, email, and/or social media accounts.[26]

Location and Extent

INFRASTRUCTURE FAILURE

Infrastructure failure may happen anywhere. The specific risk of any individual piece of infrastructure failing depends on the type of infrastructure, the conditions it is exposed to, and how well it is maintained. Although no piece of infrastructure is completely safe, infrastructure that is well maintained and protected from degradation as much as possible is less likely to suffer failure. There is no scale for infrastructure failure. Key pieces of infrastructure that serve a critical function to the community are analyzed as part of the threat assessment in Chapter 4.

POWER FAILURE

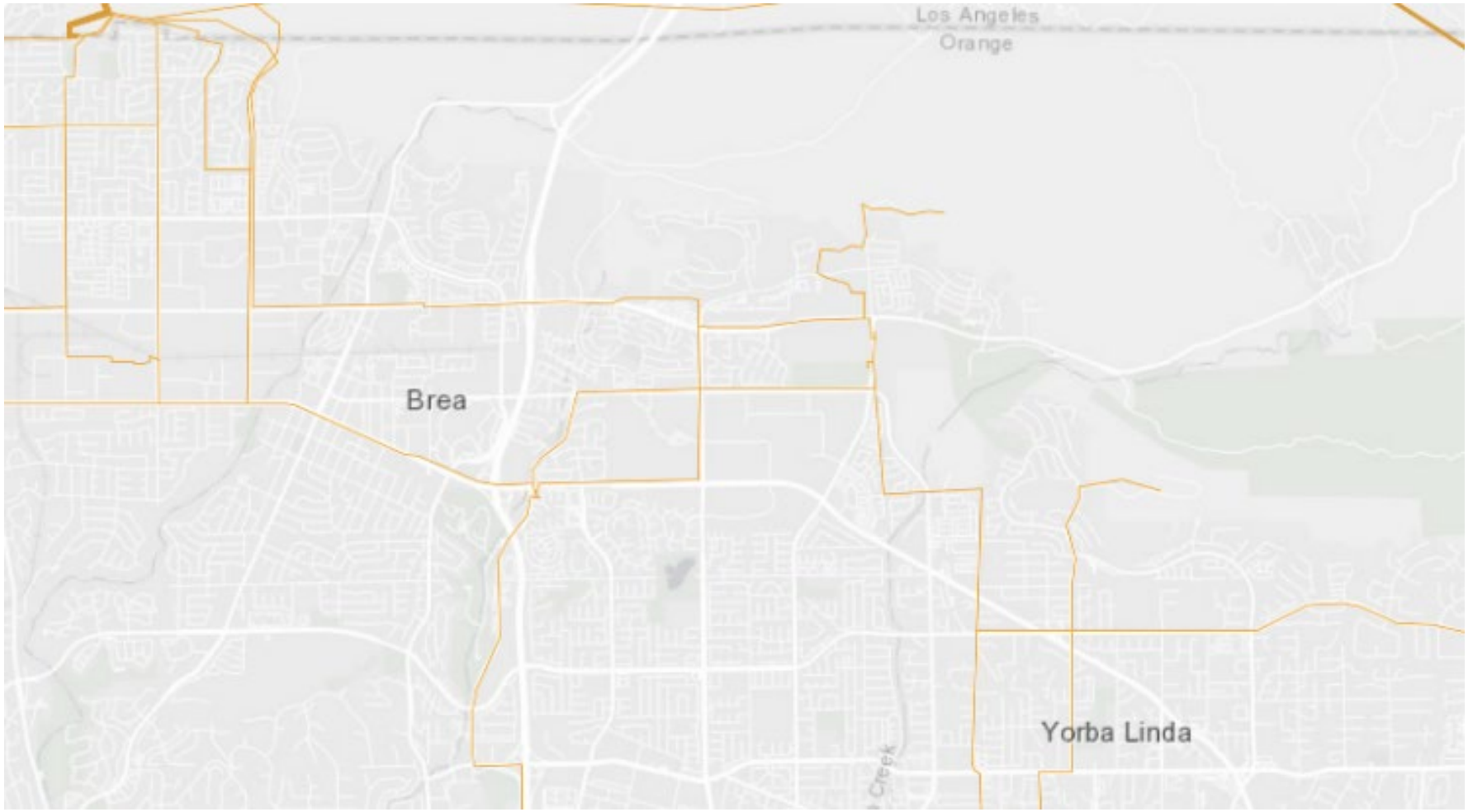
The entire city of Brea is vulnerable to energy/power failure. Most power outage events, as stated earlier, are not necessarily caused by humans. An overwhelming demand for power due to accidents, equipment malfunction/failure, weather conditions, or other natural hazards the City is susceptible to can be the catalyst that creates a loss of energy/power. According to the California Energy Commission, electricity is transmitted to the distribution network from transmission lines that originate from outside city limits, a 500kV transmission line east of Yorba Linda and a 220kv transmission line terminating at the Orange County/Los Angeles County border near La Habra. From these sources, power is then distributed to the City through a series of 66 kV distribution lines (**Figure 3-7**).

Power failure/shortage can occur in only small areas of the city, such as a single location or neighborhood, or the entire grid could fail, suddenly causing the entire city to lose power. Power/energy failure is indiscriminate in who, where, or what it affects; however, locations with older infrastructure or infrastructure located above ground may be more susceptible to weather-related hazards. The duration of these power/energy failures completely depends on the severity of the actual cause of the power loss and what is required to repair the issue or issues.

The electricity industry operated for years through "vertically integrated utilities," meaning that they owned generation, transmission, and distribution, which typically had monopolies in their designated service areas. In 1996, the Federal Regulatory Commission issued orders 888 and 889 requiring utilities with transmission infrastructure to provide nondiscriminatory access to all transmission customers. One way for a utility company to comply with this new requirement was to allow an independent system operator (ISO) to operate their transmission system for them. ISOs do not own the electricity transmitted over the grid, and they allow market participants to transmit electricity at the best available price. In 1998, because of Order 888 and CA state legislation AB 1890, the California ISO was incorporated as a nonprofit public benefit corporation to fulfill this mission. ISOs are often compared to air traffic controllers, as they independently manage the traffic on a power grid they do not own, much like air traffic controllers manage airplane traffic in the airways and on airport runways.

26 “SCE’s 2020 Planning for Public Safety Power Shutoffs (PSPS)”.https://www.sce.com/sites/default/files/2020-06/SCE%E2%80%99s%202020%20PSPS%20Preparations.pdf

FIGURE 3-7: ELECTRICAL POWER DISTRIBUTION GRID IN BREA



Power lines in and around Brea

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The California ISO is one of nine independent system operators in North America (refer to **Figure 3-8)**. Collectively, they deliver over 2.2 million gigawatt-hours of electricity each year and oversee more than 26,000 miles of high-voltage power lines. These independent grid operators serve two-thirds of the United States.[27]

FIGURE 3-8: ALL OF THE ISOS IN NORTH AMERICA

Figure 3-9 identifies the PSPS circuits identified within Orange County. According to SCE, the city has nine separate PSPS circuits that can affect power transmission and distribution within Brea, meaning the city faces potential public safety power shutoff events. This potential is exacerbated during the hot and dry summer/fall months, especially when significant Santa Ana wind events occur. SCE has placed these circuits strategically throughout Orange County to help mitigate the potential threat of wildfires in open space and forested areas. The City needs to anticipate and prepare for the potential effects of these events, including power degradation, an influx of people from neighboring communities/cities affected by power loss and/or evacuation, and increased calls for service.

Past Events

INFRASTRUCTURE FAILURE

Brea has suffered occasional infrastructure failures; however, most incidents have been minor and have not caused catastrophic harm to businesses and residents. Breakage of underground pipes and/or overhead lines has occurred due to failure, human error, or other events like severe weather or flooding.

POWER FAILURE

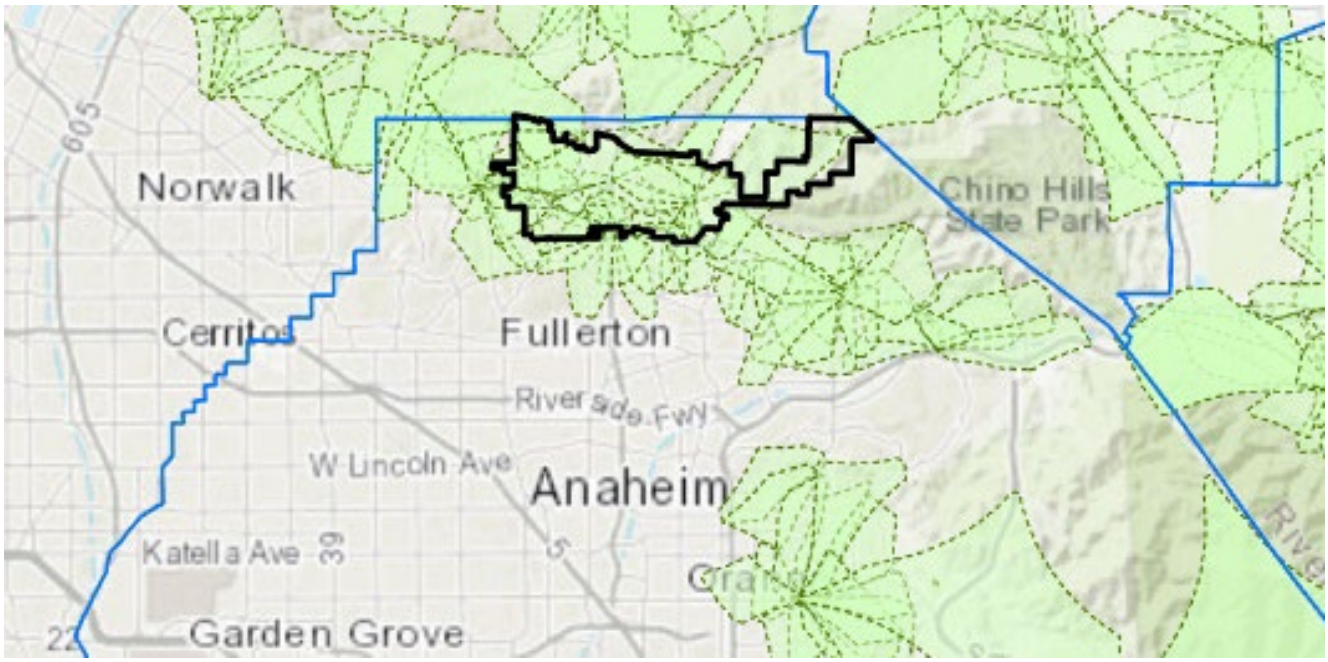
Due to maintenance and infrastructure failure, small-scale power/energy failure frequently occurs throughout Southern California. The City has experienced several occasions where power has been lost due to human-caused errors and natural hazards. Some recent events (within the last 15 years) include:

- **November 13, 2009 -** An Edison underground electrical vault had a faulty cable that failed, resulting in a small explosion that knocked out power and vented smoke from a vent. The Carl's Jr restaurant had to be temporarily closed, as did Imperial Highway at Randolph St, while crews fixed the problem and made the area safe again.
- **July 26, 2015** - A power outage in the vicinity of Imperial Highway and State College Blvd left some 200 residences and businesses without power.
- **June 19, 2016** - A power outage that affected 1,685 residential and commercial customers in West Brea also caused multiple traffic signals to be out in the area. The Brea Community Center was opened to assist residents. Edison crews were dispatched to fix the outage.

27 California ISO website: "ISO History." http://www.caiso.com/about/Pages/OurBusiness/ISO-history.aspx

- **December 3, 2019** - A power outage caused by an Edison transformer malfunction impacted a large portion of Brea, Placentia, and Fullerton. There was a power loss at the Brea Civic Center and the Brea Mall, which necessitated the evacuation of holiday shoppers. Traffic signals were out in areas, prompting warnings from the Brea Police Department. Edison and Public Works crews were dispatched to fix the outage; Edison reported that the malfunction occurred in one substation.

FIGURE 3-9: SOUTHERN CALIFORNIA EDISON PSPS CIRCUITS



Energy failures and blackouts tend to occur on a larger regional scale, affecting Brea residents and businesses depending on the location of the failure. California has experienced some major statewide and regional energy failures due to various reasons, including:

- **December 1982** (near Tracy, California)- Loss of a transmission tower, two (2) 500-kV lines, and a pair of 230-kV lines. Five (5) million people were impacted. (Equipment Failure)[28]
- **October 1989** (Loma Prieta Earthquake)- Loss of substations; 1.4 million people impacted (Seismic Event)[29]
- **August 1996** (region)- Cascading impacts from loss of power from 1996 North American Blackouts[30]

28 “The 3 Worst Power Outages in the History of the U.S”.https://www.a-1-electric.com/the-3-worst-power-outages-in-the-history-of-the-u-s/#:~:text=On%20December%2022nd%2C%201982,going%20without%20electricity%20for%20hours.

29 Eguchi, R. T.; Seligson, H. A. (1994), "Lifeline perspectives" Practical lessons from the Loma Prieta earthquake, National Academies Press.

30 *Venkatasubramanian, Mani V. (2003-08-20)* "Analyzing Blackout Events: Experience from the Major Western Blackouts in 1996."

- **December 1998** (San Francisco)- Loss of substations, impacting 350,000 buildings and 940,000 people. (Infrastructure failure, human error)[31]
- **2000** (statewide)- Power outages due to electricity crisis.[32]
- **2011** (Southwest Blackout)- Cascading impacts from the loss of power from the 23 distinct events on 5 separate power grids impacted 1.4 million people. This was the largest power failure in California history.[33]
- **July 2017** (Los Angeles)- An explosion at a power plant caused widespread outages in San Fernando Valley.[34]

Risk of Future Events

INFRASTRUCTURE FAILURE

Infrastructure failure events are expected to continue in Brea. Events such as clogged or broken storm drains, damaged power lines, and ruptured water and wastewater pipes are likely to occur in the future, particularly as infrastructure ages and new hazards present themselves. More serious but less frequent forms of infrastructure failure may also occur, particularly if key infrastructure is not well maintained. As identified in **Tables 3-2 and 3-3**, the future probability of an infrastructure failure or a power failure is between a one-tenth (0.1%) of a percent and a one percent chance each year.

POWER FAILURE

Today, several mechanisms are in place to monitor, manage, and adapt to changing conditions and demands to help reduce and/or eliminate energy failures. California and regional departments (California Independent System Operator- Cal ISO, Federal Energy Regulatory Commission- FERC, Western Electricity Coordinating Council- WECC, North American Electric Reliability Corporation- NERC, California Public Utilities Commission- CPUC, California Energy Commission- CEC) are focused on energy production, use, and management. Each agency plays a role in planning, managing, and coordinating the allocation of energy within the state of California. Brea can experience a power/energy failure anytime and anywhere throughout the year. The probability of it occurring again will always be present, as the City depends on electricity to function.

Climate Change Considerations

INFRASTRUCTURE FAILURE

Infrastructure failure that is caused by other hazard types may be affected by climate change. Many infrastructure failure events are typically caused by some natural hazards (i.e., flooding, high winds, etc.). As discussed in the Severe Weather section, some severe storms are expected to intensify because of climate change. This, in turn, may increase the frequency and/or severity of infrastructure failures. Climate change is also expected to increase the number of extreme heat

31 “Technician's error caused 1998outage” https://www.sfgate.com/bayarea/article/Technician-s-error-caused-1998-outage-1-death-2595806.php

32 Sweeney, James L. 2002. "The California Electricity Crisis: Lessons for the Future." https://www.nae.edu/Publications/Bridge/OurEnergyFuture/TheCaliforniaElectricityCrisisLessonsfortheFuture.aspx

33 Medina, Jennifer (September 10, 2011) "Human Error Investigated in California Blackout's Spread to Six Million". The New York Times. https://www.nytimes.com/2011/09/10/us/10power.html?scp=1&sq=blackout&st=cse

34 DWP Plant Explosion Causes Massive Power Outage In San Fernando Valley, https://laist.com/news/dwp-plant-explosion-causes-massive

events in Brea. As higher temperatures stress mechanical and electrical systems, this effect may also increase the frequency or severity of infrastructure failure events.

Power Failure

Projections of changing climatic conditions through the end of the century suggest that the City should address future power failure concerns. Energy demands are not anticipated to increase significantly throughout the City (due to compliance with updated codes and requirements); however, electricity production occurs outside the City, reducing opportunities for Brea to be energy-independent. To better address energy/power failure, Brea's current and future climate change mitigation and adaptation efforts should prioritize energy efficiency measures, generate energy locally from clean and renewable sources, and build reliability & redundancy using the latest energy storage and backup systems technologies.

Geologic Hazards (Landslide, Soil Erosion)

Description

Landslide

Landslides are a serious geologic hazard in almost every state in America. Nationally, landslides cause 25 to 50 deaths each year. The best estimate of direct and indirect costs of landslide damage in the United States ranges between $1 and $2 billion annually. As a seismically active region, California has had many locations impacted by landslides. Some landslides result in private property damage, and other landslides impact transportation corridors, fuel and energy conduits, and communication facilities. They can also pose a serious threat to human life.

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 destabilize 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.

Landslides can be broken down into two categories: (1) rapidly moving (generally known as debris flows), and (2) slow moving. Rapidly moving landslides or debris flows present the greatest risk to human life, and people living in or traveling through areas prone to rapidly moving landslides are at increased risk of serious injury. Slow-moving landslides can cause significant property damage but are less likely to result in serious human injuries.

Soil Erosion

Soil erosion is a gradual process of movement and transport of the upper layer of soil (topsoil) by different agents – particularly water, wind, and mass movement – causing its deterioration in the long term. Soil erosion is a complex process that depends on soil properties, ground slope, vegetation, and rainfall amount and intensity. The agents of soil erosion are the same as those of all types of erosion: water, wind, ice, or gravity. Running water is the leading cause of soil erosion because water is abundant and has a lot of power. Wind is also a leading cause of soil erosion because wind can pick up soil and blow it far away. Activities that remove vegetation (such as farming, grazing, logging, mining, recreation activities, and construction), disturb the ground, or allow the ground to dry are activities that increase erosion.

Location and Extent

LANDLSIDE

Identifying hazardous locations is an essential step toward implementing more informed mitigation activities. The city's foothill areas, as well as the structures and people in these areas, are vulnerable to slope instability. According to the study performed in 2004 by the United States Geological Survey (USGS) and the California Geological Survey (CGS), slope instability is a concern in the Santa Ana Quadrangle, which encompasses the City of Brea.[35] Slope stability hazards in the city correspond primarily to the city's sloped and undeveloped areas, as grading activities and soil remediation techniques have been used to mitigate these hazards before development.

Landsliding and the accompanying debris/mud flows are the dominant geologic hazard risk in the City of Brea. The city's hilly and canyon-like topography lends itself to landslide susceptibility. In addition, factors that contribute to slope instability and landslides include rainfall and earthquakes. Debris flows can occur rapidly and without warning during periods of exceptionally high rainfall. Rockfall and mudflow hazards are more likely to occur, especially along Carbon Canyon Road and Brea Canyon.

The potential for slope failure is dependent on many factors and their interrelationships. Some of the most important factors include slope height, slope steepness, sheer strength, orientation of weak layers in the underlying geologic unity, and poor water pressures. Joints and shears, which weaken the rock fabric, allow water penetration, leading to deeper weathering of the rock, increasing the pressures, the plasticity of weak clays, and the weight of the landmass. These factors are combined in calculations to determine if a slope meets a minimum safety standard for the engineering of earth materials. The generally accepted standard is a factor of safety of 1.5 or greater, where (1.0 equilibrium and less than 1.0 is failure). Although existing landslides are not widespread in the area, it is probable that many of the steeper hillsides do not meet the minimum factor of safety, and slope stabilization may be needed if development reaches these areas. Natural slopes, graded slopes, or graded/natural slope combinations must meet these minimum engineering standards where they impact planned homes, subdivisions, or other types of developments. Slopes adjacent to areas where the risk of economic losses from land sliding is small, such as parks and mountain roadways, are often allowed a lesser safety factor. **Figure 3-10** shows the areas of the city mapped as landslide hazard zones.

SOIL EROSION

Erosion conditions exist in all the same areas in the City where landslide susceptibility is present. This is especially a concern in the City's Brea Canyon and Carbon Canyon areas. Refer to **Figures 3-10** and **3-11** as a point of reference for these areas. Any areas in the City with steep slopes will always be susceptible to erosion, especially during heavy rain and wind events.

[35] Geologic Map of the Santa Ana 30' x 60' Quadrangle, D.M Morton. https://pubs.usgs.gov/of/1999/of99-172/

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FIGURE 3-10: LANDSLIDE HAZARD ZONES IN BREA

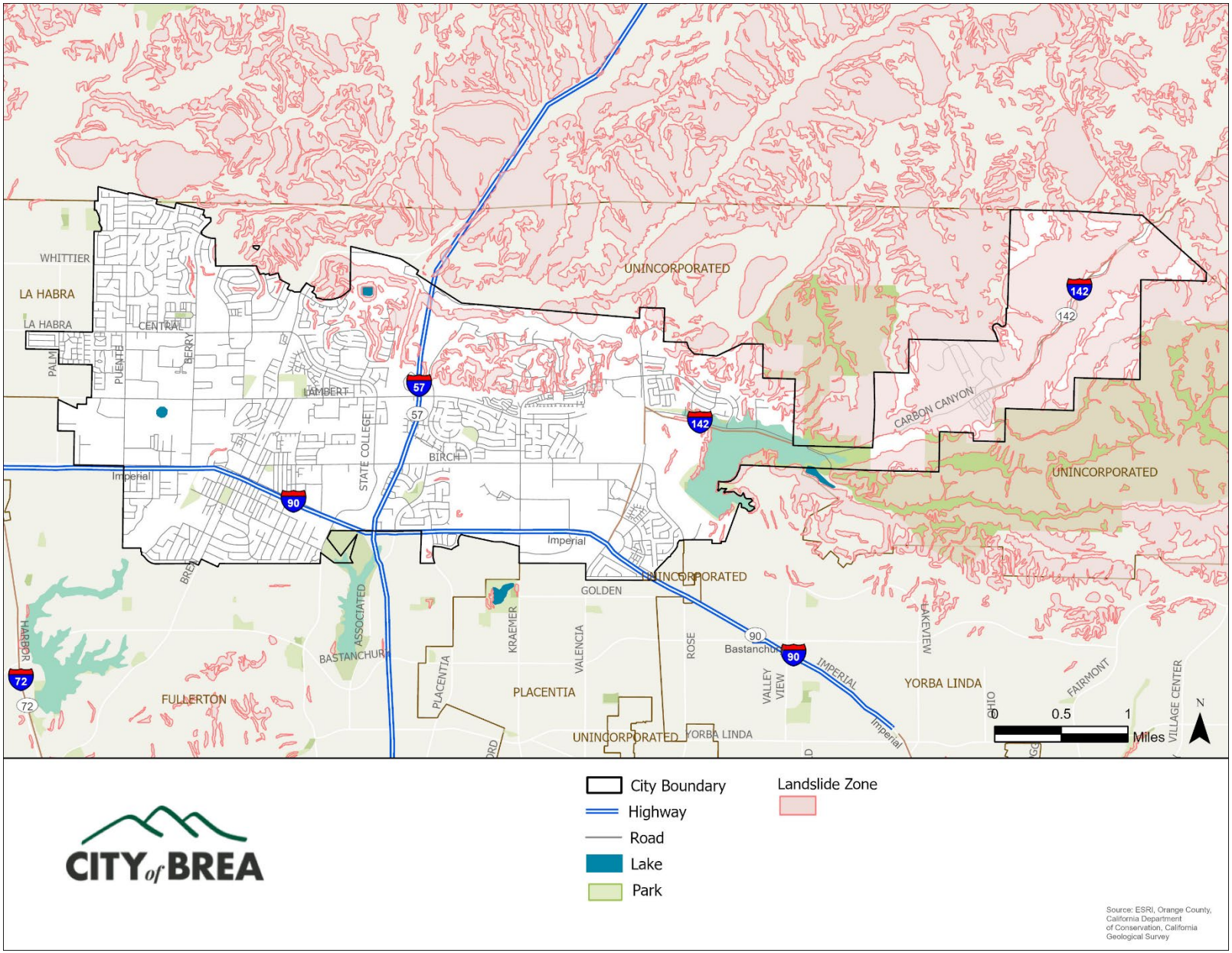
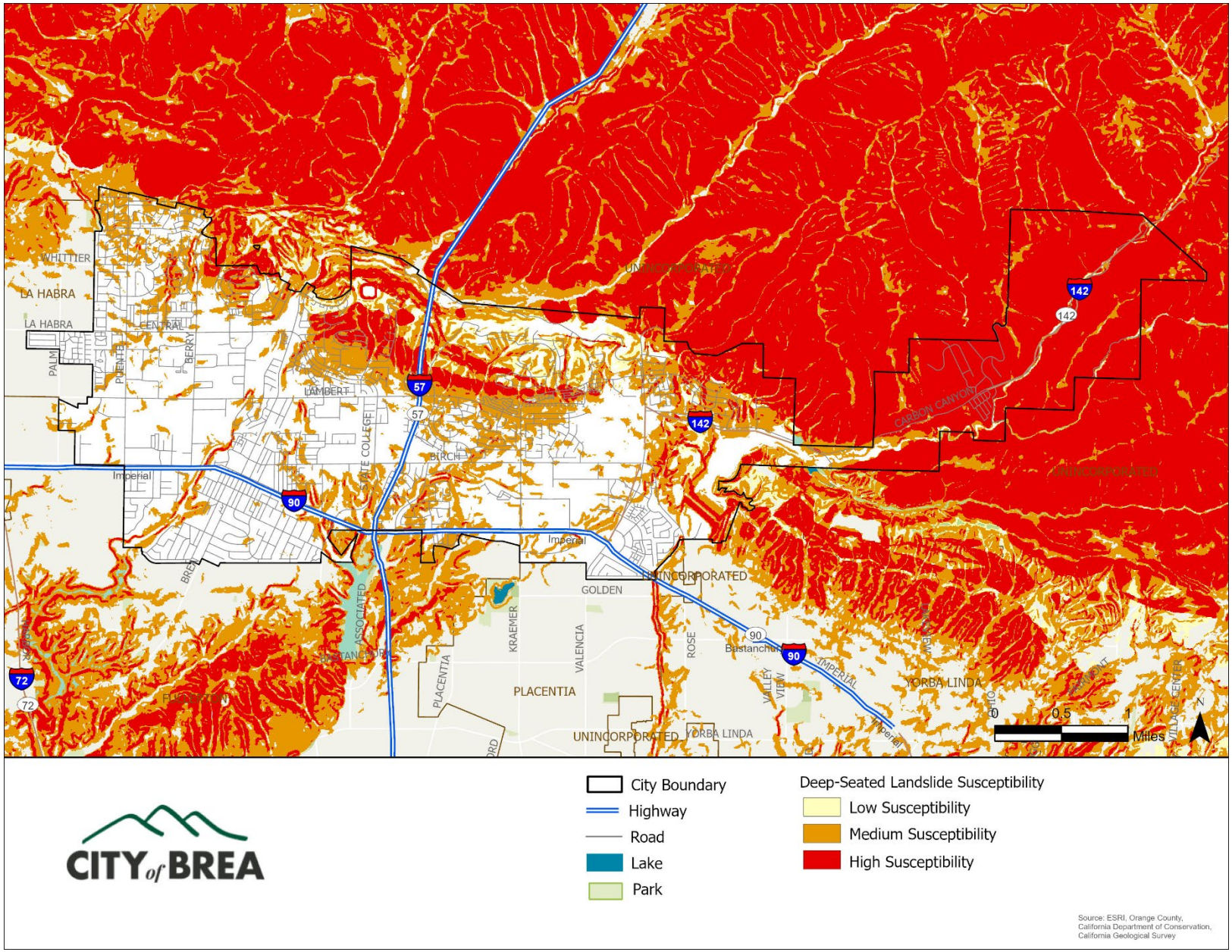


FIGURE 3-11: LANDSLIDE SUSCEPTIBILITY AREAS IN BREA



Past Events

LANDSLIDE

The hilly topography of the City and the surrounding area make it susceptible to landslides and erosion. Given this topography, some major landslides have occurred in the City, the county, and the region. Land sliding may result from heavy rain, erosion, removal of vegetation, and seismic activity. Listed below are some of these major landslide events.

- **October 2, 1978** – *Bluebird Canyon, Laguna Beach:* unusually heavy rains in March of 1978 may have contributed to the landslide initiation. Although the 1978 slide area was approximately 3.5 acres, it is suspected to be a portion of a larger, ancient landslide. Sixty houses were destroyed or damaged, causing over $52 million in damage at the time.
- **January 19, 1993** – *Anaheim Hills:* 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.
- **February 8, 1998** – *Brea*: a rock and mudslide caused the closure of Carbon Canyon Rd in Brea.
- **February 24, 1998** – *Brea:* Carbon Canyon Rd was closed after a hillside slid across half of the road at the La Vida Hot Springs Resort.
- **March 19, 1998** – *Laguna Niguel*: during the 1997/1998 El Nino Season, heavy rainfall increased movement on the site of an ancient landslide in Laguna Niguel. The storms in December 1997 had accelerated its movement, and in early 1998, a crumbling hillside forced the evacuation of 10 hilltop homes and more than 10 condominium units resting below. Ultimately, four hilltop homes collapsed, falling down the hillside into the void created by the slide area. The condominium complex has since been demolished, and the site is now open space.
- **December 12, 2008** – *Brea*: a major storm, brought 1-2" of rain overnight, causing mud and debris to be carried onto Carbon Canyon Rd below. This area was affected by the Freeway Complex Fire earlier in the year. The heavy rains, burn scar, and lack of vegetation created a dangerous scenario.
- **March 3, 2014** – *Brea*: the La Habra Earthquake caused several landslides in Carbon Canyon, prompting closures along Carbon Canyon Rd west of Olinda Village and the area between Olinda Village and Chino Hills State Park Discovery Center. It was also reported that a rockslide caused a car to be overturned when struck by the slide, but thankfully, only minor injuries were reported. It took several days to clean up the slides and have the area evaluated for safety by geologists before re-opening the road to the public.
- **January 23, 2017** – *Brea:* heavy rains caused a hill to collapse, creating a large mudslide of mud and debris along Carbon Canyon Rd near Santa Fe Rd. Clean-up crews worked around the clock and had the added difficulty of secondary slides repeatedly occurring during the cleanup process as the rains continued. Days later, the work continued as crews removed excess dirt from the hillside to prepare for the next storm.
  June 14, 2023 – *Brea*: a rockslide in Carbon Canyon caused Carbon Canyon Rd to be closed from Santa Fe Rd to Olinda Dr into the afternoon.

EROSION

Specific evidence of erosion wasn't available; however, most properties within the city, Carbon Canyon, and the surrounding area are characterized by steep, rugged hillside terrain subject to landslides and soil erosion. Wildfires and heavy rains are major contributors to soil erosion,

leading to the degradation and stability of hillsides, and are generally the underlying reason for most landslides, including those events that occur within the city.

Risk of Future Events

LANDSLIDE

The potential for landslides will continue to exist in areas of the city, especially those in Brea located along the canyons and hillier sections of the City. All expectations are that the probability of a landslide occurring again is likely. As discussed in **Table 3-2 and Table 3-3**, there is a probability of greater than a ten percent chance of a landslide occurring annually.

EROSION

The potential for erosion will continue to exist in areas of the city, especially those in Brea located along the canyons and hillier sections of the City. All expectations are that the probability of erosion occurring in the future is likely. As discussed in **Table 3-2 and Table 3-3**, there is a probability of greater than a ten percent chance of a landslide occurring annually.

Climate Change Considerations

LANDSLIDE

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 soil on slopes and making future landslide events more likely.

EROSION

Climate change could also affect the conditions in which erosion occurs, such as an increased frequency and intensity of rainstorms, increased temperatures leading to dryer overall conditions, and the decline/death of slope-stabilizing plant cover, further increasing the susceptibility of erosion in the hilly areas of the City.

FLOODING (INCLUDING DAM FAILURE)

Description

FLOOD

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 people needing 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: El Niño, the warm and wet phase, and 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.

Dam Failure

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.

Location and Extent

Flood

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 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 the 100-year flood and 500-year flood zones. These designations do not refer to floods that occur every 100 or 500 years but to the likelihood of occurring yearly. 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 3-12** 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. For example, an area with a three-foot BFE can expect to see a minimum floodwater depth of three feet with potentially additional depth in particularly severe flood events.

TABLE 3-12: 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)
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.

FEMA has designated most Brea as lying within Zone “X,” generally meaning the City is not in danger of a 500-year flood. 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 maintained by the Street, Sewer, Storm Drain and Sanitation Division of the Public Works Department through its stormwater management plan, to the regional facilities owned and maintained by the Orange County Flood Control District. The Orange County Flood Control District has constructed and maintains several improved flood control channels within Brea, most notably Brea Creek Channel west of and parallel to Brea Boulevard and the Loftus Channel east of SR-57, below Birch Street. The Brea Creek Channel captures and conveys significant runoff from the hillsides. Any new development that would affect the volume or speed of runoff within the creek’s tributary to the Brea Creek Channel would be required to maintain channel capacity and function to protect adjacent and downstream properties. The area upstream from Carbon Canyon Dam is open space specifically designed and intended to accommodate flood waters.[36] Brea has experienced minor flooding on city streets, residential mud run-off, brownouts, repeated closure, and significant damage along Carbon Canyon Road (State Highway 142), which accesses Olinda Village and Chino Hills. This road is particularly prone to problems during heavy rain - if not from the storm directly, then also from

36 2021 Brea General Plan Safety Element, Flood Concerns.

resulting mudslides, loose rocks, and car accidents.[37] Ponding events can occur on any flat surface where sufficient drainage is unavailable. These include parking lots, landscaped areas, 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. **Figure 3-12** depicts the city's 100-year and 500-year flood zones as mapped by FEMA.

Table 3-13 identifies relevant data regarding Brea from the National Flood Insurance Program (NFIP).

TABLE 3-13 NFIP DATA FOR BREA

Total Number of Policies:	**44**
Total Premiums:	$101,332
Insurance in Force:	$15,659,000
Total Number of Closed Paid Losses:	2
$ of Closed Paid Losses:	$6,613
# of Repetitive Loss (RL) Properties	0
# of Severe Repetitive Loss (SRL) Properties	0
CRS Class Rating	N/A

Source: FEMA, 2023

37 City of Brea Website: Homepage, City Services, Fire, Emergency Preparedness, Flooding & Storms

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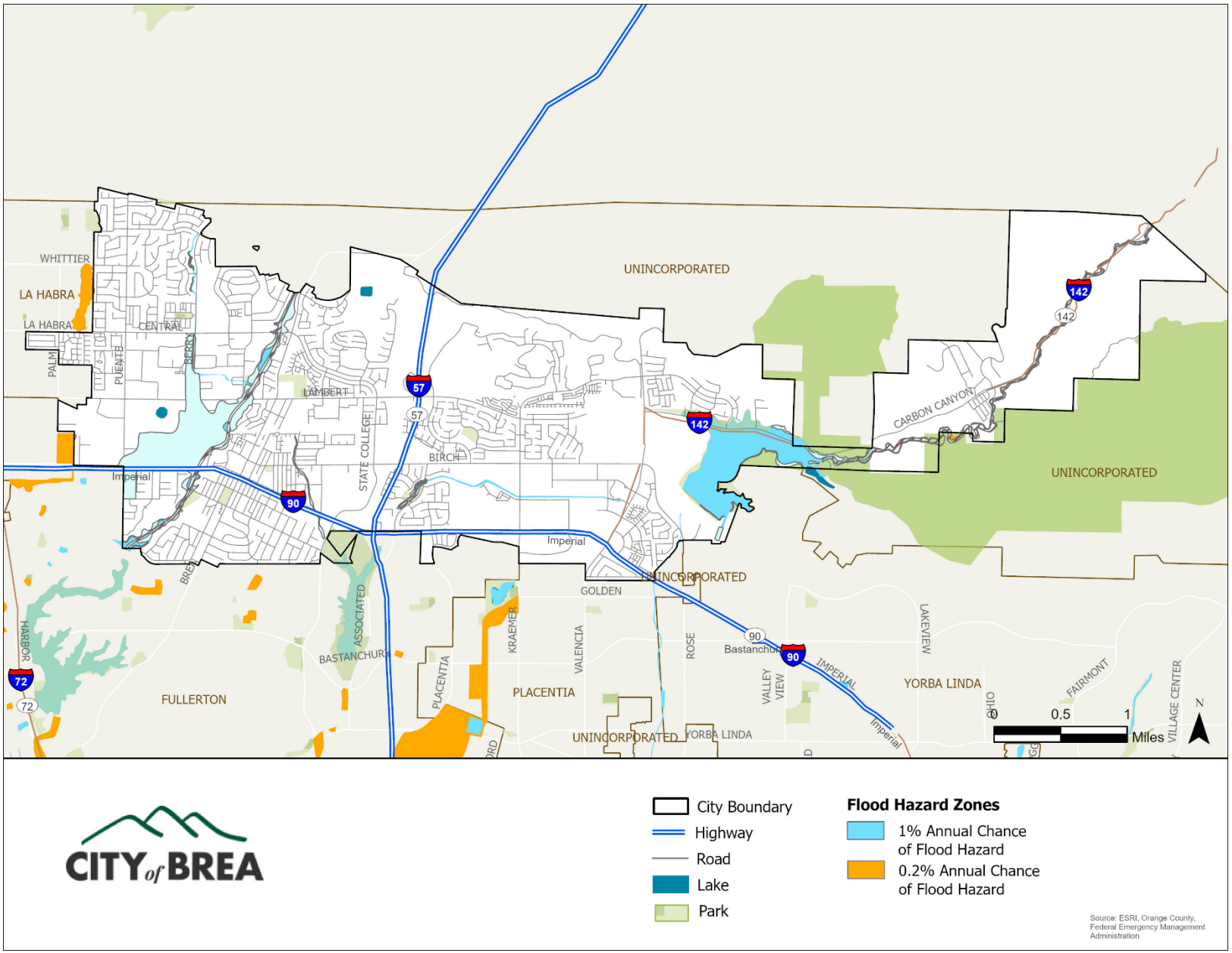
FIGURE 3-12: FEMA 100 – YEAR AND 500 -YEAR FLOOD ZONES IN BREA



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DAM FAILURE

Inundation from the following dams and reservoirs could potentially result in flooding in Brea in the event of failure:

Carbon Canyon Dam

- **Carbon Canyon Dam** - Carbon Canyon Dam is located near the northern edge of Orange County, California. The dam is approximately 4 miles east of the city of Brea and approximately 12 miles north of the city of Santa Ana. Carbon Canyon Dam and Reservoir was constructed and is owned and operated by the U.S. Army Corps of Engineers, Los Angeles District (LAD). Construction of this dam started in April 1959. It was completed on 9 May 1961, under the authority of the Flood Control Act of 1936, based on the 29 July 1935 report of the Orange County Flood Control District (OCFCD) in connection with an application for a grant under the Federal Emergency Relief Appropriation Act of 1935. Its primary purpose is for flood control in and around the drainage basin. In conjunction with Brea and Fullerton Dams, Carbon Canyon Dam is vital for the flood protection of portions of the coastal plains in Orange County, including the cities of Brea, Fullerton, Placentia, and Anaheim. Currently, no facilities exist for hydroelectric power generation at Carbon Canyon Dam, nor are any contemplated. LAD is responsible for operating and maintaining the dam, reservoir, and outlet works. LAD is also responsible for developing the flood control regulation plan for Carbon Canyon Dam and Reservoir and the dam's operation.
- **Orange County Reservoir** - Used for water storage, is owned by the cities of Brea (40%), La Habra (20%), and Fullerton (40%) and is operated by the Metropolitan Water District. The reservoir covers 7 acres and has a capacity of 217 acre-feet. Like Carbon Canyon Dam, this dam receives periodic inspections. Should the dam fail, the flood inundation path would largely affect residential properties.

There are also five reservoir tanks located in the hills above the city. These reservoirs contain a total of 67.3 million gallons of water, which is for domestic use by the residents of the city. According to the City of Brea 2021 Safety Element, all these reservoirs except the Valencia reservoir were built to meet all current seismic hazard codes and standards. **Figure 3-13** displays the identified and mapped inundation zones in and immediately adjacent to the City.

Past Events

FLOOD

Orange County 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 damage in the City of Brea in the past.

DAM FAILURE

California’s dam infrastructure varies in age (some are decades old, while others are more recently constructed), type, and size. While there have been no recorded dam failure events in

Brea (the closest being the failure of the Brea Dam in neighboring Fullerton), 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.[38]
- **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 was breached. With the cooperation of local law enforcement, they successfully evacuated and saved 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.[39]
- **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), as well as concerns regarding the stability of the emergency 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.[40]
- **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.[41]

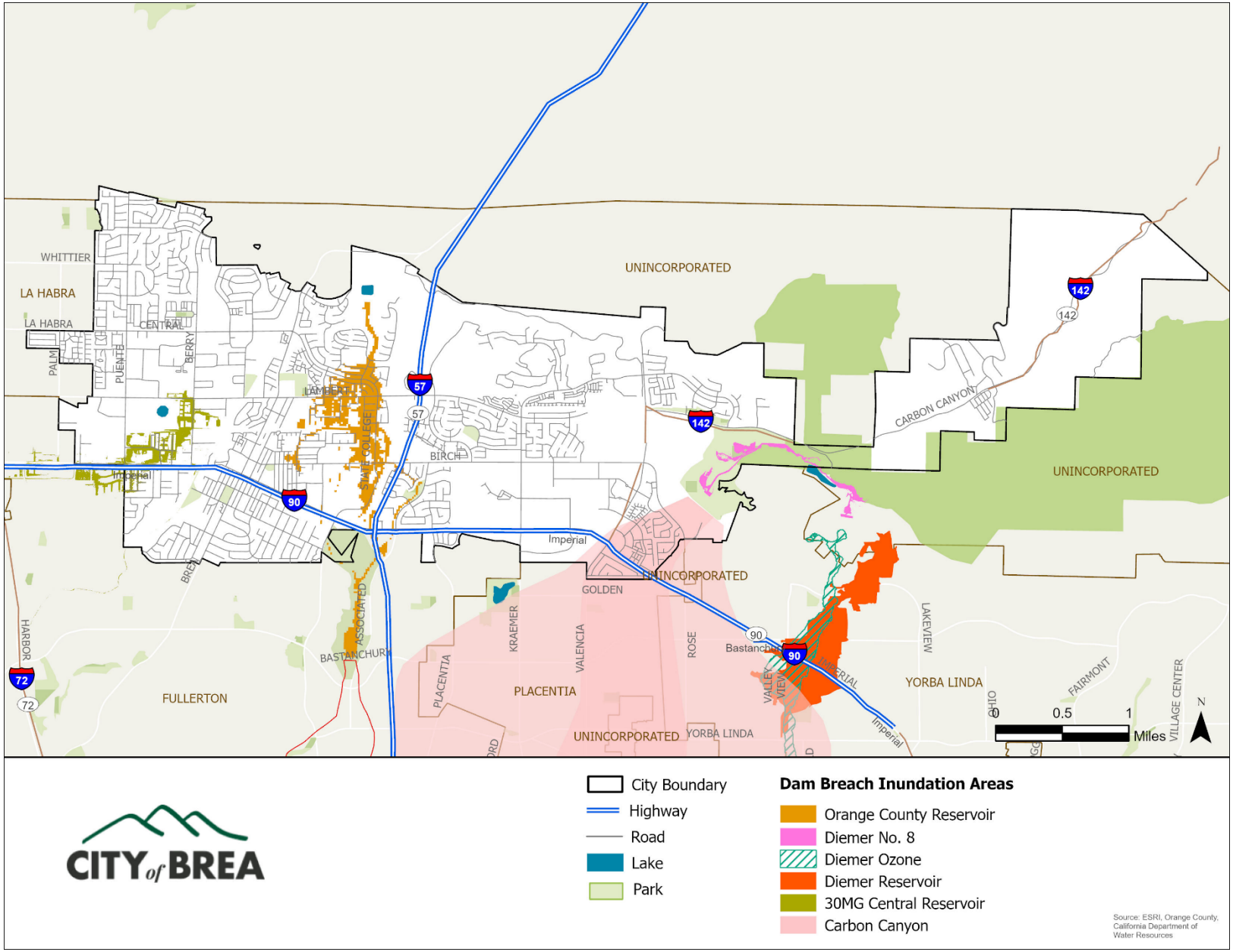
38 Riley, K. March 2018. 90 Years Later, The St. Francis Dam Failure Remains A Vital Safety Lesson. Association of State Dam Safety Officials. https://damsafety.org/sites/default/files/files/StFrancis_DecadeAnniv%202018.pdf

39 Association of State Dam Safety Officials. Case Study: Baldwin Hills Dam. https://damfailures.org/case-study/baldwin-hills-dam/

40 California Office of Emergency Services. 2023. California State Hazard Mitigation Plan. https://www.caloes.ca.gov/cal-oes-divisions/hazard-mitigation/hazard-mitigation-planning/state-hazard-mitigation-plan

41 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

FIGURE 3-13: DAM AND RESERVOIR INUNDATION ZONES IN BREA



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Risk of Future Events

FLOOD

Localized instances of ponding occur at least annually or 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 Brea will experience some type of flood event. Larger-scale flood events have been rare in Brea. However, Brea could experience some degree of large-scale flooding with inundation levels greater than one foot in depth during a particularly severe rainstorm or after a dam failure. All expectations are that the probability of floods/storms occurring again in the future is likely. As discussed in **Table 3-2 and Table 3-3**, there is a probability of less than a one-tenth percent chance of a flood occurring annually.

DAM FAILURE

Due to the presence of several dams and reservoirs near Brea, areas of the City could be at risk of inundation in the case of significant dam failure. The potential consequences of dam failure are death or injury, people being 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, the probability of failure, and the potential consequences. 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 embankment erosion.

Climate Change Considerations

FLOOD

Climate change is expected to exacerbate the conditions leading to Brea's urban flooding. 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 its effects are anticipated to 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 in Brea that could overwhelm the capacity of the region’s flood control system to contain and drain all the precipitation.

Due to climate change, droughts are also expected to increase in length and frequency. 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 Brea.

DAM FAILURE

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 Brea and the rest of Orange County. Indirectly, increased climate change-induced rains may cause more erosion, compromising the dam's structural integrity and the foundation on which it sits.

Human-Caused Hazards – Hazardous Materials Release, Oil Spills, Mass Casualty Incident (Terrorism)

The Human-Caused Hazards profile discusses hazardous materials release and mass casualty incidents (terrorism).

Description

Hazardous Materials Release

The state of California defines hazardous materials as substances that are toxic, ignitable, or flammable, reactive, and/or corrosive. The state also defines hazardous materials as substances that show high acute or chronic toxicity, are carcinogenic (causes cancer), have bioaccumulative properties (accumulates in the body's tissues), are persistent in the environment, or are water-reactive. The primary concern associated with a hazardous materials release is the public's short and/or long-term effects from exposure to the hazardous material.

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

The threat that hazardous materials pose to human health depends on the type of material, frequency, and duration of exposure, and whether chemicals are inhaled, penetrate the skin, or are ingested, among other factors. Exposure to hazardous materials can result in short- or long-term effects, including major damage to organs and systems in the body or death. Hazardous waste is any material with properties that make it dangerous or potentially harmful to human health or the environment and is no longer of use requiring disposal. Hazardous materials can also cause health risks if they contaminate soil, groundwater, and air, potentially posing a threat long after the initial release.

Oil Spill

An oil spill is the release of a liquid petroleum hydrocarbon into the environment, especially the marine ecosystem, due to human activity and is a form of pollution. Refined petroleum products such as diesel and gasoline also qualify as oil spills. The term is usually given to marine oil spills, but spills may also occur on land and are a hazard of concern for the City of Brea.

Mass Casualty Incident/Terrorism

Terrorism is the use or threat of force to achieve a particular social or political outcome. The goals of terrorism may sometimes be the overturning of a government, the reversal of a public policy, the release of 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 some or all these goals. 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 very rare. While incidents of terror caused by foreign individuals or groups receive significant media and public attention, most acts of terror in the United States have been caused by domestic terrorists.

A mass casualty incident describes an incident within the United States in which emergency medical services resources, such as personnel and equipment, are overwhelmed by the number

and severity of casualties. The more commonly recognized events of this type include building collapses, train and bus collisions, plane crashes, earthquakes, and other large-scale emergencies. Terrorism, mass transportation accidents, or natural disasters generally cause the most common types. Events such as the Oklahoma City bombing in 1995 and the September 11 attacks in 2001 are well-publicized examples of mass casualty incidents.

Location and Extent

HAZARDOUS MATERIALS RELEASE

Hazardous materials and chemicals are used daily in households and businesses throughout Brea. In addition to the locations of large commercial and industrial uses, sources of hazardous materials can originate from seemingly harmless places such as gas stations, auto repair shops, dry cleaners, medical centers, and almost any industrial business. Hazardous waste can take the form of liquids, solids, contained gases, or sludge. It can be the by-products of manufacturing processes or simply discarded commercial products, like cleaning fluids and pesticides.

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

Figure 3-14 identifies stationary hazardous materials locations within Brea that store, use, or produce hazardous materials regulated by the state. While these locations are fixed, roadways throughout the community are commonly used to transport hazardous materials and waste. These facilities are common locations for spills and releases. While there is no extent scale for hazardous materials release, the probability of an incident is anticipated to be occasional (less than 10% chance of occurrence) each year. Currently, the City has 1,271 facilities registered with the Environmental Protection Agency (EPA). According to the California State Water Resources Control Board, there are a total of 90 sites in the city that require cleanup activity. Of these, 85 cases have been completed and considered closed. Of the remaining five, one site is currently in remediation, two sites are under verification monitoring, and the final two sites are considered inactive. Another site of concern is the Olinda Alpha landfill and the potential release of landfill gas generated from decomposing organic matter contained within. In October 2019, EDL acquired the Brea landfill gas plant which has been in operation since November 2012. The Brea landfill gas plant converts landfill gas into electricity with a capacity of 32.2MW renewable energy comprised of turbines and heat steam recovery generators, significantly reducing emissions. Brea Power began the operation of a renewable energy power plant that utilizes landfill gas to produce up to 32.5 megawatts of electricity; it is the third largest landfill gas-fueled plant in the U.S.

OIL SPILL

According to the California Geologic Energy Management Division (CalGEM), the City has 879 oil and gas wells in various states of operation (261 active, 463 plugged, 152 idle, and 3 canceled). According to Cal OES, most incidents within the City originate from repair shops, petroleum transportation, accidental spills from citizens, gas stations, and utility companies such as So Cal Edison or Southern California Gas Company. These incidents are reported, logged, and cleaned up accordingly. While the City doesn't own any oil wells, it owns the mineral rights to some active oil wells located on city-owned property adjacent to a public park and a school. According to the Public Works Department, these areas are generally located on City property to the east of the easternmost baseball field adjacent to Brea Sports Park.

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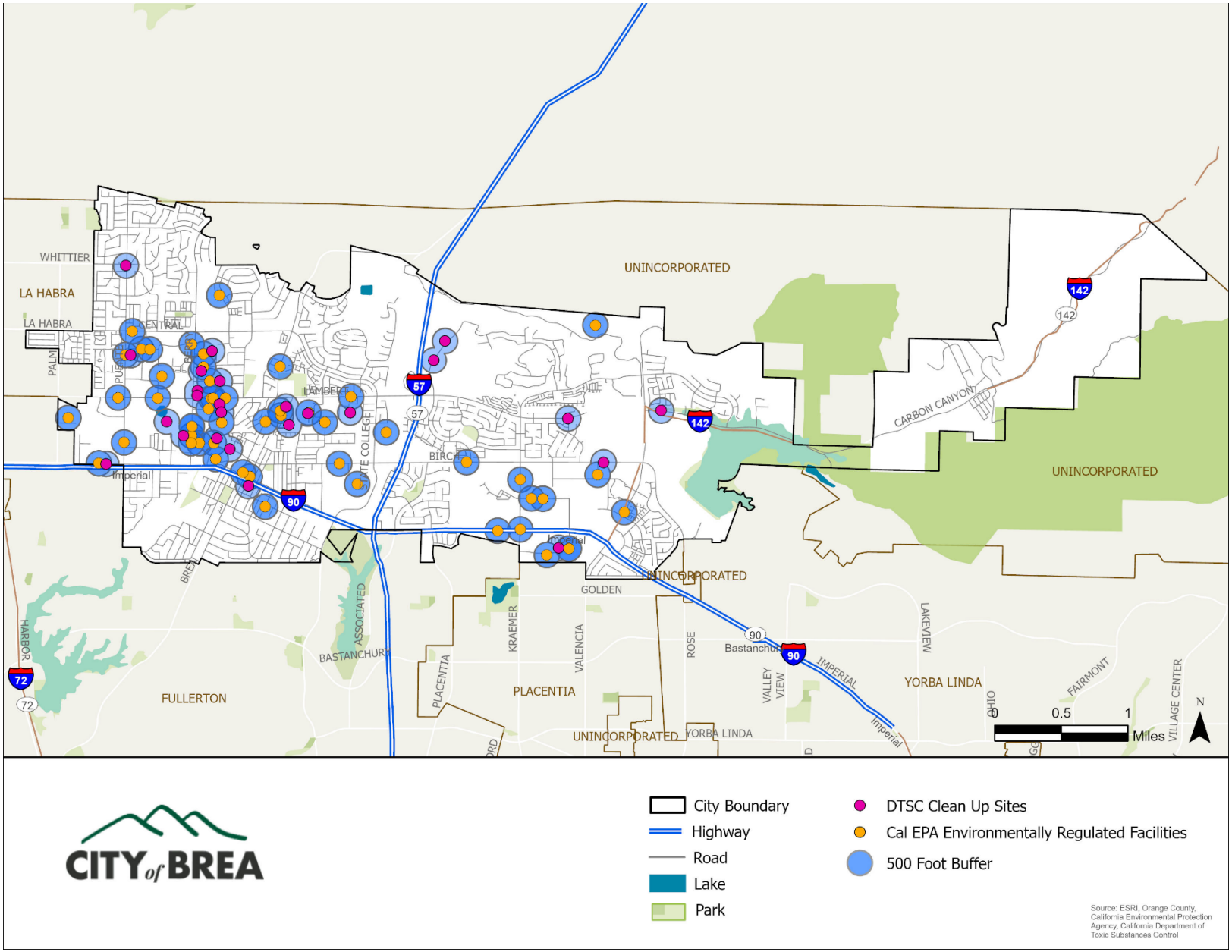
FIGURE 3-14: HAZARDOUS MATERIALS LOCATIONS IN BREA



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MASS CASUALTY INCIDENT/TERRORISM

Mass Casualty Incidents can occur anywhere, although public spaces and locations where many people congregate (parks, schools, places of worship, government facilities, shopping centers, and public gathering areas) are most common. Key locations in Brea may be large shopping and entertainment centers (i.e., Brea Mall, Brea Downtown), governmental facilities (i.e., Civic Center), schools, medical facilities, and parks (i.e., Carbon Canyon Regional Park).

Acts of terrorism may be located at the locations listed above; however, the perpetrators may also choose 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.

Past Events

HAZARDOUS MATERIAL RELEASE

Brea has experienced an average of 6.64 hazardous materials spills reported annually to the Cal OES Spill Release Reporting database. **Table 3-14** displays this data. Most of these incidents involve the release of sewage and petroleum products.

TABLE 3-14: HAZARDOUS MATERIALS RELEASE REPORTING

Year	Reported Releases
2010	11
2011	8
2012	5
2013	10
2014	6
2015	6
2016	4
2017	10
2018	5
2019	5
2020	3
2021	6
2022	7
2023	7
Annual Avg	**6.64**

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

OIL SPILL

The City has experienced accidents resulting in oil spills since its incorporation. The following are some of these incidents.

- **July 19-23, 1987** – 1,000 gallons of waste oil spilled into a flood control channel in Brea after the rupture of an industrial sewer line from area oil fields. An industrial waste line became clogged, spilling wastewater collected from the oil fields onto the ground near Imperial Highway and Randolph Street; the wastewater then overflowed through a maintenance hole in the 200 block of South Pine Street and entered the flood control channel.
- **March 17, 1998** – An oil pipe near Imperial Highway sprung a leak, sending 120 gallons of crude oil into Brea Canyon Creek. Cleanup crews spent the day at Arovista Park, the center of the spill; Nuevo Energy Co. owned the pipe.
- **November 16, 2011** – A spill occurred when crude oil was spilled due to overfilling a tanker truck belonging to Breitburn Energy. According to Public Works, the upper portion of a creek in the Santa Ana River watershed was minimally impacted.
- **September 14, 2023** – An estimated 6.1 barrels of crude oil was accidentally released into the City of Brea's dedicated open space area from a Vactor (vacuum truck) overflow, impacting the soil and vegetation. The oil spill occurred along the Coyote Creek watershed. A plan was discussed in the field for the contamination cleanup and restoration needed to resolve the impacted areas. The spill was successfully contained.

MASS CASUALTY INCIDENT/TERRORISM

The following mass casualty incidents/ terrorism events have occurred within Brea, Orange County, the State, or the Country and may be relevant to the community:

- **October 18, 1970** - Bombing of the Stanford Research Institute facility, which caused approximately $500,000 in property damage. No injuries or deaths occurred during this incident.[42]
- **October 26, 1970** - Bombing of a Bank of America Branch, which caused approximately $500,000 in property damage. No injuries or deaths occurred during this incident.[43]
- **April 19, 1995** - Timothy McVeigh detonated a bomb outside the Alfred P. Murrah Federal Building in Oklahoma City, OK. The blast was so powerful that the Federal Building was destroyed, and more than 300 nearby buildings were damaged or destroyed. The bombing killed 168 people, including 19 children. Timothy McVeigh's motive for bombing the Federal Building was that he hoped to inspire a revolution against the federal government.[44]
- **September 11, 2001** - Terrorists hijacked four commercial airliners. The hijackers flew two of the planes into the twin towers at the World Trade Center in New York City and one into the Pentagon in Arlington, VA. The fourth plane crashed in a field in rural Pennsylvania. The attacks on 9/11 killed 2,976 people and injured thousands more.[45]
- **April 15, 2013** - Two bombs detonated near the finish line of the Boston Marathon. The explosion killed three spectators and wounded more than 264 other people. Police captured 19-year-old Dzhokhar Tsarnaev in connection with the bombing; the second suspect, Tamerlan Tsarnaev, died following a shootout with law enforcement. Investigators concluded that the Tsarnaev brothers planned and carried out the attack on their own and were not connected to any specific terrorist group.[46]
- **December 2, 2015** - A terrorist attack, consisting of a mass shooting and an attempted bombing, occurred at the Inland Regional Center in San Bernardino, California. The perpetrators, Syed Rizwan Farook and Tashfeen Malik, a married couple living in the city of Redlands, targeted a San Bernardino County Department of Public Health training event and Christmas party of about 80 employees in a rented banquet room. Fourteen

42 Global Terrorism Database. 2020. "1970-10-18". https://www.start.umd.edu/gtd/search/IncidentSummary.aspx?gtdid=197010180001

43 Global Terrorism Database. 2020. "1970-10-26". https://www.start.umd.edu/gtd/search/IncidentSummary.aspx?gtdid=197010260001

44 Federal Bureau of Investigation. Famous Cases and Criminals. https://www.fbi.gov/history/famous-cases/oklahoma-city-bombing

45 Federal Bureau of Investigation. Famous Cases and Criminals. https://www.fbi.gov/history/famous-cases/911-investigation

46 History.com Editors. June 2019. Boston Marathon Bombing. https://www.history.com/topics/21st-century/boston-marathon-bombings

people were killed, and 22 others were seriously injured. Farook was a U.S.-born citizen of Pakistani descent who worked as a health department employee.[47]

- **October 1, 2017** - Stephen Paddock opened fire on the Route 91 Harvest Festival concert in Las Vegas from an elevated position at the Mandalay Bay Hotel. The attack resulted in 61 people killed (including two victims who died in 2019 and 2020 and Paddock himself) and 867 injured. Paddock shot and killed himself before responding officers reached him. The FBI Behavioral Analysis Unit determined no clear motivation for the attack. Although this attack did not occur in California, many California residents were affected by the event, as more than half of the 61 people killed were from California.[48]

- **May 15, 2018** – A bomb explodes at the Magyar Kozmetica spa in Aliso Viejo. The resulting explosion killed the owner and seriously injured two clients of the day spa. Witnesses said that the explosion occurred when the owner opened a cardboard box. Stephen Beal, co-owner of the spa and ex-boyfriend, was arrested as a suspect in the explosion. Chemicals used to create explosives were found in his home and were similar to those detected at the explosion site, as well as bits of wire and other materials that were used in the bomb's construction. Beal was arrested and charged for the crime. He was convicted and found guilty of 4 felonies in July of 2023 and faces a minimum of 30 years in prison.[49]

- **September 2018** – A Brea police officer pulls over Saleh Ali for expired tags. Ali had a suspended driver's license, and the officer planned to impound the car. During the ensuing inventory search of the car, the officer found what appeared to be two homemade improvised explosive devices, instructions on how to build a bomb, and other materials. Prosecutors believe that Ali was headed to the downtown area and Brea Mall. He was tried and convicted of multiple felonies in 2019 and sentenced to 19 years in prison.[50]

Risk of Future Events

HAZARDOUS MATERIALS RELEASE

Most of the release events within Brea have occurred due to human error, malfunctioning equipment, or a deliberate act. Given this, it is anticipated that future events within Brea will include minor incidents like some of the past occurrences identified above in **Table 3-15**. Activities to prevent future releases, as well as response strategies, should take this into consideration. As identified in **Tables 3-2 and 3-3**, the future probability of hazardous materials release is between a one-tenth (0.1%) of a percent and a one percent chance each year.

47 Global Terrorism Database. 2020. "2015-12-02." https://www.start.umd.edu/gtd/search/IncidentSummary.aspx?gtdid=201512020012

48 Los Angeles Times Staff. "Las Vegas Shooting Victims: Portraits of the Fallen." October 2017. https://www.latimes.com/projects/la-na-las-vegas-shootings-victims-list-20171002/

49 Sean Emery. The Orange County Register. "Jury deadlocks in fatal Brea spa-bombing trial of Ling Beach man", August 2022. https://www.ocregister.com/2022/08/22/jury-deadlocks-in-fatal-aliso-viejo-spa-bombing-trial-of-long-beach-man/

50 ABC 7 Eyewitness News Staff "Brea explosives sentencing: Man found with bombs inside car during 2018 traffic stop ij Brea sentenced to 19 years in prison", March 2019. https://abc7.com/saleh-ali-sentencing-explosives-bombs/5216876/

Oil Spill

As long as oil wells are present in and near the city, either permanently or temporarily, there is some chance for an accidental release or spill. The transportation of crude oil through active transmission lines beneath the city further compounds this potential for accidents to occur. Given that hazardous material releases, such as oil spills, have occurred in the past in Brea, all expectations are that similar releases could continue to occur. Assuming no substantial deviations from past trends exist, most releases will likely be small-scale events with rare larger releases. As identified in **Tables 3-2 and 3-3**, the future probability of hazardous materials release is between a one-tenth (0.1%) of a percent and a one percent chance each year.

Mass Casualty Incident/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 Brea does not feature critical national or state facilities, 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. As identified in **Tables 3-2 and 3-3**, the future probability of hazardous materials release is less than a one-tenth (0.1%) of a percent.

Climate Change Considerations

Hazardous Materials Release

Climate-related natural hazard events, such as increased precipitation and subsequent flooding, could cause an increase in hazardous materials release. Some of these incidents could result from transportation crashes (due to poorer road conditions) 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. These issues should be monitored during the five-year implementation period of this plan.

Mass Casualty Incident

The link between mass casualty incidents/terrorism and climate change is not well understood. However, it has been suggested that the impacts of a changing climate may exacerbate existing social, political, religious, and ethnic tensions. For example, longer, more 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 Brea is negligible since these changes are more likely to impact developments on the national or international level.

CHAPTER 4 – THREAT AND VULNERABILITY

THREAT ASSESSMENT PROCESS

The threat assessment process evaluates the harm Brea may experience from a hazard event. Threat assessment does not consider a hazard's likelihood, so it gives equal consideration to more likely hazards (e.g., earthquakes, drought) and less probable hazards (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 owned and operated privately, such as 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 HMPC identified 14 CFs and 9 FOCs in Brea that fall into three 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. **Figure 4-1** displays the location of the CFs and FOCs in Brea.

The potential loss value is the total insured value of the CFs that fall within the hazard zone. It is intended to estimate 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; 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" is used in the table.

TABLE 4-1: CRITICAL FACILITIES AND FACILITIES OF CONCERN

Category	Number of Facilities		Potential Loss
	Critical	Concern	
City Facilities (City Hall, Fire, Police)	5	0	$81,586,665
Community Centers and Parks	0	5	$29,203,991
Water Infrastructure	8	0	$53,849,454
Other Facilities of Concern (Parking Structure)	1	4	$63,908,873
Total	**14**	**9**	**$228,548,983**

* Based on the City of Brea insured replacement values

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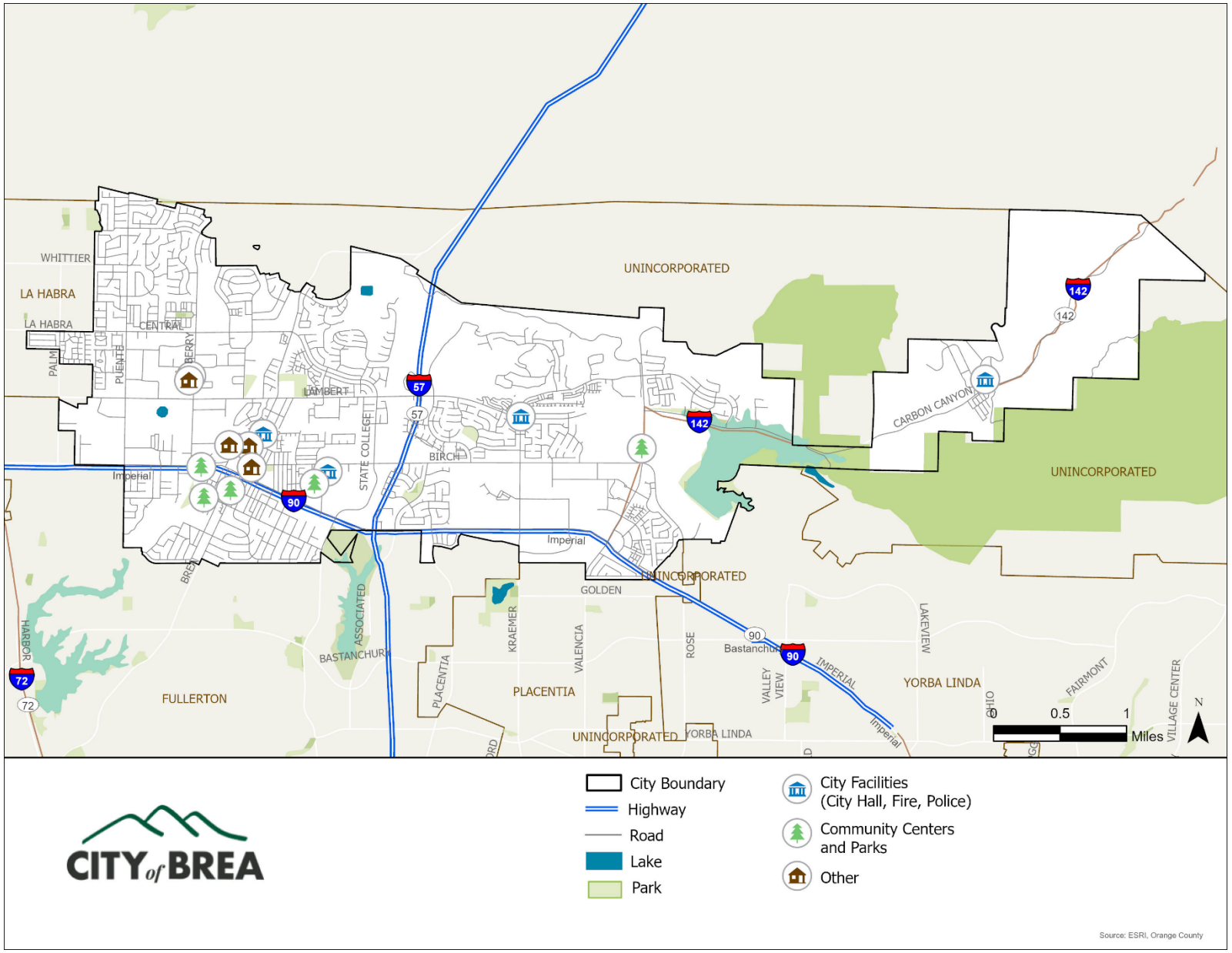
FIGURE 4-1: CRITICAL FACILITIES AND FACILITIES OF CONCERN



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Based on the available data provided by the City, there is a minimum of $228,548,983 worth of City-owned assets. The greatest potential for loss among the city-owned assets comes from the City Facilities (City Hall, Fire, Police) category. The next category with the greatest loss potential is the Other Facilities of Concern category, followed by the Water Infrastructure category. 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 citywide. The following are parameters to help understand how much a proposed investment/improvement compares to the existing assets within the City:

1% Impact - $2,285,490
5% Impact - $11,427,449
10% Impact - $22,854,899
20% Impact - $45,709,797
50% Impact - $114,274,492

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.

Vulnerable Populations

Factors such as age (children or elderly residents), 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 impact all parts of Brea equally, people may experience the impacts differently. Higher-income households, for instance, are more likely 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 how hazard events are likely to impact different demographic populations in Brea 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 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 $35,750 or less. For Orange County, the FY 2022 Low-Income Limit for a four-person family, according to Housing and Urban Development (HUD), is $108,400.

- *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 Brea residents who meet at least one of the criteria for threatened populations.

TABLE 4-2: BREA THREATENED-POPULATION METRICS

Threatened Population Metrix	Community-Wide Data
Population	48,159
Households	17,489
Median household income	$108,900
Renter Households	37.4%
Percentage of households with at least one person living with a disability	18.7%
Percentage of households living under the poverty limit	6.4%
Percentage of households with one member aged 65+	30.7%
Area Affected by Hazard (Sq Mile and Pct of City)	12.43 Sq Miles (100%)

Source: 2017-2021 U.S. Census Bureau's American Community Survey, 2023 U.S. Census Bureau's Estimates

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 when comparing the two data sets. The data relies on readily available 2023 US Census Survey Projections and the 2017-2021 U.S. American Community Survey. **Chapter 2** identifies additional census-related information, which may differ 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 Brea. These assets may include services, artistic or cultural landmarks, or local economic activities. The threat assessment describes the potential harm to these other assets based on available information.

THREAT PROFILES

Earthquake Hazards (Fault Rupture, Seismic Shaking, Liquefaction)

PHYSICAL THREAT

FAULT RUPTURE

The City has one AP Zone identified by the California Department of Conservation, the Whittier Fault, which roughly travels through the northeastern section of the City. This AP zone does not currently have any CFs of FOCs located within the designated 500ft hazard buffer zone. Any future development in these areas could be at risk of damage from fault rupture should there be a large seismic event within the AP zone.

SEISMIC SHAKING

Many physical assets in the City are estimated to experience the same seismic shaking intensity, ranging from 0.8501 to 1.05g (shaking intensity in relation to earth's gravity). Therefore, all facilities could 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 $45 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 Brea homes and businesses would not be available until repairs are completed. **Table 4-3** displays the potential scenario and losses incurred should shaking reach the described threshold. **Figure 4-2** displays the CFs (11) and FOCs (9) within the City's Seismic shaking potential hazard zones.

TABLE 4-3: CRITICAL FACILITIES & FACILITIES OF CONCERN (SEISMIC SHAKE 0.8501 TO 1.05G)

Category	Number of Facilities		Potential Loss
	Critical	Concern	
City Facilities (City Hall, Fire, Police)	5	0	$81,586,665
Community Centers and Parks	0	5	$29,203,991
Water Infrastructure	5	0	$55,668,959
Other Facilities of Concern (Parking Structure)	1	4	$46,952,681
Total	**11**	**9**	**$213,412,296**

* Based on the City of Brea insured replacement values

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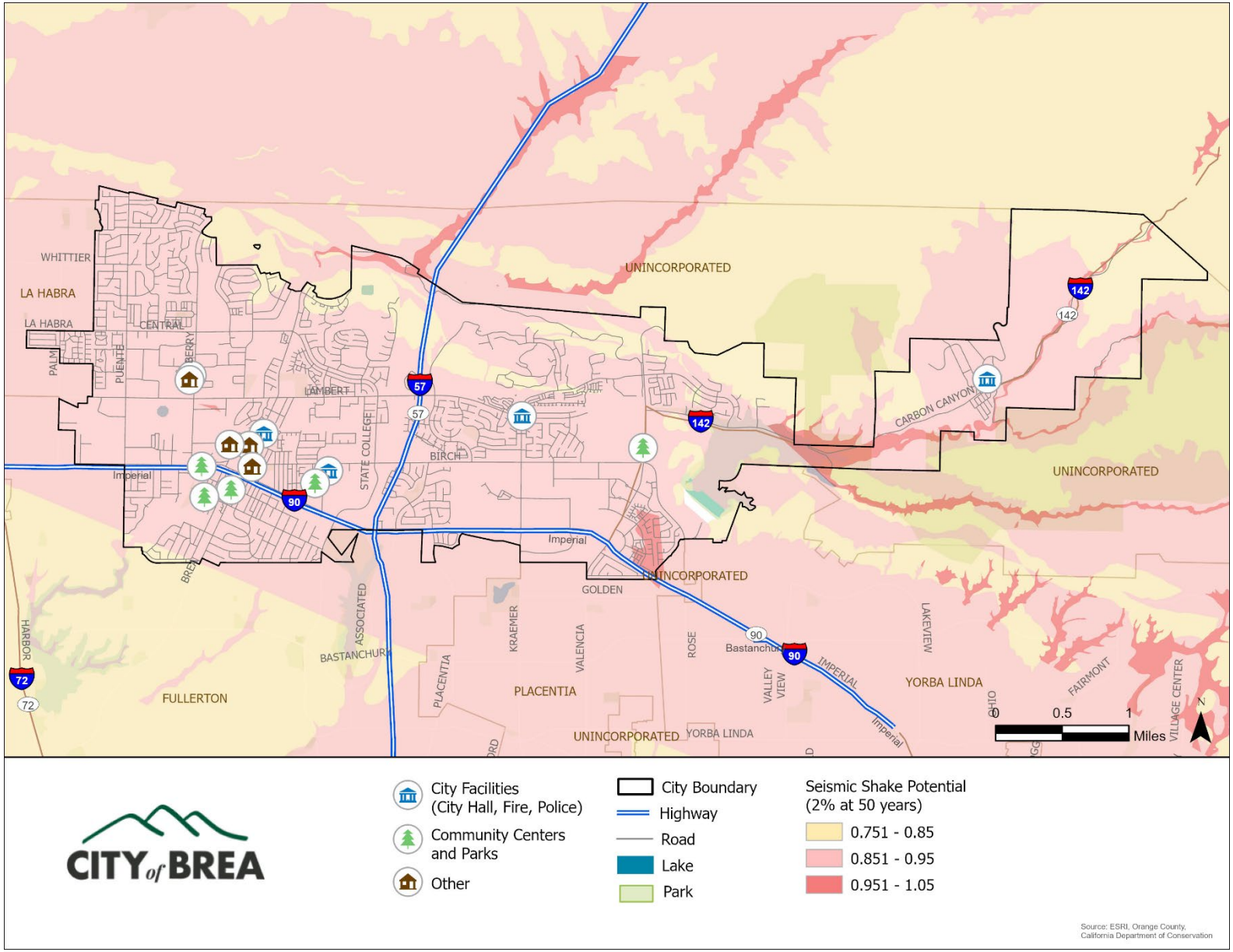
FIGURE 4-2: CFS AND FOCS LOCATED IN POTENTIAL SEISMIC SHAKING HAZARD ZONES



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LIQUEFACTION

Due to the City's location near so many regionally active faults capable of generating large earthquakes, the potential for CFs and FOCs to be affected by liquefaction is a concern. Like other cities in Orange County, Brea is in a geographical area where the soil makeup is conducive to liquefaction hazards in some areas. **Table 4-4** identifies the CFs and FOC located within these areas. According to data, one FOC is located in this area; however, replacement value data was unavailable for this facility. **Figure 4-3** displays the CFs and FOCs in liquefaction susceptible hazard zones within the city.

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

Category	Number of Facilities		Potential Loss
	Critical	Concern	
City Facilities (City Hall, Fire, Police)	0	0	$ -
Community Centers and Parks**	0	1	$ -
Water Infrastructure	0	0	$ -
Other Facilities of Concern (Parking Structure)	0	0	$ -
Total	**0**	**1**	**$ -**

* Based on the City of Brea insured replacement values
**Replacement value data was not available

SOCIAL THREAT

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

FAULT RUPTURE

To analyze the social threat associated with fault rupture, the City identified the populations within the AP Zone. **Table 4-5** identifies the characteristics of these areas, covering approximately .44 Sq miles (3.6%) of the City, which include households with higher median household incomes, lower percentages of persons living with a disability, and lower percentages of households with one-member aged 65+ displays the information on this hazard threatened population.

TABLE 4-5: FAULT RUPTURE (500FT BUFFER ZONE) THREATENED POPULATIONS

Threatened Population Metrics	Living within Fault 500ft Buffer Zone	City of Brea
Population	510	48,159
Households	144	17,489
Median household income	$183,253	$108,900
Renter Occupied Households	32.7%	37.4%
Percentage of households with at least one person living with a disability	4.7%	18.7%
Percentage of households living under the poverty limit	4.7%	6.4%
Percentage of households with one member aged 65+	15.1%	30.7%
Percentage of Brea Potentially Affected Area.	.44 Sq miles	3.6%

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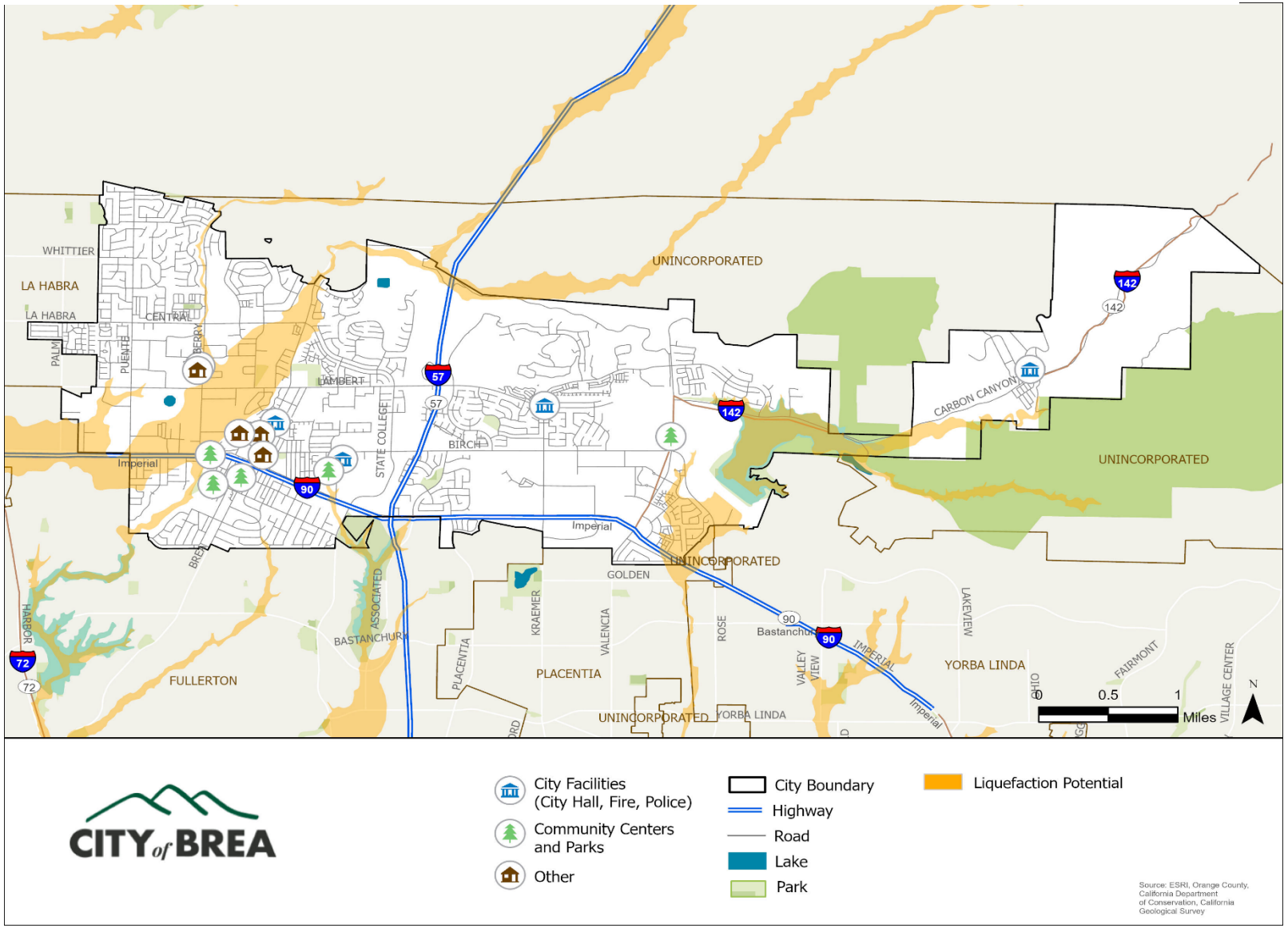
FIGURE 4-3: CFS AND FOCS LOCATED IN LIQUEFACTION HAZARD ZONES



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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 homes become uninhabitable.

Data compares the populations within the seismic shaking hazard zones to the citywide population. Of the approximately 48,159 residents of Brea, approximately 93.2% or 44,861 residents live within the 0.55 to 0.65g seismic shake zone. This equates to approximately 16,485, approximately 94.3%, of the City's 17,489 households located in a potential seismic shaking hazard zone. **Table 4-6** displays these characteristics of threatened populations in this area, covering approximately 10.44 sq miles (85.4%) of the City, which include households with lower median household incomes, slightly higher percentages of persons living with a disability, and higher percentages of households with one-member aged 65+.

TABLE 4-6: SEISMIC SHAKING THREATENED POPULATIONS

Threatened Population Metrics	Seismic Shaking (0.5501 to 0.65g)	City of Brea
Population	44,861	48,159
Households	16,485	17,489
Median household income	$107,020	$108,900
Renter Occupied Households	38.2%	37.4%
Percentage of households with at least one person living with a disability	18.8%	18.7%
Percentage of households living under the poverty limit	6.5%	6.4%
Percentage of households with one member aged 65+	31.1%	30.7%
Percentage of Brea Potentially Affected Area.	10.44 Sq Miles	85.4%

LIQUEFACTION

Just over 12.6% of the City's population is located within a designated zone of liquefaction, and over time, mitigation measures have been incorporated into most construction. With a higher percentage of renters and households with overall lower incomes, residents located in these areas may be more impacted, especially in older construction, as they may not have the financial resources needed or authorization to make repairs and/or retrofit older buildings. **Table 4-7** compares threatened populations living within the liquefaction hazard zones to the citywide population, covering approximately 1.5 sq miles (12.3%) of the City, which includes households with lower median household incomes, lower percentages of persons living with a disability, and lower percentages of households with one-member aged 65+.

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 the distance that rupture can occur. Strong events can create a larger problem with other identified hazards, such as dam inundations and flooding.

TABLE 4-7: LIQUEFACTION HAZARD THREATENED POPULATIONS

Threatened Population Metrics	Living within Liquefaction Hazard Zones	City of Brea
Population	6,071	48,159
Households	2,654	17,489
Median household income	$94,664	$108,900
Renter Occupied Households	60.6%	37.4%
Percentage of households with at least one person living with a disability	14.7%	18.7%
Percentage of households living under the poverty limit	6.3%	6.4%
Percentage of households with one member aged 65+	23.0%	30.7%
Percentage of Brea Potentially Affected Area.	1.5 sq mile	12.3%

SEISMIC SHAKING

The goal of early earthquake warning systems is to afford utility providers additional time that they may use to shut off gas, water, and power transmission to try and control potential leaks following the event. Authorities may also have enough warning to halt the use of bridges or safely shelter or evacuate workers away from hazardous locations. Therefore, the goal is to allow service providers to remain inactive, reducing further impact, 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. Due to the liquefying soils, sidewalks, roadways, and pipelines may become fractured and disjointed. 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 soil loses substantial strength.

CHANGES IN POPULATION AND LAND USE DEVELOPMENT

FAULT RUPTURE

Based on the current Housing Element data, the city's anticipated residential/population growth over the next five years will increase Brea’s vulnerability to earthquake-related hazards. While this may also be true concerning land use and development, if a strong earthquake impacts the city, there is the potential that older structures of the city may be impacted more severely than newer structures and developments in the city.

SEISMIC SHAKING

Based on the current Housing Element data, the city's anticipated residential/population growth over the next five years is anticipated to increase Brea's vulnerability to earthquake-related hazards. While this may also be true concerning land use and development, if a strong earthquake impacts the city, there is the potential that older structures of the city may be impacted more severely than newer structures and developments in the city.

LIQUEFACTION

Liquefaction is being monitored throughout hazard-prone areas in the city; the impacts can cause damage to structures located within these zones. However, these zones are generally located in certain areas of the city, meaning that the damage potential is limited to these areas. Despite this potential, liquefaction is unlikely to cause changes in population patterns. However, land use designations and new development may be limited in these areas out of precaution or subject to policies developed in City documents such as the LHMP, Land Use, Housing, and Safety Elements. The City's development review process will identify steps to mitigate or prevent future liquefaction events. Based on the current Housing Element data, the city's anticipated residential/population growth over the next five years will increase Brea's vulnerability to earthquake-related hazards.

Wildland/Urban Fires

PHYSICAL THREAT

Structures and physical assets in Brea 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 wildland or urban fires, 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 is responsible for wildland fire protection. **Figure 4-4** identifies these zones and the City's CFs and FOCs within the area. All structures within this fire zone are at an elevated risk of wildfire impacts. **Figure 4-5** identifies Brea's wildland-urban interface (WUI) area, including the CFs and FOCs and historic wildfire perimeters in and around the City. **Table 4-8** identifies a combined total of 12 CFs and two FOCs within these zones, which could result in a potential total loss of approximately $32.9 million. While these areas have a high degree of vulnerability to wildfire, other areas of the City may also be susceptible due to ember cast. Sometimes, the ignition of a wildfire may occur due to power lines located around overgrown trees, causing a spark and catching the tree on fire.

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FIGURE 4-4: CFS AND FOCS LOCATED IN VERY HIGH FIRE HAZARD SEVERITY ZONES

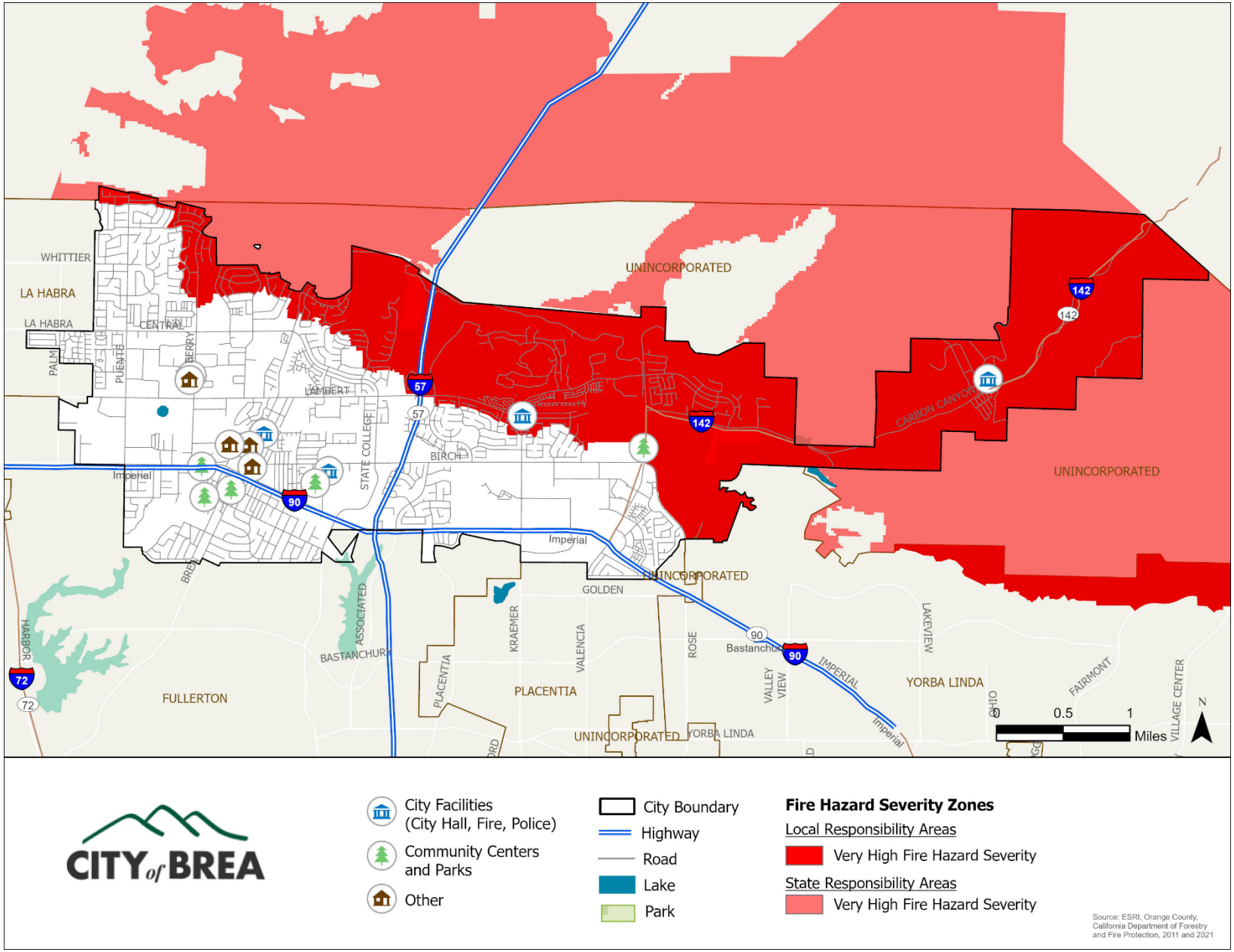


FIGURE 4-5: CFS AND FOCS LOCATED IN THE WILDLAND URBAN INTERFACE (WUI) AND HISTORICAL WILDFIRE PERIMETERS

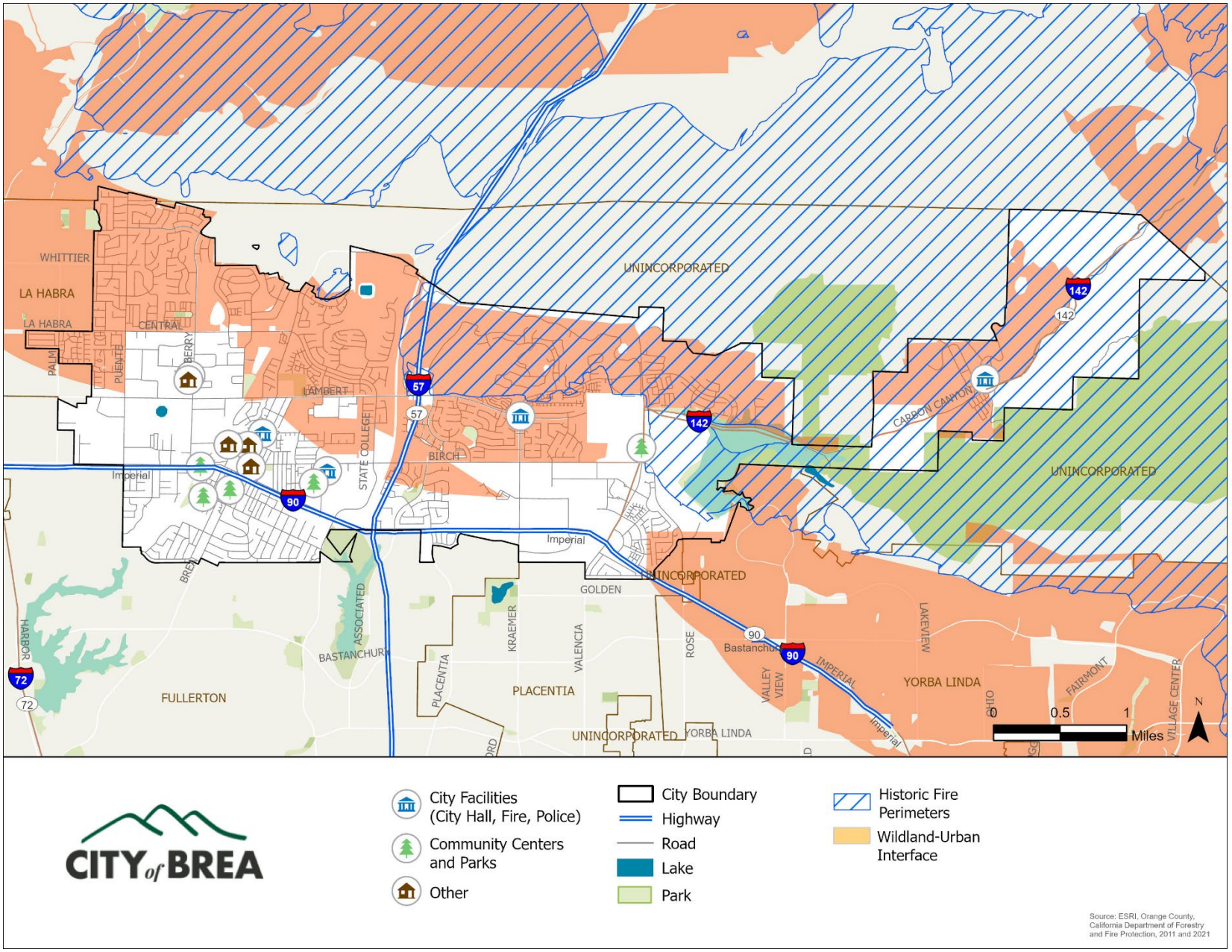


TABLE 4-8: CRITICAL FACILITIES AND FACILITIES OF CONCERN (VERY HIGH FIRE HAZARD SEVERITY ZONES)

Category	LRA - VHFHZ		Potential Loss*	WUI/SRA - VHFHZ		Potential Loss*
	Critical	Concern		Critical	Concern	
City Facilities (City Hall, Fire, Police)	2	0	$2,888,531	2	0	$2,888,531
Community Centers and Parks**	0	1	$ -	0	1	$ -
Water Infrastructure	5	0	$18,245,120	3	0	$8,855,291
Other Facilities of Concern (Parking Structure)	0	0	$ -	0	0	$ -
Total	**7**	**1**	**$21,133,651**	**5**	**1**	**$11,743,822**

* Based on the City of Brea insured replacement values
**Replacement Values are unavailable as they are not City-owned.

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 Brea 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 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. In the case of renters, these groups may not possess the financial resources or authority to rebuild their homes or relocate to new homes after a wildland or urban fire.

WILDFIRE

Brea has a sizable portion of its residents in the LRA, primarily within the City's western and southern portions. **Table 4-9** shows that approximately 21.9% of the City's population is located within Brea's LRA and the identified VHFHSZ. Of these households, the vulnerable populations represent approximately 20.2% of these households having at least one person living there with a disability, 4.0% of these households live under the poverty limit, and 30.3% of these households have one member aged over 65+; however, these households have a much higher median income than the City as a whole.

Brea also has a sizeable portion of its residents located within the Wildland Urban Interface (WUI). **Table 4-10** shows that approximately 62.7% of the City's population is within Brea's WUI. Of these households, the vulnerable populations represent approximately 20.2% of these households having at least one person living there with a disability, 5.0% of these households live under the poverty limit, and 34.0% of these households have one member aged over 65+; however, these households have a slightly higher median income than the City as a whole.

TABLE 4-9: VERY HIGH FIRE HAZARD SEVERITY ZONE THREATENED POPULATIONS (LRA)

Threatened Population Metrics	LRA - VHFHZ	City of Brea
Population	10,568	48,159
Households	3,646	17,489
Median household income	$147,281	$108,900
Renter Occupied Households	22.8%	37.4%
Percentage of households with at least one person living with a disability	20.2%	18.7%
Percentage of households living under the poverty limit	4.0%	6.4%
Percentage of households with one member aged 65+	30.3%	30.7%
Percentage of Brea potentially affected area	5.63 sq miles	46.1%

TABLE 4-10: WILDLAND URBAN INTERFACE THREATENED POPULATIONS

Threatened Population Metrics	WUI	City of Brea
Population	30,181	48,159
Households	10,596	17,489
Median household income	$116,919	$108,900
Renter Occupied Households	29.6%	37.4%
Percentage of households with at least one person living with a disability	20.2%	18.7%
Percentage of households living under the poverty limit	5.0%	6.4%
Percentage of households with one member aged 65+	34.0%	30.7%
Percentage of Brea potentially affected area	5.82 sq miles	47.6%

OTHER THREATS

WILDFIRE

Wildfires and urban fires can consume power lines and force utility operators to shut off electrical and gas transmission activity, leading to utility outages in Brea homes and businesses. Any streets surrounded by blazes or blocked by burning debris would hinder transportation, prevent residents from evacuating, 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. Multiple circuits can affect the City, and 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 Brea, the City's resources could be strained as residents of affected areas seek refuge in communities with 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.

Climate Change Vulnerability

Climate change will likely increase the city's vulnerability to wildfire impacts because of increasing temperatures, which could change the moisture content of plant materials and potentially increase future drought conditions.

Changes in Population Patterns and Land Use Development

If a large wildfire were to occur, it is feasible that changes to population patterns could fluctuate. Future land use designations, re-development, or new development in these areas could be restricted or prohibited, especially in the WUI and the VHFHSZ. Based on the current Housing Element data, the city's anticipated residential/population growth over the next five years is also anticipated to increase Brea's vulnerability to wildfire-related hazards.

Severe Weather (Windstorm, Extreme Heat, Winter Storms)

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.

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

Extreme Heat

Extremely high temperatures can cause roads to deform and buckle as the pavement expands in the heat, especially in poorly maintained areas. Power lines and other electrical grid sections are less effective in higher temperatures and may be damaged due to stress during extreme heat events. Buildings with dark pavement will absorb more heat than surfaces with vegetation or lighter materials that are better at reflecting the sun's energy. This urban heat island effect is strongest during hot periods when the sun is strongest.

Winter Storms

There is no indication that rainfall or severe rain hazards will abate either in Brea or the greater region of Southern California in the future. While Brea may experience prolonged periods of dry or wet years, all expectations are that they will continue and increase in severity. Rain could damage structures with poorly constructed roofs and erode the soil around building foundations. Heavy rain could also lead to flooding, damaging unelevated structures in flood zones. Landslides triggered by heavy rains would damage structures below the landslide's starting point.

Social Threat

Windstorm

Windstorm events can harm people throughout Brea 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

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

People living in homelessness are at a high risk of health complications during heat waves, especially if they are unsheltered. According to Point in Time Count data performed by the County of Orange, in 2022, there were approximately 5,718 individuals experiencing homelessness in the county, with approximately 53.5% unsheltered. Of the 5,718 individuals experiencing homelessness within the county, approximately 24 individuals are experiencing homelessness within the city.[51] During a heatwave, these people are very vulnerable to heatstroke, especially if they cannot reach a cooling center.

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

WINTER STORMS

Severe storms threaten any groups in Brea who cannot access adequate shelter. Homeless people often live in tents or other informal structures that may protect against minor rains but are inadequate against heavy rain events. Heavy rain can lead to flooding, which could inundate or sweep away informal dwellings. Additionally, vulnerable populations living in older homes with outdated building materials may experience damage during significant rain events. If affected groups have limited incomes or lack the resources to make necessary repairs or maintain the structures, retrofit of these structures may be hindered.

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 damage 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 windstorms 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. The city has multiple PSPS circuits, which means Brea and other parts of Southern California affected could impact the city in other ways (people relocating to Brea temporarily).

51 Orange County. Everyone Counts: 2022 Point in Time Summary. https://www.ochealthinfo.com/sites/hca/files/2022-05/2022%20PIT%20Data%20Infographic%20-%205.10.2022%20Final.pdf

EXTREME HEAT

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

WINTER STORMS

The potential for winter storms to create a financial strain on both the public and the City exists in the event of utility infrastructure damage and loss of power. Damage to roadway networks, including bridges, can interrupt effective transportation throughout the city, possibly hindering emergency equipment and first responder response capability. Major storm events can even impact the effectiveness of the evacuation capacity of the roadway network into and out of the City.

CLIMATE CHANGE VULNERABILITY

WINDSTORM

Climate change will likely increase the city's vulnerability to severe weather impacts because of the increase in anticipated storm intensity and frequency and anticipated temperature increases.

EXTREME HEAT

Climate change will likely increase the city's vulnerability to extreme heat impacts because of the anticipated temperature increase in intensity, duration, and frequency.

WINTER/COASTAL STORMS

Climate change and increased temperatures will likely increase the city's vulnerability to winter/coastal storms because of the anticipated alteration of rainfall patterns and the increase in anticipated storm intensity and frequency. Vulnerability to rain inundation events that lead to flooding and erosion and increase the threat of dam failure, landslides, and other potential hazards within the community and surrounding area could also increase.

CHANGES IN POPULATION AND LAND USE DEVELOPMENT

WINDSTORM

Severe windstorms occur periodically (primarily during the Fall months) and generally do not affect populations to the degree that they would need to migrate in and out of the city. It is unlikely that severe wind will affect land use and development because the development review process will take steps to mitigate or minimize the impacts of severe wind. There is the potential that older structures in parts of the city may be impacted more severely than newer structures within the city. Based on the current Housing Element data, the city's anticipated residential/population growth over the next five years will increase Brea's vulnerability to windstorms.

EXTREME HEAT

It is unlikely that extreme heat will affect land use and development because the development review process will take steps to mitigate or minimize impacts from severe weather and heat events. Brea Municipal Code Chapter 15.24 has adopted the California Green Building Standards Code, which sets environmentally friendly building standards. Based on the current Housing Element data, the city's anticipated residential/population growth over the next five years will increase Brea's vulnerability to winter/coastal storms.

WINTER/COASTAL STORMS

It is unlikely that winter/coastal rainstorms will affect land use and development because the development review process will take steps to mitigate or minimize impacts from severe

rainstorms. The City has invested significantly in its stormwater management infrastructure, which should protect much of the city from the effects of severe rainstorms. Based on the current Housing Element data, the anticipated residential growth in the city over the next five years will increase Brea's vulnerability to winter/coastal storms.

Infrastructure Failure (Power Failure)

Physical Threat

Infrastructure failure can often be the direct result of power failure. This is especially difficult to predict within the city, as it can affect any CF or FOC anywhere within the City at any time. Traffic control infrastructure, communications networks, and emergency services are just some critical services/infrastructure that can be disrupted during a power failure. Facilities such as police and fire stations are equipped with backup generators to ensure continuity of operations in the event of power failures; however, generators can sometimes fail. In addition, physical damage to systems could result from intermittent or unexpected power loss that damages electrical and computer equipment. These events could result from maintenance, isolated power outages due to equipment failure, or loss of power from infrastructure (powerlines, powerplants, transformers, sub-stations) failure.

Social Threat

Persons with health issues are more vulnerable to this hazard since they may rely on medical equipment that requires power. Vital medical treatments such as dialysis are at risk of being canceled or postponed if a medical facility does not have enough backup generator power to conduct appointments. If the power outage occurs during the warmer months, young children, the elderly, or people suffering from serious medical conditions are more vulnerable to heat-related complications if they are unable to relocate to a cooler location. Additionally, lower-income residents may be affected if the power outage lasts for an extended amount of time, as they may not be able to afford to replace the food spoiled from the loss of refrigeration. Additionally, any private schools, preschools, residential care, and skilled nursing facilities located in this area are at risk of being impacted.

Other Threat

Older structures, electrical wiring, and outlets may not meet current building code requirements, which could cause damage during power surges or damage the devices connected to them. In addition, many businesses and residents may not use proper equipment to help prevent power surges or loss, which can impact the functions and operations of businesses and City services or affect residents negatively. Given the potential for future power failure events, protective measures (improved outlets, ground fault circuit interceptor outlets, surge protectors, and backup battery (uninterruptible power supply) technologies should be promoted in any retrofits and improvements within the City. Current and future climate change mitigation and adaptation efforts in Brea should prioritize energy efficiency measures, generate energy locally from clean and renewable sources, and build reliability & redundancy using the latest energy storage and backup systems technologies.

Climate Change Vulnerability

While climate change has no direct link to infrastructure failure, the secondary effects can have an impact on the city's potential vulnerability. Elevated temperatures, duration and intensity of precipitation events, and extended drought conditions can strain the infrastructure within the City, potentially resulting in failure as demand for services rises.

Changes in Population Patterns and Land Use Development

Based on the current Housing Element data, the city's projected residential/population growth over the next five years is anticipated to increase Brea's vulnerability to infrastructure failure. As demand for utilities and power increases, coupled with the strain placed on current infrastructure to accommodate the population growth, the potential for infrastructure failure will also increase.

Geological Hazards (Landslides, Erosion)

Physical Threat

Landslides

Landslides pose a threat to a variety of city and resident-owned facilities. **Table 4-11** identifies the 4 CFs located within the mapped deep-seated landslide hazard zones. Approximately 2.49 sq miles (20.4%) of the City is located within the designated high susceptibility landslide hazard areas, especially in those areas characterized by steep slopes and canyons (Carbon Canyon and Brea Canyon), which are vulnerable to landslides during long periods of rainfall or seismic events. Deep-seated landslides could cause over $10.6 million in losses based on the 4 CFs located in these zones. **Figure 4-6** displays these areas of the city along with the mapped CFs and FOCs that landslide events could potentially damage.

Erosion

The physical impacts of erosion would be present in the portions of the City where the threat of landslide is identified, more so in VHFHSZs as these areas can be stripped of groundcover and hillside stabilizing vegetation, as well as the areas along streambeds and other watersheds. Those CFs and FOCs identified in **Table 4-11** would be vulnerable to erosion, in addition to any residential homes and buildings in these areas (**Table 4-12**).

Table 4-11: 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)	1	0	$**
Community Centers and Parks**	0	0	$
Water Infrastructure	3	0	$10,643,245
Other Facilities of Concern (Parking Structure)	0	0	$
Total	**4**	**0**	**$10,643,245**

* Based on the City of Brea insured replacement values
**Replacement value data was not available

Social Threat

Landslides

As shown in **Table 4-12**, 3,555 people and 1,241 households live within the deep-seated landslide hazard zone, which is approximately 7.4% of the city's population. The median household income is higher in these areas, while the percentage of households living under the poverty limit for this population is just slightly lower than in the City overall. However, households with at least one person living with a disability and the percentage of households with one member aged 65+ are higher than the City overall. Additionally, private schools, preschools, residential care, and skilled nursing facilities located in this area are at risk of being impacted.

TABLE 4-12: DEEP-SEATED LANDSLIDE (CATEGORY 7+) HAZARD ZONE THREATENED POPULATIONS

Threatened Population Metrics	High Susceptibility	City of Brea
Population	3,555	48,159
Households	1,241	17,489
Median household income	$124,442	$108,900
Renter Occupied Households	25.5%	37.4%
Percentage of households with at least one person living with a disability	22.3%	18.7%
Percentage of households living under the poverty limit	6.1%	6.4%
Percentage of households with one member aged 65+	33.6%	30.7%
Percentage of Brea potentially affected area	2.49	20.4%

EROSION

Generally, erosion would affect any vulnerable groups living in the hillside and canyon communities, as identified in **Table 4-12**. Lower-income residents and renters living in these areas may be more vulnerable to the effects of erosion, as they may be unable to retrofit their homes or rebuild their homes in the event of a landslide caused by erosion.

OTHER THREATS

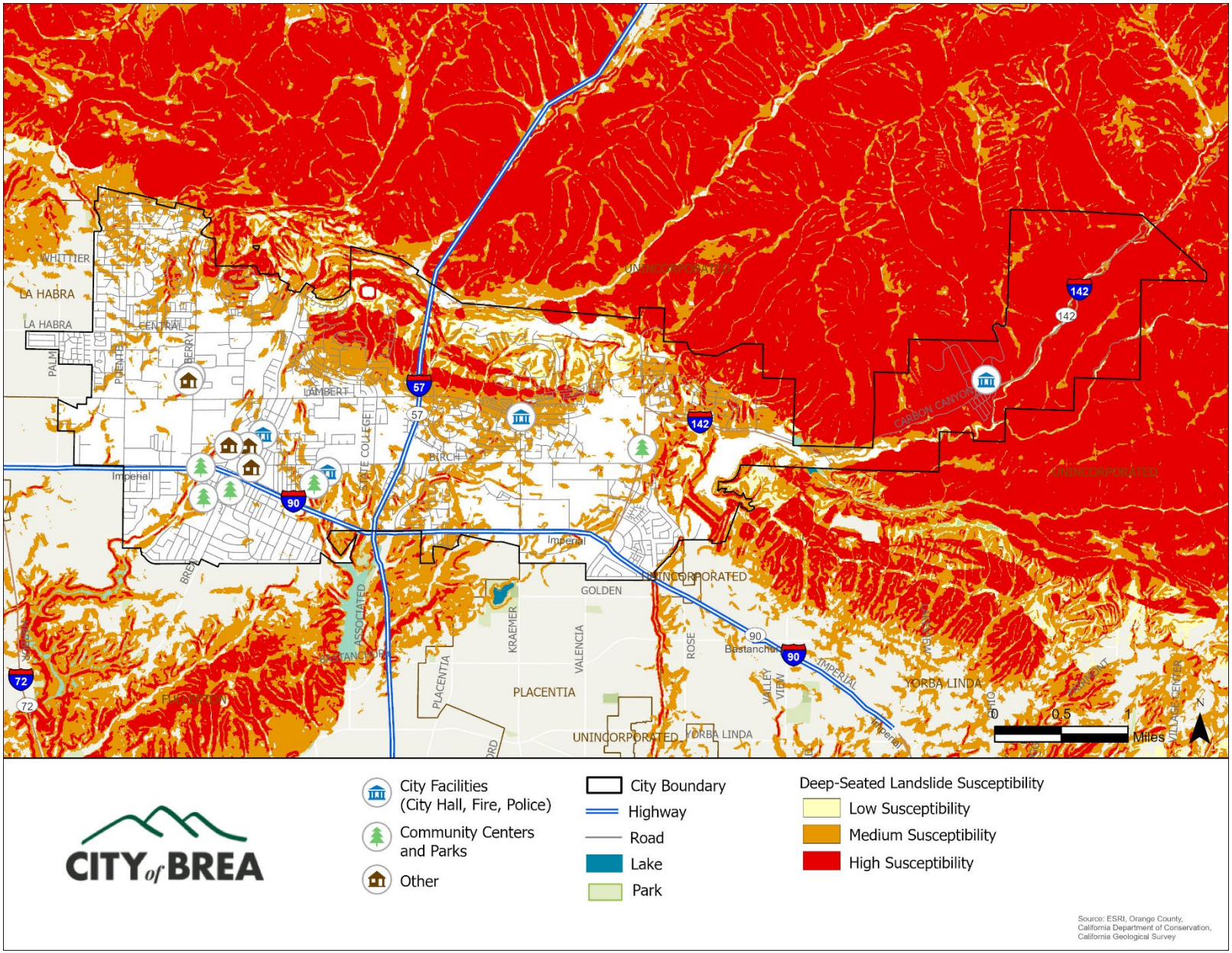
LANDSLIDES

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 (Carbon Canyon Regional Park), causing localized harm to the region's ecosystem (Carbon Canyon), although widespread disruptions are unlikely. City facilities, 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. Infrastructure such as utility lines, including natural gas lines, power lines, or water pipes, may be broken by a landslide, interrupting important services.

EROSION

Erosion generally occurs slowly over time and can be the underlying cause of long-term disruptions to various infrastructure, roadways, levees, streams, riverbanks, or slopes, to name a few. These physical threats and damage can be the beginning of longer-reaching effects. Traffic circulation can be temporarily or even permanently disrupted until roadway infrastructure can be repaired. The slow erosion of streams or watersheds can cause the permanent alteration of waterways, leading to flooding in areas where it previously did not exist, damaging homes and structures, and creating economic burdens. As discussed in the previous section, many of these other threats caused by erosion can also result from landslides.

FIGURE 4-6: CFS AND FOCS LOCATED WITHIN LANDSLIDE SUSCEPTIBLE ZONES



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CLIMATE CHANGE VULNERABILITY

LANDSLIDE

Climate change could indirectly increase the city's vulnerability to landslide impacts. Increased frequency and intensity of future storms may cause more moisture-induced landslides. Warmer temperatures and more frequent drought conditions may lead to more fires, destabilizing soil on slopes and making future landslide events more likely.

EROSION

Climate change could indirectly increase the city's vulnerability to erosion impacts. Increased frequency and intensity of temperatures will dry out the slope, stabilizing plants and ground cover on hillsides and watercourses, coupled with increased frequency and intensity of storms, which could increase erosion potential within the city.

CHANGES IN POPULATION AND LAND USE DEVELOPMENT

LANDSLIDE/EROSION

Landsliding is being monitored throughout the hazard-prone areas in the city. The impacts can cause damage to structures located within these zones; however, these zones are generally located in certain areas of the city, meaning that the damage potential is limited to these areas. Despite this potential, landslides are unlikely to cause changes in population patterns. However, land use designations and new development may be limited in these areas out of precaution or subject to any policies developed in City documents such as the LHMP, Land Use, Housing, and Safety Elements. The City's development review process will identify steps to mitigate or prevent future landslide events. Based on the current Housing Element data, the city's anticipated residential/population growth over the next five years is anticipated to increase Brea's vulnerability to landslides and erosion events.

Flooding (Including Dam Failure)

PHYSICAL THREAT

FLOOD

Any physical assets within these mapped boundaries could be inundated if enough precipitation fell, exceeding the storm drain infrastructure design capacity in these areas. Electronic or mechanical equipment on the ground could become waterlogged and nonfunctional. Brea currently has four CFs and no FOCs located within the mapped FEMA flood zones, representing a potential loss of over $40 million. **Table 4-13** depicts these statistics for the 100-Year and 500-Year FEMA Flood zones. **Figure 4-7** displays these FEMA Flood zones in relation to the City's CFs and FOCs.

DAM FAILURE

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 Brea are threatened. Carbon Canyon Dam has large storage capacities that could cause widespread inundation in Brea and Orange County if the reservoir waters are released due to a dam breach. The Orange County Reservoir and the five other reservoirs in the hills above the City could potentially inundate the City in the event of a failure. Fortunately for the City, no CFs or FOCs are located within the inundation zone. However, there are populations and private residences that could be impacted in the event of a dam failure, which will be discussed in the next section. **Figure 4-8** depicts the various dams/reservoirs inundation zones in and around the city.

TABLE 4-13: CRITICAL FACILITIES AND FACILITIES OF CONCERN LOCATED IN FEMA FLOOD ZONES

Category	100-Year Flood		Potential Loss	500-Year Flood		Potential Loss*
	Critical	Concern		Critical	Concern	
City Facilities (City Hall, Fire, Police)	0	0	$ -	1	0	$1,983,816
Community Centers and Parks	0	0	$ -	0	0	$ -
Water Infrastructure	0	0	$ -	2	0	$29,857,476
Other Facilities of Concern (Parking Structure)	0	0	$ -	1	0	$8,239,914
Total	**0**	**0**	**$ -**	**4**	**0**	**$40,081,206**

* Based on the City of Brea insured replacement values
**Replacement Values are unavailable as they are not City-owned.

SOCIAL THREAT

FLOOD

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. 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 Brea 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 4-14** shows that approximately 2.6% of the City's population is within the 500-yr floodplain. Of these households, the vulnerable populations represent approximately 27.3% of these households having at least one person living there with a disability, 10.7% of these households live under the poverty limit, and 29.6% of these households have one member aged over 65+; these households have a lower median income than the City as a whole, and 50.4% of these households rent their homes.

DAM FAILURE

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 Carbon Canyon Dam, Orange County Reservoir, and the 30MG Central Reservoir. The greatest risk to the City and its population comes from the failure of Carbon Canyon Dam, which would affect almost 5.3% of the population and inundate 2.9% of the acreage in the City. Of these households, the vulnerable populations represent lower percentages of households having at least one person with a disability, a slightly higher percentage of these households live under the poverty limit, and a lower percentage of these households have one member aged over 65+; these households have a higher median income than the City as a whole.

FIGURE 4-7: FEMA 100-YEAR AND 500-YEAR FLOOD ZONES

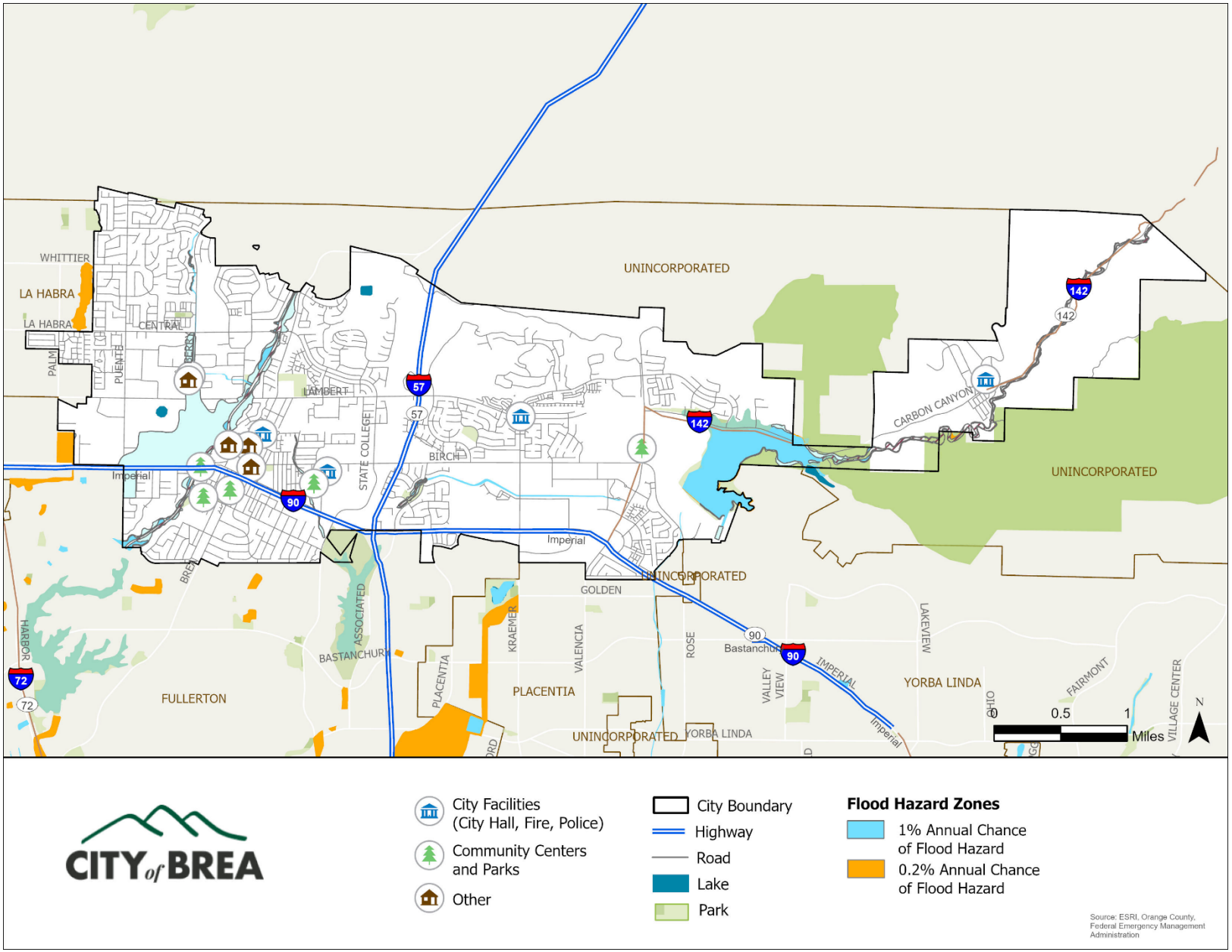

FIGURE 4-8: DAM INUNDATION ZONES IN AND AROUND BREA

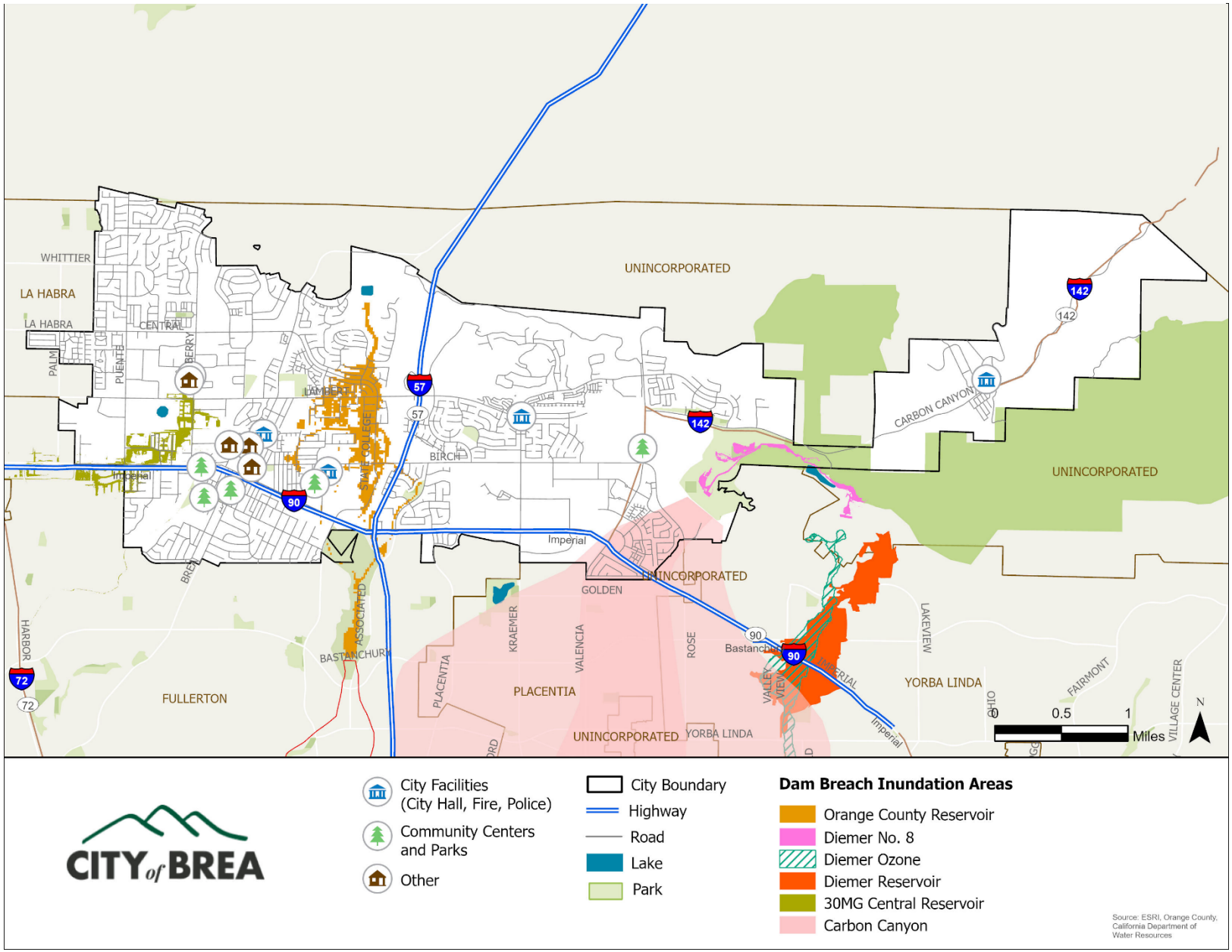

TABLE 4-14: THREATENED POPULATIONS IN THE FEMA 100-YR AND 500-YR FLOOD ZONES

Threatened Population Metrics	Flood Hazards (100-year)	Flood Hazards (500-year)	City of Brea
Population	0	1,258	48,159
Households	0	611	17,489
Median household income	$0	$89,247	$108,900
Renter Occupied Households	0.0%	50.4%	37.4%
Percentage of households with at least one person living with a disability	0.0%	27.3%	18.7%
Percentage of households living under the poverty limit	0.0%	10.7%	6.4%
Percentage of households with one member aged 65+	0.0%	29.6%	30.7%
Percentage of Brea potentially affected area	0.0%	3.7%	

TABLE 4-15: THREATENED POPULATIONS IN DAM INUNDATION ZONES

Threatened Population Metrics	Carbon Canyon	Orange County Reservoir	30MG Central Reservoir	City of Brea
Population	2,561	584	76	48,159
Households	1,026	192	23	17,489
Median household income	$111,454	$114,563	$132,962	$108,900
Renter Occupied Households	25.1%	21.9%	30.4%	37.4%
Percentage of households with at least one person living with a disability	16.6%	8.2%	23.1%	18.7%
Percentage of households living under the poverty limit	8.8%	0.5%	7.7%	6.4%
Percentage of households with one member aged 65+	5.0%	31.9%	38.5%	30.7%
Percentage of Brea potentially affected area	.34 sq miles/2.9%	.3 sq miles/2.5%	Less than 3	

OTHER THREATS

FLOOD

Flooding may temporarily stop any type of transportation in the City. Debris from floodwaters can block roadways, hinder vehicle access, and potentially affect emergency response services. One foot of rushing water is enough to carry small vehicles. A severe flood may prevent people who own smaller vehicles from driving to work, reducing economic activity. Severe flooding that causes serious damage to homes and businesses may also reduce economic activity until repair work is completed.

DAM FAILURE

Dam failures are often triggered by other events (e.g., seismic shaking, intense rainstorms, etc.). There would most likely be service disruptions in Brea if this type of event occurred. Floodwaters could quickly inundate the City, disrupting utilities like 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 likely inundate roadways and other low-lying, flat areas, such as parking lots, open spaces, and schoolyards. In severe scenarios, mobility in these areas would likely be restricted or impossible. Any unprotected or unhoused mechanical or electronic equipment not properly elevated would become waterlogged and inoperable until crews can conduct repairs or replacements.

CLIMATE CHANGE VULNERABILITY

Climate change will likely increase the city's vulnerability to flooding impacts because of the anticipated increase in the intensity and frequency of local, regional, and global weather patterns, intensifying atmospheric rivers. This increases the likelihood of an exceptional rain event in Brea that could overwhelm the capacity of the region's flood control system to contain and drain all the precipitation. Due to climate change, droughts are also expected to increase in length and frequency. Soils dried by extensive drought periods are less able to absorb and drain water, likely increasing flood possibility. Climate change is expected to create conditions that will raise the likelihood of flood-related hazards (including Dam Failure) in Brea.

CHANGES IN POPULATION AND LAND USE DEVELOPMENT

Given the current percentage of residents residing in FEMA flood zones, it is possible that flooding will affect the city's population patterns and growth. However, it is unlikely that flooding will affect land use and development patterns because the development review process ensures flood-related impacts are mitigated or minimized. Based on the current Housing Element data, the city's anticipated residential/population growth over the next five years is also anticipated to increase Brea's potential vulnerability to flood-related hazards (including dam failure).

Human-Caused Hazards – Hazardous Materials Release, Mass Casualty Incident/Terrorism

PHYSICAL THREAT

HAZARDOUS MATERIALS RELEASE

Hazardous materials can cause damage to physical assets in Brea if they are released into the environment. Corrosive hazardous materials can damage the building exteriors of CFs or FOCs. Flammable hazardous materials can start fires and cause any CFs or FOCs nearby to flashover and ignite. Generally, sites closer to the origin for releasing hazardous materials are threatened greater than those further away.

Table 4-16 shows the numbers of physical assets in Brea threatened by a hazardous materials release within 500 feet of a site storing or using hazardous materials. There are 2 CFs composed of Vital City Operations located within 500 feet of a site with hazardous materials and 2 FOCs within 500 feet of a site with hazardous materials. The total potential loss estimated for these locations is approximately $39.1 million. **Figure 4-9** depicts these sites in relation to CFs and FOCs within the City.

TABLE 4-16: CRITICAL FACILITIES AND FACILITIES OF CONCERN (HAZ MAT BUFFER 500 FT)

Category	Number of Facilities		Potential Loss*
	Critical	Concern	
City Facilities (City Hall, Fire, Police)	2	0	$6,851,989
Community Centers and Parks**	0	0	$ -
Water Infrastructure	0	0	$ -
Other Facilities of Concern (Parking Structure)	0	2	$32,275,704
Total	**2**	**2**	**$39,127,693**

* Based on the City of Brea insured replacement values
**Replacement value data was not available

TERRORISM/MASS-CASUALTY INCIDENT

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

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 4-17** shows the City's vulnerable populations living within 500 feet of hazardous materials storage/waste sites. The median household income for these site types is approximately $11,600 less than the rest of the City. This suggests that more impoverished populations may live near hazardous materials locations, indicating potential environmental justice concerns should be considered. This data also suggests higher percentages of households with at least one person living with a disability, higher percentages living under the poverty limit, and slightly fewer percentages of households compared to the rest of the City living with at least one member aged 65+.

Groups such as older people, low-income persons, or 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 move away to a home that is further from the potential sources of hazardous materials release events. Additionally, public and private schools, preschools, residential care, and skilled nursing facilities in this area are at risk of being impacted.

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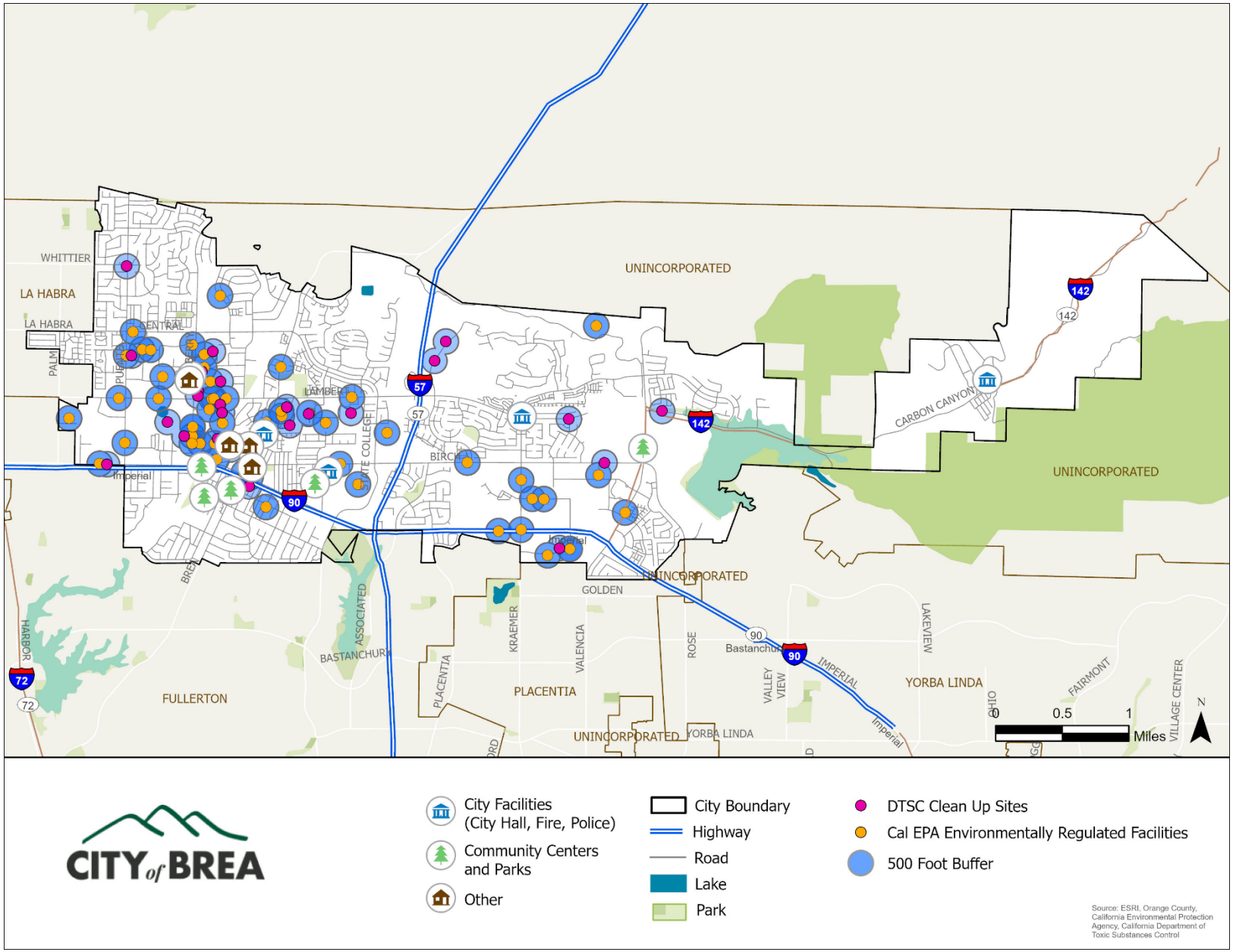
FIGURE 4-9: CFS AND FOCS LOCATED NEAR HAZARDOUS MATERIALS SITES (500 FT BUFFER)



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Brea residents living next to major transportation infrastructures, such as highways or major arterial streets, also face a greater threat of being affected by a release of hazardous materials since vehicles transporting hazardous materials may release their contents into the environment if involved in a collision. Specifically, residents in Brea living near the major transportation corridor running through the City (SR-57 and SR-142) are at greater risk of exposure from a transportation-related hazardous material release than residents living in other parts of the City. **Figure 4-10** depicts the overall community health score for the City as analyzed by the California Office of Environmental Health Hazard Assessment (OEHHA) tool CalEnviroScreen. This mapping tool helps identify California communities that are most affected by many sources of pollution and where people are often especially vulnerable to pollution's effects. This tool uses environmental, health, and socioeconomic information to produce scores for every census tract in the state. The scores are mapped so that different communities can be compared. An area with a high score experiences a much higher pollution burden than areas with low scores. **Figure 4-11** depicts the FEMA National Risk Index score for Brea. The National Risk Index is a data set and an online tool to help illustrate the United States communities most at risk for 18 natural hazards (including coastal flooding, cold wave, *drought, earthquake*, hail, *heat wave*, hurricane, ice storm, *landslide*, lightning, riverine flooding, *strong wind*, *tornado*, tsunami, volcanic activity, *wildfire*, winter weather); the italicized hazards are hazards that can affect Brea.

TABLE 4-17: HAZARDOUS MATERIALS THREATENED POPULATIONS (500 FT BUFFER)

Threatened Population Metrics	Hazardous Materials	City of Brea
Population	2,077	48,159
Households	716	17,489
Median household income	$97,233	$108,900
Renter Occupied Households	38.6%	37.4%
Percentage of households with at least one person living with a disability	20.1%	18.7%
Percentage of households living under the poverty limit	8.5%	6.4%
Percentage of households with one member aged 65+	28.9%	30.7%
Percentage of Brea potentially affected area	1.49 sq miles	12.2%

TERRORISM/MASS-CASUALTY INCIDENT

Since mass casualty incidents/acts of terrorism could occur anywhere in Brea, 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, or financial institutions. Populations frequently visiting 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 medical facilities than other subpopulations in the city. If an incident occurs at a medical facility or within the community (overwhelming medical resources), these groups are expected to face an increased impact from the incident.

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FIGURE 4-10: OEHHA CALENVIROSCREEN RATING FOR BREA

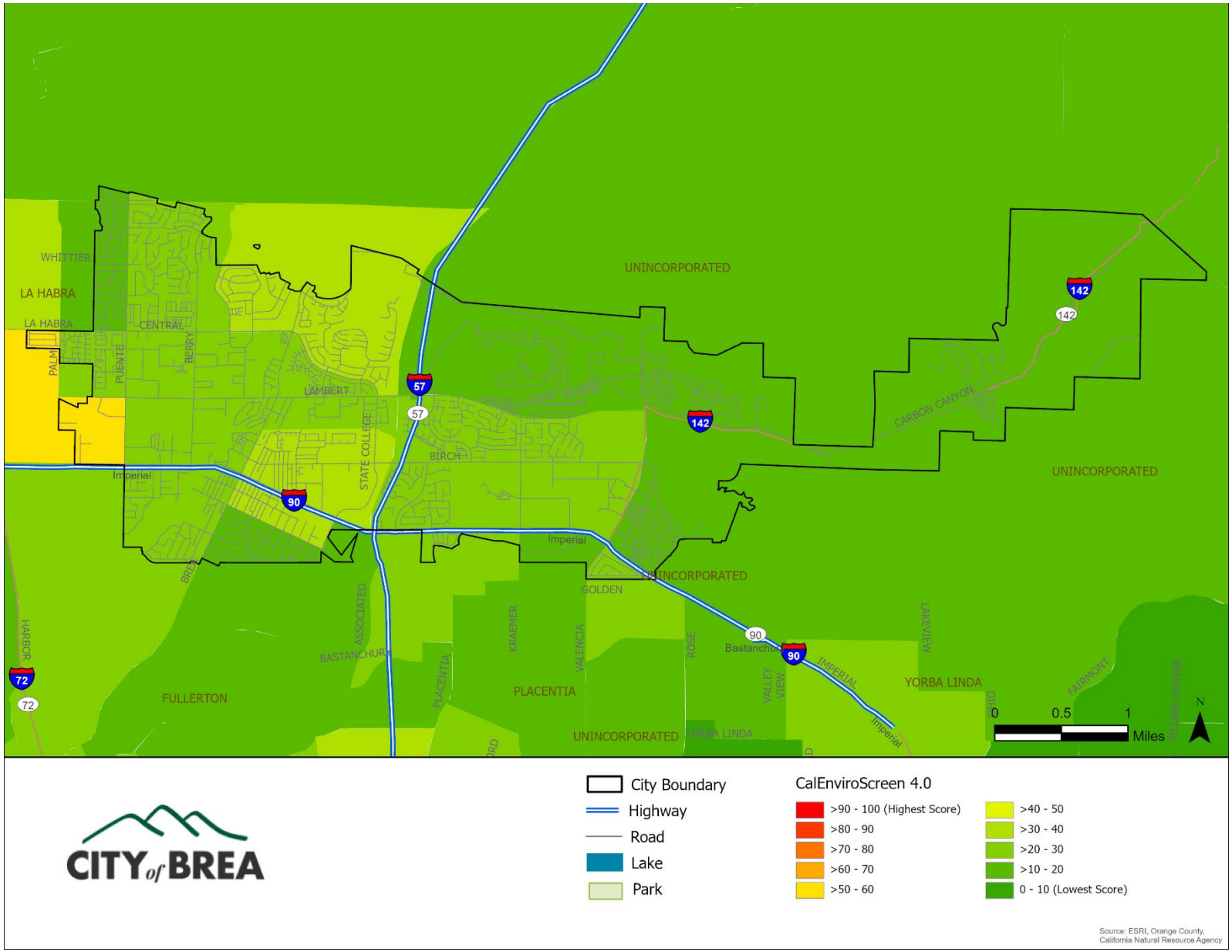
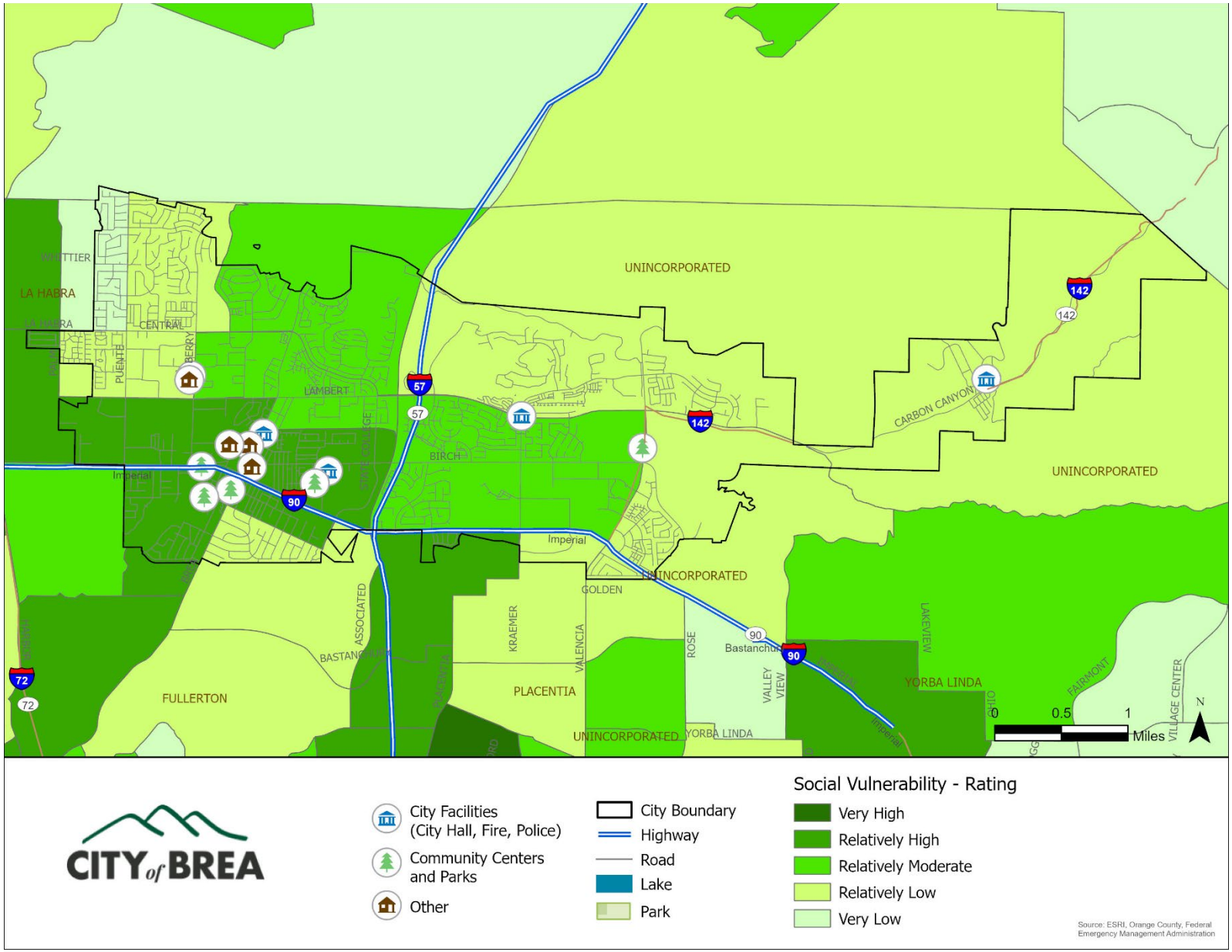


FIGURE 4-11: FEMA NATIONAL RISK INDEX SCORING FOR BREA



An incident at a government building or financial institution may be more likely to threaten seniors or lower-income individuals relying on in-person transactions instead of online options. As such, their use of these in-person services may place them in harm's way. An incident at Brea City Hall/Civic Center or bank locations in the City can be expected to threaten these groups more. Seniors and persons with limited income may be challenged if there is a need to shelter in place or evacuate during an incident requiring additional services, assistance, and/or medical treatment.

Other Threats

Hazardous Materials Release

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

Climate Change Vulnerability

Hazardous Materials Release

Climate change could indirectly increase the city's vulnerability to the impacts of a hazardous materials release as climate-related hazard events occur. Precipitation events with increased intensity causing flooding or overwhelming infrastructure could cause an increase in hazardous materials release. 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/Mass-Casualty Incident

Climate change has no direct link to human-caused hazards and is not anticipated to increase the city's vulnerability at this time.

Changes in Population and Land Use Development

Hazardous Materials Release

A change in population pattern would only occur if a hazardous materials release was severe enough to require people to move. It is unlikely that hazardous materials release will affect land use and development because the development review process will take steps to mitigate or minimize impacts from a hazardous materials release event. Locations that store, produce, and dispose of hazardous materials are highly regulated within the city and monitored regularly. It is not anticipated that land use and development patterns will change through this process and the development review process. Based on the current Housing Element data, the anticipated residential/population growth in the city over the next five years is anticipated to increase Brea's vulnerability to hazardous materials release and potential of exposure to terrorism/mass-casualty incidents.

Terrorism/Mass Casualty Incident

A change in population and the anticipated growth patterns could affect the city's vulnerability. As the number of people, businesses, and traffic increases, so too does the potential for increase for the city to become a target for terrorism/mass casualty events.

CHAPTER 5 – HAZARD MITIGATION STRATEGY

STRATEGY DEVELOPMENT PROCESS

Brea'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 required for an LHMP, but they support and complement mitigation activities. The HMPC chose to include them as part of the overall hazard mitigation strategy.

Use of Hazard and Threat Assessment

The HMPC relied partly on this plan's hazard profiles and threat assessments to develop the mitigation strategy's actions. A comprehensive set of mitigation actions was prepared to respond to the relevant hazard situations and protect Brea's residents, businesses, and community assets. The HMPC 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 HMPC also drafted mitigation actions to help protect the most vulnerable community members and 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 Brea. 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*

Capabilities Improvement/Expansion

The ability to expand current mitigation capabilities will generally be reliant upon the budgeting allocated for each department/program for that fiscal year. The level at which these programs may or may not be expanded depends on the funding received. FEMA has released a series of guides over the past few years highlighting some ways jurisdictions can expand mitigation. Some strategies for increasing current mitigation capabilities may include:

1. The City should actively identify, adopt, and enforce the most current set of development codes and standards available. Strongly encouraging new development to be constructed to higher standards than currently required increases community resilience.
2. Engaging parts of the community that may not be actively involved in mitigation efforts.
3. Expanding the number and types of organizations involved in mitigation planning and implementation increases efficiency and bandwidth.
4. Fostering new relationships to bring underrepresented populations and partners to the hazard mitigation planning process.

5. During the annual LHMP review, the committee should look for opportunities to fund and expand/enhance the effectiveness of current mitigation actions.

Table 5-1 shows the capabilities assessment for Brea.

TABLE 5-1: CITY OF BREA CAPABILITIES ASSESSMENT

Resource	Resource Description	Connection to Current Mitigation/Future Opportunities for Expansion and Improvement
Legal and Regulatory Capabilities		
Brea City General Plan – Chapter 6, Public Safety (2021)	The Chapter identifies potential hazards: • Climate change • Flooding • Hazardous material release • Seismically induced conditions, including ground shaking, surface rupture, ground failure, slope instability leading to mudslides and landslides, subsidence, and other geologic hazards • Wildland and urban fires It discusses water supply requirements and design standards for new development as they relate to identified fire, seismic, and geologic hazards. Details of the Public Safety chapter, including a discussion of the process to reduce the loss of life, injury, private property damage, infrastructure damage, economic losses, and social dislocation can be found at: https://www.ci.brea.ca.us/DocumentCenter/View/13944/Chapter-6---Public-Safety-2021	Expansion and Improvement: The HMP will be informed by reference in the Public Safety chapter of the General Plan. The City will adopt the approved HMP as part of the General Plan to meet the requirements of AB 2140. As the Public Safety chapter is revised, include applicable material from the HMP for hazard analysis and goals. Add drought to the Safety Element.
Brea City General Plan – Chapter 2, Community Development (2006)	The Chapter serves as a guide to the ultimate development pattern for the City, both within its incorporated boundaries and sphere of influence. The Community Development chapter: • Designates the distribution, location, and balance of land uses. • Describes the desired build-out of Brea • Describes building intensity standards for each land use. • Communicates population density. • Ensures compatibility between land uses. The entire Land Use Community Development chapter can be found at: https://www.ci.brea.ca.us/DocumentCenter/View/13949/Chapter-2---Community-Development-2003	Expansion and Improvement: The Community Development chapter and HMP will be aligned to describe developmental trends, hazards, and potential development in hazard areas
Brea City General Plan – Chapter 3, Housing Element (2022)	The Housing Element contains the following material: • Discusses demographics such as age and race. • Includes a description of the household, including size, income, and home ownership. • Discusses new housing growth needs • Discusses sustainability and energy efficiency • Addresses building code The Housing Element can be found at: https://www.ci.brea.ca.us/DocumentCenter/View/13950/Chapter-3---Housing-Element-2022---6th-Cycle	Expansion and Improvement: The Community profile and HMP will be aligned to describe the City and its population.
Brea City Municipal Code – Chapter 15 Building and	The purpose of the Building and Construction Safety Code is to implement the Brea City General Plan by classifying and regulating the uses of land and structures. It addresses earthquake and fire safety of structures, historic preservation,	Expansion and Improvement: Building code policies should inform the HMP and the General Plan Community Development element to

TABLE 5-1: CITY OF BREA CAPABILITIES ASSESSMENT

Resource	Resource Description	Connection to Current Mitigation/Future Opportunities for Expansion and Improvement
Construction Safety (2022)	and compliance with California and Uniform Building Code regulations. The building and construction safety code can be found at: https://codelibrary.amlegal.com/codes/brea/latest/brea_ca/0-0-0-65928	provide guidance on developing structures that are compatible with and able to withstand hazards.
Brea City Municipal Code – Chapter 20, Zoning Code (2022)	The purpose of this section of the Municipal Code is to promote public health, safety, and general welfare and preserve and enhance the aesthetic quality of the City by providing regulations to ensure an appropriate mix of land uses in an orderly manner. The zoning code can be found at: https://codelibrary.amlegal.com/codes/brea/latest/brea_ca/0-0-0-68094	Expansion and Improvement: Understanding land use policy and regulatory requirements is essential to developing mitigation strategies and activities. The land use components of the City Code will inform the development of the HMP mitigation actions.
Brea City Municipal Code – Chapter 8, Emergency Preparedness (2022)	This section of the municipal code provides for the preparation and implementation of plans for the protection of persons and property within the city in the event of an emergency, the direction of the emergency organization, and the coordination of the emergency functions of the city of Brea with all other public agencies, corporations, organizations, and affected private persons. This section of the City Code can be found at: https://codelibrary.amlegal.com/codes/brea/latest/brea_ca/0-0-0-61305	Expansion and Improvement: The emergency management organization described in the City Code represents a framework for understanding preparedness activities. It can inform the LHMP of how the City prepares to respond to hazards.
National Flood Insurance Program	NFIP makes federally-backed flood insurance available to homeowners, renters, and business owners in participating communities. The City will continue to participate in the NFIP program and will make changes accordingly.	Expansion and Improvement: City websites and social media accounts will include information on the value of flood insurance for properties located in flood hazard areas and how to buy the insurance.
California Standards Building Code (2022)	The California Building Standards Code is a compilation of three types of building standards from three different origins: • Building standards that state agencies have adopted without change from building standards contained in national model codes. • Building standards that have been adopted and adapted from national model codes to address California's ever-changing conditions and • Building standards, authorized by the California legislature, which constitute amendments not covered by national model codes, which have been created and adopted to address California concerns.	Expansion and Improvement: Adherence to building codes including local code and regulates growth and controls land use patterns. Addressing known hazards, as codes are updated, results in lowered risk and potentially less losses.
California Emergency Services Act	The California Emergency Services Act is found in Govt C §§8550-8669.7. It covers the entire range of disaster and emergency powers and responsibilities of state and local government dealing with any natural or humanmade disasters or a state of war.	Expansion and Improvement: The City shall maintain a current version of the Emergency Services Act to inform the City Council and staff of changes to disaster mitigation and preparedness activities and processes in the State

TABLE 5-1: CITY OF BREA CAPABILITIES ASSESSMENT

Resource	Resource Description	Connection to Current Mitigation/Future Opportunities for Expansion and Improvement
City Emergency Operations Plan	Explains how the City will respond to a major emergency or disaster and coordinate between the Emergency Operations Center (EOC) and field-level Incident Commanders; includes the hazards with a description of each; the concept of operations during a major emergency or disaster; the role of the EOC, and the coordination that occurs between the EOC and County's departments and other local, state, and federal governments in times of disaster.	The hazards section of the Emergency Operations Plan (EOP) is informed by the HMP as the two are closely correlated.
Orange County Hazard Mitigation Plan	Mitigation actions for Brea 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 Brea's hazard mitigation plans can lead to a more regionally unified hazard mitigation strategy, improving effectiveness. The OCHMP can be found at the following link: Orange County Hazard Mitigation Plan	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 2023 State Hazard Mitigation Plan SHMP Public Review Draft can be found at the following link: 2023 State Hazard Mitigation Plan (SHMP) Public Review Draft	The City can use the 2023 State Hazard Mitigation Plan as a source of information to refine the hazard profiles and vulnerability assessments in future Brea LHMPs.
Administrative and Technical Capabilities		
Planning Division	The Planning Division is responsible for implementing the City's Zoning Code and related goals, policies, and objectives of the City's General Plan. The Planning Division processes land use and development applications, promoting public health, safety, and general welfare to preserve or enhance the high quality of life. The Planning Division is also responsible for long-range planning, housing issues, and administering the Community Development Block Grant program. The Planning Division provides support to the City's Planning and Transportation Commission. Able to apply for grants (Grant Writer).	Expansion and Improvement: Provide opportunities for continued education to Community Development staff to maintain state-of-the-art knowledge of new code and regulatory requirements.
Building and Safety Services Division	Building Services is responsible for administrating and enforcing the uniform codes and related federal, state, and city-adopted laws and ordinances. This responsibility includes meeting state mandates to ensure all structures meet or exceed the minimum life safety standards of the aforementioned codes, laws, and ordinances. This division assures these standards by providing organized procedures for reviewing plans and specifications, field-checking construction projects, and investigating substandard structures for abatement.	Expansion and Improvement: Provide opportunities for continued education to Code Enforcement staff to maintain state-of-the-art knowledge of new code and regulatory requirements.
Building and Safety Services Division Code Enforcement	Code Enforcement's primary responsibility is the enforcement of Building Standards. These standards include the California Building, Electrical, Plumbing, Mechanical, and Energy Codes and Disabled Access Regulations contained in Title 24 of the California Code of Regulations.	Expansion and Improvement: Provide opportunities for continued education to Building and Safety staff to maintain state-of-the-art knowledge of new code and regulatory requirements.

TABLE 5-1: CITY OF BREA CAPABILITIES ASSESSMENT

Resource	Resource Description	Connection to Current Mitigation/Future Opportunities for Expansion and Improvement
Brea Police Department	The Police Department is responsible for the protection of citizens, enforcement of laws, and crime prevention. Law enforcement services include patrol and general and special crime investigations. Police Services preserve the quality of life throughout the community by enforcing the adopted local codes and ordinances that govern the proper use and maintenance of private properties. The Police Department provides support for emergency management activities.	Expansion and Improvement: Provide training to Officers to enable them to see potential hazards better and take action to report them.
Brea Fire Department	The Brea Fire Services Department's primary mission is delivering life safety services. The department provides 24-hour emergency response to various critical situations, including fires, explosions, hazardous materials incidents, medical emergencies, accidents, and miscellaneous public assistance requests. In addition, the department operates a very active Fire Prevention and Emergency Preparedness Program, which provides for fire inspections, hazardous process permitting, fire code enforcement, public education, and business emergency planning in accordance with the California Code of Regulations.	Expansion and Improvement: Provide training to staff to enable them to see potential hazards better and take action to report them. Utilize the Fire Marshall to provide input into the LHMP mitigation action plan.
Public Works Department	The Public Works Department oversees the Engineering, Transportation, Integrated Waste Management, and Water Quality. Public Works reviews development proposals and street improvement plans; manages capital improvement projects and oversees construction work within the public right-of-way; maintains the City's Master Drainage program and flood control systems; oversees water quality programs; manages the design, construction, and operation of the City's transportation network; manages the City's solid waste contract and recycling programs; and implements environmental programs. The Public Works Department provides support to the City's Traffic Committee.	Expansion and Improvement: Public Works provides engineers and technicians who manage the city's infrastructure. They possess a critical understanding of the risks posed by hazards and potential mitigation activities to address the risks to lifeline infrastructure. Their input into developing mitigation strategies and actions is critical.
Floodplain Manager	The duties and responsibilities of the Floodplain Administrator shall include, but not be limited to: • Permit review • Flood hazard reduction • NFIP program administration • Construction inspections	Expansion and Improvement: The Floodplain Administrator supports compliance with NFIP requirements, advocates for appropriate development in flood hazard areas, and provides technical expertise on effective flood mitigation activities. This can support mitigation activities.
Planning Commission	This five (5) member Commission, established by state law, has a primary function of studying proposed developments that may impact the community's growth and environment. This commission ensures that proposed developments will meet the City of Brea's technical, environmental, and aesthetic standards. The commission holds public hearings to review plans to ensure they comply with the city's zoning regulations and general plan for development.	Expansion and Improvement: Provide opportunities for continued education to members of the Planning Commission to maintain state-of-the-art knowledge of new code and regulatory requirements.

TABLE 5-1: CITY OF BREA CAPABILITIES ASSESSMENT

Resource	Resource Description	Connection to Current Mitigation/Future Opportunities for Expansion and Improvement
City Attorney	Reviews and approves resolutions and ordinances.	Expansion and Improvement: Provide opportunities for the County Attorney to review updates to regulatory information to provide expert review of County resolutions and ordinances that may address hazard mitigation
City Clerk	The City Clerk serves as a critical link between the City of Brea and its citizens. The City Clerk is the local official who administers democratic processes such as elections, all legislative actions, and ensures transparency to the public. The City Clerk is a compliance officer for federal, state, and local statutes, including the Political Reform Act and the Brown Act.	Expansion and Improvement: The City Clerk is integral to the HMP adoption process. They make sure the adoption resolution meets all administrative requirements.
Southern California Association of Governments (SCAG)	Functions as the Metropolitan Planning Organization for six counties: Los Angeles, Orange, San Bernardino, Riverside, Ventura, and Imperial. As the designated Metropolitan Planning Organization, the Association of Governments is mandated by the federal government to research and draw up plans for transportation, growth management, hazardous waste management, and air quality.	Expansion and Improvement: Attend SCAG meetings. Continue to participate in SCAG-sponsored programs. Routinely coordinate with SCAG staff to stay informed of current planning initiatives.
Community GIS	Provides complex mapping and data management of City facilities, land use and potential hazards. It supports the visualization of complex data sets using geo-location and data correlation.	Expansion and Improvement: Acquire and conduct training for GIS technicians on the latest versions of ArcGIS
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 liaising between local and federal agencies on emergency-related issues. Cal OES guides hazard mitigation planning activities, shares best practices, and distributes funding opportunities.	Expansion and Improvement: 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.	Expansion and Improvement: FEMA also provides funding for hazard mitigation actions through grant programs.
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.	Expansion and Improvement: The City can use Cal-Adapt to monitor anticipated changes in future climate conditions and adjust mitigation actions accordingly.
Online Services (Brea Website, Social Media Accounts)	Over the past several years, the City of Brea has provided 24/7 access to a wide range of online services. The website includes featured City services from Brea. Provides alert and warning information. Provides weather information and other public safety. Contains information on home and individual preparedness. The City Website and Social Media Accounts can be found at the following link: City of Brea	Expansion and Improvement: 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. Link to FEMA, State, and County websites and social media accounts. Provide comprehensive personal/family preparedness information on these media.

TABLE 5-1: CITY OF BREA CAPABILITIES ASSESSMENT

Resource	Resource Description	Connection to Current Mitigation/Future Opportunities for Expansion and Improvement
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.	Expansion and Improvement: Mitigation measures related to ensuring the resiliency of state-designated routes will be implemented through coordination with Caltrans.
Financial Resources		
General Fund	Program operations and specific projects. Consists of property tax, sales tax, transient occupancy tax, and franchise tax that can be used for general purposes.	Expansion and Improvement: Hazard mitigation projects may be considered during the annual budgeting process for funding from the general fund.
Enterprise Funds	The City operates 7 Enterprise Funds, listed as Proprietary Funds in the comprehensive annual budget (which include urban runoff, water, utility, sewer utility, sanitation, information technology, external support to public agencies, and golf course activities). These Enterprise funds account for revenue derived from specific taxes or other revenue sources restricted by law or administrative action to be expended for specified purposes.	Expansion and Improvement: Where permissible, Proprietary Funds may be considered during annual budgeting for funding mitigation projects.
Community Development Block Grants (CDBG)	The CDBG program provides funding for eligible senior activities such as in-home care, art classes, counseling, and home-delivered meals. HUD also provides Disaster Recovery Assistance in the form of flexible grants to help cities, counties, and States recover from Presidentially declared disasters, especially in low-income areas, subject to the availability of supplemental appropriations.	Expansion and Improvement: Where applicable, CDBG grants should be used to fund mitigation projects that enhance the resiliency of low-income and underserved communities.
Hazard Mitigation Grant Program (HMPG)	Provides support for pre-and post-disaster mitigation plans and projects	Expansion and Improvement: Train staff on notice of intent (NOI) procedures and track opportunities on the Cal OES mitigation website to initiate applications for grant funding.
California Proposition One Bond Programs	Authorizes $7.545 billion in general obligation bonds to fund ecosystems and watershed protection and restoration, water supply infrastructure projects, including surface and groundwater storage, and drinking water protection.	Expansion and Improvement: Provides monetary opportunities for projects that are outside of traditional mitigation projects.
Building Resilient Infrastructure and Communities (BRIC)	Provides support for pre-disaster mitigation plans and projects.	Expansion and Improvement: Train staff on notice of intent (NOI) procedures and track opportunities on the Cal OES mitigation website to initiate applications for grant funding.
Flood Mitigation Assistance Grant Program (FMA)	Mitigates structures and infrastructure that have been repetitively flooded.	Expansion and Improvement: Train staff on notice of intent (NOI) procedures and track opportunities on the Cal OES mitigation website to initiate applications for grant funding

TABLE 5-1: CITY OF BREA CAPABILITIES ASSESSMENT

Resource	Resource Description	Connection to Current Mitigation/Future Opportunities for Expansion and Improvement
Special Use Funds	Program operations and specific projects. It consists of property tax, sales tax, transient occupancy tax, and franchise tax, which can be used for general purposes.	Expansion and Improvement: Hazard mitigation projects may be considered during the annual budgeting process for funding from the general fund.
Education and Outreach Capabilities		
FEMA	Provides free preparedness materials from FEMA's online ordering platform. Contains a link to the FEMA readiness app FEMA's website can be found at the following link: FEMA	Expansion and Improvement: Provide link to site on County web page and Facebook account.
Orange County Emergency Management Division Webpage	Responsible for the comprehensive development and implementation of the four phases of emergency management. The Orange County Emergency Management Division website can be found at the following link: Orange County EMDW	Expansion and Improvement: Expand and reorganize the website's disaster preparedness links page.
Brea Emergency Readiness Web Site	The Fire Department website has educational material on evacuation, making an emergency plan, stocking supplies, staying informed, and getting involved. The Brea emergency Readiness website can be found at the following link: Brea Emergency Readiness	Expansion and Improvement: Provide links to the County website on the County's website. Post material on social media accounts that provide a link to the appropriate County website page.
Cal OES Family Readiness Guide	The Guide provides a comprehensive toolkit for making a family emergency plan. The Cal OES Family Readiness Guide can be found at the following link: Cal OES Family Readiness Guide	Expansion and Improvement: Provide link to the Readiness Guide on County website and Facebook account.
Community Emergency Response Team (CERT)	The Brea CERT program educates people about disaster preparedness for hazards that may impact their area and trains them in basic disaster response skills, such as fire safety, light search and rescue, team organization, and disaster medical operations. Using the training learned in the classroom and during practical exercises, CERT members can then assist others in their neighborhood or workplace immediately following an event when professional emergency responders are not immediately available to help.	Expansion and Improvement: Include material in CERT curriculum that provides updates to progress in the mitigation action plan and contains links to the appropriate website page.
Brea Community Outreach Program	The Community Outreach Bureau consists of the Downtown Liaison Officer (DLO), the Homeless Liaison Officer (HLO), and the School Resource Officer (SRO), all of which are under the direct supervision of one Lieutenant. This unit allows the police department greater flexibility and responsiveness to meet our community's needs. These officers, while maintaining their primary responsibilities, are cross-trained in one another's assignments and partner together as a team, assisting each other as the demands of their roles fluctuate.	Expansion and Improvement: Use trained staff to collect information and input about hazards and risks from traditionally underserved communities.

TABLE 5-1: CITY OF BREA CAPABILITIES ASSESSMENT

Resource	Resource Description	Connection to Current Mitigation/Future Opportunities for Expansion and Improvement
	The Community Outreach Bureau is often present at community events, engaging with the public on a regular basis. They not only respond to incidents but also focus on education and building strong working relationships with community members.	
AlertOC	Orange County Sheriff's and Fire Departments can send high-speed mass notifications via telephone, email, and text messages. This system can be targeted to specific geographic areas. A link to the AlertOC membership can be found at the following link: AlertOC	Expansion and Improvement: Continue to conduct outreach to expand the database and increase the percentage of residents who are subscribers.
City Social Media Accounts: **Facebook** **Twitter** **Instagram**	Over the past several years, the City of Brea has provided 24/7 access to a wide range of online services. The website includes featured City services from Brea. Provides alert and warning information. Provides weather information and other public safety. Contains information on home and individual preparedness.	Expansion and Improvement: Link to FEMA, State and County websites, and social media accounts. Provide comprehensive personal/family preparedness information on these media.

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 Brea. These goals informed the development of mitigation actions and acted as checkpoints to help City staff determine implementation progress.

EVALUATION OF POTENTIAL HAZARD MITIGATION ACTIONS

The HMPC prepared a set of potential mitigation actions based on the hazard profiles, threat assessment, capabilities assessment, community survey results, discussions among HMPC members, and existing best practices. Next, the HMPC 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 HMPC may elect to include measures with high costs or low benefits, but such measures should benefit the community and make 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 HMPC also reviewed and revised the potential hazard mitigation actions using the STAPLE/E (Social, Technical, Administrative, Political, Legal, Economic, and Environmental) criteria (**Table 5-2**). The HMPC did not formally assess every potential mitigation action under all STAPLE/E criteria but used the criteria to guide and inform the discussion. The HMPC 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 Brea 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 Brea 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 Brea 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?

CHANGES TO PREVIOUS MITIGATION ACTIONS

This document serves as the City of Brea's first officially adopted Local Hazard Mitigation Plan. As such, there were no previous mitigation actions to change, improve upon, or remove. Upon the next update of this plan, all mitigation actions should be reviewed and changed according to completion status and relevance to the community's current best interests.

2023 Hazard Mitigation Strategies and Actions

Table 5-3 identifies the 2023 mitigation strategies and actions proposed by the City as part of this LHMP process. In addition to the list of actions, the table also identifies potential funding sources, responsible departments, relative cost estimates, timeframes, and priorities for these actions, which are described further below. In addition to mitigation action and strategies, several preparedness activities were identified and denoted with the letter "P."

POTENTIAL FUNDING SOURCES

Table 5-3 identifies the potential funding sources that may be used to implement mitigation strategies. These funding sources include the following federal and state sources:

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 to rebuild in a way that reduces or mitigates future disaster losses in their communities. This grant funding is available after a presidentially declared disaster.

Emergency Management Performance Grant Program (EMPG): The federal government, through the EMPG Program, provides necessary direction, coordination, and guidance and provides necessary assistance, as authorized in this title, to support a comprehensive all-hazards emergency preparedness system.

Other Grants: Other grants may include State of California grants associated with climate change, water infrastructure, homeland security, transportation, or other funding sources that periodically become available. The list below provides some common sources:

1. Climate Adaptation Planning Sustainable Transportation Planning Grant Program - Department of Transportation
2. Sustainable Communities Competitive – Department of Transportation
3. CAL FIRE Wildfire Prevention Grants Program – Department of Forestry and Fire Protection
4. Integrated Climate Adaptation and Resiliency Program's Climate Adaptation Planning Grant – Office of Planning and Research
5. Small Community Drought Relief Program – Department of Water Resources
6. Addressing Climate Impacts – Department of Fish and Wildlife
7. Cleanup Loans and Environmental Assistance to Neighborhoods (CLEAN) Program – Department of Toxic Substances Control
8. Clean Water State Revolving Fund (CWSRF) Program Construction – State Water Resources Control Board

9. Drinking Water State Revolving Fund (DWSRF) Construction – State Water Resources Control Board
10. Water Recycling Funding Program (WRFP) Construction Grant – State Water Resources Control Board
11. Equitable Community Revitalization Grants (ECRG) – Department of Toxic Substances Control
12. Water Recycling Funding Program (WRFP) Planning Grant – State Water Resources Control Board
13. Infrastructure State Revolving Fund (ISRF) Program - Infrastructure and Economic Development Bank

RESPONSIBLE DEPARTMENT

Table 5-3 includes the identification of key responsible departments that will be focused on future implementation of mitigation strategies and actions identified by the City.

RELATIVE COST ESTIMATES

The HMPC 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 ($): $75,000 or less
- Medium cost ($$): $75,001 to $4,999,999
- High cost ($$$): Greater than $5,000,000

TIMEFRAMES

Table 5-3 includes timeframes that provide general timing durations due to the nature of the mitigation actions identified by the City. The following timeframes are used based on the following conditions:

Ongoing (Annually): Actions that identify this timeframe are the types of actions that City staff would conduct annually.

Ongoing (As Needed): Actions that identify this timeframe include activities that City staff would conduct in response to a request by internal (City Departments) or external (Property Owners) forces.

Future Planning Process: Actions identified within this timeframe are considered low-priority actions that the City would like to continue to track but does not feel they would be able to implement in the current planning implementation timeframe.

For actions that use these terms, it is intended to identify that the action may add to existing capabilities and not have a particular start or end date or occur periodically. This is typically used for actions that include new policies, tasks, or standard operating procedures intended to mitigate future risks.

PRIORITIZATION

As part of the mitigation actions development and review, the HMPC also prioritized the actions. The prioritization efforts looked at the risks and threats of each hazard, financial costs and benefits, technical feasibility, and community values. HMPC members were asked to identify their priority actions through a voting exercise. Items are prioritized based on the number of votes the

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

Based on the criteria and evaluation processes used during Plan development, the HMPC prepared a prioritized list of mitigation actions **(Table 5-3)** to improve Brea's resilience to hazard events.

TABLE 5-3: MITIGATION ACTIONS IMPLEMENTATION PLAN

Action #	Mitigation Action Item	Potential Policy Integration	Potential Funding Source	Responsible Department	Relative Cost	Time Frame	Priority
Emergency Preparedness Activities							
P1	Conduct regular emergency preparedness drills and training exercises for City staff.		General Fund, EMPG	Emergency Management, Fire			Ongoing
P2	Expand participation in the Brea Community Emergency Response Team (CERT) program.		General Fund, EMPG	Emergency Management, Fire			Ongoing
P3	Ensure that community evacuation plans include provisions for community members who do not have access to private vehicles or are otherwise unable to drive.		General Fund, EMPG	Emergency Management, Fire			Ongoing
P4	Continue to ensure effective emergency notifications through multiple media formats, in languages appropriate for the community, about pending, imminent, or ongoing emergency events. Ensure that information is accessible to persons with access and functional needs.		General Fund, EMPG	Emergency Management, Fire			Ongoing
P5	Maintain at least one emergency power-generating station in all critical facilities that the City could use as an emergency public assembly area, such as the Civic Center, Community Centers, and any other locations designated in the future.		General Fund, EMPG	Emergency Management, Fire			Ongoing
P6	Update the Brea Emergency Operations Plan to identify backup power and communications locations for critical facilities.		General Fund, EMPG	Emergency Management, Fire			Ongoing
P7	Continuously update response procedures for first responder departments to properly address new hazard events as they emerge.		General Fund, EMPG	Emergency Management, Fire			Ongoing
P8	Increase the number of City staff who have CalOES Safety Assessment Program (SAP) credentials.		General Fund, EMPG	Emergency Management, Fire, Building and Safety Division, Community Development Department			Ongoing

TABLE 5-3: MITIGATION ACTIONS IMPLEMENTATION PLAN

Action #	Mitigation Action Item	Potential Policy Integration	Potential Funding Source	Responsible Department	Relative Cost	Time Frame	Priority
P9	Establish or update agreements with local schools to ensure facilities can act as evacuation sites during major emergencies.		General Fund, EMPG	Emergency Management, Fire			Ongoing
P10	Add emergency alert and warning signage along the hazard-prone areas in Carbon Canyon to provide critical information and evacuation instruction during hazard events.		General Fund, EMPG, BRIC/ HMGP Grants, Cal Fire Grants, Other Grants	Public Works Department			Ongoing
Multiple Hazards							
1.01	Install energy-efficient equipment upgrades in City facilities to increase the longevity of the fuel supply for backup generators. (Hazards addressed: All)		General Fund, BRIC/ HMGP Grants, Other Grants	Public Works Department	$$	2028	Low
1.02	Install digital signage in key locations to aid in public outreach and information dissemination during emergency events.		General Fund, EMPG	Emergency Management, Fire, Public Works Department	$	2027	Low
1.03	Conduct routine updates to Facility Conditions Assessments for City-owned infrastructure and other utilities and coordinate with other agencies to ensure inspections of other important infrastructure. (Hazards addressed: All)		General Fund, BRIC/ HMGP Grants, Other Grants	Building and Safety Division	$$	Annually	Low
1.04	Conduct a feasibility assessment of the installation of solar and battery backup systems at key critical facilities within the City. (Hazards addressed: All)		General Fund, BRIC/ HMGP Grants, Other Grants	Public Works Department	$$	2027	Medium
1.05	Work closely with community groups to increase awareness of hazard events and resiliency opportunities among socially vulnerable community members, including those experiencing homelessness. (Hazards addressed: All)		General Fund, BRIC/ HMGP Grants, Other Grants	Community Development Department, Community Services Department	$	Annually	Low
1.06	Closely monitor changes in the boundaries of mapped hazard areas resulting from land use changes or climate change and adopt	X	General Fund, BRIC/ HMGP Grants, Other Grants	Community Development Department	$	Annually	Low

TABLE 5-3: MITIGATION ACTIONS IMPLEMENTATION PLAN

Action #	Mitigation Action Item	Potential Policy Integration	Potential Funding Source	Responsible Department	Relative Cost	Time Frame	Priority
	new mitigation actions or revise existing ones to ensure continued resiliency. (Hazards addressed: All)						
1.07	Integrate policy direction and other information from this Plan into other City documents, including the General Plan, Emergency Operations Plan, and Capital Improvements Program. (Hazards addressed: All)	X	General Fund, BRIC/ HMGP Grants, Other Grants	All Departments	$	Following All Plan Updates	Medium
1.08	Monitor funding sources for hazard mitigation activities. (Hazards addressed: All)		General Fund, BRIC/ HMGP Grants, Other Grants	Fire	$	Annually	Low
1.09	Integrate climate change mitigation and adaptation information and analysis into future LHMP updates and other City Plans, where practicable. (Hazards addressed: All)	X	General Fund, BRIC/ HMGP Grants, Other Grants	All Departments	$	Following Any Plan Update	Low
1.10	Update the City's Master Plans periodically (in conjunction with the LHMP and CIP) to incorporate new data/ mapping and/or address emerging issues. (Hazards addressed: All)		General Fund, BRIC/ HMGP Grants, Other Grants	Public Works Department, Community Development Department	$$	Following LHMP/CIP Updates	Medium
1.11	Install and harden encased emergency backup power generators at critical facilities and key infrastructure as deemed necessary. Prioritize installations for facilities that serve as key cooling/warming centers (including the Senior Center), and evacuation centers. (Hazards addressed: All)		General Fund, BRIC/ HMGP Grants, Other Grants	Public Works Department	$$	2027	Medium
1.12	Create an inventory of all senior centers, mobile home parks (especially those located in the Canyon), and other vulnerable populations to ensure that this population group is accounted for in emergency scenarios where evacuation is required. (Hazards Addressed: All)		General Fund, BRIC/ HMGP Grants, Other Grants	Fire, Community Services Department	$	Annually	Medium
1.13	Explore funding opportunities to create an inventory of sewer lines in Carbon Canyon, harden infrastructure, and ensure		General Fund, BRIC/ HMGP Grants, Other Grants	Public Works Department	$	2027	Low

TABLE 5-3: MITIGATION ACTIONS IMPLEMENTATION PLAN

Action #	Mitigation Action Item	Potential Policy Integration	Potential Funding Source	Responsible Department	Relative Cost	Time Frame	Priority
	functionality after a hazardous event. (Hazards Addressed: All)						
1.14	Install battery backup power supplies for traffic signals to ensure functionality in the event of power failure.		General Fund, BRIC/ HMGP Grants, Other Grants	Public Works Department	$$$	2025	High
Earthquake Hazards							
2.01	Develop a small project-based retrofit program to assist homeowners with simple earthquake mitigation activities (i.e., water heater straps, furniture anchoring, gas shut-off tools, and other emergency supplies) to reduce strain on City resources during an event.		General Fund, BRIC/ HMGP Grants, California Earthquake Authority Grants, Other Grants	Fire	$	2027	Medium
2.02	Conduct an educational campaign to incentivize and promote medium-scale seismic retrofits, such as window films to minimize shattering, rooftop-mounted equipment anchors, masonry chimney bracing, and other preventative measures to reduce damage to private buildings.		General Fund, BRIC/ HMGP Grants, California Earthquake Authority Grants, Other Grants	Fire, Community Development Department	$	Annually	Low
2.03	Conduct a seismic analysis of all City-owned key facilities and retrofit vulnerable facilities.		General Fund, BRIC/ HMGP Grants, California Earthquake Authority Grants, Other Grants	Public Works Department	$	2027	Low
2.04	To the extent feasible, construct all new City-owned facilities to remain operational in the event of a major earthquake.	X	General Fund, BRIC/ HMGP Grants, California Earthquake Authority Grants, Other Grants	Public Works Department	$$$	2028	Low
2.05	Retrofit key critical facilities with seismically rated window film treatments that ensure glass windows do not shatter during a strong seismic event.		General Fund, BRIC/ HMGP Grants, California Earthquake Authority Grants, Other Grants	Public Works Department	$$	2028	Low
2.06	Improve local understanding of the threat of a major earthquake by conducting a citywide assessment modeling potential losses due to		General Fund, BRIC/ HMGP Grants, California Earthquake	Fire	$	2028	Low

TABLE 5-3: MITIGATION ACTIONS IMPLEMENTATION PLAN

Action #	Mitigation Action Item	Potential Policy Integration	Potential Funding Source	Responsible Department	Relative Cost	Time Frame	Priority
	destroyed and damaged structures, and interruptions to key services.		Authority Grants, Other Grants				
2.07	Analyze the City's building and housing stock to create an inventory of seismically vulnerable buildings (unreinforced masonry, soft-story construction, non-ductile concrete buildings) within the city and conduct an educational program providing information on how to begin the process of seismically retrofitting these buildings		General Fund, BRIC/ HMGP Grants, California Earthquake Authority Grants, Other Grants	Public Works Department, Community Development Department	$$	2027	Medium
2.08	Seismically retrofit or replace Fire Station 1 to meet current seismic requirements as set forth by the State.		General Fund, BRIC/ HMGP Grants, California Earthquake Authority Grants, Other Grants	Management Services, Public Works Department	$$$	2026	High
2.09	Seismically retrofit or replace the Civic Center to meet current seismic requirements as set forth by the State.		General Fund, BRIC/ HMGP Grants, California Earthquake Authority Grants, Other Grants	Management Services, Public Works Department	$$$	2026	High
2.10	Seismically retrofit or replace the City owned parking structure and bridges.		General Fund, BRIC/ HMGP Grants, California Earthquake Authority Grants, Other Grants	Public Works Department	$$$	2026	High
Wildland/Urban Fires							
3.01	Promote the proper maintenance and separation of power lines and efficient response to fallen power lines, particularly in the WUI and VHFHSZs.	X	General Fund, BRIC/ HMGP Grants, California Climate Resilience Grants, Cal Fire Grants, Other Grants	Fire, Public Information Officer	$	Annually	Low
3.02	Identify funding for existing non-conforming retrofits in fire-prone areas to use non-combustible building materials such as masonry, brick, stucco, concrete, steel, or others as appropriate. Establish defensible space zones around homes in these areas to reduce fire vulnerability.	X	General Fund, BRIC/ HMGP Grants, California Climate Resilience Grants, Cal Fire Grants, Other Grants	Fire	$$	Annually	Medium

TABLE 5-3: MITIGATION ACTIONS IMPLEMENTATION PLAN

Action #	Mitigation Action Item	Potential Policy Integration	Potential Funding Source	Responsible Department	Relative Cost	Time Frame	Priority
3.03	Explore new funding opportunities to increase the budget for public outreach and fire hazard prevention awareness and education.		General Fund, BRIC/ HMGP Grants, California Climate Resilience Grants, Cal Fire Grants, Other Grants	Fire	$	Annually	Low
3.04	Routinely participate in regional areas focused on wildfire preparedness and investigate the feasibility of developing additional defensible space and home hardening guidance for existing structures.		General Fund, BRIC/ HMGP Grants, California Climate Resilience Grants, Cal Fire Grants, Other Grants	Fire	$	Annually	Low
3.05	Create a rapid response plan from among Brea's and surrounding counties' first responders to secure hospital, nursing, and assisted living facilities, especially those located within fire hazard severity zones.		General Fund, BRIC/ HMGP Grants, California Climate Resilience Grants, Cal Fire Grants, Other Grants	Fire	$	2027	Low
3.06	Clear dead vegetation and invasive plants in flood control facility footprints, trails, parks, and open spaces, especially during and after a drought episode.	X	General Fund, BRIC/ HMGP Grants, California Climate Resilience Grants, Cal Fire Grants, Other Grants	Fire	$	Annually	Low
3.07	Coordinate with OCFA and surrounding jurisdictions on home hardening and vegetation management assessments to assist residents in understanding and addressing wildfire risk.		General Fund, BRIC/ HMGP Grants, California Climate Resilience Grants, Cal Fire Grants, Other Grants	Fire	$	Annually	Low
3.08	Conduct regular fuel modification projects and clear vegetation to reduce fire hazard risks, such as removal of dead vegetation and invasive plants in parks, open spaces, and right-of-way embankments and creating larger buffers within the wildland-urban interface.		General Fund, BRIC/ HMGP Grants, California Climate Resilience Grants, Cal Fire Grants, Other Grants	Fire, Public Works Department	$$	Annually	Low

TABLE 5-3: MITIGATION ACTIONS IMPLEMENTATION PLAN

Action #	Mitigation Action Item	Potential Policy Integration	Potential Funding Source	Responsible Department	Relative Cost	Time Frame	Priority
3.09	Create a fire-adapted landscape program to assist existing property owners with retrofits.	X	General Fund, BRIC/ HMGP Grants, California Climate Resilience Grants, Cal Fire Grants, Other Grants	Fire, Community Development Department	$$	2027	Low
3.10	Replace Fire Station 4, with a permanent structure designed for wildfire-prone areas.		General Fund, BRIC/ HMGP Grants, California Climate Resilience Grants, Cal Fire Grants, Other Grants	Fire, Public Works Department	$$$	2026	High
Human-Caused Hazards (Hazardous Materials, Active Shooter [Terrorism])							
4.01	Conduct active shooter trainings and exercises for City staff, residents, and businesses. Hazard Addressed: Terrorism		General Fund, BRIC/ HMGP Grants, Other Grants	Police Department, Fire	$	Annually	Medium
4.02	Retrofit critical facilities, administration buildings, and other city-owned buildings are deemed important, along with counterterrorism design elements and building materials. Hazard Addressed: Terrorism		General Fund, BRIC/ HMGP Grants, Other Grants	Police Department, Public Works	$$$	2026	High
4.03	Coordinate and enhance datasets for schools, medical facilities, senior assisted living facilities, and other critical facilities with the School District and other key entities within the City to better respond to mass-casualty and terrorism incidents. Hazard Addressed: Terrorism		General Fund, BRIC/ HMGP Grants, Other Grants	Police Department, Fire	$	2027	Low
4.04	Discourage new sensitive land uses, including schools, parks, childcare centers, adult and senior assisted living facilities, and community centers, from locating near identified hazardous material facilities. Discourage or prohibit new hazardous material facilities from locating near sensitive land uses.	X	General Fund, BRIC/ HMGP Grants, Other Grants	Community Development Department	$	Ongoing/ Annually	Medium

TABLE 5-3: MITIGATION ACTIONS IMPLEMENTATION PLAN

Action #	Mitigation Action Item	Potential Policy Integration	Potential Funding Source	Responsible Department	Relative Cost	Time Frame	Priority
	Hazard Addressed: Hazardous Materials Release						
4.05	Pursue full alignment of the General Plan with policies and actions outlined in state and regional plans, such as the California Accidental Release Prevention (CalARP) Program and the Orange County Fire Authority Hazardous Materials Area Plan. Hazard Addressed: Hazardous Materials Release		General Fund, BRIC/ HMGP Grants, Other Grants	Community Development Department, Fire	$$	2028	Low
4.06	Continuously inspect businesses and other properties storing hazardous materials and create an inventory of storage locations that require updates, maintenance, or renovation. Hazard Addressed: Hazardous Materials Release		General Fund, BRIC/ HMGP Grants, Other Grants	OC Health, Community Development Department, Fire	$	Annually	Medium
4.07	Develop a parcel-level database, in coordination with Orange County, which tracks the status of hazardous materials storage and use, prioritized by potential threat to surrounding properties. Hazard Addressed: Hazardous Materials Release		General Fund, BRIC/ HMGP Grants, Other Grants	Fire, Administrative Services	$$	2026	High
Severe Weather (Windstorm, Extreme Heat, Winter Storm)							
5.01	Expand current outreach to residents and businesses prior to the severe winds (Santa Ana Wind events) on proper tree maintenance and identification of potentially hazardous trees. (Hazards addressed: Windstorms, Winter Storm)		General Fund, BRIC/ HMGP Grants, California Climate Resilience Grants, Other Grants	Public Information Officer	$	Annually	Low
5.02	Remove or trim trees determined to be susceptible to blowing over during a severe wind event. Encourage the undergrounding of existing utilities. (Hazards addressed: Windstorms, Winter Storm)		General Fund, BRIC/ HMGP Grants, Other Grants	Public Works Department	$$	Annually	Low

TABLE 5-3: MITIGATION ACTIONS IMPLEMENTATION PLAN

Action #	Mitigation Action Item	Potential Policy Integration	Potential Funding Source	Responsible Department	Relative Cost	Time Frame	Priority
5.03	Expand current outreach to residents and businesses regarding extreme heat events. Educate residents on the dangers of extreme heat and identify actions they can take to mitigate the negative effects of extreme heat (Hazards addressed: Extreme Heat)		General Fund, BRIC/ HMGP Grants, California Climate Resilience Grants, Other Grants	Public Information Officer	$	Annually	Low
Geologic Hazards (Landslide, Soil Erosion)							
6.01	Install and maintain slope stabilization measures on publicly-owned hillsides above roads, buildings, and other facilities.		General Fund, BRIC/ HMGP Grants, Other Grants	Public Works Department	$$$	2029	Low
6.02	Retrofit City facilities to reduce the potential for landslide events within or adjacent to critical infrastructure.		General Fund, BRIC/ HMGP Grants, Other Grants	Public Works Department	$$$	2029	Low
6.03	Require geotechnical studies in areas of significant landslide threat and identify strategies for existing development downstream of these hazard areas.	X	General Fund, BRIC/ HMGP Grants, Other Grants	Community Development Department	$	Ongoing/ Annually	Low
6.04	Establish/encourage the planting and maintenance of slope stabilizing, non-flammable vegetation in all landslide hazard-prone areas of the city.	X	General Fund, BRIC/ HMGP Grants, Other Grants	Community Development Department, Fire	$	Ongoing/ Annually	Low
Flooding (Dam Failure)							
7.01	Update the City's Master Plan of Drainage on a regular basis to incorporate new data and/or address emerging issues.		General Fund, BRIC/ HMGP Grants, Flood Mitigation Assistance Grants, Other Grants	Public Works Department	$$	Annually	Low
7.02	Investigate the use of permeable paving and landscaped swales for new construction and replacement of City-owned hardscaped areas.		General Fund, BRIC/ HMGP Grants, Flood Mitigation Assistance Grants, Other Grants	Public Works Department	$	2028	Low
7.04	Identify potential flood improvements that reduce inundation from both storm flows and potential dam inundation effects.		General Fund, BRIC/ HMGP Grants, Flood Mitigation Assistance Grants, Other Grants	Public Works Department	$	2028	Low

TABLE 5-3: MITIGATION ACTIONS IMPLEMENTATION PLAN

Action #	Mitigation Action Item	Potential Policy Integration	Potential Funding Source	Responsible Department	Relative Cost	Time Frame	Priority
7.05	Conduct frequent cleanings of storm drain intakes, especially before and during the rainy season.		General Fund, BRIC/ HMGP Grants, Flood Mitigation Assistance Grants, Other Grants	Public Works Department	$	Annually	Medium
7.06	Track areas where ponding frequently occurs during heavy rainfall and install new drains or upgrade existing ones to reduce ponding.		General Fund, BRIC/ HMGP Grants, Flood Mitigation Assistance Grants, Other Grants	Public Works Department	$	2028	Low
7.07	Identify all structures located in FEMA flood zones and determine the need to map, analyze, and modify FEMA flood maps. If flood map revisions are possible, work with property owners to determine the desire to perform this activity on their behalf.		General Fund, BRIC/ HMGP Grants, Flood Mitigation Assistance Grants, Other Grants	Public Works Department, Administrative Services	$	2027	Low
7.08	Coordinate with dam owners/operators, state, and federal agencies to collectively identify threats to the City and the region and identify ways to retrofit/strengthen the dams under their control.		General Fund, BRIC/ HMGP Grants, Flood Mitigation Assistance Grants, Other Grants	Public Works Department, Fire	$	2028	Low

*** Relative Cost Categories**	
$	Less than $75,000
$$	$75,001 to $4,999,999
$$$	Greater than $5,000,000

National Flood Insurance Program

Brea participates in the National Flood Insurance Program (NFIP), created by Congress in 1968 to provide subsidized flood insurance to homeowners living in flood-prone areas. Brea has participated in NFIP since December 1980. **Table 5-4** provides the City's NFIP information.

Table 5-4: City of Brea NFIP Information

Initial Flood Hazard Boundary Map (FHBM)	**5/24/1974**
Initial Flood Insurance Rate Map (FIRM)	**12/2/1980**
NFIP Participation Date	**12/2/1980**
Current Effective Map Date	**12/3/2009**

Although participation is not a dedicated hazard mitigation action, Brea will continue participating in the NFIP and comply with the program's requirements by enforcing the City's Floodplain Management Regulations. 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 Manager, 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, Brea 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, land use shifts, flood regime changes 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. **Table 5-5** provides the City's floodplain management regulations.

Table 5-5: City of Brea Floodplain Management Regulations

Adoption of Minimum Floodplain Management Criteria, and Implementation and Enforcement of Floodplain Management Regulations	**Ord 1132, passed 12/1/2009. Chapter 18.204 Purpose and Methods**
Designee to Implement NFIP	**Ord. 1132, passed 12/1/2009, § 18.216.010 Designation of the Floodplain Administrator. The City Engineer fulfills this role.**
Implementation of Substantial Improvement/ Substantial Damages Provisions	**Ord. 1132. Passed 12/1/2009, § 18.216.020 Duties and Responsibilities of the Floodplain Administrator**

Note: Ordinances are hyperlinked to the relative Municipal Code section

The City of Brea contains Special Flood Hazard Areas (SFHA). Under the NFIP, there are 44 policies in force, amounting to roughly $101,332 in premiums paid annually. Total insurance coverage for these policies amounts to $15,659,000. Brea has no repetitive loss properties that FEMA identified; however, they have had a total of 2 closed Paid Loss cases totaling some $6,613 in damages paid out.

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CHAPTER 6 – PLAN MAINTENANCE

For this LHMP to remain effective and useful to the community of Brea, it must remain up to date. An updated version of the LHMP will continue to guide Brea's hazard mitigation activities and help keep the City eligible for state and federal hazard mitigation funding. The HMPC has structured this LHMP so individual sections can easily be updated as new information becomes available and 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 HMPC will remain responsible for maintaining and updating the Plan, including evaluating the Plan's effectiveness as needed. Members of the HMPC will also coordinate the plan's implementation in their respective positions. **Table 1-1** contains a list of current members. In future years, staff and representatives (either current HMPC members or other individuals) from the following departments, districts, and agencies should be included in maintenance and update activities:

- Administrative Services
- City Manager
- Community Development
- Finance
- Human Resources
- Public Services
- Community Services
- City Clerk
- City Attorney
- Police Department
- Building and Safety Division
- Public Works
- Fire Department

The staff member currently serving as the HMPC leader (the person responsible for coordinating future updates) is in the Emergency Services Department. They will serve as the project manager or designate this role to another staff member during the update process. The HMPC leader or their designee will coordinate the maintenance of this Plan, lead the formal Plan review and evaluation activities, direct the Plan update, and assign tasks to other members of the HMPC to complete these activities. Such tasks may include collecting data, developing new mitigation actions, updating mitigation actions, making presentations to City staff and community groups, and revising the Plan sections.

PLAN IMPLEMENTATION

The 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. HMPC 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:

Brea 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.

Brea 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.

Brea 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 Brea 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 Brea 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 HMPC 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 2025-2026 fiscal calendar year. To the extent possible, HMPC 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 HMPC meets to evaluate the Plan, members should consider these questions:

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

Plan Updates

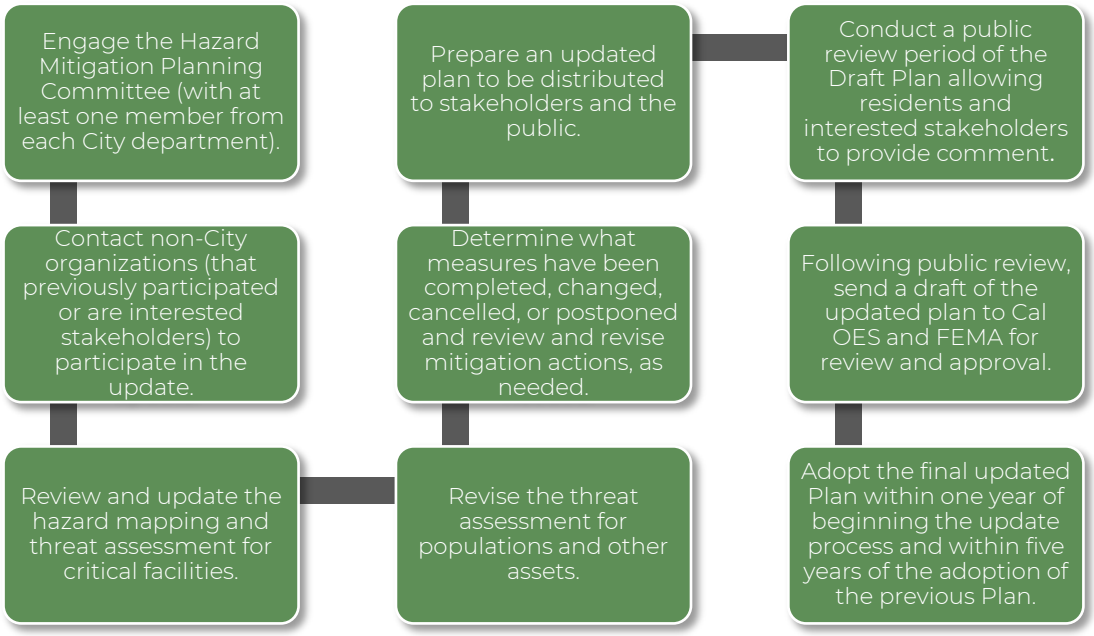
The information in this Plan, including the hazard profiles, threat assessments, and mitigation actions, is based on the best available information, practices, technology, and methods available to the City and HMPC when this Plan was prepared. As factors change, including technologies, community demographics 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 will begin no later than four years after this Plan is adopted, allowing a year for the update process before the Plan expires. However, it is recommended that you begin the update process three years after plan adoption if the funding source for the plan will be a mitigation grant. 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 Brea or an area that includes part or the entire City
- A hazard event that results in one or more fatalities in Brea

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



UPDATE ADOPTION

The Brea 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 HMPC's actions to review and update the LHMP. The HMPC 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 HMPC 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 HMPC meeting.

Point of Contact

The Hazard Mitigation Plan leader for Brea is the primary point of contact for this Plan and future updates. At the time of production, the LHMP project coordinator is Lisa Keyworth, Emergency Preparedness Coordinator, Brea Fire Department, available at lisak@cityofbrea.net or 714.990.7622

Appendix A – HMPC Meeting Materials

TABLE 1-1: BREA HAZARD MITIGATION PLANNING COMMITTEE		
Name	**Title**	**Department**
Lisa Keyworth	Emergency Preparedness Coordinator	Brea Fire Department
George Avery	Fire Chief	Brea Fire Department
Scott Wiedensohler	Division Chief District 4	OCFA
Rudy Correa	Superintendent	Water Division
Michael Ho	Public Works Director	Public Works
Jason Killbrew	Community Development Director	Community Development
Monica Lo	Deputy Administrative Services Director	Administrative Services
Liz Pharis	Communications & Marketing Manager/PIO	City Manager's Office
Joanne Hwang	City Planner	Planning Department
Jessica Newton	Senior Planner	Planning Department
Cristal Nava	Assistant Planner	Planning Department

Location: In Person
Date: May 18, 2023
Time: 1:00 PM – 3:00 PM

City of Brea

Local Hazard Mitigation Plan Update
HMPC Meeting #1 Agenda

I. **Team Introductions**

II. **Local Hazard Mitigation Plan Overview**

III. **Project Goals and Expectations**

IV. **Hazard Mitigation Planning Team Roster**

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

VI. **Community Engagement and Outreach Strategy**

VII. **Hazard Identification/Prioritization**

VIII. **Next Steps and To-Do List**

Hazard Mitigation Planning Update Process	**April 2023 – December 2023**
Community Outreach	Ongoing
Administrative Draft LHMP	Summer / Fall 2023
Public Review Draft LHMP Document	Fall 2023
Cal OES/FEMA Review Draft Document	Fall 2023/ Winter 2024

Location: In Person
Date: August 17, 2023
Time: 10:00 AM – 12:00 PM

City of Brea

Local Hazard Mitigation Plan Update
HMPC Meeting #2 Agenda

Team Introductions

Review of Project Goals

Review of Hazard Profile Organization

Review of Critical Facilities

Review of Hazard Profiles/Mapping Discussion/Threat Assessment

Introduction to Mitigation Strategies

Next Steps

Hazard Mitigation Planning Update Process	**April 2023 – Winter 2024**
HMPC Meeting #3 – Mitigation Action Review/Prioritization	September 2023
Community Outreach	Ongoing
Administrative Draft LHMP	Fall 2023
Public Review Draft LHMP Document	Fall 2023/ Winter 2024
Cal OES/FEMA Review Draft Document	Winter 2024

Probability	Importance
Based on estimated likelihood of occurrence from historical data	**2.0**
Probability	Score
Unlikely - less than 1% chance each year	1
Occasional - a 1 to 10% chance each year	2
Likely - a 10 to 90% chance each year	3
Highly Likely - more than 90% chance each year	4

Secondary Impacts	Importance
Based on estimated secondary impacts to community at large	**0.5**
Impact	Score
Negligible - no loss of function, downtime, and/or evacuations	1
Limited - minimal loss of function, downtime, and/or evacuations	2
Moderate - some loss of function, downtime, and/or evacuations	3
High - major loss of function, downtime, and/or evacuations	4

Location	Importance
Based on size of geographical area of community affected by hazard	**0.8**
Affected Area	Score
Negligible	1
Limited	2
Significant	3
Extensive	4

Maximum Probable Extent (Primary Impact)	Importance
Based on percentage of damage to typical facility in community	**0.7**
Impact	Score
Weak - little to no damage	1
Moderate - some damage, loss of service for days	2
Severe - devastating damage, loss of service for months	3
Extreme- catastrophic damage, uninhabitable conditions	4

City of Brea

Local Hazard Mitigation Plan Update
HMPC Meeting #3 Agenda

I. Introductions

II. Review of Project Goals

- GOAL-1: Protect against threats from natural hazards to life, injury, and property damage for the Brea community.
- GOAL-2: Increase public awareness of potential hazard events.
- GOAL-3: Preserve critical services and functions by protecting key facilities and infrastructure.
- GOAL-4: Protect natural systems from current and future conditions.
- GOAL-5: Coordinate mitigation activities among City departments, neighboring jurisdictions, and with state and federal agencies.
- GOAL-6: Prepare for long-term changes in hazard conditions.

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 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 the City 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 City's 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

Example Cost Categories: **City specific values will be determined with the HMPC in the meeting.**	
$	Less than $100,000
$$	$100,001 to $999,999
$$$	Greater than $1,000,000

VI. Review and Discussion of Draft Mitigation Strategies

VII. Next Steps

Hazard Mitigation Planning Process	**June 2023 – June 2024**
Community Outreach	Ongoing
Administrative Draft LHMP	Winter 2024
Public Review Draft LHMP Document	Spring 2024
Cal OES/FEMA Review Draft Document	Summer 2024

Follow-up Items

- What is the level of development the City is expecting to occur. Within that development, how much of it is expected to be ADUs?

- Get information from Arborist regarding pest impacts on trees and is pest management a problem that should be addressed in the LHMP.

- Ask PD for civil unrest information (dates of rallies, estimated number of attendees, any issues/violence/property destruction that occurred).

- Get a copy of the City's Insured Asset Inventory.

- Verify information regarding water tanks and lift stations listed on the critical facilities/facilities of concern spreadsheet.

Mitigation Actions follow-up

Follow up with Public works in the following Mitigation Actions:

- 1.3 - Expand fiber optic communication systems throughout the City through the following strategies:
  - Connect key critical facilities with fiber optic communications.
  - Improve emergency communications between critical facilities and key infrastructure through the use of a "dark fiber" network.
  - Install fiber optic systems or conduits for fiber optic infrastructure in coordination with undergrounding infrastructure projects or projects that include subsurface excavation within public streets.
  - Require installation of underground conduit in association with private developments proposed throughout the City.

- 1.7 - Explore the feasibility of connecting key critical facilities, including City Hall/Police Station, Marine Safety HQ, and community fire stations, to a microgrid power-supply network.

- 1.8 - Coordinate closely with water and natural gas providers to add isolation valves at key locations along their pipeline networks. Identify locations and corridors necessary to isolate wastewater from human contact due to overflows caused by catastrophic service failures.

- 1.10 - Identify areas in need of slope stabilization and stabilize with deep-rooted vegetation, geotextile fabric, and other slope stabilization techniques. (Has this been documented?)

- 2.4 - Explore modifications to the berm at Main Beach Park as necessary and modify the design of the barrier to the extent feasible to protect the park and adjacent properties from coastal (tsunami, wave run-up, etc.) and inland flooding conditions.

- 5.1 - Use permeable paving and landscaped swales in all new and replacement City-owned hardscapes to the extent feasible.

- 7.3 - Conduct a community-wide moisture-induced landslide and mudslide risk analysis, including the potential for building destruction/damage, deaths, and injuries. Consider the anticipated changes to precipitation patterns, wildfires, and other factors that may influence mudslide events.

Follow up with Community Development on the following Mitigation Actions:

- 1.12 - Establish greater setbacks for siting new City critical facilities in mapped flood hazard, coastal hazard, and landslide hazard zones to the extent feasible. Ensure critical facilities sited within the wildfire hazard zone exceed the minimum mitigation standards as defined by the Fire Code. (Is this feasible?)

- 2.1 - Develop criteria for clifftop properties to estimate when erosion may begin to cause structural damage or pose a safety risk.

- 5.2 - Require new construction and significant redevelopment projects not required to prepare a Water Quality Management Plan to reduce runoff through the use of landscaped swales, permeable paving, and other applicable low-impact development strategies.

Follow up with WEROC/MWDOC on the following Mitigation Action:

- 4.4 - Incentivize indoor and outdoor water efficiency through community-wide education and rebate programs and continue to maintain these programs and other restrictions on water use in the absence of drought conditions. This activity requires close coordination with local water providers and the Municipal Water District of Orange County.

Follow up with Fire Chief on the following Mitigation Actions:

- 1.5 - Replace or supplement larger emergency response equipment with smaller vehicles that are better able to navigate narrow community streets without sacrificing response effectiveness. (Remove?)

- 9.6 - Develop a fire response time analysis that determines the key factors that affect emergency response issues, such as street width, type of response apparatus, and parking restrictions. Outcomes from this analysis should be incorporated into new City policy and standards, if necessary.

- 9.7 - Develop a vegetation management pilot program that assists abatement activities for homeowners that meet low-income requirements. (Do you want to keep?)

Follow up with the Fire Marshal on the following Mitigation Action:

- 9.1 - Create a streamlined permitting process with Coastal Commission for fuel removal activities that are consistent with the Natural Community Conservation Plan and Habitat Conservation Plan for Orange County's Central and Coastal Subregion.

Follow up with Water Quality/Water Districts on the following Mitigation Actions:

- 1.2 – Install and harden emergency backup generators at water pump stations and sewer lift stations. (is more work necessary, or can we mark it as complete?)

- 4.2 - Aggressively search for and repair leaks in water infrastructure through close coordination and cooperation with the Laguna Beach County Water District and South Coast Water District.

- 4.3 - Increase the use of recycled water sources for City residents and businesses through close coordination and collaboration with the Laguna Beach County Water District and South Coast Water District.

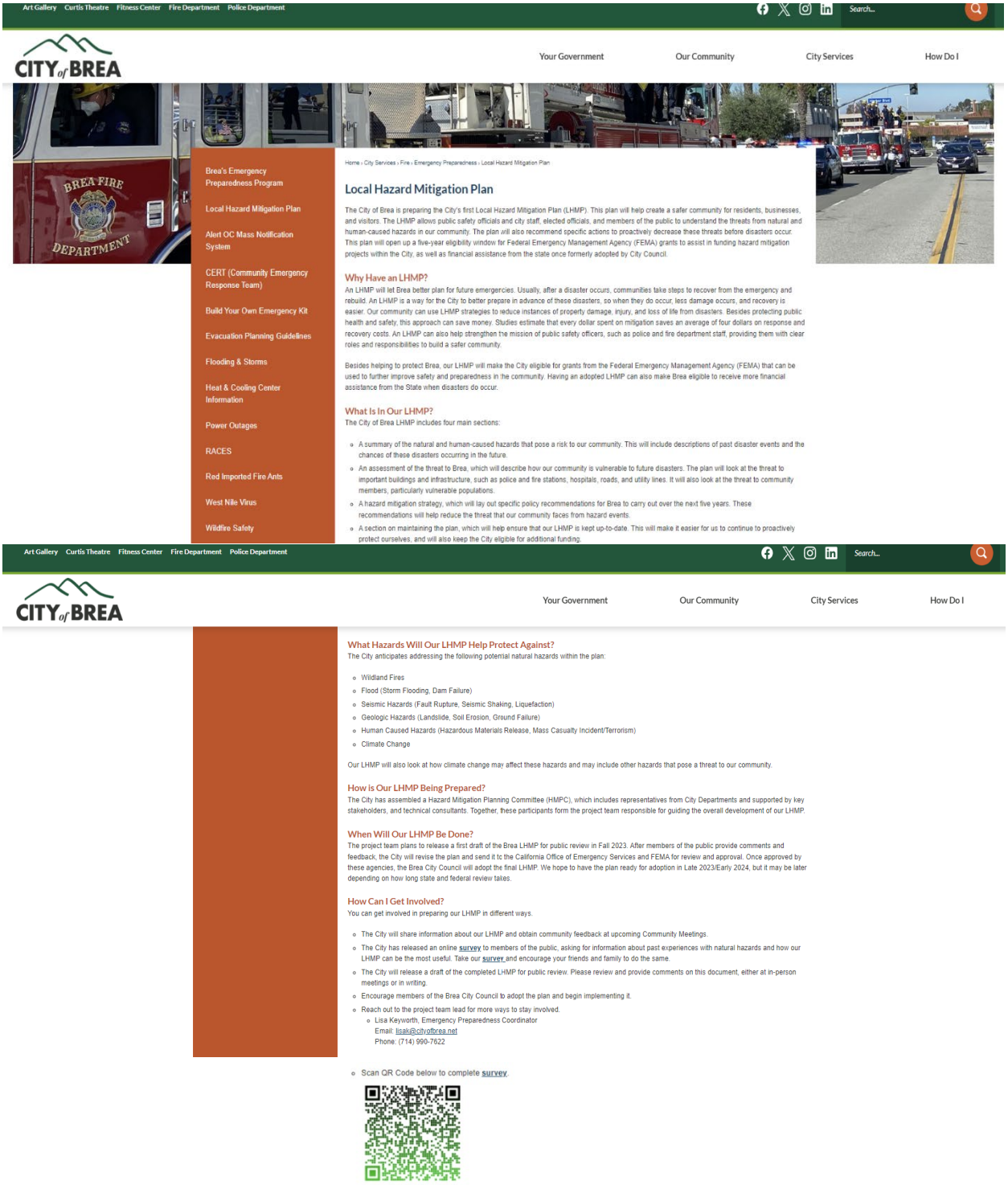
Follow up with Arborist on the following Mitigation Action:

- 3.4 - Update City landscape standards to incorporate disease-resistant plant species as part of landscaping projects/ improvements.

Follow up with City Manager's Office on the following Mitigation Action:

- 2.2 - Explore the feasibility of long-term acquisition for properties that have been made unsafe or unsuitable for development due to erosion. (Done for landslides, not sure about erosion).

Appendix B – Outreach Engagement Materials


Art Gallery Curtis Theatre Fitness Center Fire Department Police Department
Search...
CITY of BREA
Your Government
Our Community
City Services
How Do I
Brea's Emergency Preparedness Program
Local Hazard Mitigation Plan
Alert OC Mass Notification System
CERT (Community Emergency Response Team)
Build Your Own Emergency Kit
Evacuation Planning Guidelines
Flooding & Storms
Heat & Cooling Center Information
Power Outages
RACES
Red Imported Fire Ants
West Nile Virus
Wildfire Safety
Home › City Services › Fire › Emergency Preparedness › Local Hazard Mitigation Plan
Local Hazard Mitigation Plan
The City of Brea is preparing the City's first Local Hazard Mitigation Plan (LHMP). This plan will help create a safer community for residents, businesses, and visitors. The LHMP allows public safety officials and city staff, elected officials, and members of the public to understand the threats from natural and human-caused hazards in our community. The plan will also recommend specific actions to proactively decrease these threats before disasters occur. This plan will open up a five-year eligibility window for Federal Emergency Management Agency (FEMA) grants to assist in funding hazard mitigation projects within the City, as well as financial assistance from the state once formerly adopted by City Council.
Why Have an LHMP?
An LHMP will let Brea better plan for future emergencies. Usually, after a disaster occurs, communities take steps to recover from the emergency and rebuild. An LHMP is a way for the City to better prepare in advance of these disasters, so when they do occur, less damage occurs, and recovery is easier. Our community can use LHMP strategies to reduce instances of property damage, injury, and loss of life from disasters. Besides protecting public health and safety, this approach can save money. Studies estimate that every dollar spent on mitigation saves an average of four dollars on response and recovery costs. An LHMP can also help strengthen the mission of public safety officers, such as police and fire department staff, providing them with clear roles and responsibilities to build a safer community.
Besides helping to protect Brea, our LHMP will make the City eligible for grants from the Federal Emergency Management Agency (FEMA) that can be used to further improve safety and preparedness in the community. Having an adopted LHMP can also make Brea eligible to receive more financial assistance from the State when disasters do occur.
What Is In Our LHMP?
The City of Brea LHMP includes four main sections:
A summary of the natural and human-caused hazards that pose a risk to our community. This will include descriptions of past disaster events and the chances of these disasters occurring in the future.
An assessment of the threat to Brea, which will describe how our community is vulnerable to future disasters. The plan will look at the threat to important buildings and infrastructure, such as police and fire stations, hospitals, roads, and utility lines. It will also look at the threat to community members, particularly vulnerable populations.
A hazard mitigation strategy, which will lay out specific policy recommendations for Brea to carry out over the next five years. These recommendations will help reduce the threat that our community faces from hazard events.
A section on maintaining the plan, which will help ensure that our LHMP is kept up-to-date. This will make it easier for us to continue to proactively protect ourselves, and will also keep the City eligible for additional funding.
Art Gallery Curtis Theatre Fitness Center Fire Department Police Department
Search...
CITY of BREA
Your Government
Our Community
City Services
How Do I
What Hazards Will Our LHMP Help Protect Against?
The City anticipates addressing the following potential natural hazards within the plan:
Wildland Fires
Flood (Storm Flooding, Dam Failure)
Seismic Hazards (Fault Rupture, Seismic Shaking, Liquefaction)
Geologic Hazards (Landslide, Soil Erosion, Ground Failure)
Human Caused Hazards (Hazardous Materials Release, Mass Casualty Incident/Terrorism)
Climate Change
Our LHMP will also look at how climate change may affect these hazards and may include other hazards that pose a threat to our community.
How is Our LHMP Being Prepared?
The City has assembled a Hazard Mitigation Planning Committee (HMPC), which includes representatives from City Departments and supported by key stakeholders, and technical consultants. Together, these participants form the project team responsible for guiding the overall development of our LHMP.
When Will Our LHMP Be Done?
The project team plans to release a first draft of the Brea LHMP for public review in Fall 2023. After members of the public provide comments and feedback, the City will revise the plan and send it tc the California Office of Emergency Services and FEMA for review and approval. Once approved by these agencies, the Brea City Council will adopt the final LHMP. We hope to have the plan ready for adoption in Late 2023/Early 2024, but it may be later depending on how long state and federal review takes.
How Can I Get Involved?
You can get involved in preparing our LHMP in different ways.
The City will share information about our LHMP and obtain community feedback at upcoming Community Meetings.
The City has released an online survey to members of the public, asking for information about past experiences with natural hazards and how our LHMP can be the most useful. Take our survey and encourage your friends and family to do the same.
The City will release a draft of the completed LHMP for public review. Please review and provide comments on this document, either at in-person meetings or in writing.
Encourage members of the Brea City Council to adopt the plan and begin implementing it.
Reach out to the project team lead for more ways to stay involved.
Lisa Keyworth, Emergency Preparedness Coordinator
Email: lisak@cityofbrea.net
Phone: (714) 990-7622
Scan QR Code below to complete survey.

City of Brea Hazard Mitigation Plan Survey

I. Local Hazard Mitigation Plan Survey

Dear Community Member,

The city of Brea is preparing it's first Local Hazard Mitigation Plan to help us better prepare for natural disasters. Like all cities, Brea could potentially face widespread devastation in the event of a natural disaster, such as an earthquake, wildfire, or other naturally occurring event. 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 will help shape the plan. We appreciate your feedback.**Hazard Awareness**

1. **Please indicate whether you live or work in the City of Brea.**
   a. I live in the City of Brea.
   b. I work in the City of Brea.
   c. I live and work in the City of Brea.
   d. Neither applies to me, but I am interested in the City's resiliency.

2. **What is the ZIP code of your home?**

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).?**

Seismic Hazards (Seismic Shaking, Fault Rupture, Liquefaction)	Geologhic Hazards (Landslide, Erosion, Ground Failure)
Wildland Fire	Flooding (including Dam Failure)
Severe Weather (Windstorms, Extreme Heat, Extreme Cold)	Human Caused Hazards (Hazardous Materials Release, Terrorism)
Power Failure	Other

4. **If You Selected "Other" above, please list any additional hazards that have previously impacted your neighborhood or home.**

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.**

Seismic Hazards (Seismic Shaking, Fault Rupture, Liquefaction)	Geologhic Hazards (Landslide, Erosion, Ground Failure)
Wildland Fire	Flooding (including Dam Failure)
Severe Weather (Windstorms, Extreme Heat, Extreme Cold)	Human Caused Hazards (Hazardous Materials Release, Terrorism)
Power Failure	Other

6. **If You Selected "Other" above, please list any additional hazards that have previously impacted your neighborhood or home.**

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?**
    a. I am not aware of local hazards
    b. I am aware of local hazards

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.**

Please provide as much detail as possible, including location and type of hazard.

9. **How concerned are you that climate change may create new hazardous situations in Brea or make existing natural hazards worse?**
    a. Very concerned.
    b. Somewhat concerned.
    c. Somewhat unconcerned.
    d. Not at all concerned.
    e. Unsure.

10. **When do you think climate change will pose a threat to your health, property, livelihood, or overall wellbeing?**
    a. It already is.
    b. Within the next five years.
    c. In five to twenty years.
    d. Not for at least another twenty years.
    e. Never, or not in my lifetime.

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?**
    a. Very confident.
    b. Somewhat confident.
    c. Somewhat unconfident.
    d. Not at all confident.
    e. Unsure.

12. **If you are a homeowner, do you have adequate homeowners' insurance to cover the hazards that could impact your home?**
    a. Yes, my insurance coverage should be adequate.
    b. No, I don't believe my insurance coverage would be adequate for a major disaster.
    c. Unsure.
    d. I do not have an insurance policy.
    e. Not applicable; I rent my current residence.

13. **If you rent your residence, do you have renters' insurance?**
    a. Yes
    b. No

14. **Do you have flood insurance for your home?**
    a. Yes, I own my home and have flood insurance.
    b. Yes, I rent my home and have flood insurance.
    c. No, but I am interested in reviewing flood insurance options (http://www.floodsmart.gov/floodsmart/).

15. **Have you done anything to your home to make it less vulnerable to hazards such as earthquakes, floods, and fires?**
    a. Yes
    b. No
    c. Not applicable; I rent my home.

16. **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?**
    a. Potable water (3 gallons per person)
    b. Cooking and eating utensils
    c. Can opener
    d. Canned / nonperishable foods (ready to eat)
    e. Gas grill / camping stove
    f. Extra medications and contact lenses (if applicable)
    g. First aid kit / supplies
    h. Portable AM/FM radio (solar powered, hand crank, or batteries)
    i. Handheld "walkie-talkie" radios (with batteries)
    j. Important family photos / documentation in a water- and fireproof container
    k. Extra clothes and shoes
    l. Blanket(s) / sleeping bag(s)
    m. Cash
    n. Flashlight (with batteries)
    o. Gasoline
    p. Telephone (with batteries)
    q. Pet supplies
    r. Secondary source of heat

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

17. **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)?**
    a. Yes
    b. No

18. **Are you a trained member of your Community Emergency Response Team (CERT)?**
    a. Yes
    b. No, but I would like to learn more about CERT.
    c. No, I am not interested in being a trained CERT member.

    For more information about CERT, please visit:

    https://www.ci.brea.ca.us/399/CERT-Community-Emergency-Response-Team

19. **How can the city help you become better prepared for a disaster? (Choose all that apply)**
    a. Provide effective emergency notifications and communication.
    b. Provide training and education to residents and business owners on how to reduce future damage.
    c. Provide community outreach regarding emergency preparedness.
    d. Create awareness of special needs and vulnerable populations.
    e. Other (please specify)

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

If you do NOT work in the City of Brea, please skip to section 3, question 23.

20. **What is the ZIP code of your workplace?**

21. **Does your employer have a plan for disaster recovery in place?**
    a. Yes
    b. No
    c. I don't know

22. **Does your employer have a workforce communications plan to implement following a disaster, so they can contact you?**
    a. Yes
    b. No

II. Recommendations and Future Participation

23. **Would you like to be contacted when the Draft 2024 Brea Hazard Mitigation Plan is available for review?**
    a. Yes, please notify me using my contact information in the next question.
    b. 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.

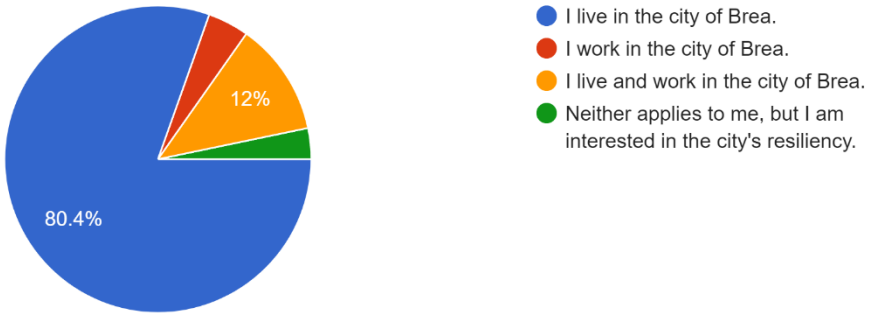
Full Name:	
Email Address:	
Street Address:	
City, State, Zip:	

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

Thank You!

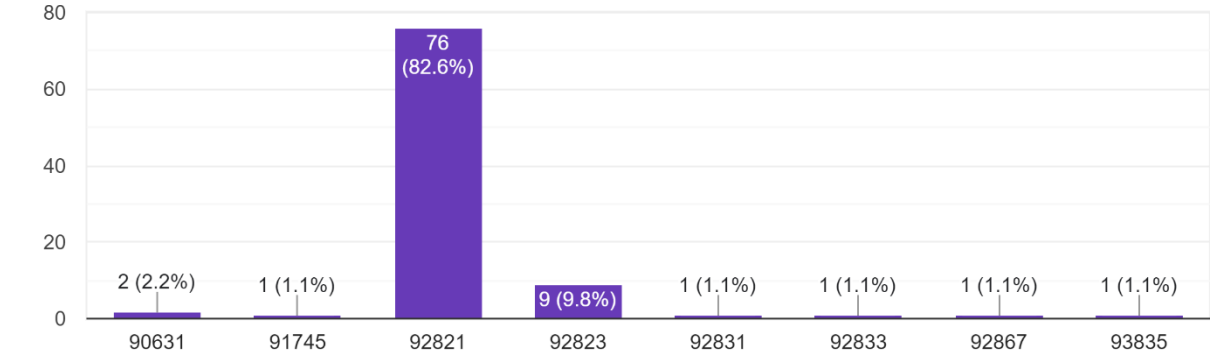
1. Please indicate whether you live or work in the City of Brea.

92 responses

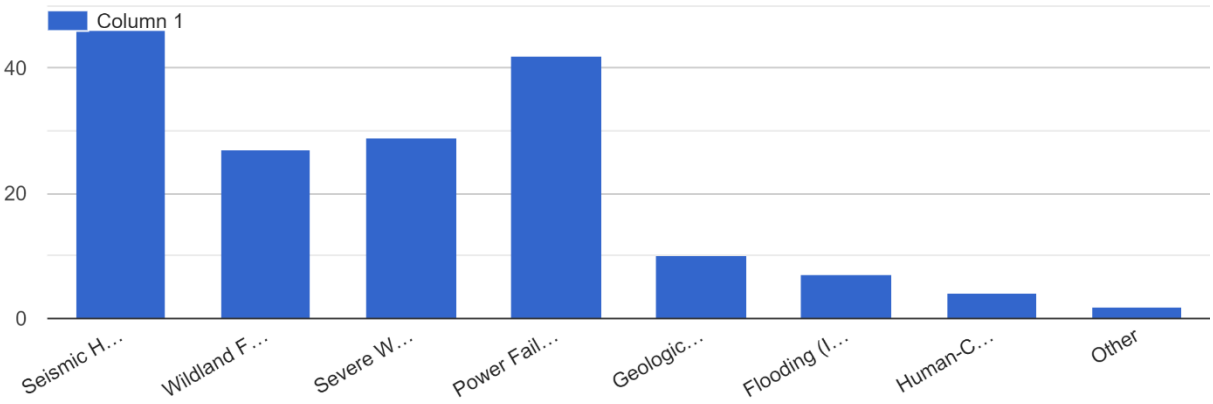


2. What is the ZIP code of your home?

92 responses



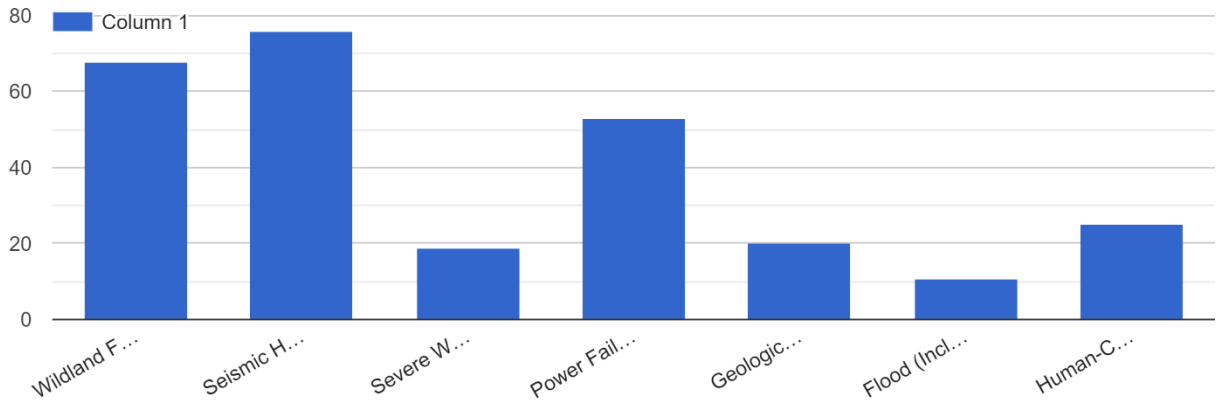
3. For your current residence or place of work, please identify if you have been affected by any of the hazards below (select all that apply).



4. If you selected "Other" above, please list any additional hazards that have previously impacted your neighborhood or home. 3 responses

None of these
No internet service or poor cell tower service
Coyotes

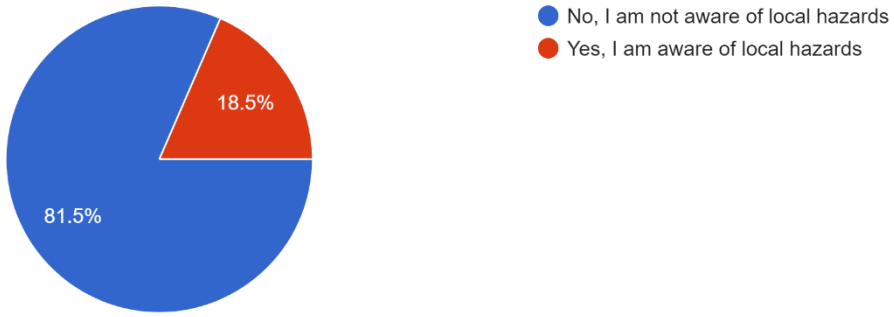
5. The following hazards could potentially impact the city. Please mark the three (3) hazards that are of most concern to your neighborhood or home.



6. 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.

7. The planning team is using various data sources to identify hazards in your community. Unfortunately, some of these data sources do not p...that you would like the planning team to consider?
92 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. 16 responses

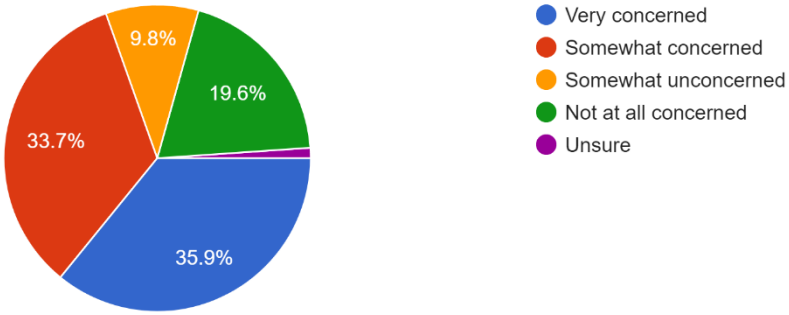
1. Poplar street access to Mormon church slope is a slip hazard used for 40 years
2. In a major fire along the Lambert corridor east of the 57, the beautiful landscaping is cause for concern. With big trees on both sides of the street and other newly planted ones in the median, a fire on the north side can easily jump to the south. This almost happened

in the Freeway Complex fire - luckily a LA Co. Fire helicopter kept dropping water on the north side until a Fullerton engine got there. Not sure, short of ripping out the trees, what can be done, but something to think about.

3. There are very, very tall Eucalyptus trees on the steep slope directly behind my house. The city has never trimmed(shortened the height) in the 27 years I have lived here. I am concerned if they fall due to their weight they will take much of the slope with them jeopardizing my home.
4. Ponding at Apricot Ave and Buttonwood during severe rain storms
5. Main streets need lines repainted for seeing lanes better at night and during rain. Lines need painting THRU intersections going north on Brea Blvd from Lambert and on St. College/Central going west THRU intersection at Brea Blvd.
6. The aroVista slope behind our homes is a concern especially if they really do the excavating of the hill that they are talking about when they renovate the park
7. Weed/dry vegetation near power poles and lines; Cracks in concrete from movement; lamd slopes that push rain water to home and form ponds
8. Open space around tract northeast of State College and Brea Blvds
9. Oil rigs
10. One escape route from the high school. When everyone is trying to exit at once, it takes a long time to exit. I can't imagine what would happen if there was a fire or earthquake and everyone was trying to exit in a panic and what if that one road is blocked?
11. Sitting water at creek at Arovista Park
12. Excessive pooling of water at Imperial & Valencia during heavy rainstorms
13. Fire hazard behind Mariposa Elementary; they need to remove weeds more than annually during rainy years; pollution; flooding at Tamarack and Central.
14. Water Run off of the hills behind Mariposa Elementary to Mariposa Ave.
15. Flooding at Craig Park; in the past.
16. car or any types of accidents, homicide, police chase

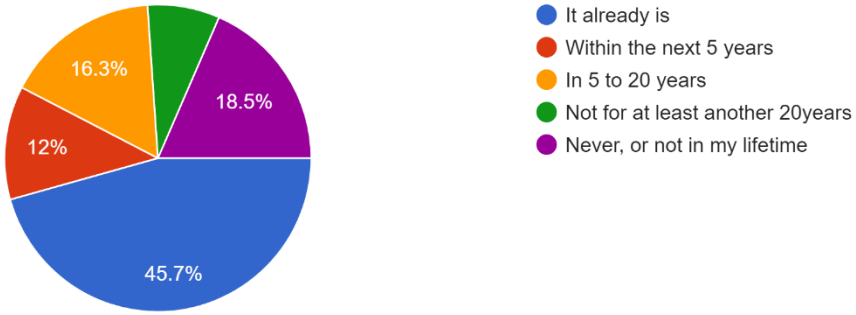
9. How concerned are you that climate change may create new hazardous situations in Brea or make existing natural hazards worse?

92 responses



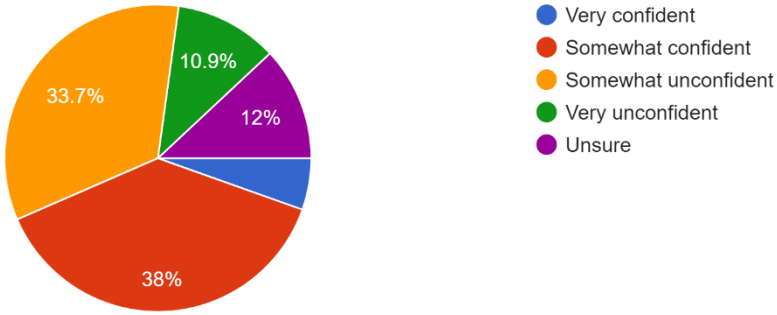
10. When do you think climate change will pose a threat to your health, property, livelihood, or overall wellbeing?

92 responses



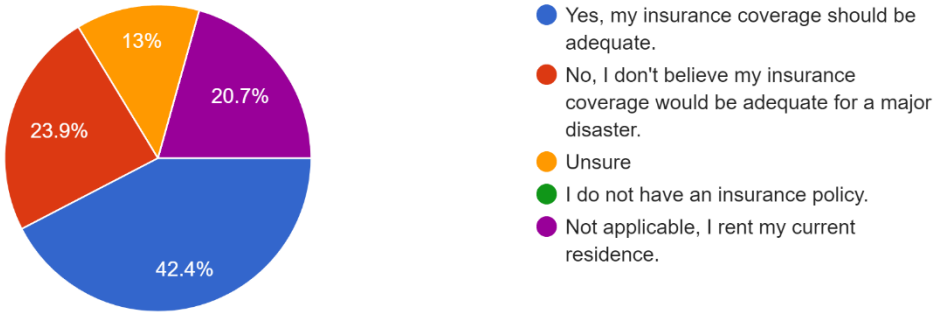
11. If you have taken any action to protect yourself against natural hazards, how confident are you that these actions will be sufficient to protect aga...ore severe hazards that are expected in the future?

92 responses



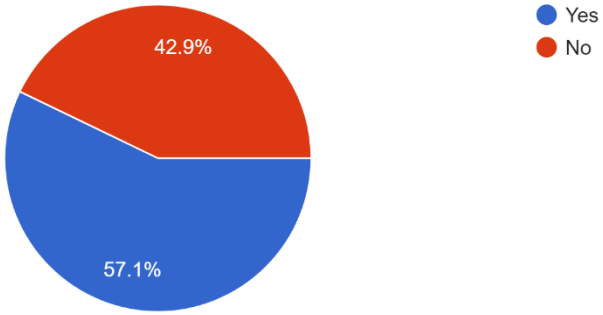
12. If you are a homeowner, do you have adequate homeowners' insurance to cover the hazards that could impact your home?

92 responses



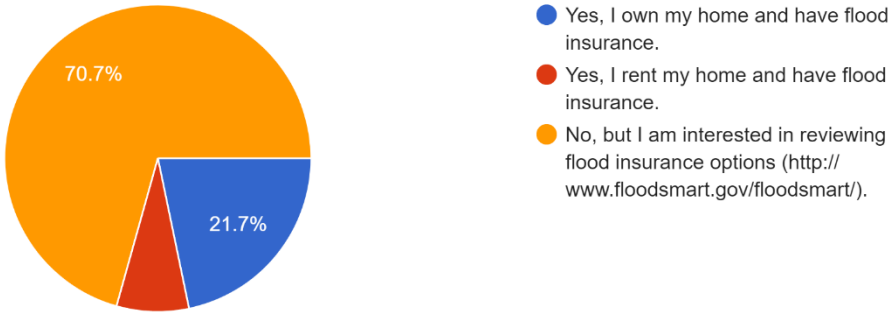
13. If you rent your residence, do you have renters' insurance?

28 responses



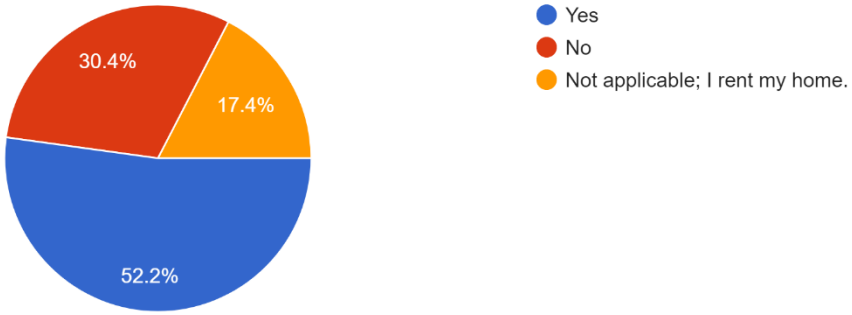
14. Do you have flood insurance for your home?

92 responses

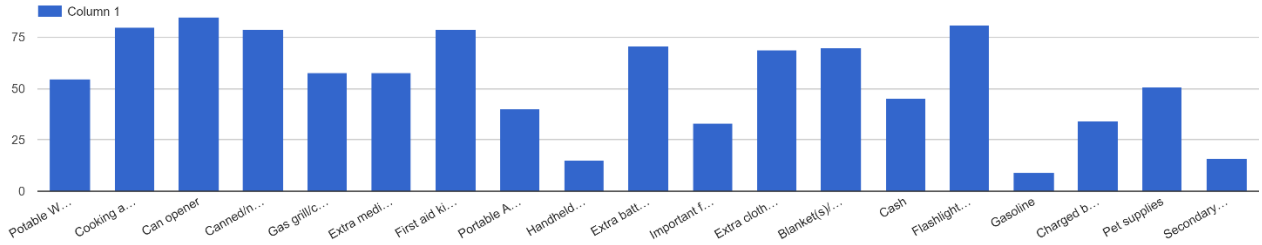


15. Have you done anything to your home to make it less vulnerable to hazards such as earthquakes, floods, and fires?

92 responses

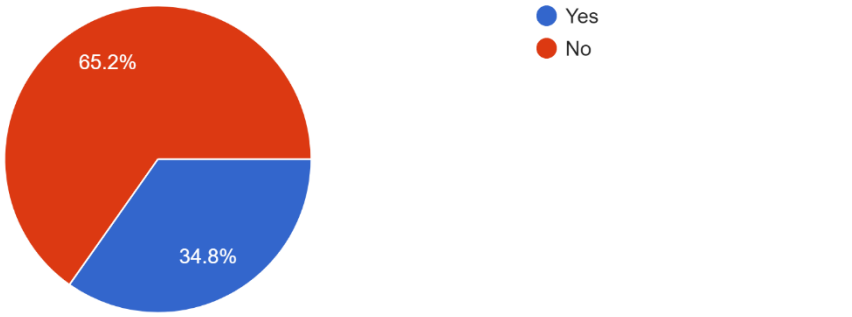


16. If a severe hazard event occurred today such that all services were cut off from your home (power, gas, water, sewer) and you were unable to leave or access a store for 72 hours, which of these items do you have readily available?



17. 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)?

92 responses

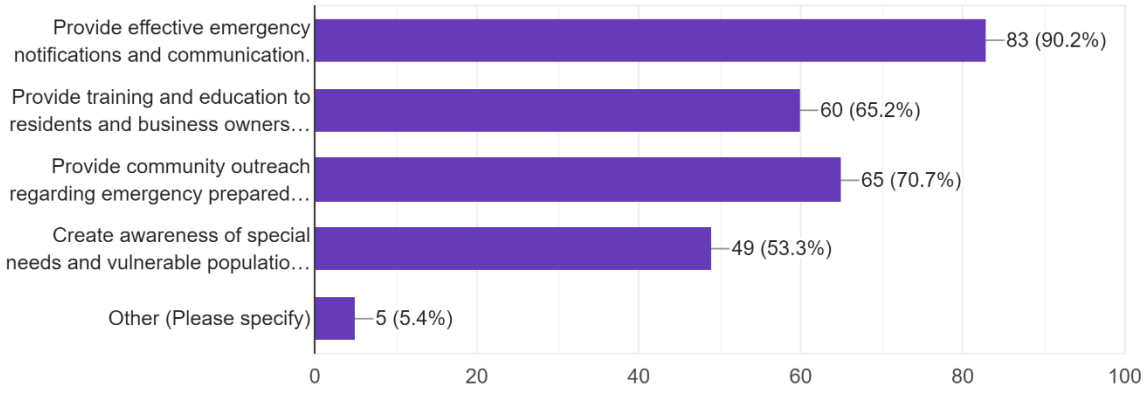


18. Are you a trained member of your Community Emergency Response Team (CERT)?

92 responses

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

92 responses

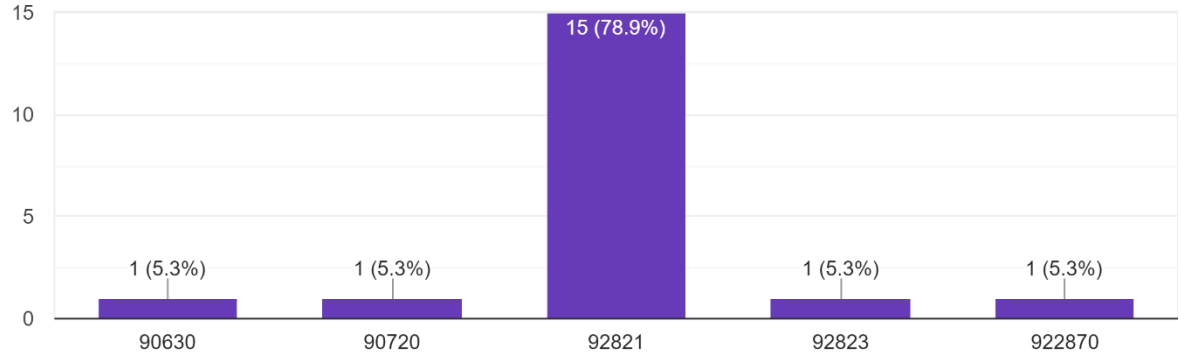


If you answered "Other" above, please specify below. (5 responses)

- Greater emphasis on amateur radio and training
- have advanced first aid and cpr training
- Affordable emergency assistance, for ex; emergency kits, MRE food supply, canned goods
- Provide basic components of an emergency kit per household
- Connect with those in the community that have the local and technical knowledge to contribute to this plan. I am an emergency management/homeland security consultant—if you don't have people on the planning team with the technical expertise that also live here, this needs to be prioritized.

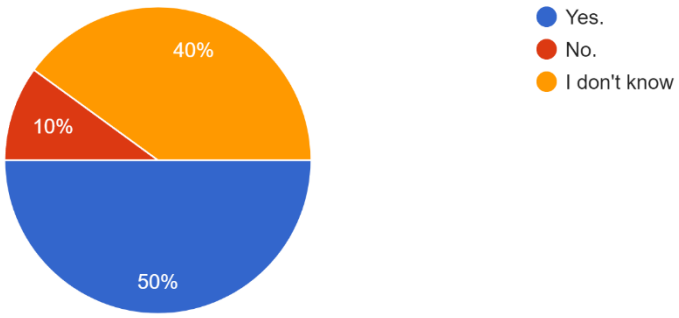
20. What is the ZIP code of your workplace?

19 responses



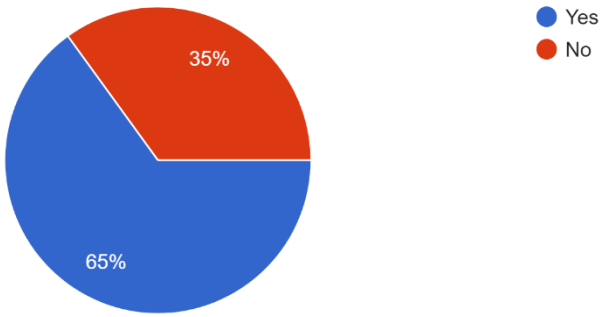
21. Does your employer have a plan for disaster recovery in place?

20 responses



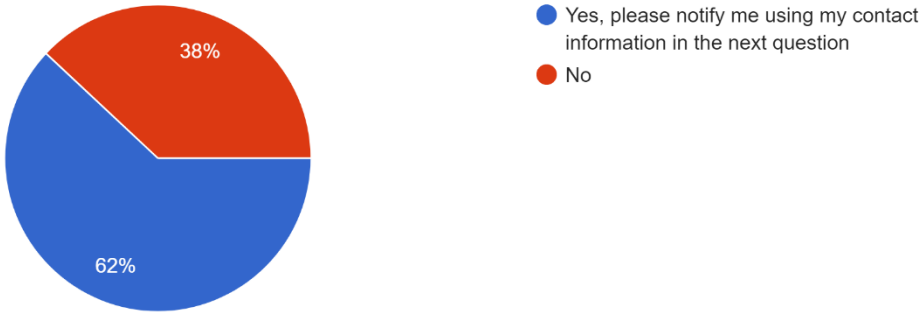
22. Does your employer have a communications plan to implement following a disaster, so they can contact you?

20 responses



23. Would you like to be contacted when the Draft 2024 City of Brea Hazard Mitigation Plan is available for review?

92 responses



Please provide us with any additional comments/suggestions/questions that you have regarding your risk of future hazard events. 12 responses

1. I think multiple homes in Brea should be designated to have emergency kits provided by the city, so that every neighborhood would have a safety location.
2. Thank you for your hard work, dedication, and civil service.
3. Not at this time
4. PLEASE do a better job of fire hazard reduction in and around Olinda Village. Lots of weeds. Seems sometimes as if the city of Brea either has no teeth or is afraid of upsetting people. Let's see some more inspections, reminders and citations, if necessary.
5. Please include a voluntary list of homes where assistance might be required because of individuals with limited mobility.
6. Provide information regarding what will the security level be in an emergency
7. Utilizing individuals that have had previous FEMA training would be helpful.
8. We need more residents and business owners to get CERT trained and prepared for whatever could happen. And we need more young people CERT certified!
9. I would like to suggest looking at reducing urban heat islands and pollution burden by including urban greening programs (i.e., tree plantings, etc.) , cool roofs, cool streets, and so on.
10. As stated, I'm an emergency management/homeland security consultant. I've written hazard mitigation plans, SOPs, EOPs, THIRAs, etc. for public and private entities at the local, state, federal, and international levels. Please reach out to me, I would love to provide assistance.
11. My main areas of focus are electric infrastructure, terrorism, and seismic/weather related incidents.
12. It might be helpful to include some additional answers and/or clarification for some of the questions: #11 - Add N/A, #12 - Clarify if it includes or excludes earthquakes, #14 - should

have a "No" response as well, #18 - add "No, but havve other training" Just some thoughts.

13. Thank you for looking towards the future, and for striving to educate us with the goal of helping us to each be aware and proactive and reactive enough in this neck of the woods to stay alive when the (unavoidable but mitigatible) future emergencies confront us

Appendix C - Resolution of Adoption

RESOLUTION NO. 2024-060

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF BREA ADOPTING THE 2024 LOCAL HAZARD MITIGATION PLAN AND MAKING A CEQA EXEMPTION DETERMINATION

A. RECITALS:

(i) The Disaster Mitigation Act of 2000 ("Act") (Pub. L. 106-390), as implemented by 44 CFR § 201.6, mandates that local governments wishing to be eligible for federal hazard mitigation grant funding, adopt a Federal Emergency Management Agency ("FEMA") approved local hazard mitigation plan.

(ii) The California Office of Emergency Services has approved the proposed City of Brea 2024 Local Hazard Mitigation Plan ("LHMP", sometimes herein). FEMA has approved the LHMP pending adoption of this Resolution.

(iii) The LHMP identifies and assesses hazards to which the City is most vulnerable, and sets forth coordinated mitigation strategies to reduce its vulnerability to the risks inherent in natural and human-made hazards. The approved and adopted LHMP will make the City eligible to apply for grant funding to reduce vulnerability to disasters within the community and help it recover more quickly and effectively if and when disasters occur.

B. RESOLUTION:

NOW, THEREFORE, be it is found, determined and resolved by the City Council of the City of Brea as follows:

1. The facts set forth in the Recitals, Part A above, are true and correct.

2. The City Council hereby adopts the City of Brea 2024 Local Hazard Mitigation Plan, a full, true and correct copy of which is on file in the Office of the Emergency Preparedness Coordinator and is incorporated by reference herein.

3. Based on its independent judgment, the City Council hereby finds and determines that adoption of the LHMP is exempt from the requirements of the California Environmental Quality Act ("CEQA") pursuant to CEQA Guidelines Section 15061(b)(3) because it can be seen with certainty that there is no possibility that such adoption will have a significant effect on the environment. The adoption of the proposed LHMP is an administrative process of the City that will not result in direct or indirect physical changes in the environment.

APPROVED AND ADOPTED this 15th day of October, 2024.

Christine Marick, Mayor

ATTEST: _____
Lillian Harris-Neal, City Clerk

I, Lillian Harris-Neal, City Clerk of the City of Brea, do hereby certify that the foregoing Resolution was adopted at a regular meeting of the City Council of the City of Brea, held on the 15th day of October, 2024 by the following vote:

AYES: COUNCIL MEMBERS: Marick, Stewart, Hupp, Simonoff, Vargas

NOES: COUNCIL MEMBERS: None

ABSENT: COUNCIL MEMBERS: None

ABSTAIN: COUNCIL MEMBERS: None

DATED: 10/16/2024

_____
Lillian Harris-Neal, City Clerk

Appendix D- List of Key Facilities

Asset Type Category	Critical Facility	Facility of Concern
Government/City Operations	2	1
Emergency Operations Fire/Police	4	0
City Owned Structures	0	4
Recreational, Cultural, Community	0	4
Water and Wastewater, Infrastructure	6	0
Total	**12**	**9**

Appendix E – Hazard Mitigation Implementation Handbook

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Local Hazard Mitigation Plan Implementation Handbook

June 2024

What Is This Handbook?

The Local Hazard Mitigation Plan (LHMP) for the City of Brea 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 on what to do following the 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 Brea 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
- Brea is undergoing its budgeting process
- Brea is holding its annual meeting of the Hazard Mitigation Planning Committee
- Brea 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 Hazard Mitigation Planning Committee (HMPC) leader is responsible for maintaining this Handbook. At the time of writing, the current HMPC leader is Lisa Keyworth from the Brea Fire Department. The HMPC may delegate this responsibility to someone else should they choose.

What to do when a disaster has been proclaimed or declared

Disasters may be proclaimed or declared by the Brea 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 Brea City Council

If the Brea 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 Brea.
- ☐ 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 in **Attachment 4**.
- ☐ **Chapter 6** of the Brea 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 Brea, 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 Brea or an area that includes part or all of Brea, take the following steps:

- ☐ Update **Attachment 1** with information about the disaster. Include information about cumulative damage, including any damage outside of Brea.
- ☐ 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 in **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 Brea 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 Brea, 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 Brea or any area that includes part or all of Brea, take the following steps:

- ☐ Update **Attachment 1** with information about the disaster. Include information about

cumulative damage, including any damage outside of Brea.

- ☐ Collaborate with Cal OES and FEMA representatives to assess the damage.
- ☐ Determine if Brea 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 in **Attachment 4**.
- ☐ The Hazard Mitigation Grant Program (HMGP) is a FEMA program that helps fund hazard mitigation activities after a disaster event. Brea may be eligible for funding because of the federal disaster declaration, although not all activities may meet the program's requirements. If Brea is eligible, work with FEMA to apply for this funding.
- ☐ **Chapter 6** of the Brea 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 Brea, 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's 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 has been 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 for the program. At the time of writing, this webpage is available at https://www.fema.gov/grants/mitigation/building-resilient-infrastructure-communities.

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 the time of writing, this webpage is available at https://www.fema.gov/grants/mitigation/building-resilient-infrastructure-communities.
- ☐ 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 long-term damage from flooding. The funding is only available to communities participating in the National Flood Insurance Program (NFIP), which Brea currently does. Communities must also have a valid hazard mitigation plan that meets FEMA guidelines 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 the time of writing, this webpage is available at https://www.fema.gov/grants/mitigation/floods.

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 the time of writing, this webpage is available at https://www.fema.gov/grants/mitigation/floods.
- ☐ 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.

Brea is going through the budgeting process

Brea'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. Brea 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 Brea's annual budget:

- ☐ Include hazard mitigation activities in Brea'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 in the CIP or can support efforts within the CIP.
- ☐ Review the risk and threat assessments in the LHMP (Chapter 3) to ensure that all

items in the list of CIP are planned, designed, and constructed 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 (Planning Committee) considered a high priority.
- ☐ Set aside staff to conduct hazard mitigation activities, including time to participate in Planning Committee meetings and research, prepare, and submit BRIC and FMA grant opportunities (consult the "I Want to Apply for Mitigation Grant Funding" section above).
- ☐ Ensure hazard mitigation activities are reflected in each department's priorities and earmarked time for specific goals.

Brea is Conducting its Annual meeting of the Hazard Mitigation Planning Committee

The hazard mitigation planning process brings together representatives from multiple City departments as well as other relevant stakeholders. It provides a forum to discuss the hazards in Brea and how to mitigate them effectively. As mentioned in **Chapter 5** of the LHMP, the Planning Committee should meet at least once each year, beginning a year after the LHMP is adopted. During these meetings, the Planning Committee should discuss implementation progress and integration of hazard mitigation actions in other City documents. At these meetings, the Planning Committee 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 Planning Committee to strategically plan for the upcoming year.

It may help for the Planning Committee to meet early in the year, in advance of annual budget activities. **Attachment 3** contains an example of a Planning Committee 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 current LHMP, the following individuals were part of the Planning Committee:

BREA HAZARD MITIGATION PLANNING COMMITTEE		
Name	Title	Department
Lisa Keyworth	Emergency Preparedness Coordinator	Brea Fire Department
Mark Terrill	Fire Chief	Brea Fire Department
Scott Wiedensohler	Division Chief District 4	OCFA
Rudy Correa	Superintendent	Water Division
Michael Ho	Public Works Director	Public Works
Jason Killbrew	Community Development Director	Community Development
Jimmy Dao	GIS Specialist	Administrative Services
Liz Pharis	Communications & Marketing Manager/PIO	City Manager's Office
Joanne Hwang	City Planner	Planning Division
Jessica Newton	Senior Planner	Planning Division
Cristal Nava	Assistant Planner	Planning Division
Aaron Pfannenstiel	LHMP Project Manager	Atlas Planning Solutions
Crystal Stueve	LHMP Planner	Atlas Planning Solutions
Robert Jackson	LHMP Planner	Atlas Planning Solutions

In advance of Planning Committee meetings, consider using **Attachment 1** to maintain an accurate list of recent disaster events that have occurred in and around Brea since the LHMP was adopted. At the Planning Committee 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 Planning Committee members the opportunity to review the actions in the hazard mitigation strategy **(Attachment 4)** and ensure that they are implemented as intended.

Brea is updating its policy and regulatory documents

If Brea 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 Brea 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 Brea or if a disaster leads to a loss of life in Brea (see the "What to Do When a Disaster Has Been Proclaimed or Declared" section), as discussed in **Chapter 5** of the LHMP.

Take the following steps to update the LHMP:

ASSEMBLE THE HAZARD MITIGATION PLANNING COMMITTEE

- ☐ Convene a Planning Committee meeting no later than four years after the LHMP is adopted. Invite the regular Planning Committee 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 begins.
- ☐ Create and implement a community engagement strategy based on 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 Brea. Consider recent hazard events, new science associated with hazards and climate change, new development and land use patterns, and other recent changes in 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. Reassess 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 to make them more feasible or remove them from the list of mitigation actions if they are no longer appropriate for Brea.
- ☐ Develop mitigation actions to improve the status of hazard mitigation activities in Brea by addressing any issues not covered by the existing LHMP.
- ☐ The ability to expand current mitigation capabilities will generally be reliant upon the budgeting allocated for each department/program for that fiscal year. The level at which these programs may or may not be expanded upon will be dependent upon the amount of funding received. FEMA has released a series of guides over the past few years that highlight some of the ways in which jurisdictions can expand mitigation. Some strategies for increasing current mitigation capabilities may include:
  - City should actively identify, adopt, and enforce the most current set of development codes and standards available. Strongly encouraging new development to be constructed to higher standards than currently required, increasing resilience within the community.
  - Engaging parts of the community that may not be actively involved in mitigation efforts.
  - Expanding the number and types of organizations involved in mitigation planning and implementation, increasing both efficiency and bandwidth.
  - Fostering new relationships to bring underrepresented populations and partners to the hazard mitigation planning process.
  - During the annual LHMP review, the HMPC should look for opportunities to fund and expand/enhance the effectiveness of current mitigation actions.
  - During annual budgeting processes, the City should identify new funding sources (bonds, grants, assessment districts, etc.) that can be used to support existing capabilities enhancements.
- ☐ Ensure that the feedback from the community engagement activities is 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 the Planning Committee members and revise the plan to reflect any comments by Planning Committee members.
- ☐ Distribute the updated Plan to any appropriate external agencies not included in the

Planning Committee 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 necessary revisions.
- ☐ Submit the plan to the Brea City Council for adoption.

The Safety Element of the General Plan

The Safety Element is a required component of Brea'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. Ensure that both documents meet all state requirements.
- ☐ Ensure that the information in both plans does not contradict each other and that any inconsistencies are corrected to use the most accurate and appropriate information. This information should include a community description, 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 Brea'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. Like an LHMP, state regulations require the Housing Elements to be updated regularly to remain current and valid.

The Housing Element is not required to contain any information or policies related 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 several 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 new Housing Element's adoption date, 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 Planning Committee 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 Brea Municipal Code

Brea'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 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 15, "Buildings and Construction Safety," of Brea's Municipal Code contains building regulations and incorporates the BSC. Other sections of the Code adopt additional standards as desired by the City that adapts the BSC to Brea's local context.

As a participant in the National Flood Insurance Program (NFIP), Brea is required to incorporate Floodplain Management Requirements in its Zoning Code, which is located in Title 18, Division 2 – Floodplain Management. These regulations establish standards for developing and operating facilities within mapped flood-prone areas. Other sections of the Brea 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, Brea 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

related 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 Brea 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, 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 the information about any disaster events that have occurred in Brea or nearby and have affected 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 Planning Committee'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 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 and Threat and Vulnerability Assessment			
Chapter 4: Hazard Mitigation Strategy			
Chapter 5: Plan Maintenance			
Appendices			

Attachment 3: Sample Agenda and Topics for the Hazard Mitigation Planning Committee

This attachment includes a sample agenda and discussion topics for the annual meeting of the Planning Committee. 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 Planning Committee will meet more frequently. The meetings of the Planning Committee 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 Brea or nearby in a way that affected the community?
- Identify events that caused loss of life or significant injury to Brea community members, significant property damage in Brea, or widespread disruption to Brea.
- 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 using 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 Planning Committee last met? Is the 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 related 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 Brea to support the 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 unavailable, 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 budgeted 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 Planning Committee 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 Planning Committee 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 Planning Committee members coordinate efforts with those responsible for capital projects to take advantage of economies of scale that will make implementing hazard mitigation activities easier?

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 Planning Committee. Identify if a technical consultant is needed and begin the contracting process.

5.7. Are there any other opportunities for Planning Committee members and the organizations they represent to coordinate efforts?

ITEMS 6: NEW BUSINESS

6.1. Are there any other items related to the Planning Committee's mission?

Attachment 4: Hazard Mitigation Strategy

TABLE 5-3: MITIGATION ACTIONS IMPLEMENTATION PLAN

Action #	Mitigation Action Item	Potential Policy Integration	Potential Funding Source	Responsible Department	Relative Cost	Time Frame	Priority
Emergency Preparedness Activities							
P1	Conduct regular emergency preparedness drills and training exercises for City staff.		General Fund, EMPG	Emergency Management, Fire			Ongoing
P2	Expand participation in the Brea Community Emergency Response Team (CERT) program.		General Fund, EMPG	Emergency Management, Fire			Ongoing
P3	Ensure that community evacuation plans include provisions for community members who do not have access to private vehicles or are otherwise unable to drive.		General Fund, EMPG	Emergency Management, Fire			Ongoing
P4	Continue to ensure effective emergency notifications through multiple media formats, in languages appropriate for the community, about pending, imminent, or ongoing emergency events. Ensure that information is accessible to persons with access and functional needs.		General Fund, EMPG	Emergency Management, Fire			Ongoing
P5	Maintain at least one emergency power-generating station in all critical facilities that the City could use as an emergency public assembly area, such as the Civic Center, Community Centers, and any other locations designated in the future.		General Fund, EMPG	Emergency Management, Fire			Ongoing
P6	Update the Brea Emergency Operations Plan to identify backup power and communications locations for critical facilities.		General Fund, EMPG	Emergency Management, Fire			Ongoing
P7	Continuously update response procedures for first responder departments to properly address new hazard events as they emerge.		General Fund, EMPG	Emergency Management, Fire			Ongoing
P8	Increase the number of City staff who have CalOES Safety Assessment Program (SAP) credentials.		General Fund, EMPG	Emergency Management, Fire, Building and Safety Division, Community			Ongoing

TABLE 5-3: MITIGATION ACTIONS IMPLEMENTATION PLAN

Action #	Mitigation Action Item	Potential Policy Integration	Potential Funding Source	Responsible Department	Relative Cost	Time Frame	Priority
				Development Department			
P9	Establish or update agreements with local schools to ensure facilities can act as evacuation sites during major emergencies.		General Fund, EMPG	Emergency Management, Fire			Ongoing
P10	Add emergency alert and warning signage along the hazard-prone areas in Carbon Canyon to provide critical information and evacuation instruction during hazard events.		General Fund, EMPG, BRIC/ HMGP Grants, Cal Fire Grants, Other Grants	Public Works Department			Ongoing
Multiple Hazards							
1.01	Install energy-efficient equipment upgrades in City facilities to increase the longevity of the fuel supply for backup generators. (Hazards addressed: All)		General Fund, BRIC/ HMGP Grants, Other Grants	Public Works Department	$$	2028	Low
1.02	Install digital signage in key locations to aid in public outreach and information dissemination during emergency events.		General Fund, EMPG	Emergency Management, Fire, Public Works Department	$	2027	Low
1.03	Conduct routine updates to Facility Conditions Assessments for City-owned infrastructure and other utilities and coordinate with other agencies to ensure inspections of other important infrastructure. (Hazards addressed: All)		General Fund, BRIC/ HMGP Grants, Other Grants	Building and Safety Division	$$	Annually	Low
1.04	Conduct a feasibility assessment of the installation of solar and battery backup systems at key critical facilities within the City. (Hazards addressed: All)		General Fund, BRIC/ HMGP Grants, Other Grants	Public Works Department	$$	2027	Medium
1.05	Work closely with community groups to increase awareness of hazard events and resiliency opportunities among socially vulnerable community members, including those experiencing homelessness. (Hazards addressed: All)		General Fund, BRIC/ HMGP Grants, Other Grants	Community Development Department, Community Services Department	$	Annually	Low

TABLE 5-3: MITIGATION ACTIONS IMPLEMENTATION PLAN

Action #	Mitigation Action Item	Potential Policy Integration	Potential Funding Source	Responsible Department	Relative Cost	Time Frame	Priority
1.06	Closely monitor changes in the boundaries of mapped hazard areas resulting from land use changes or climate change and adopt new mitigation actions or revise existing ones to ensure continued resiliency. (Hazards addressed: All)	X	General Fund, BRIC/ HMGP Grants, Other Grants	Community Development Department	$	Annually	Low
1.07	Integrate policy direction and other information from this Plan into other City documents, including the General Plan, Emergency Operations Plan, and Capital Improvements Program. (Hazards addressed: All)	X	General Fund, BRIC/ HMGP Grants, Other Grants	All Departments	$	Following All Plan Updates	Medium
1.08	Monitor funding sources for hazard mitigation activities. (Hazards addressed: All)		General Fund, BRIC/ HMGP Grants, Other Grants	Fire	$	Annually	Low
1.09	Integrate climate change mitigation and adaptation information and analysis into future LHMP updates and other City Plans, where practicable. (Hazards addressed: All)	X	General Fund, BRIC/ HMGP Grants, Other Grants	All Departments	$	Following Any Plan Update	Low
1.10	Update the City's Master Plans periodically (in conjunction with the LHMP and CIP) to incorporate new data/ mapping and/or address emerging issues. (Hazards addressed: All)		General Fund, BRIC/ HMGP Grants, Other Grants	Public Works Department, Community Development Department	$$	Following LHMP/CIP Updates	Medium
1.11	Install and harden encased emergency backup power generators at critical facilities and key infrastructure as deemed necessary. Prioritize installations for facilities that serve as key cooling/warming centers (including the Senior Center), and evacuation centers. (Hazards addressed: All)		General Fund, BRIC/ HMGP Grants, Other Grants	Public Works Department	$$	2027	Medium
1.12	Create an inventory of all senior centers, mobile home parks (especially those located in the Canyon), and other vulnerable populations to ensure that this population group is accounted for in emergency scenarios where evacuation is		General Fund, BRIC/ HMGP Grants, Other Grants	Fire, Community Services Department	$	Annually	Medium

TABLE 5-3: MITIGATION ACTIONS IMPLEMENTATION PLAN

Action #	Mitigation Action Item	Potential Policy Integration	Potential Funding Source	Responsible Department	Relative Cost	Time Frame	Priority
	required. (Hazards Addressed: All)						
1.13	Explore funding opportunities to create an inventory of sewer lines in Carbon Canyon, harden infrastructure, and ensure functionality after a hazardous event. (Hazards Addressed: All)		General Fund, BRIC/ HMGP Grants, Other Grants	Public Works Department	$	2027	Low
1.14	Install battery backup power supplies for traffic signals to ensure functionality in the event of power failure.		General Fund, BRIC/ HMGP Grants, Other Grants	Public Works Department	$$$	2025	High
Earthquake Hazards							
2.01	Develop a small project-based retrofit program to assist homeowners with simple earthquake mitigation activities (i.e., water heater straps, furniture anchoring, gas shut-off tools, and other emergency supplies) to reduce strain on City resources during an event.		General Fund, BRIC/ HMGP Grants, California Earthquake Authority Grants, Other Grants	Fire	$	2027	Medium
2.02	Conduct an educational campaign to incentivize and promote medium-scale seismic retrofits, such as window films to minimize shattering, rooftop-mounted equipment anchors, masonry chimney bracing, and other preventative measures to reduce damage to private buildings.		General Fund, BRIC/ HMGP Grants, California Earthquake Authority Grants, Other Grants	Fire, Community Development Department	$	Annually	Low
2.03	Conduct a seismic analysis of all City-owned key facilities and retrofit vulnerable facilities.		General Fund, BRIC/ HMGP Grants, California Earthquake Authority Grants, Other Grants	Public Works Department	$	2027	Low
2.04	To the extent feasible, construct all new City-owned facilities to remain operational in the event of a major earthquake.	X	General Fund, BRIC/ HMGP Grants, California Earthquake Authority Grants, Other Grants	Public Works Department	$$$	2028	Low
2.05	Retrofit key critical facilities with seismically rated window film treatments that ensure glass windows do not shatter during a strong seismic event.		General Fund, BRIC/ HMGP Grants, California Earthquake Authority Grants, Other Grants	Public Works Department	$$	2028	Low

TABLE 5-3: MITIGATION ACTIONS IMPLEMENTATION PLAN

Action #	Mitigation Action Item	Potential Policy Integration	Potential Funding Source	Responsible Department	Relative Cost	Time Frame	Priority
2.06	Improve local understanding of the threat of a major earthquake by conducting a citywide assessment modeling potential losses due to destroyed and damaged structures, and interruptions to key services.		General Fund, BRIC/ HMGP Grants, California Earthquake Authority Grants, Other Grants	Fire	$	2028	Low
2.07	Analyze the City's building and housing stock to create an inventory of seismically vulnerable buildings (unreinforced masonry, soft-story construction, non-ductile concrete buildings) within the city and conduct an educational program providing information on how to begin the process of seismically retrofitting these buildings		General Fund, BRIC/ HMGP Grants, California Earthquake Authority Grants, Other Grants	Public Works Department, Community Development Department	$$	2027	Medium
2.08	Seismically retrofit or replace Fire Station 1 to meet current seismic requirements as set forth by the State.		General Fund, BRIC/ HMGP Grants, California Earthquake Authority Grants, Other Grants	Management Services, Public Works Department	$$$	2026	High
2.09	Seismically retrofit or replace the Civic Center to meet current seismic requirements as set forth by the State.		General Fund, BRIC/ HMGP Grants, California Earthquake Authority Grants, Other Grants	Management Services, Public Works Department	$$$	2026	High
2.10	Seismically retrofit or replace the City owned parking structure and bridges.		General Fund, BRIC/ HMGP Grants, California Earthquake Authority Grants, Other Grants	Public Works Department	$$$	2026	High
Wildland/Urban Fires							
3.01	Promote the proper maintenance and separation of power lines and efficient response to fallen power lines, particularly in the WUI and VHFHSZs.	X	General Fund, BRIC/ HMGP Grants, California Climate Resilience Grants, Cal Fire Grants, Other Grants	Fire, Public Information Officer	$	Annually	Low

TABLE 5-3: MITIGATION ACTIONS IMPLEMENTATION PLAN

Action #	Mitigation Action Item	Potential Policy Integration	Potential Funding Source	Responsible Department	Relative Cost	Time Frame	Priority
3.02	Identify funding for existing non-conforming retrofits in fire-prone areas to use non-combustible building materials such as masonry, brick, stucco, concrete, steel, or others as appropriate. Establish defensible space zones around homes in these areas to reduce fire vulnerability.	X	General Fund, BRIC/ HMGP Grants, California Climate Resilience Grants, Cal Fire Grants, Other Grants	Fire	$$	Annually	Medium
3.03	Explore new funding opportunities to increase the budget for public outreach and fire hazard prevention awareness and education.		General Fund, BRIC/ HMGP Grants, California Climate Resilience Grants, Cal Fire Grants, Other Grants	Fire	$	Annually	Low
3.04	Routinely participate in regional areas focused on wildfire preparedness and investigate the feasibility of developing additional defensible space and home hardening guidance for existing structures.		General Fund, BRIC/ HMGP Grants, California Climate Resilience Grants, Cal Fire Grants, Other Grants	Fire	$	Annually	Low
3.05	Create a rapid response plan from among Brea's and surrounding counties' first responders to secure hospital, nursing, and assisted living facilities, especially those located within fire hazard severity zones.		General Fund, BRIC/ HMGP Grants, California Climate Resilience Grants, Cal Fire Grants, Other Grants	Fire	$	2027	Low
3.06	Clear dead vegetation and invasive plants in flood control facility footprints, trails, parks, and open spaces, especially during and after a drought episode.	X	General Fund, BRIC/ HMGP Grants, California Climate Resilience Grants, Cal Fire Grants, Other Grants	Fire	$	Annually	Low
3.07	Coordinate with OCFA and surrounding jurisdictions on home hardening and vegetation management assessments to assist residents in understanding and addressing wildfire risk.		General Fund, BRIC/ HMGP Grants, California Climate Resilience Grants, Cal Fire Grants, Other Grants	Fire	$	Annually	Low

TABLE 5-3: MITIGATION ACTIONS IMPLEMENTATION PLAN

Action #	Mitigation Action Item	Potential Policy Integration	Potential Funding Source	Responsible Department	Relative Cost	Time Frame	Priority
3.08	Conduct regular fuel modification projects and clear vegetation to reduce fire hazard risks, such as removal of dead vegetation and invasive plants in parks, open spaces, and right-of-way embankments and creating larger buffers within the wildland-urban interface.		General Fund, BRIC/ HMGP Grants, California Climate Resilience Grants, Cal Fire Grants, Other Grants	Fire, Public Works Department	$$	Annually	Low
3.09	Create a fire-adapted landscape program to assist existing property owners with retrofits.	X	General Fund, BRIC/ HMGP Grants, California Climate Resilience Grants, Cal Fire Grants, Other Grants	Fire, Community Development Department	$$	2027	Low
3.10	Replace Fire Station 4, with a permanent structure designed for wildfire-prone areas.		General Fund, BRIC/ HMGP Grants, California Climate Resilience Grants, Cal Fire Grants, Other Grants	Fire, Public Works Department	$$$	2026	High
Human-Caused Hazards (Hazardous Materials, Active Shooter [Terrorism])							
4.01	Conduct active shooter trainings and exercises for City staff, residents, and businesses. Hazard Addressed: Terrorism		General Fund, BRIC/ HMGP Grants, Other Grants	Police Department, Fire	$	Annually	Medium
4.02	Retrofit critical facilities, administration buildings, and other city-owned buildings are deemed important, along with counterterrorism design elements and building materials. Hazard Addressed: Terrorism		General Fund, BRIC/ HMGP Grants, Other Grants	Police Department, Public Works	$$$	2026	High
4.03	Coordinate and enhance datasets for schools, medical facilities, senior assisted living facilities, and other critical facilities with the School District and other key entities within the City to better respond to mass-casualty and terrorism incidents. Hazard Addressed: Terrorism		General Fund, BRIC/ HMGP Grants, Other Grants	Police Department, Fire	$	2027	Low
4.04	Discourage new sensitive land uses, including schools, parks, childcare centers, adult and senior assisted living	X	General Fund, BRIC/ HMGP Grants, Other Grants	Community Development Department	$	Ongoing/ Annually	Medium

TABLE 5-3: MITIGATION ACTIONS IMPLEMENTATION PLAN

Action #	Mitigation Action Item	Potential Policy Integration	Potential Funding Source	Responsible Department	Relative Cost	Time Frame	Priority
	facilities, and community centers, from locating near identified hazardous material facilities. Discourage or prohibit new hazardous material facilities from locating near sensitive land uses. Hazard Addressed: Hazardous Materials Release						
4.05	Pursue full alignment of the General Plan with policies and actions outlined in state and regional plans, such as the California Accidental Release Prevention (CalARP) Program and the Orange County Fire Authority Hazardous Materials Area Plan. Hazard Addressed: Hazardous Materials Release		General Fund, BRIC/ HMGP Grants, Other Grants	Community Development Department, Fire	$$	2028	Low
4.06	Continuously inspect businesses and other properties storing hazardous materials and create an inventory of storage locations that require updates, maintenance, or renovation. Hazard Addressed: Hazardous Materials Release		General Fund, BRIC/ HMGP Grants, Other Grants	OC Health, Community Development Department, Fire	$	Annually	Medium
4.07	Develop a parcel-level database, in coordination with Orange County, which tracks the status of hazardous materials storage and use, prioritized by potential threat to surrounding properties. Hazard Addressed: Hazardous Materials Release		General Fund, BRIC/ HMGP Grants, Other Grants	Fire, Administrative Services	$$	2026	High
Severe Weather (Windstorm, Extreme Heat, Winter Storm)							
5.01	Expand current outreach to residents and businesses prior to the severe winds (Santa Ana Wind events) on proper tree maintenance and identification of potentially hazardous trees. (Hazards addressed: Windstorms, Winter Storm)		General Fund, BRIC/ HMGP Grants, California Climate Resilience Grants, Other Grants	Public Information Officer	$	Annually	Low

TABLE 5-3: MITIGATION ACTIONS IMPLEMENTATION PLAN

Action #	Mitigation Action Item	Potential Policy Integration	Potential Funding Source	Responsible Department	Relative Cost	Time Frame	Priority
5.02	Remove or trim trees determined to be susceptible to blowing over during a severe wind event. Encourage the undergrounding of existing utilities. (Hazards addressed: Windstorms, Winter Storm)		General Fund, BRIC/ HMGP Grants, Other Grants	Public Works Department	$$	Annually	Low
5.03	Expand current outreach to residents and businesses regarding extreme heat events. Educate residents on the dangers of extreme heat and identify actions they can take to mitigate the negative effects of extreme heat (Hazards addressed: Extreme Heat)		General Fund, BRIC/ HMGP Grants, California Climate Resilience Grants, Other Grants	Public Information Officer	$	Annually	Low
Geologic Hazards (Landslide, Soil Erosion)							
6.01	Install and maintain slope stabilization measures on publicly-owned hillsides above roads, buildings, and other facilities.		General Fund, BRIC/ HMGP Grants, Other Grants	Public Works Department	$$$	2029	Low
6.02	Retrofit City facilities to reduce the potential for landslide events within or adjacent to critical infrastructure.		General Fund, BRIC/ HMGP Grants, Other Grants	Public Works Department	$$$	2029	Low
6.03	Require geotechnical studies in areas of significant landslide threat and identify strategies for existing development downstream of these hazard areas.	X	General Fund, BRIC/ HMGP Grants, Other Grants	Community Development Department	$	Ongoing/ Annually	Low
6.04	Establish/encourage the planting and maintenance of slope stabilizing, non-flammable vegetation in all landslide hazard-prone areas of the city.	X	General Fund, BRIC/ HMGP Grants, Other Grants	Community Development Department, Fire	$	Ongoing/ Annually	Low
Flooding (Dam Failure)							
7.01	Update the City's Master Plan of Drainage on a regular basis to incorporate new data and/or address emerging issues.		General Fund, BRIC/ HMGP Grants, Flood Mitigation Assistance Grants, Other Grants	Public Works Department	$$	Annually	Low
7.02	Investigate the use of permeable paving and landscaped swales for new construction and replacement of City-owned hardscaped areas.		General Fund, BRIC/ HMGP Grants, Flood Mitigation Assistance Grants, Other Grants	Public Works Department	$	2028	Low

TABLE 5-3: MITIGATION ACTIONS IMPLEMENTATION PLAN

Action #	Mitigation Action Item	Potential Policy Integration	Potential Funding Source	Responsible Department	Relative Cost	Time Frame	Priority
7.04	Identify potential flood improvements that reduce inundation from both storm flows and potential dam inundation effects.		General Fund, BRIC/ HMGP Grants, Flood Mitigation Assistance Grants, Other Grants	Public Works Department	$	2028	Low
7.05	Conduct frequent cleanings of storm drain intakes, especially before and during the rainy season.		General Fund, BRIC/ HMGP Grants, Flood Mitigation Assistance Grants, Other Grants	Public Works Department	$	Annually	Medium
7.06	Track areas where ponding frequently occurs during heavy rainfall and install new drains or upgrade existing ones to reduce ponding.		General Fund, BRIC/ HMGP Grants, Flood Mitigation Assistance Grants, Other Grants	Public Works Department	$	2028	Low
7.07	Identify all structures located in FEMA flood zones and determine the need to map, analyze, and modify FEMA flood maps. If flood map revisions are possible, work with property owners to determine the desire to perform this activity on their behalf.		General Fund, BRIC/ HMGP Grants, Flood Mitigation Assistance Grants, Other Grants	Public Works Department, Administrative Services	$	2027	Low
7.08	Coordinate with dam owners/operators, state, and federal agencies to collectively identify threats to the City and the region and identify ways to retrofit/strengthen the dams under their control.		General Fund, BRIC/ HMGP Grants, Flood Mitigation Assistance Grants, Other Grants	Public Works Department, Fire	$	2028	Low

*** Relative Cost Categories**	
$	Less than $75,000
$$	$75,001 to $4,999,999
$$$	Greater than $5,000,000