Attachment A

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LOCAL HAZARD MITIGATION PLAN

2025 Final Draft

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RECORD OF REVIEWS AND REVISIONS

Revision #	Date	Revisions Made	Entered By
1	01-02-2026	Population updated to reflect CA Department of Finance	Nallely Procopio

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PLAN DISTRIBUTION

Date	Plan Version	Method of Distribution (Email, Post on Server, Provide Hard Copy, etc.)	Distributed To (Name and Department/Organization

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SECTION 1: INTRODUCTION

The City of Pasadena (City) has prepared the 2025 Local Hazard Mitigation Plan (LHMP) to assess the natural and human-caused risks to the City and to reduce the potential impact of these hazards by creating mitigation strategies. The 2025 LHMP represents the City's commitment to create a safer and more resilient community by taking actions to reduce risk and by committing resources to lessen the effects of hazards on the residents and property of the City.

This plan complies with the Federal Disaster Mitigation Act (2000), Federal Register 44 CFR Parts 201 and 206, which modified the Robert T. Stafford Disaster Relief and Emergency Assistance Act by adding a new section, 322 - Mitigation Planning. As of November 1, 2004, this law requires local governments to develop and submit hazard mitigation plans as a condition of receiving Hazard Mitigation Grant Program (HMGP) and other mitigation project grants. The City Fire Department has coordinated the preparation of the LHMP in cooperation with the City departments, community stakeholders, partner agencies, and members of the public.

This introduction to the LHMP provides a brief description of hazard mitigation planning, local mitigation plan requirements, and an outline of the 2025 LHMP. There is also an overview of Federal Emergency Management Agency (FEMA) programs and grants related to hazard mitigation.

1.1 Hazard Mitigation Planning

Hazard mitigation is any sustained action taken to reduce or eliminate the long-term risk to human life and property from hazards. In general, hazard mitigation is done to minimize the impact of a hazard event before it occurs, intending to reduce losses from future disasters. 44 CFR § 201.1(b) states that the purpose of mitigation planning is for local governments to identify the hazards that impact them, to identify actions and activities to reduce losses from those hazards, and to establish a coordinated process to implement the plan, taking advantage of a wide range of resources.

For the City, hazard mitigation planning is a process in which the City will:

- Identify and profile hazards that affect the City
- Analyze the City facilities and infrastructure at risk from those hazards
- Develop a mitigation strategy and actions to lessen or reduce the impact of the hazards profiled
- Implement the strategy and actions that may involve planning, policy changes, programs, projects, and other activities

The City's implementation of mitigation actions, which include short-term or long-term strategies, is the planning process's primary objective. This type of planning will supplement the City's comprehensive planning and emergency management programs.

1.2 Local Mitigation Planning Requirements

Hazard mitigation planning is governed by the Stafford Act, as amended by the Disaster Mitigation Act of 2000 (DMA 2000), and by federal regulations implementing the Stafford Act. DMA 2000 revised the Stafford Act to require state, local, and tribal governments to develop and submit to FEMA a mitigation plan that outlines processes for identifying the natural hazards, risks, and vulnerabilities of the jurisdiction. Plan approval by FEMA is a prerequisite to receiving federal hazard mitigation grant funds.

To implement the mitigation planning requirements of the Stafford Act, FEMA promulgated 44 CFR Part 201, the federal regulations governing the planning process, plan content, and the process for obtaining approval of the plan from FEMA. The planning requirements set forth in the CFR are identified throughout this plan mirroring the order of the FEMA Regulation Checklist in the Local Mitigation Planning Handbook.

Federal law and the State of California's requirements for hazard mitigation plans require coverage of only natural hazards. The City's Hazard Mitigation Plan (2018) includes technological and human-caused hazards as well as natural hazards. The planning team decided to cover both natural and technological/human-caused hazards for the LHMP, including a description and analysis of each hazard.

FEMA has produced a Local Mitigation Plan Review Tool, which has been tailored by Region IX as an appendix to the Local Mitigation Planning Handbook (2023), to demonstrate how the mitigation plan meets the regulation in 44 CFR § 201.6 and offers State and FEMA Mitigation Planners an opportunity to provide feedback to the jurisdiction. The Plan Review Tool has a regulation checklist that provides a summary of FEMA's evaluation of whether the plan has addressed all requirements. Local planners can also use the checklist prior to submitting the plan for approval to ensure they have addressed all the requirements. The Local Mitigation Plan Review Tool Regulation Checklist is provided in **Appendix A** of this document.

1.3 Hazard Mitigation Plan Description

The 2025 LHMP consists of the sections and appendices described below:

Table 1-1: Plan Sections, Appendices, and Descriptions

Section	Description
Section 1: Introduction	Section 1 includes an introduction to hazard mitigation planning, lists the LHMP planning requirements, provides a description of the plan, and discusses grants related to hazard mitigation.
Section 2: Hazard Mitigation Planning Organization and Process	Section 2 describes the planning process for the 2025 LHMP, including an overview of how the LHMP was prepared, identification of the LHMP planning team, involvement of outside agencies and communities, the inclusion of related plans, reports, and information, and stakeholder and public outreach activities.
Section 3: Planning Area Description	Section 3 includes a description of the natural and built states of the City, including climate, geography, demographics, land use, and economic conditions.
Section 4: Risk Assessment	Section 4 provides a list of the hazards identified in the 2025 LHMP, a profile of each hazard and hazard summary, and a risk assessment of the planning area. Additionally, identifies and evaluates the resources available for hazard mitigation within the City.
Section 5: Mitigation Strategy	Section 5 identifies and evaluates the current, ongoing, and completed mitigation projects and programs in the City and lists mitigation strategies for reducing potential losses.
Section 6: Plan Implementation and Maintenance	Section 6 describes procedures for updating the LHMP to keep it current and for continued public engagement in the planning process.
Section 7: Plan Approval and Adoption	Section 7 includes documentation of California Office of Emergency Services (Cal OES) and the U.S. Federal Emergency Management Agency (FEMA) processes and adoption of the LHMP by the City Council

Section	Description
Appendix A	Appendix A contains the FEMA Local Mitigation Plan Review Tool, which documents the City's compliance with the local hazard mitigation plan requirements of 44 CFR Part 201.
Appendix B	Appendix B contains documentation of the planning process for the planning team, including invitations, attendee lists, meetings minutes, presentations, emails, etc.
Appendix C	Appendix C contains documentation of the planning process, including surveys, social media outreach and opportunity for comment for the stakeholders and public, and other stakeholder/public outreach efforts.
Appendix D	Appendix D lists acronyms and abbreviations used in the 2025 LHMP.

1.4 Grant Programs with Mitigation Plan Requirements

Currently, three (3) FEMA grant programs provide funding to local entities that have a FEMA-approved local mitigation plan meeting federal hazard mitigation plan requirements. Two (2) of the grant programs are authorized under the Stafford Act. The remaining two (2) programs are authorized under the National Flood Insurance Act.

1.4.1 Stafford Act Grant Programs

FEMA funding is provided to state, local, and tribal governments that have an approved Hazard Mitigation Plan through the following programs.

Hazard Mitigation Grant Program (HMGP)

The HMGP provides grants to implement long-term hazard mitigation measures after declaration of a major disaster. The purpose of the HMGP is to reduce the loss of life and property due to natural disasters and to enable mitigation measures to be implemented during the immediate recovery from a disaster. To qualify for HMGP funding, projects must provide a long-term solution to a problem, and the project's potential savings must exceed the cost of implementing the project.

HMGP funds may be used to protect either public or private property or to purchase property that has been subjected to, or is in danger of, repetitive damage. The amount of funding available for the HMGP under a particular disaster declaration is limited. Under the program, the federal government may provide a state or tribe with up to 20 percent of the total disaster grants awarded by FEMA and may provide up to 75 percent of the cost of projects approved under the program.

1.5.2 National Flood Insurance Act Grant Programs

Flood Mitigation Assistance Grant Program

The goal of the Flood Mitigation Assistance (FMA) Grant Program is to reduce or eliminate flood insurance claims under the National Flood Insurance Program (NFIP). This program emphasizes mitigating repetitive loss (RL) properties. The primary source of funding for the FMA program is the National Flood Insurance Fund. Grant funding is available for planning, project, and technical assistance. Project grants are awarded to local entities to apply mitigation measures to reduce flood losses to properties insured under the NFIP. In FY 2014, FMA funding totaled $89 million. The cost-share for this grant is 75 percent federal and 25 percent nonfederal. However, a cost- share of 90 percent federal and 10 percent nonfederal is available in certain situations to mitigate severe repetitive loss (SRL) properties.

Repetitive Flood Claims Program

The Repetitive Flood Claims (RFC) Program provides funding to reduce or eliminate the long-term risk of flood damage to residential and non-residential structures insured under the NFIP. Structures considered for mitigation must have had one or more claim payments for flood damage. All RFC grants are eligible for up to 100 percent federal assistance.

SECTION 2: PLANNING PROCESS

The requirements for documentation of the LHMP planning process are described below. This section summarizes the planning area's hazard mitigation planning efforts in 2025. In addition, the section describes public and stakeholder outreach efforts as part of the LHMP planning process. The section also summarizes the review and incorporation of existing plans, studies, and reports used to develop the LHMP. Documentation of the 2025 LHMP planning process for the Hazard Mitigation Planning Team is provided in **Table 2-1**, and documentation of the process for the public and stakeholders is found in **Table 2-2**. These appendices document the planning meetings and outreach and include meeting agendas, presentation, sign-in sheet, minutes, social media materials and other documentation used to conduct the planning process.

The planning process began with the City establishing the planning team and emailing stakeholders within the planning area to invite them to participate in the process. The City also posted a notice on its website announcing the planning process that contained a mechanism to provide input and feedback. In addition, the City identified the financial and technical resources required to update the LHMP. Once all the City's financial and technical resources were identified, the City established the planning team and created a schedule for the process.

2.1 Plan History

The 2025 LHMP is an update of the 2018-19 Plan. It combines Human -Caused hazards into one category and removes Agricultural Pests, Aircraft Crashes, Radiological Incidents, and Train Accidents. The 2025 LHMP contains many of the mitigation actions listed in the 2018-19 version as they are ongoing and still relevant.

2.2 Plan Purpose and Authority

The purpose of the Plan is to identify natural and human-caused hazards that impact the City, to assess the vulnerability and risk posed by those hazards to City-wide human and structural assets, to develop strategies for mitigation of those identified hazards, to present future maintenance procedures for the plan, and to document the planning process.
The Plan is prepared in compliance with DMA 2000 requirements and represents an updated LHMP.

The requirements for adopting this LHMP by all local governing bodies, as set forth in the Stafford Act and as amended by DMA 2000 and its implementing regulations, are

described below. The local planning requirements are documented throughout the LHMP and in **Appendix A**, *FEMA Local Mitigation Plan Review Tool*.

The City's 2025 Operations Budget provided funding for the development of the Plan. Navigating Preparedness Associates was retained by the City to provide consulting services in guiding the planning process and Plan development.

2.3 Planning Process Description

In August 2024, the planning process for the 2025 LHMP began. Select staff from various departments in the City, and other stakeholders were invited to join the Hazard Mitigation Planning Team to develop the 2025 LHMP. Representatives from the County of Los Angeles, Disaster Management Area Coordinator, CalTech, Jet Propulsion Laboratory, and Pasadena City College were invited to the Planning Team meetings. Documentation of participant outreach and public engagement are in **Appendices B and C.**

2.4 Planning Team

Members of the LHMP planning team are listed in **Table 2-1** below.

Table 2-1: LHMP Planning Team

Department or Agency	Member Name	Key Role
City Clerk	Mark Jomsky	Planning Team Member
City Manager's Office	Alexander Souto	Planning Team Member
City Manager's Office	Henry Frometa	Planning Team Member
City Manager's Office, PIO	Lisa Derderian	Planning Team Member
City Manager's Office	Sara Goldman	Planning Team Member
Finance	Armine Trashian	Planning Team Member
Finance	Gloria Acevedo	Planning Team Member
Fire	Anthony James	Planning Team Member
Fire	Nallely Procopio	Planning Team Member

Department or Agency	Member Name	Key Role
Housing	Jennifer O'Reilly-Jones	Planning Team Member
Human Resources	Brady Griffin	Planning Team Member
Information Technology	Dan Augustyn	Planning Team Member
Library	William Petry	Planning Team Member
Parks, Recreation, and Community Services	Koko Panossian	Planning Team Member
Parks, Recreation, and Community Services	Melchor Alonzo	Planning Team Member
Planning & Community Development	David Sinclair	Planning Team Member
Planning & Community Development	Anita Cerna	Planning Team Member
Planning & Community Development	Jesse De Anda	Planning Team Member
Police	Arthur Chute	Planning Team Member
Police	Derek Locklin	Planning Team Member
Police	Jose Urita	Planning Team Member
Public Health	Adrienne Kim	Planning Team Member
Public Health	Michael Oshiro	Planning Team Member
Public Works	Brent Maue	Planning Team Member
Public Works	Hayden Melbourn	Planning Team Member
Public Works	Mandy Templeton	Planning Team Member
NPA	Lee Rosenberg	NPA Project Manager

Department or Agency	Member Name	Key Role
NPA	Francisco Soto	NPA Lead Planner

2.4.1 Planning Team Activities

Three (3) meetings were held with the planning team: representatives from the City held the responsibility of chairing the planning team. The City project manager reviewed all documents and sent out meeting notices. **Appendix B** documents the LHMP planning activities. The planning team's responsibility included providing feedback on hazards that affect the planning area, reviewing drafts of the plan, and participating in developing mitigation activities.

Table 2-2: Planning Activities

Date	Activity	Purpose
8/29/2024	LHMP Project Kickoff Meeting Team Meeting #1	Introduce core Planning Team members, review the project management plan, align expectations. Describe the regulatory issues of LHMP, the value of them, and the LHMP planning process. Distribute data collection forms.
11/14/2024	LHMP Planning Team Meeting #2	Review potential hazards and select those that pose risks. Use CPRI. Review status of 2018 mitigation activities and update status. Review data-collection-sheet inputs, begin to develop potential mitigation activities. Request information for hazard analysis and potential losses
2/18/2025	LHMP Planning Team Meeting #3	Review risk assessment and potential losses. Develop draft mitigation goals and actions. Review current plan mitigation activities.

2.4.2 Other Jurisdictions Agency/Organizational Participation

External organizations listed below participated in Planning Team meetings and reviewed drafts of the plan. They were invited by an MS Outlook invitation to the meetings. **Appendix B**, Planning Team Meetings notes, documents their engagement. **Table 2-3** lists the organizations and attendees that were contacted to participate in the planning process.

Table 2-3: Organization Participation

Organization	Staff
Pasadena City College	Alexander Boekelheide
The Rose Bowl	Jenessa Castillo
California Institute of Technology	Catherine Christensen
Disaster Management Area Coordinator – Area C	Soraya Sutherlin
Jet Propulsion Laboratory	Chief David Dollarhide
Los Angeles County Office of Emergency Management	Sinan Khan
City of South Pasadena	Andy Dubois
City of San Marino	Mario Rueda
City of Glendale	Tommy Nicola
City of Burbank	Eric Baumgardner
City of Pasadena **Accessibility and Disability Commission (Underserved Community)**	Sara Goldman
City of Pasadena **Home Instruction for Parents of Preschool Youngsters (Underserved Community)**	Marina Ovanessian

Copies of the draft LHMP were provided to the City Planning Team, including the participating organizations above, and distributed to the public for their review. Comments received from these partners are incorporated in the final draft of the LHMP and are documented in **Appendix C**.

2.5 Community Engagement

Once the planning process commenced, the City provided public notification through its website, press release, and social media accounts. Additionally, the City conducted an online survey to solicit input on the hazards that the City faces and the types of mitigation activities the City should undertake. The draft LHMP was placed on the City website; and hard copies were posted at City Hall and City libraries for public review and comment. Notification of the draft LHMP review and adoption by the City Council was advertised as required by the Brown Act. To reach residents who might get their information from other sources, the City included a hazard mitigation flyer within the water department's customer bills.

The public survey input from the 189 respondents was used to select hazards and rank their effects. Earthquake and Wildfire were ranked as the two (2) top hazards of concern for residents. This input was also used to inform the Calculated Priority Risk Index (CPRI) in **Table 4-2**. Finally, survey input was used to select mitigation actions. Input from publicly posting the draft LHMP was used to refine the Plan and to prepare it for submission for review.

On November 19, 2024, the City posted information about the LHMP update process on its website and social media channels; and invited the public to take a Hazard Mitigation Survey to gather information about the public's knowledge of hazards in the City and their level of preparedness. **Appendix C** contains screenshots of the website, social media, and survey. The City also invited surrounding cities and other stakeholders to review the LHMP. **Appendix C** contains the invitation and feedback received. A survey was distributed to request feedback on the Public Review Draft of the 2025 Hazard Mitigation Plan. The feedback provided valuable insight to the community's concerns regarding wildfire mitigation. Based on the feedback received, the City added several mitigation actions to mitigate wildfire risk, including conducting fuel modification projects to reduce fire hazard risks and creating a wildfire ordinance to reduce development in wildfire hazard zones.

On November 19, 2024, the City hosted their monthly Accessibility and Disability Commission meeting which included a presentation on the hazard mitigation planning process.

On June 9, 2025, a draft of the plan was distributed to the public for review and input. The planning team received 23 comments on the public review draft plan. After reviewing the comments, portions of the LHMP were modified or expanded. One comment received provided detailed recommendations for additional input to the LHMP from and integration with other planning mechanisms such as the City's planning commission. While the recommendations are valuable, the planning team elected to table them until the next plan review as the current LHMP is expired and the City needs an approved LHMP for current HMPG funding opportunities.

Table 2-4: Public Engagement Activities

Date	Activity	Documentation
November 19, 2024 - Present	Survey posted on City Website with links provided in social media accounts. General Hazard Mitigation documents.	Documentation 1 – Survey Documentation 2 – Posting on City Instagram Account Documentation 3 – Posting on City Facebook Account Documentation 4 – News release Documentation 5 – Google Search Documentation 6 – Posting on City website Documentation 7 – LHMP Flyer (English) Documentation 8 – LHMP Flyer (Spanish) Documentation 9 – LHMP Flyer (Chinese) Documentation 10 – Survey (Spanish) Documentation 11 – Survey (Chinese) Documentation 12 – City website presentation and newsletter
November 19, 2024	Public Meetings	Documentation 13: Accessibility & Disability Commission Presentation Agenda

Date	Activity	Documentation
3 months	Public hazard mitigation survey conducted.	Documentation 14: Survey results
Ongoing	Outreach Materials at Public Facing Facilities	Documentation 15: Outreach Materials at Public Facing Facilities
6/9/2025	Draft LHMP provided for public review.	Documentation 16: Survey Distribution for Feedback
Ongoing	Survey Results to Public Review Draft Feedback	Documentation 17: Survey Distribution for Feedback
6/24/2025	Draft LHMP provided to neighboring jurisdiction for review and comment.	Documentation 18: Email/Feedback

2.6 Incorporation into Other Planning Mechanisms

The City's 2018 LHMP provide key input to and was incorporated into the following planning mechanisms:

1. City Emergency Operations Plan - Hazards descriptions in the LHMP were abbreviated and included in the EOP.
2. General Plan - Land Use Policies: Reviews of zoning and land use policies were conducted to align with hazard mitigation priorities, such as restricting development in flood-prone areas.

The City's 2025 hazard mitigation identification, risk assessment, plan recommendations and mitigation actions will be integrated into the following planning mechanisms.

Emergency Operations Plan

1. Hazards identified in this LHMP were incorporated into the EOP.
2. Align Response Strategies: Ensured that the EOP incorporates the hazard profiles and mitigation strategies from the LHMP for a cohesive response framework.
3. Training and Exercises: Conducted joint training and exercises based on scenarios identified in the LHMP to improve preparedness.

Public Health Emergency Operations Plan

1. The LHMP informed the risk assessment of the Public Health Emergency Operations Plan.

Capital Improvement Plan (CIP)

1. Aligned LHMP actions with climate adaptation strategies to address the increasing frequency and severity of hazards due to climate change. For example, enhanced urban green spaces to mitigate heatwaves.
2. Infrastructure Resilience: Planned for resilient infrastructure investments, such as upgrading drainage systems to handle increased rainfall.

Building Codes and Regulations:

1. Strengthen Building Standards: Update building codes to incorporate hazard-resistant construction practices, such as seismic retrofitting for earthquake-prone areas.
2. Enforcement and Incentives: Implement enforcement mechanisms and provide incentives for property owners to comply with updated building standards.

Community Rating System (CRS)

1. Enhanced Floodplain Management: Integrated LHMP strategies into the CRS to improve floodplain management and potentially lower flood insurance premiums for residents.
2. Public Education: Used CRS outreach activities to educate the public about hazard mitigation and preparedness.

Climate Action Plan:

1. Developed climate adaptation strategies and actions that complement other hazard mitigation strategies when appropriate.

2. Address Climate Risks: Aligned LHMP actions with the Climate Action Plan to address climate-related hazards such as extreme heat, wildfires, and flooding.

General Plan

1. When possible, updated the Housing Element, Safety Element, and/or local hazard mitigation plan concurrently or sequentially to synchronize long-term integration and meet SB 1035 requirements.
2. Incorporated Hazard Mitigation Goals: Embed the LHMP's goals and objectives into the city's general plan to ensure alignment with broader land use and development policies.
3. Land Use Policies: Updated zoning and land use policies to reflect hazard mitigation priorities, such as restricting development in flood-prone areas.

Incorporating a diverse range of plans and strategies into the Local Hazard Mitigation Plan ensures a comprehensive approach to reducing risks and enhancing community resilience. By addressing risk assessments, land use planning, infrastructure resilience, community engagement, emergency response, natural resource management, economic resilience, and continuous monitoring, communities can better prepare for, respond to, and recover from hazards and disasters.

2.7 Review of Existing Plans, Reports, Technical Documents, and Data

In updating the LHMP, the Planning Team used a large number of resource documents and references. **Table 2-5** contains a comprehensive list of guidance, policy tools, extant plans, and authorities incorporated to create the current Plan.

Table 2-5: Resource Documents and References Reviewed and Incorporated in the Plan

Referenced Document or Technical Source	Resource Type	Description of Reference and Its Use
California State Hazard Mitigation Plan (2023) https://www.caloes.ca.gov/wp-content/uploads/Hazard-Mitigation/Documents/2023-	Technical and Planning Resource	Provides the State of California's Hazard Mitigation Plan for 2023-2028. Describes hazards that informed the hazard analysis and risk assessment portion of this

Referenced Document or Technical Source	Resource Type	Description of Reference and Its Use
California-SHMP_Volume-1_11.10.2023.pdf		LHMP.
County of Los Angeles All Hazards Mitigation Plan (2020) https://ceo.lacounty.gov/wp-content/uploads/2023/08/County-of-Los-Angeles-All-Hazards-Mitigation-Plan-APPROVED-05-2020.pdf	Technical and Planning Resource	Describes hazards that informed the hazard analysis and risk assessment sections of this LHMP.
California Energy Commission (2018). California's Fourth Climate Change Assessment https://www.energy.ca.gov/data-reports/reports/californias-fourth-climate-change-assessment	Technical and Planning Resource	Describes monitoring, analysis, and modeling of climate as well as efforts designed to reduce emissions.
FEMA Dam Safety https://www.fema.gov/emergency-managers/risk-management/dam-safety	Technical Resource	Database used in the dam failure hazard profiling. Used in the risk assessment.
National Weather Service https://www.weather.gov/	Technical Resource	Source for hazard information, data sets, and historical event records. Used in the risk assessment.
United States Geological Survey Earthquake Hazards Program. https://www.usgs.gov/programs/earthquake-hazards	Technical Data	Source for geological hazard data and incident data. Used in the risk assessment.
Western Regional Climate Center	Website Data	Online resource for climate data used in climate discussion.

Referenced Document or Technical Source	Resource Type	Description of Reference and Its Use
https://wrcc.dri.edu/		
California Department of Conservation https://www.conservation.ca.gov/cgs/geohazards	Technical and Planning Resource	Identifies significant geologic hazards that exist, or are likely to exist, so that informed land use and emergency response planning decisions can be made.
California Department of Water Resources https://water.ca.gov/Programs/All-Programs/Division-of-Safety-of-Dams/Inundation-Maps https://fmds.water.ca.gov/webgis/?appid=dam_prototype_v2	Technical and Planning Resource	Provides information on dam safety, a list of dams within California and dam inundation maps for dams in the planning area.
Federal Emergency Management Agency	Technical and Planning Resource	Resource for LHMP guidance (How-To series), floodplain and flood-related NFIP data (mapping, repetitive loss, NFIP statistics), and historic hazard incidents. Used in the risk assessment and mitigation strategy.
Cybersecurity & Infrastructure Security Agency https://www.cisa.gov/	Technical and Planning Resource	Resource for cybersecurity and cyberattack guidance, especially regarding critical infrastructure and public utilities. Describes historical cybersecurity incidents and lessons learned. Used in the risk assessment and mitigation strategy.
HAZUS-MH	Technical Resource	Base data sets within the program were used in the vulnerability analysis.
National Centers for	Technical	Online resource for weather-related data and historic hazard event data.

Referenced Document or Technical Source	Resource Type	Description of Reference and Its Use
Environmental Information https://www.ncdc.noaa.gov/data-access	Resource	Used in the risk assessment.
National Integrated Drought Information System (2025) https://www.drought.gov/drought/	Technical Resource	Source for drought-related projections and conditions. Used in the risk assessment.
California Energy Commission (2018). California's Fourth Climate Change Assessment https://www.energy.ca.gov/data-reports/reports/californias-fourth-climate-change-assessment	Technical and Planning Resource	Describes monitoring, analysis, and modeling of climate as well as efforts designed to reduce emissions.
California Governor's Office of Emergency Services http://myhazards.caloes.ca.gov/	Technical and Planning Resource	Provides a tool for the general public to discover hazards in their area (earthquake, flood, fire, and tsunami) and learn steps to reduce personal risk.

SECTION 3: PLANNING AREA DESCRIPTION

The following section provides an overview of the City's planning area. It includes a description of the natural and population characteristics.

3.1 Location and Description

The City is located in the San Gabriel Valley, at the base of the San Gabriel Mountains. The area was part of Rancho El Rincon de San Pasqual, a northeast section of the San Gabriel Mission (1771). The City was founded in 1874 by Thomas B. Elliott as Indiana Colony; the name Pasadena, a Chippewa word meaning "crown of the valley," was adopted in 1875.

The City's growth as a winter resort and citrus center was stimulated by the Santa Fe Railway, and subsequent freeway construction brought it within easy commuting distance to Los Angeles, which lies 12 miles (19 km) southwest.

Pasadena is the home to many recognized businesses including: Pasadena City (community) College (1924), Pacific Oaks College (1945), and Art Center College of Design (1930), California Institute of Technology- CalTech (1891), the Pasadena Playhouse, the Norton Simon Museum of Art (formerly Pasadena Art Institute and Pasadena Museum of Modern Art), and the Pacific Asia Museum contains exhibits on the history and art of Asia and the Pacific; its grounds contain a Chinese courtyard garden and koi ponds.

The City is perhaps most famous for its New Year's Day Tournament of Roses, first held in 1890, which features a televised parade attended by several hundred thousand people and the Rose Bowl classic, a contest between two (2) major college gridiron football teams.

The City is served by the California 210 - Foothill Freeway, the California 110 - Pasadena Freeway (Arroyo Seco Parkway), the California 134 - Ventura Freeway, and the California Interstate 710 - Long Beach Freeway. The major arterial highways are Fair Oaks Avenue, Lake Avenue, and Los Robles Avenue, which run north to south. Colorado Boulevard. Walnut Street, Del Mar Boulevard, and Green Street run east to west.

Pasadena has a residential population of 139,692*. Pasadena consists of 23 square miles and is approximately 58% residential, 9% commercial, 2% industrial and 31% open space, parks, institutional or vacant land. (Land Use Element of Revised General Plan, 2015). The boundary is shown against the regional topography in **Figure 3-1**.

*Note: Population as of 01/01/2024 reported in CA Department of Finance

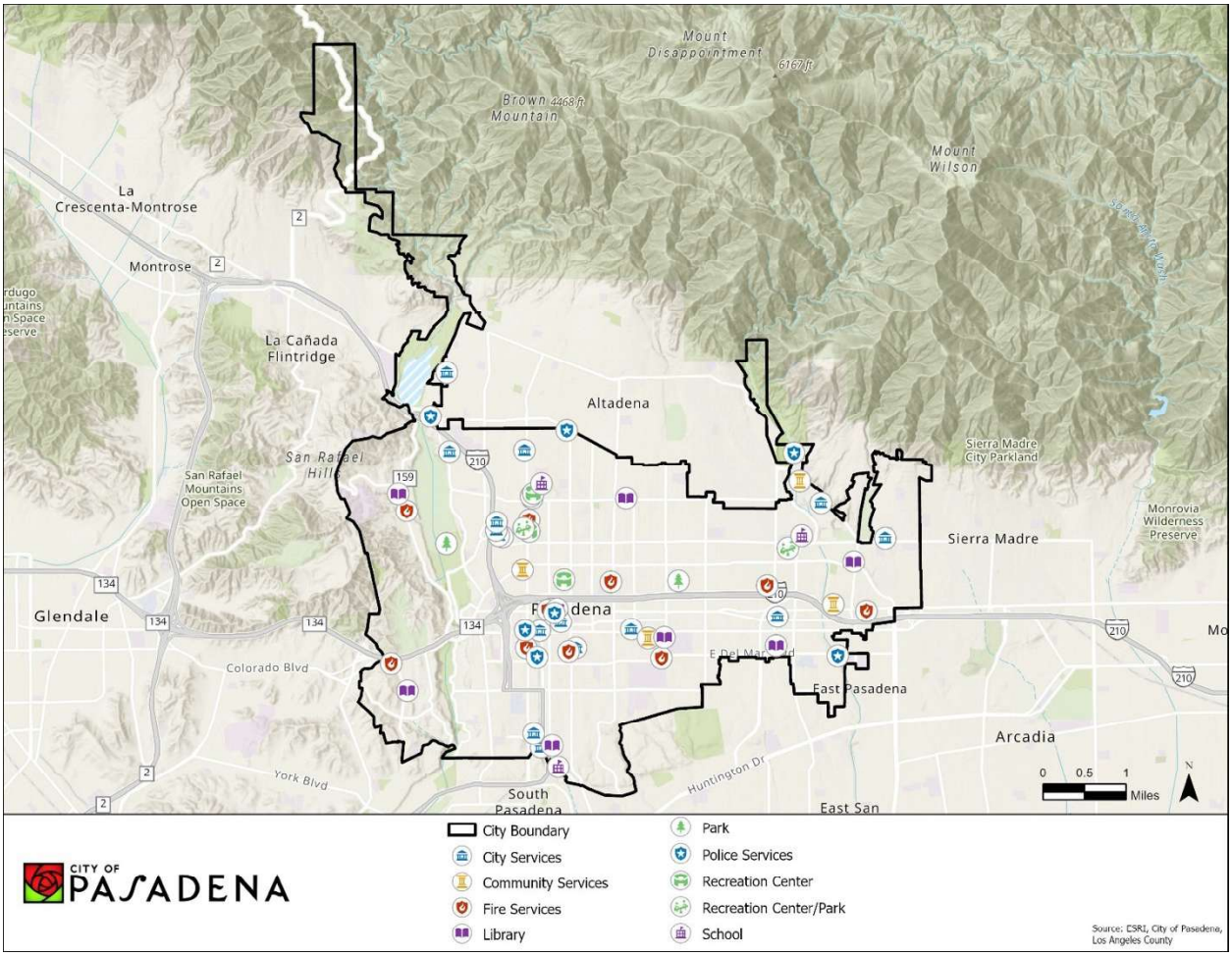


Figure 3-1. City Boundary with Topography

3.2 Geology

The Los Angeles Basin is a seismically active area in Southern California located in the northern portion of the Peninsular Ranges geomorphic province and is a northwest-trending alleviated lowland plain, sometimes called the Coastal Plain of Los Angeles. The Peninsular Ranges are characterized by northwest-trending blocks of mountain ridges and sediment-floored valleys. The dominant geologic structural features are northwest reverse faults that form the southern margin of the Transverse Ranges. Furthermore, the Los Angeles Basin is filled with sedimentation thousands of feet thick and is structurally influenced by thrusting fault blocks and strike slip fault expressions trending northwest.

3.3 Climate

The climate is sub-tropical and simi-arid. The average daytime temperature is 78 Fahrenheit (26 Celsius) annually. The average nighttime temperature is 53 Fahrenheit (11 Celsius). The overall average temperature is 65 (18 C). The highest recorded temperature was 113 Fahrenheit (45 C) on June 17, 1917, while the lowest recorded temperature was 21 Fahrenheit (-6 C) on January 7, 1913. The average yearly rainfall is 20 inches. During the winter months of December through March, it is a sunny or partly sunny 75 percent of the time. It has snowed twice in the City's history: January 13, 1932, and January 7, 1913.

3.4 History

In 1886 Pasadena incorporated, largely as a measure to rid the City of its saloon. In the ensuing decade, amenities such as sewers, paved streets, and electric street lighting were installed. On January 1, 1890, the Valley Hunt Club initiated a mid-winter festival with a procession of flower-bedecked horses and carriages. This became a yearly tradition that in 1898 was formally sponsored by the Tournament of Roses Association. An added tourist attraction was the Echo Mountain incline railway which opened in 1893 and included a mountain chalet resort and the Alpine Tavern at Crystal Springs.

The cultural and educational side of the City was not neglected. The educational system expanded in both the public and private sector. Throop Polytechnic Institute (first named Throop University) was founded in 1891 and later became the California Institute of Technology.

3.5 Government

The City has a Council-Manager form of government with seven (7) City Councils, each electing a Councilmember to a four (4)-year term. The mayor is an at-large or Citywide elected position serving a four (4)-year term. The City Council is responsible for setting policies, passing ordinances, adopting the budget, appointing committee members, and hiring the City Manager, City Attorney/City Prosecutor, and the City Clerk.

The mayor acts as the chief executive of the City in performing all acts required to be performed under the laws of the State of California and our City Charter. The mayor is the official head of the City for all ceremonial purposes, by the Courts for serving civil process and by the Governor of the State for military purposes. The mayor has a voice and vote in all proceedings of the City Council and presides over City Council meetings.

The City has 17 departments, three (3) operating companies, the Successor Agency to the Pasadena Community Development Commission (PCOC), and a City Council Office.

3.6 Economy

Pasadena has a diverse economy of employers from various sectors, including distribution, retail/wholesale trade, manufacturing, administrative support, construction, hotels and entertainment, health services, and education. Nearly 71,039 of the population are employed in a wide variety of industries. According to the 2023 American Community Survey Estimates, population 16 years and older are employed as follows: 52.6 percent managerial and professional related occupations; 16.2 percent service occupations; 20.4 percent sales and office occupations; 5.1 percent construction, extraction and maintenance occupations; and 5.7 percent production, transportation, and materials moving technology occupations.

3.7 Demographics

Pasadena is an ethnically diverse community. The 2023 American Community Survey Estimates found 38 percent of Pasadena residents are white, 32 percent are Hispanic, 18 percent are Asian, 8 percent are African American, 3 percent are American Indian and Alaska Native, and 5 percent are some other races. (Percentages may add up to more than 100 percent because individuals may report more than one race.)

Table 3-1: City Demographics

Total Population, All Races	American Indian & Alaska Native	Asian	Black or African American	Native Hawaiian & Other Pacific Islander	White (Not Hispanic or Latino)	Some Other Race	Two (2) or More Races	Hispanic or Latino (Overlaps with other race categories)
137,554	711	24,492	11,022	81	47,131	24,984	17,174	48,538
N/A	0.52%	17.81%	8.01%	0.06%	34.26%	18.16%	12.49%	35.29%

Note: Population by race for each racial category is also shown as a percentage of the total population for that community. U.S. Census estimates based upon data and surveys collected by the American Community Survey over a five (5)-year period. These estimates are issued annually between full Decennial Census counts conducted each decade.

3.8 Land Use

Pasadena's General Plan Land Use Element is grounded by Guiding Principles that cumulatively represent the community's vision for the future. The Guiding Principles were developed through an extensive program of community outreach and input conducted over a six (6)-year period. The Guiding Principles are:

1. Growth will be targeted to serve community needs and enhance the quality of life. Higher density development will be directed away from residential neighborhoods and into the Central City, Transit Villages, and Neighborhood Villages. These areas will have a diverse housing stock, job opportunities, exciting cities with commercial and recreational uses, and transit opportunities. New development will build upon Pasadena's tradition of strong sense of place, great neighborhoods, gardens, plazas, parks, and trees.
2. Pasadena's historic resources will be preserved. Citywide, new development will be in harmony with and enhance Pasadena's unique character and sense of place. New construction that could affect the integrity of historic resources will be compatible with, and differentiated from, the existing resource.
3. Pasadena will be an economically vital City by providing jobs, services, revenues, and opportunities. A diverse economic base with jobs for Pasadena residents will be fostered; existing businesses will be encouraged to stay or expand; affordable housing will be provided for the labor pool; the continued fiscal health of the City will be ensured.
4. Pasadena will be a socially, economically, and environmentally sustainable community. Safe, well designed, accessible and human-scale residential and commercial areas will be provided where people of all ages can live, work and play.
5. These areas will include neighborhood parks, urban open spaces and the equitable distribution of public and private recreational facilities; new public spaces will be acquired. Human services will be coordinated and made accessible to those who need them.
6. Pasadena will be a City where people can circulate without cars. Specific plans in targeted development areas will emphasize a mix of uses, pedestrian activity, and transit; public and private transit will be made more available; neighborhood villages and transit villages will reduce the need for auto use.
7. Pasadena will be a cultural, scientific, corporate, entertainment and education center for the region. Long-term growth opportunities will be provided for existing

institutions; a healthy economy will be fostered to attract new cultural, scientific, corporate, and entertainment and educational institutions.

8. Community Participation will be a permanent part of achieving a greater city. Citizens will be provided with timely and understandable information on planning issues and projects; citizens will directly participate in shaping plans and policies for Pasadena's future.

The Land Use Diagram **(Figure 3-2)** functions as a guide to the general public, planners, and decision-makers, depicting the ultimate pattern of development for Pasadena in 2035, consistent with the requirements of State planning law (Government Code§65302(a)). It depicts the distribution of various uses and intensity of development that shall be permitted as the physical representation of this element's goals and policies.

3.9 Changes in Development

Tracking previous and future growth in potential hazard areas provides an overview of increased exposure to hazards within a community. Hazard mitigation plan updates must be revised to reflect changes in development within the planning area during the previous performance period of the plan, as stated in 44 CFR Section 201.6(d)(3). The plan must describe changes in development in hazard- prone areas that increased or decreased vulnerability since the last plan was approved.

The City has adopted a general plan that governs land-use decisions and policymaking, as well as a building code and specialty ordinances based on state and federal mandates. This hazard mitigation plan update assumes that some new development over the performance period occurred in hazard areas. All new development would have been regulated pursuant to local programs and codes, such as the International Building Code and flood damage prevention requirements of the NFIP. Therefore, it is assumed that hazard vulnerability did not measurably increase, even if exposure did.

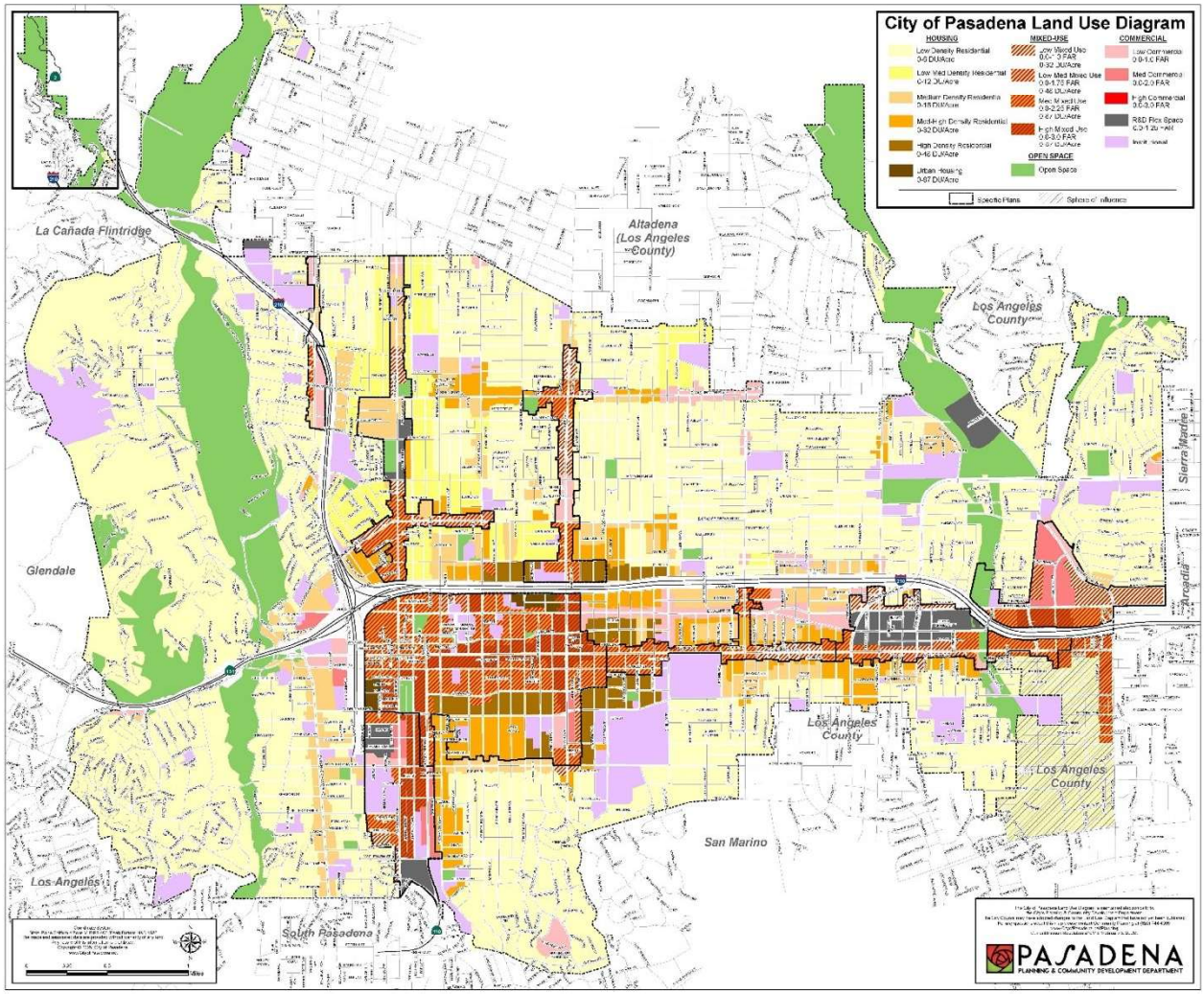


Figure 3-2: City Land Use Diagram

SECTION 4: HAZARD IDENTIFICATION AND RISK ASSESSMENT

This section of the LHMP includes requirements for hazard profiles and a risk assessment, as provided in the Code of Federal Regulations. The goal of mitigation is to reduce the future impacts of hazards, including loss of life, property damage, disruption to the local economy, and the expenditure of public and private funds for recovery.

4.1 Hazard Analysis

A hazard analysis consists of identifying, screening, and profiling each hazard. The hazard analysis encompasses natural, human-caused, and technological hazards. Natural hazards result from unexpected or uncontrollable natural events of significant size and destructive power. Human-caused hazards result from human activity and encompass technological hazards. Technological hazards are generally accidental or result from events with unintended consequences (for example, accidental release of hazardous materials).

The goal of mitigation is to reduce the future impacts of hazards, including loss of life, property damage, disruption to the local economy, and the expenditure of public and private funds for recovery. Hazard identification was conducted as part of the planning process. For the 2025 LHMP, the potential risk for each hazard was rated using the Calculated Priority Risk Index (CPRI). The CPRI examines four (4) criteria for each hazard (probability, magnitude/severity, warning time, and duration). **Table 4-5** provides the results of the CPRI which were used to both select applicable hazards to include in the LHMP and to determine risk.

4.2 Disaster Proclamation History and Process

When there is a condition of extreme peril or potential peril to the safety of persons and property, and the condition is beyond the capability of the local jurisdiction to control effectively, the local governing body (city council, board of supervisors, or a person authorized by ordinance) may proclaim that a local emergency exists. The local government may request the California Governor's Office of Emergency Services (Cal OES) Director to concur in their proclamation of a local emergency and to provide assistance under the California Disaster Assistance Act (CDAA).

A copy of the resolution must be provided to the Los Angeles Operational Area as soon as possible for transmission to Cal OES. When a county proclaims a local emergency pursuant to Section 8630 of the Government Code, based upon conditions which

include both incorporated and unincorporated territory of the county, it is not necessary for the cities to also proclaim the existence of a local emergency independently.

If sufficient conditions occur, the state may proclaim a state of emergency to fully commit state and mutual aid assistance and provide resources to assist local government. Following the proclamation of a state of emergency, the California OES Director may recommend that the Governor request a Presidential declaration of a major disaster under the authority of Public Law 93-288. The Governor's request to the president is submitted through FEMA.

Table 4-1 below lists the state and federal disaster declarations affecting Los Angeles County.

Table 4-1: Los Angeles County Disaster Proclamation History

Year	Disaster #	Hazard	Declaration
2025	DR-4856-CA	Fire	California Wildfires ad Straight-line Winds
2025	DR-4769-CA	Severe Storm	Severe Winter Storms, Tornadoes, Flooding, Landslides, and Mudslides
2023	DR-4699-CA	Severe Storm	Severe Winter Storms, Tornadoes, Flooding, Landslides, and Mudslides
2023	EM-3592-CA	Flood	California Severe Winter Storms, Flooding, Landslides, and Mudslides
2023	DR-4683-CA	Flood	California Severe Winter Storms, Flooding, Landslides, and Mudslides
2020	DR-4569-CA	Fire	California Wildfires
2020	DR-4482-CA	Pandemic	California COVID-19 Pandemic
2018	DR-4353-CA	Wildfires, Flooding, Mudflows, Debris Flows	California Wildfires, Flooding, Mudflows, and Debris Flows

Year	Disaster #	Hazard	Declaration
2017	DR-4305-CA	Flooding	Severe Winter Storms, Flooding, and Mudslides in California One (1) of three (3) proclamations that covered 57/58 counties in the state
2012-2016	Statewide Drought	Drought	This period was one of the driest in California history since record-keeping began. The drought led to Governor Jerry Brown's instituting mandatory 25% water restrictions in June 2015.
2013	Heatwave	Extreme Heat	In late June 2013, an intense heatwave struck the Southwestern United States. Various places in Southern California reached up to 122°F.
2009		H1N1 Swine flu	State proclamation

4.3 Hazard Identification

A list of all hazards that had the potential to occur in the City was presented to stakeholders in the first Hazard Mitigation Planning Committee (HMPC) meeting and to the general public through a survey. The list of hazards was derived from the 2018 LHMP, the 2018 Emergency Operations Plan, the 2020 County of Los Angeles All-Hazards Mitigation Plan, and the 2023 California State Hazard Mitigation Plan. The 2018 LHMP contained the following hazards:

- Earthquake
- Wildfire
- Drought/Water Shortage
- Windstorm
- Energy Shortage/Outage
- Agricultural Pests/Disease
- Infectious Disease
- Terrorism
- Cyber Attack
- Civil Disturbance
- Landslide/Earth Movements
- Extreme Heat
- Hailstorm
- Air Pollution
- Oil Spill
- Dam Failure

- Hazardous Material Release
- Radiological Incidents
- Aircraft Crashes
- Train Accidents
- Natural Gas Pipeline/Storage Facility

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 the previous hazards in the 2018 plan and discussed other potential hazards, excluding ones that do not pose a threat or are not a significant concern to Pasadena.

Table 4-2 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 Los Angeles County Hazard Mitigation Plan (LAC HMP).

Table 4-2: Hazard Evaluation for Pasadena LHMP

Hazard	Recommended for Consideration	Included in LHMP?	Reason for Inclusion or Exclusion
Agricultural Pests	SHMP	No	While historically agricultural activities have occurred within the City, commercial farming does not occupy a large amount of land. Most farmland has been replaced by new residential and commercial developments. Without the presence of these large agricultural areas in the community, the HMPC did not identify this as a hazard of concern for the City.

Hazard	Recommended for Consideration	Included in LHMP?	Reason for Inclusion or Exclusion
Air Pollution	SHMP	No	Air pollution is a state and regional issue that is addressed through plans and regulations administered by the South Coast Air Quality Management District and/or California Air Resources Board. Since the City does not regulate these resources, the HMPC did not identify this as a hazard of concern that could be addressed in this plan.
Aircraft Incident	SHMP	No	Hollywood Burbank Airport is located within 15 miles of the City. This facility is operated under a Joint Powers Agreement that the City is party to, however the JPA conducts all planning activities for the facility. Given the lack of control over this asset and few past incidents associated with aircraft incidents have occurred, the HMPC determined that this hazard should not be included in the plan.
Aquatic Invasive Species	SHMP	No	There are no major riparian environments in Pasadena where aquatic invasive species could endanger the community.

Hazard	Recommended for Consideration	Included in LHMP?	Reason for Inclusion or Exclusion
Avalanche	FEMA guidance SHMP	No	Pasadena is not located within potential avalanche zones.

Hazard	Recommended for Consideration	Included in LHMP?	Reason for Inclusion or Exclusion
Civil Disturbance or Riot	SHMP	No	The HMPC determined that the City includes a number of areas where large populations visit/congregate, however these locations have not experienced significant issues associated with civil disturbance. There was a large-scale protest in 2020 associated with the George Floyd killing. While considerable resources were expended providing security resources, no injuries or property damage occurred. In January 2025, Pro-Palestinian protesters disrupted the 135th annual Rose Parade for about 20 minutes. A dozen or so protesters sat down on the street at the intersection of Lake Ave. and Colorado Boulevard at the start of the parade. Police let the protesters stay for 20 minutes before stepping in to escort them off the street, prompting cheers to erupt from the crowd. Occasional protests have also occurred at PCC but have largely been nonviolent. For this reason, the HMPC did not identify this as a hazard of concern.

Hazard	Recommended for Consideration	Included in LHMP?	Reason for Inclusion or Exclusion
Climate Change	SHMP LAC HMP	Yes	Climate change is discussed as a function of each relevant hazard and is mentioned throughout the Plan.
Coastal Flooding and Storm	FEMA guidance SHMP	No	Pasadena is not located along the coast of California. Coastal flooding and storms are not anticipated to impact the community.
Cyber Threats	SHMP	Yes	With the increase in cyber threats occurring throughout California and the nation, the HMPC is concerned about the potential effects on vital records, communications and industrial control systems.
Dam Failure	FEMA guidance SHMP LAC HMP	Yes	Pasadena is located downstream of Devils Gate Dam, classified by the California Department of Water Resources as an extremely high danger dam, operated by Los Angeles County Public Works. Due to City's location downstream of these facilities, the HMPC identified dam failure as a hazard of concern.

Hazard	Recommended for Consideration	Included in LHMP?	Reason for Inclusion or Exclusion
Drought	SHMP LAC HMP	Yes	While the HMPC is confident in the current hydrologic infrastructure to supply water for the City, drought can potentially impact the operations Pasadena Water and Power. Long term drought can reduce available water from the Raymond Basin aquifer and may result in reduced resources available from the State Water Project through the Metropolitan Water District. The HMPC does not consider drought to be a local issue alone, but rather a regional one. It is addressed in both the State and Los Angeles County HMP's.
Loss of Power	SHMP	Yes	While energy shortage has the potential to occur in Pasadena, the risk associated with this is similar to surrounding communities. For loss of power, the bigger concern for the City is the effects this could have on critical infrastructure services.

Hazard	Recommended for Consideration	Included in LHMP?	Reason for Inclusion or Exclusion
Epidemic, Pandemic, Vector-Borne Disease	SHMP	Yes	Pasadena is in Los Angeles County, which has experienced several health-related incidents in the past. Pasadena is one of three (3) cities in California that operates its own public health department. The HMPC felt it was best to address issues with infectious diseases and other public health issues through the Department of Public Health preparedness planning mechanisms such as the Public Health Emergency Operations Plan.
Erosion	FEMA guidance SHMP	No	While a part of the City is in the hilly Arroyo Seco, it is mostly protected parkland and open space. the HMPC did not identify erosion as a hazard of concern for the City.
Expansive Soil	FEMA guidance	No	Expansive soils were not identified by the HMPC as a hazard of concern. While they could exist, the City requires compliance with the California Building Code, which is intended to mitigate hazards associated with this condition.

Hazard	Recommended for Consideration	Included in LHMP?	Reason for Inclusion or Exclusion
Extreme Cold	FEMA guidance SHMP	No	Temperatures in the City do not reach a level that would be considered a danger to public safety. Due to this the HMPC did not identify this as a hazard of concern.
Extreme Heat	FEMA guidance SHMP	Yes	Extreme heat has occurred in Pasadena and is expected to be a recurring event. Extreme heat was identified by the HMPC as a hazard of concern and included in the Extreme Weather profile.
Fault Rupture	FEMA guidance SHMP LAC HMP	Yes	The Raymond Fault is a known Alquist-Priolo fault zone is located within Pasadena. As a result, the HMPC identified this as a hazard of concern to the City. Fault rupture is included in the discussion of Seismic Hazards.
Flooding	FEMA guidance SHMP	Yes	Several watercourses transect the City and are identified within FEMA flood hazard zones. While significant flooding events have not affected properties within the City recently, the presence of these flood zones indicates the potential for future hazards. The HMPC identified flooding as a hazard of concern included in the Flooding profile.

Hazard	Recommended for Consideration	Included in LHMP?	Reason for Inclusion or Exclusion
Fracking	SHMP	No	Fracking does not occur in the City.
Hail	FEMA guidance	No	Hail that is severe enough to pose a threat to people and property is too rare in Pasadena to be included.
Hazardous Materials Release	SHMP	Yes	The presence of uses for storing, manufacturing, disposing, and transporting hazardous materials was identified as a concern for the HMPC. In addition, several major roadways, freeways, and rail lines transecting the City allow for the transport of these materials that could endanger the community if a release into the environment were to occur
Hurricane	FEMA guidance SHMP	No	Hurricanes do not occur in Pasadena. Although Tropical Stom Hillary impacted the City in August 2023, no fatalities from Hilary were reported in the state. Damage to residences and critical infrastructure as very minimal.
Infrastructure Failure	SHMP	No	Infrastructure failure can pose a threat to people and property in Pasadena. A discussion of infrastructure failure is discussed as a function of other hazards.

Hazard	Recommended for Consideration	Included in LHMP?	Reason for Inclusion or Exclusion
Landslide	FEMA guidance SHMP	Yes	Landslides associated with earthquakes can occur in the hilly sections of the City. This hazard is included in the discussion of the Seismic Hazards section.
Levee Failure	SHMP	No	While levees are located within the City in Arroyo Seca, they were not deemed a significant concern for failure. These levees are owned and managed by Los Angeles County and the City does not have the authority to address these facilities but coordinates with the County on issues and upgrades. Based on this, the HMPC did not include levee failure as a hazard of concern.
Lightning	FEMA guidance	No	Although lightning does occasionally occur in Pasadena, it does not pose a significant threat to people or property.
Liquefaction	FEMA guidance SHMP LAC HMP	Yes	According to mapping prepared by the California Geological Survey, area in Arroyo Seca and the western section of the City are prone to liquefaction prone areas. This hazard is included in the discussion of the Seismic Hazards section.

Hazard	Recommended for Consideration	Included in LHMP?	Reason for Inclusion or Exclusion
Methane Containing Soils	SBC HMP	No	The City does not have methane- containing soils that pose a threat to the public health and safety of residents and businesses. The HMPC did not identify this as a hazard of concern to the City.
Natural Gas Pipeline Hazards	SHMP	Yes	Natural gas pipelines traverse Pasadena, posing a danger to people and property if they were to breach and release their contents. This condition is discussed in the Community Profile in Chapter 2 and is discussed in the vulnerability assessment where applicable.
Oil Spills	SHMP	No	There is no history of oil drilling and extraction within the City. Based on this, the HMPC did not identify this as a hazard of concern to the City.
Power Failure	SHMP	No	While power loss events can occur in the City, the HMPC determined that this hazard shouldn't be addressed within the LHMP and is better suited as a hazard addressed in the City's EOP.

Hazard	Recommended for Consideration	Included in LHMP?	Reason for Inclusion or Exclusion
Radiological Accidents	SHMP	No	There are no known major sources of radiation in Pasadena or the immediate surrounding area that could pose a serious threat to the community.
Sea-level Rise	FEMA guidance SHMP	No	The City is not located along the coast or near any large bodies of seawater. The HMPC did not identify this as a hazard of concern for the City
Seiche	FEMA guidance SHMP	No	There are no major bodies of water in Pasadena that could be subjected to seiche.
Seismic Shaking	FEMA guidance SHMP	Yes	Pasadena 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	Severe Weather includes discussions regarding extreme heat, severe wind, and rain, which are weather-related hazards that are most common in Pasadena.

Hazard	Recommended for Consideration	Included in LHMP?	Reason for Inclusion or Exclusion
Severe Weather and Storms	FEMA guidance SHMP	Yes	Severe Weather includes discussions regarding extreme heat, severe wind, and rain, which are weather-related hazards that are most common in Pasadena.
Storm Surge	FEMA guidance	No	Pasadena is not a coastal community. The HMPC did not identify this as a hazard of concern to the City.
Subsidence	FEMA guidance	Yes	The HMPC believed that subsidence could occur with significant groundwater pumping. Subsidence is not discussed as a stand-alone hazard but rather is a function of the Seismic Hazards profile.
Terrorism	SHMP	Yes	The HMPC was concerned about terrorism incidents posing a threat to public safety given the number of significant locations that could be considered targets within the City. A discussion of this is in the Human-Caused Hazards profile.
Thunderstorm	SHMP	No	Thunderstorms that cause damage and endanger public safety are rare in the Southern California region. The HMPC did not identify this as a hazard of concern.

Hazard	Recommended for Consideration	Included in LHMP?	Reason for Inclusion or Exclusion
Tornadoes	FEMA guidance SHMP	No	No tornadoes are known to have occurred in Pasadena. The HMPC did not identify this as a hazard of concern.
Transportation Accidents	SHMP	Yes	Around the City, transportation accidents could endanger public safety. A discussion of this is in the Human-Caused Hazards profile.
Tree Mortality	SHMP	No	The HMPC noted that the City's has a significant number of trees, however the City currently manages these resources effectively and did not feel it was necessary to profile as a hazard of concern.
Tsunami	FEMA guidance SHMP	No	Pasadena is not a coastal community. The HMPC did not identify this as a hazard of concern to the City
Urban Fire	SHMP LAC HMP	Yes	The HMPC identified urban fires as a risk to property and life in Pasadena.
Volcano	SHMP	No	There are no volcanoes near Pasadena to reasonably pose a threat. The HMPC did not identify this as a hazard of concern to the City

Hazard	Recommended for Consideration	Included in LHMP?	Reason for Inclusion or Exclusion
Wildland Fire	FEMA guidance SHMP LAC HMP	Yes	Portions of the City are in the very high fire danger zone as determined by Cal Fire. These areas are in the northern canyons and western section.

After hazard evaluation and the organizational changes made by the HMPC, this Plan discusses ten (10) broad hazard types with their respective sub-categories. During a review of the 2018 hazards, the planning team decided to eliminate Agricultural Pests/Disease, Aircraft Crashes, and Natural Gas Pipeline/Storage Facility. The planning team decided to combine extreme heat, windstorm, and hailstorm into a single hazard named Extreme Weather. Additionally, the planning team combined oil spills, train accidents, and radiological accidents into a single hazard called Hazardous Materials Release. Finally, the planning team decided to combine power outage, cyber-attack, civil disturbance, and Air Quality into a single hazard called Human Caused Hazards. Below are the hazards that will be profiled in the 2025 plan.

Table 4-3: Hazards Profiled in 2025 Plan

Hazard Type	Sub-Categories
Dam Failure/Inundation	
Drought	
Earthquake/Geologic Hazards	• Seismic Shaking • Subsidence • Liquefaction • Fault Rupture • Landslide
Extreme Weather	• Severe Winds • Extreme Heat • Severe Rainstorm
Flooding	
Hazardous Materials Release	Profiled in Human Caused Hazards
Fire	• Wildland Fire • Urban Fire
Human-Caused Hazards	• Civil Disturbance • Cyber Attack • Hazardous Materials Release • Power Outage • Terrorism • Transportation Incidents • Natural Gas Incidents
Public Health Incidents	
Climate Change	Discussed in all Hazard Categories

4.4 Hazard Risk Rating

For the 2025 LHMP, the risk for each potential hazard was rated using the Calculated Priority Risk Index (CPRI). The CPRI examines four (4) criteria for each hazard (probability, magnitude/severity, warning time, and duration) (**Table 4-4**). For each hazard, an index value is assigned for each CPRI category from 0 to 4, with “0” being

the least hazardous and "4" being the most hazardous situation. This value is then assigned a weighting factor, and the result is a hazard ranking score (**Table 4-5**).

Table 4-4: Calculated Priority Risk Index Tables

CPRI Category: Probability (Assigned Weight 45%)

Level ID	Description	Index Value
Unlikely	Extremely rare with no documented history of occurrences or events. Annual probability of less than 0.001.	**1**
Possible	Rare occurrences with at least one (1) documented or anecdotal historic event. Annual probability of between 0.01 and 0.001.	**2**
Likely	Occasional occurrence with at least two (2) or more documented historical 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**

CPRI Category: Magnitude-Severity (Assigned Weight 30%)

Level ID	Description	Index Value
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**

Level ID	Description	Index Value
Limited	Slight property damages (greater than 5% and less than 25% of critical and non-critical facilities and infrastructure). 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**

CPRI Category: Warning Time (Assigned Weight 15%)

Level ID	Description	Index Value
> than 24 hours	Population receives greater than 24 hours of warning.	**1**
12 to 24 hours	Population receives between 12-24 hours of warning.	**2**
6 to 12 hours	Population receives between 6-12 hours of warning.	**3**
< than 6 hours	Population receives less than 6 hours of warning.	**4**

CPRI Category: Duration (Assigned Weight 10%)

Level ID	Description	Index Value
< than 6 hours	Disaster event will last less than 6 hours.	**1**
6 to 24 hours	Disaster event will last between 6-24 hours.	**2**
24 hrs. to 1 week	Disaster event will last between 24 hours and 1 week.	**3**
> than 1 week	Disaster event will last more than 1 week.	**4**

The results of the CPRI are contained in **Table 4-5** below:

Table 4-5: Calculated Priority Risk Index Summary

Hazard	Probability	Weighted 45%	Magnitude Severity	Weighted 30%	Warning Time	Weighted 15%	Duration	Weighted 10%	CPRI Ranking
Civil Disturbance	2	.90	1	.30	2	.30	2	.20	1.70
Climate Change	4	1.8	2	.60	1	.15	4	.40	2.95
Cyber Attack	3	1.35	2	.60	4	.60	3	.30	2.40
Dam Failure	1	.45	2	.60	3	.45	1	.10	1.60
Drought	3	1.35	2	.60	1	.15	4	.40	2.50
Earthquake	3	1.35	3	.90	4	.60	4	.40	3.25
Extreme Weather	3	1.35	2	1.2	1	.15	3	.30	3.00
Fire (Windland/Urban)	4	1.8	2	.60	4	.60	3	.30	3.30
Flooding	2	.9	1	.30	1	.15	1	.10	1.45
Hazardous Material Releases	2	.90	2	.60	2	.60	2	.20	2.30
Landslide	2	.9	2	.60	4	.60	1	.10	2.20
Natural Gas Pipeline Failure	1	.45	1	.30	4	.60	1	.20	1.55
Oil Spills	1	.45	2	.60	2	.60	2	.20	1.85
Power Outage	3	1.35	3	.9	3	.45	2	.20	2.00
Public Health	2	.9	4	1.2	2	.30	4	.40	2.80

Hazard	Probability	Weighted 45%	Magnitude Severity	Weighted 30%	Warning Time	Weighted 15%	Duration	Weighted 10%	CPRI Ranking
Hazard									
Terrorism	2	.90	2	.60	4	.60	1	.20	**2.30**
Transportation Incidents	3	1.35	1	.30	4	.60	1	.20	**2.45**

CPRI Hazard Risk Scoring

Risk Level	Severe	High	Moderate	Low
Rank Score	3.5 – 4.0	3.0 – 3.4	2 – 2.9	1 – 1.9

Power failure has the most immediate and disruptive impacts on the city due to potential interruption of public safety systems and water service to customers.

4.5 Hazard Profiles

The hazards that exist in the City are profiled below. Each hazard profile includes a description of the type, location, extent, previous occurrences, regulatory environment, and probability of future events within the description. Maps and graphs are used in this plan to display hazard identification data.

The 2025 LHMP lists 17 hazards that affect the planning area based on historical information, the presence of the hazard, and the likelihood of future occurrences of the hazard. Hazard profiles serve as the basis for the hazard assessment.

4.5.1 Climate Change

Hazard Description

The earth's climate is changing. The State has warmed about two degrees Fahrenheit (2°F) in the last century. Heat waves are becoming more common throughout the southwestern United States, and snow is melting earlier in spring. In the coming decades, changing climate is likely to decrease the Colorado River's water flow,

threaten livestock's health, increase the frequency and intensity of wildfires, and convert some rangelands to the desert.

The U.S. Environmental Protection Agency (EPA) describes climate change as “any significant change in the measures of climate lasting for an extended period of time. In other words, climate change includes major changes in temperature, precipitation, or wind patterns, among other effects, which occur over several decades or longer.”

Many people confuse climate change with global warming, the recent and ongoing rise in global average temperatures near Earth’s surface. However, global warming represents only one aspect of climate change. The Earth’s average temperature has risen by 1.4°F over the past century and is projected to rise another 2.0°F to 11.5°F over the next hundred years. Rising global temperatures have been accompanied by changes in weather and climate. Many places have seen changes in rainfall, resulting in more floods, droughts, or intense rain, as well as more frequent and severe heat waves. The planet's oceans and glaciers have also experienced changes, with every glacier and permanent icefield in the State of California receding or melting entirely. Oceans are warming and becoming more acidic, ice caps are melting, and sea levels are rising. The effects of these indicators include:

- **Greenhouse Gases:** Human activities have increased the emissions of greenhouse gases. As a result of the increase in emissions, average concentrations of heat-trapping gases in the atmosphere are also increasing.
- **Weather and Climate:** Average U.S. and global temperatures are increasing while weather and climate attributes, such as precipitation, drought and tropical cyclone activity, are changing.
- **Oceans:** Average oceanic temperatures are increasing. Sea levels are rising worldwide due to thermal expansion and increases from ice melt, and waters are becoming more acidic.
- **Snow and Ice:** Glaciers in the U.S. and worldwide are generally shrinking, while snowfall and snow cover in the U.S. have decreased overall. The extent of the Arctic Sea ice is declining.
- **Health and Society:** Warmer temperatures and later fall frosts allow ragweed plants to produce pollen later into the year, potentially prolonging allergy season. The length of ragweed pollen season has increased at 10 out of 11 locations studied in the central U.S. and Canada since 1995. The change becomes more pronounced from south to north.

- **Ecosystems:** Many areas are experiencing earlier spring events, such as peak stream runoff and flower blooms. Bird migration patterns are changing, and wildfire zone size has increased.

History

Climate change has occurred throughout the planet's history due to variations in the earth's inclination to the sun, volcanic activity, and other factors such as asteroid impacts and the amount of solar radiation reaching the earth's surface rises and falls. The planet's temperature correlates to the amount of solar radiation arriving at the surface and the climate with it.

In relatively recent history, the last glacial period, popularly known as the Ice Age, occurred from c. 110,000 to 12,000 years ago. This most recent glacial period is part of a larger pattern of glacial and interglacial periods known as the Quaternary glaciation (c. 2,588,000 years ago to present). From this point of view, scientists consider this "ice age" to be merely the latest glaciation event in a much larger ice age that dates back over two (2) million years and is still ongoing.

During this last glacial period, there were several changes between glacier advance and retreat. The Last Glacial Maximum, the maximum extent of glaciation within the last glacial period, was approximately 22,000 years ago. While the general pattern of global cooling and glacier advance was similar, local differences in the development of glacier advance and retreat make it difficult to compare the details from continent to continent. Generally, temperature variation and glaciation patterns have lagged in atmospheric carbon dioxide (CO_2) content. **Figure 4.1** depicts global variations during the past 400,000 years as a correlation between temperature and atmospheric CO_2 content in part per million.

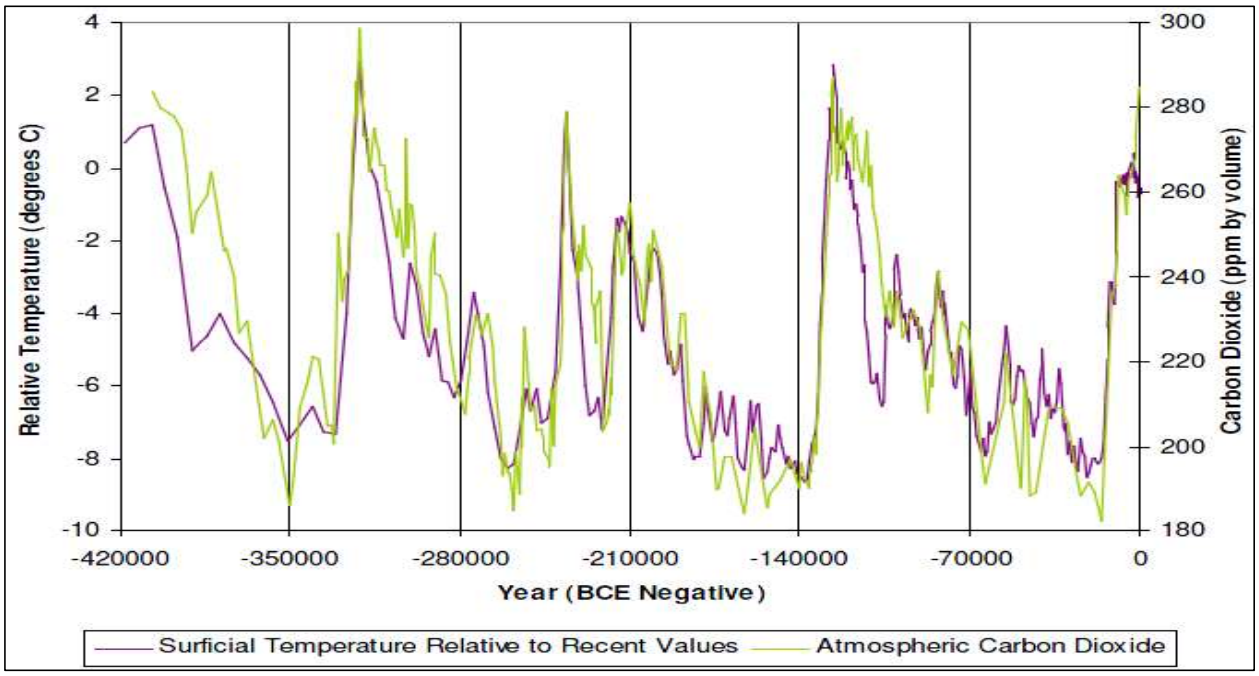


Figure 4.1: Temperature and Atmospheric CO2 Variation Past 400,000 Years

For 22,000 years ago, the planet has slowly warmed, and the glaciers retreated to high northern latitudes and mountains. In the last several decades of this period, human activity has likely led to a rapid increase in atmospheric CO2 and a matching rise in global temperature. The result has been that climate change may be accelerating. **Figure 4.2** provides a graphical depiction of the recent history of temperature rise.

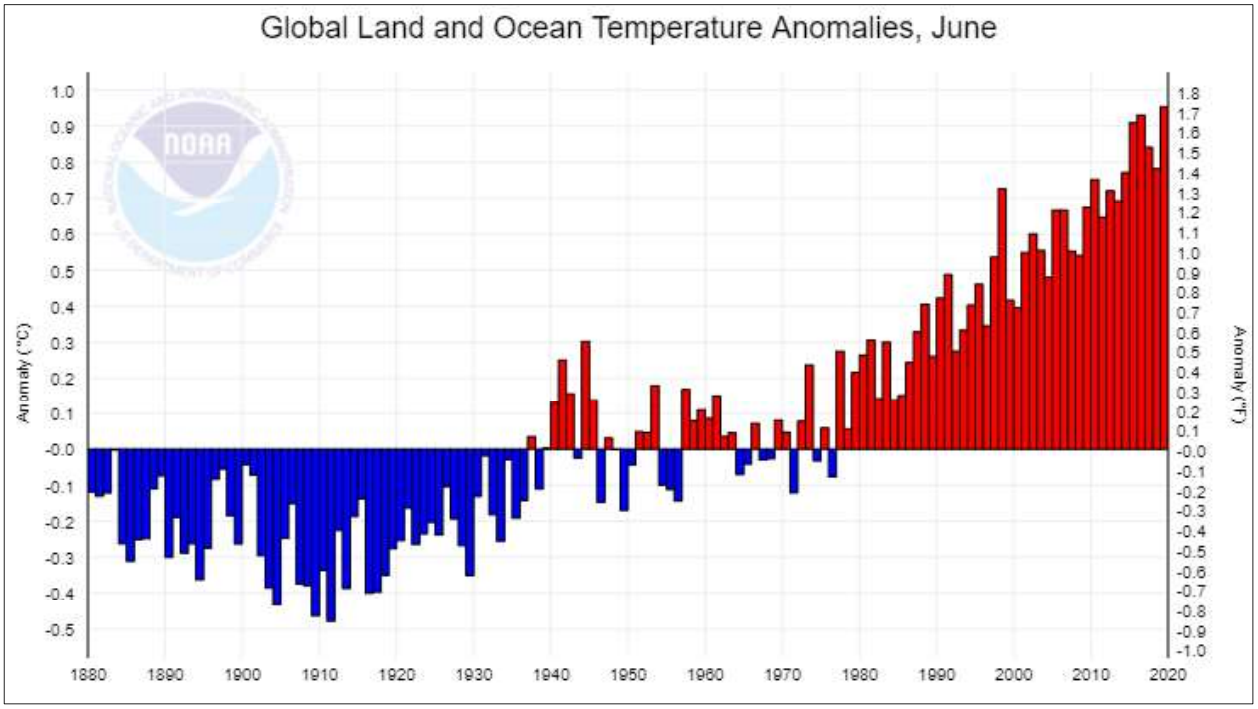


Figure 4.2: Temperature Rise Since 1880

Location

Warming and climate change are occurring globally with wide variations based on location and latitude. The polar regions have experienced particularly rapid changes in climate with increased ice melt and more sea-ice-free days. Climate change by its very definition is a global phenomenon, and so it is expected to affect the entire County.

Extent

Climate change is likely to affect the entire earth's population. More widespread drought and associated crop failure, movement of invasive species, more frequent wildfires, increased energy emergencies, and more intense climate events such as storms and extreme heat will occur throughout Southern California. The entire planning area is subject to climate change.

Specific likely impacts on California

Increasing droughts and higher temperatures will likely affect California's top agricultural products, including cattle, dairy, and vegetables. Hot temperatures threaten the health of cows and cause them to eat less, grow more slowly, and produce less milk. Livestock operations could also be impaired by fire, the lack of water, and changes in the landscape from grassland to woody shrubs, more typical of a desert. Reduced water availability would also create challenges for irrigated farms, which account for two-thirds of the water used in the state.

Wildfires, changing landscapes, higher temperatures, and drought are likely to increase the severity, frequency, and extent of wildfires which could harm property, livelihoods, and human health. On average, more than two percent (2%) of the land in California has burned per decade since 1984. Wildfire smoke can reduce air quality and increase medical visits for chest pains, respiratory problems, and heart problems. The combination of more fires and drier conditions may expand deserts and otherwise change parts of California's landscape. Many plants and animals living in arid lands are already near the limits of what they can tolerate. A warmer and drier climate would generally extend deserts to higher elevations and expand their geographic ranges.

In some cases, native vegetation may persist and delay or prevent the expansion of the desert. In other cases, fires or livestock grazing may accelerate the conversion of grassland to desert in response to a changing climate. For similar reasons, some forests may change to deserts or grassland.

Warmer and drier conditions make forests more susceptible to pests. Drought reduces the ability of trees to defend against attacks from pests such as bark beetles which have infested 100,000s of acres in California. Temperature controls the life cycle and winter mortality rates of many pests. With higher winter temperatures, some pests can persist year-round, and new pests and diseases may become established.

Hot days can be unhealthy, even dangerous. Certain people are especially vulnerable, including children, the elderly, the sick, and the poor. High air temperatures can cause heat stroke and dehydration and affect people's cardiovascular, respiratory, and nervous systems. Higher temperatures are amplified in urban settings where paved and other surfaces tend to store heat. Construction crews may have to increasingly operate on altered time schedules to avoid the heat of the day.

Rising temperatures can increase the formation of ground-level ozone, a key component of smog. Ozone has various health effects, aggravates lung diseases such as asthma, and increases the risk of premature death from heart or lung disease. The U.S. EPA and the California Air Resources Board have been working to reduce ozone concentrations. As the climate changes, continued progress toward clean air will be more difficult.

Probability of Future Events:

Climate change is an ongoing, long-term hazard. The effects of increased CO2 in the atmosphere will likely increase and persist for hundreds or thousands of years. There is a 100% chance that climate change will continue affecting the City.

Regulatory Context:

The State of California has stepped into a leadership role in planning for reducing greenhouse gas emissions and adapting to the potential impacts of climate change. Key laws, regulations, and policies helping to reduce Greenhouse Gas (GHG) emissions include:

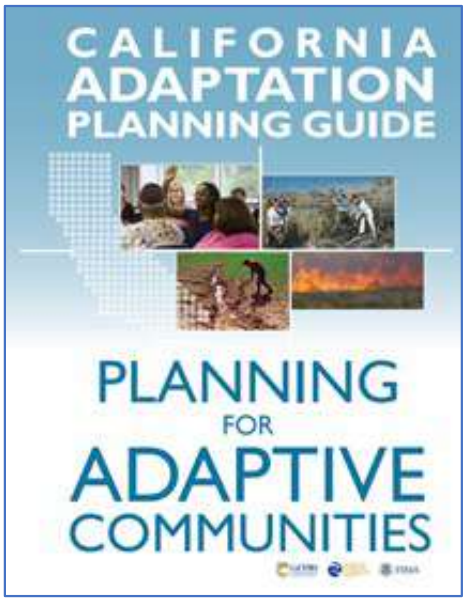
The California Global Warming Solutions Act of 2006 (Assembly Bill [AB] 32 and Senate Bill [SB] 32): AB 32 is the primary legislation that has driven GHG regulation and analysis in California between 2006 and 2016 by instructing the California Air Resource Board (CARB) to develop and enforce regulations for reporting and verifying statewide GHG emissions. The heart of the bill is the requirement that statewide GHG emissions be reduced to 1990 levels by 2020. Based on CARB's calculations of emissions levels, California must reduce GHG emissions by approximately fifteen percent (15%) below 2005 levels to achieve this goal. In September 2016, the Governor signed SB 32, which builds upon the statewide targets for 2020 by establishing a longer-term target so that "statewide greenhouse gas emissions are reduced to forty percent (40%) below the 1990 levels by 2030." The bill further authorized CARB to adopt regulations to achieve the maximum technologically feasible and cost-effective greenhouse gas emissions reductions.

California Executive Orders S-3-05 (2005) and B-30-15 (2015): These two (2) executive orders highlight longer-term GHG emissions reduction targets for the state, though such targets have not yet been adopted by the legislature and signed into law. Specifically, Executive Order (EO) S-3-05 seeks to achieve a reduction of GHG emissions of eighty percent (80%) below 1990 levels by 2050, consistent with the scientific consensus that developed regions will need to reduce emissions at least eighty percent (80%) below 1990 levels to limit global warming to two degrees Celsius (2.0°C). Executive Order B-30-15 seeks to establish an interim target between the 2020 target established through AB 32 and the long-term targets in EO S-3-05, to achieve a reduction of GHG emissions of forty percent (40%) below 1990 levels by 2030.

CEQA and Greenhouse Gas Emissions (Senate Bill 97): In 2007, the Natural Resources Agency was directed by the legislature to prepare amendments to the California Environmental Quality Act (CEQA) Guidelines, providing direction to lead agencies on how to analyze and mitigate greenhouse gas emissions.

Senate Bill 379 (2015) Planning and Zoning Law: This legislation requires that the next revision of a jurisdiction's local hazard mitigation plan on or after January 1, 2017, or, if the local jurisdiction has not adopted a local hazard mitigation plan, beginning on or before January 1, 2022, include a review and update of the safety element to address

climate adaptation and resiliency strategies applicable to that city or county. The bill would require the update to include a set of goals, policies, and objectives based on a vulnerability assessment, identifying the risks that climate change poses to the local jurisdiction and the geographic areas at risk from climate change impacts.



California has also prepared programs and guidance for local governments to consider in identifying hazards and adapting to a changing climate.

California Climate Adaptation Strategy: Executive Order S-13-08: In 2008, the Governor signed EO S-13-08, which directed the California Natural Resources Agency to lead a statewide effort to develop a climate adaptation strategy. Published in 2009, the statewide plan describes climate trends and the potential impacts of climate change on key sectors, and it outlines short- and long-term actions that state and local governments can take to address future climate impacts.

California Adaptation Planning Guide (APG): Published in 2012, this statewide resource serves as a guide to local governments to identify, evaluate, and plan for the range of unavoidable consequences their community may face in the future due to climate change. The APG includes a step-by-step process for conducting a vulnerability assessment and identifying potential adaptation strategies.

4.4.1.1 City Response to Climate Change

General Approaches—Mitigation and Adaptation

Communities and governments worldwide are working to address, evaluate and prepare for climate changes that are likely to impact communities in coming decades. Generally,

climate change discussions encompass two (2) separate but inter-related considerations: mitigation and adaptation. The term “mitigation” can be confusing because its meaning changes across disciplines:

- Mitigation in emergency management—as generally addressed in this hazard mitigation plan— is typically defined as the effort to reduce loss of life and property by lessening the impact of disasters.
- Mitigation in climate change discussions is defined as a human intervention to reduce impacts on the climate system. It includes strategies to reduce greenhouse gas sources and emissions and enhance greenhouse gas sinks.

In this chapter, mitigation is used as defined by the climate change community. In the other chapters of this plan, mitigation is primarily used in an emergency management context.

Adaptation refers to adjustments in natural or human systems in response to actual or anticipated effects of climate change. These adjustments may moderate harm or exploit beneficial opportunities. Mitigation and adaptation are related, as the world’s ability to reduce greenhouse gas emissions will affect the degree of adaptation that will be necessary. Some initiatives and actions can both reduce greenhouse gas emissions and support adaptation to likely future conditions.

Societies across the world need to adapt to climate change. Farmers are altering crops and agricultural methods to deal with changing rainfall and rising temperature; architects and engineers are redesigning buildings; planners are looking at managing water supplies to deal with droughts or flooding.

Adaptive capacity goes beyond human systems. Some ecosystems can adapt to change and buffer surrounding areas from the impacts of change. Forests can bind soils and hold large volumes of water, releasing it through the year; floodplains can absorb water during peak flows; coastal ecosystems can attenuate waves and reduce erosion. Other ecosystem services—such as food provision, timber, materials, medicines, and recreation—can provide buffers in the face of changing conditions.

Ecosystem-based adaptation is the use of biodiversity and ecosystem services as part of an overall strategy to help people adapt to the adverse effects of climate change. This includes sustainable management, conservation and restoration of specific ecosystems that provide key services.

City Climate Action Plan

The City has released its first proposed Climate Action Plan (CAP). The CAP will help reduce greenhouse gas emissions and make the City more sustainable and resilient to climate change impacts. The Pasadena CAP is the latest initiative in the City's

ongoing commitment to confronting the issue of climate change. The purpose of the CAP is to analyze GHG emissions at a programmatic-level, outline a strategy to reduce and mitigate municipal and community-wide GHG emissions, demonstrate Pasadena's commitment to achieving the state-wide emissions reduction targets, and serve as a qualified GHG reduction plan consistent with Purpose of the Pasadena Climate Action Plan the California Environmental Quality Act (CEQA) Guidelines Section 15183.5. The timeframe for the CAP extends from the date of adoption through the year 2035, consistent with the horizon year of Pasadena's 2015 General Plan Land Use Element.

The 27 listed adaptation actions in the CAP are organized into five (5) strategies:

1. Sustainable Mobility and Land Use
2. Energy Efficiency and Conservation
3. Water Conservation
4. Solid Waste Reduction
5. Urban Greening

These actions establish an initial roadmap to withstand the impacts. Over time, as understanding of climate change science evolves and local impacts are observed, the City will evaluate the need for adjusting existing actions and adding new ones. This will take place through regular CAP monitoring and reporting and future CAP updates.

4.5.2 Dam Failure

Hazard Description

Dams and reservoirs of jurisdictional size are defined in the California Water Code Sections 6000 through 6008. There are currently more than 1,400 dams of jurisdictional size in California. Approximately 1,250 of these dams are under the jurisdiction of California's Department of Water Resources, Division of Safety of Dams. Dams and reservoirs owned by the federal government are not subject to state jurisdiction except as otherwise provided by federal law. In California, there are currently 149 dams owned by federal government agencies such as the U.S. Forest Service, Bureau of Reclamation, Army Corps of Engineers, and the U.S. Military.

Los Angeles County leads the state as being the county with the most jurisdictional-size dams, with 100 dams. The term "dam failure" encompasses a wide variety of circumstances. Situations that would constitute a dam failure vary widely, from developing problems to a partial or catastrophic collapse of the entire dam. Potential causes of dam failure are numerous and can be attributed to deficiencies in the original design of the dam, the quality of construction, the maintenance of the dam and operation of the appurtenances while the dam is in operation, and acts of nature, including precipitation in excess of the design, flood, and damage from earthquakes.

Water overtopping the dam crest is a common cause of failure in earth dams. Overtopping will cause erosion of the dam crest and an eventual dam breach. Piping of each dam is another common form of failure. Piping is a form of erosion that occurs underground caused by rodent burrowing and extensive root systems from vegetation growing on and around the dam.

This type of disaster is especially dangerous because it can occur suddenly, providing little warning or evacuation time for the downstream communities. The flows resulting from dam failure generally are much larger than the capacity of the downstream channels and therefore lead to extensive flooding. Flood damage occurs due to the momentum of the flood caused by the sediment-laden water flooding over the channel banks and impact debris carried by the flow.

History

Pasadena has not been included in any federal disaster declarations or state emergency proclamations related to dam failure. Dams within Los Angeles County have failed or had the potential to fail within the past 100 years. Major incidents include:

- March 12, 1928 – The St. Francis Dam catastrophically failed, and the resulting flood caused as many as 400 fatalities. The collapse is considered one of the

worst American civil engineering disasters of the 20th century and remains the second-greatest loss of life due to a disaster in California's history.

- December 14, 1963 – The Baldwin Hills Dam inundated the neighborhood of South Los Angeles when the dam suffered a catastrophic failure and flooded the residential neighborhoods surrounding it. It began with signs of lining failure, followed by increasingly serious leakage through the dam at its east abutment. After three (3) hours, the dam breached, with a total release of 250 million U.S. gallons resulting in five (5) deaths and the destruction of 277 homes. Vigorous rescue efforts averted a greater loss of life.
- February 9, 1971 – The San Fernando region was struck by one of the most devastating earthquakes in California history. With a Richter magnitude of 6.6, it claimed 65 lives and caused damage estimated at half a billion dollars. It was California's third-worst earthquake in terms of lives lost, only exceeded by San Francisco, 1906, and Long Beach, 1933. The San Fernando quake could have been a catastrophe instead of just a costly disaster. That conclusion arises from its most striking episode: the near collapse of the lower dam at the Van Norman reservoir. The 1,100-foot dam held 3.6 billion gallons of water, but it was only half full; the water level was 36 feet below the lip. The top thirty feet of the structure crumbled, leaving the water only six feet (6 ft.) from the top and fresh chunks of earth falling off with each aftershock. A University of California Los Angeles (UCLA) study estimated that the collapse of the dam could have killed between 71,600 and 123,400 people.

Location

There are two (2) major flood infrastructure structures located in or upstream from the Pasadena area to manage the Riverine Flooding potential: Devil's Gate Dam and Reservoir and the Eaton Wash (Creek) Dam and Reservoir. These structures are owned by the Los Angeles County Department of Public Works and are located along the Arroyo Seco and Eaton Wash (Creek) tributary stream systems, respectively.

- The Devil's Gate Dam flood inundation path shows that the floodway of the Arroyo Seco would contain most of the water. Since this area is largely undeveloped and used primarily for recreation purposes, the risk posed by this hazard could be considered low.
- The Eaton Wash Dam inundation path shows that, on its southern reaches, some developed areas would be impacted. The risk posed by this hazard could be considered low.

Devils Gate Dam

Devils Gate Dam was built in 1920, the oldest dam constructed by the Los Angeles County Flood Control City, to provide flood protection to the cities of Pasadena, South Pasadena, and Los Angeles. Parts of North and South Arroyo are in the inundation zone of the Devils Gate Dam. **Figure 4-3** provides an overview of the dam. **Figure 4-4** provides the location of the Devils Gate Dam.

Figure 4-3: Devils Gate Dam

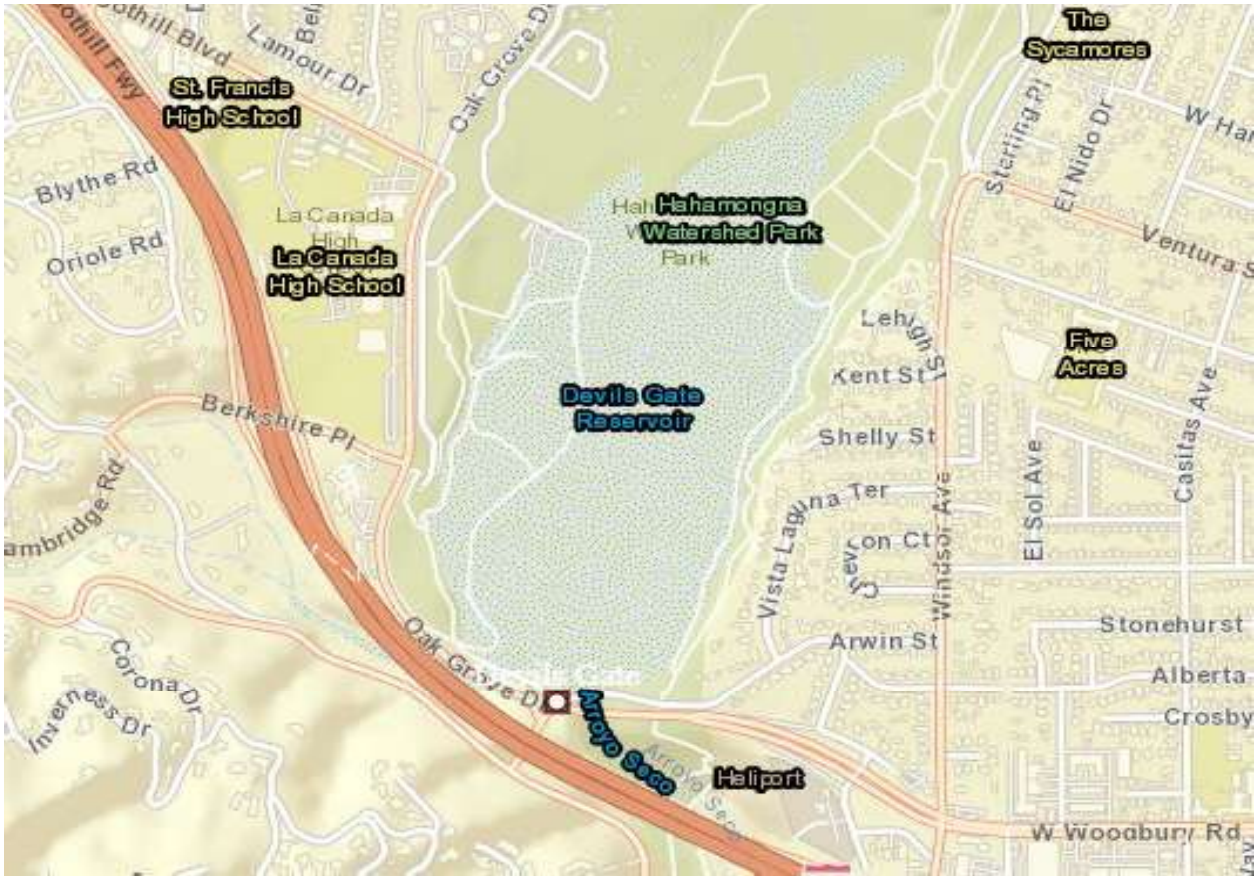


Figure 4-4: Location of Devils Gate Dam

Eaton Wash Dam

Eaton Wash Reservoir and the Eaton Wash Dam were built in 1937 (87 years ago) and are controlled by the Los Angeles County Department of Public Works. The dam is a rock fill, 63 feet (19 m) in height, and is 1,545 ft (471 m) in length. Normal storage for the reservoir is 721 acre-feet (889,000 m3). It has a surface area of 54 acres (22 ha) and drains an area of 9.47 square miles (24.5 km2). Its primary usage is for flood control and debris storage. A photograph of the dam is shown in **Figure 4-5**. Its location is shown in **Figure 4-6.**

Figure 4.5: Eaton Wash Dam

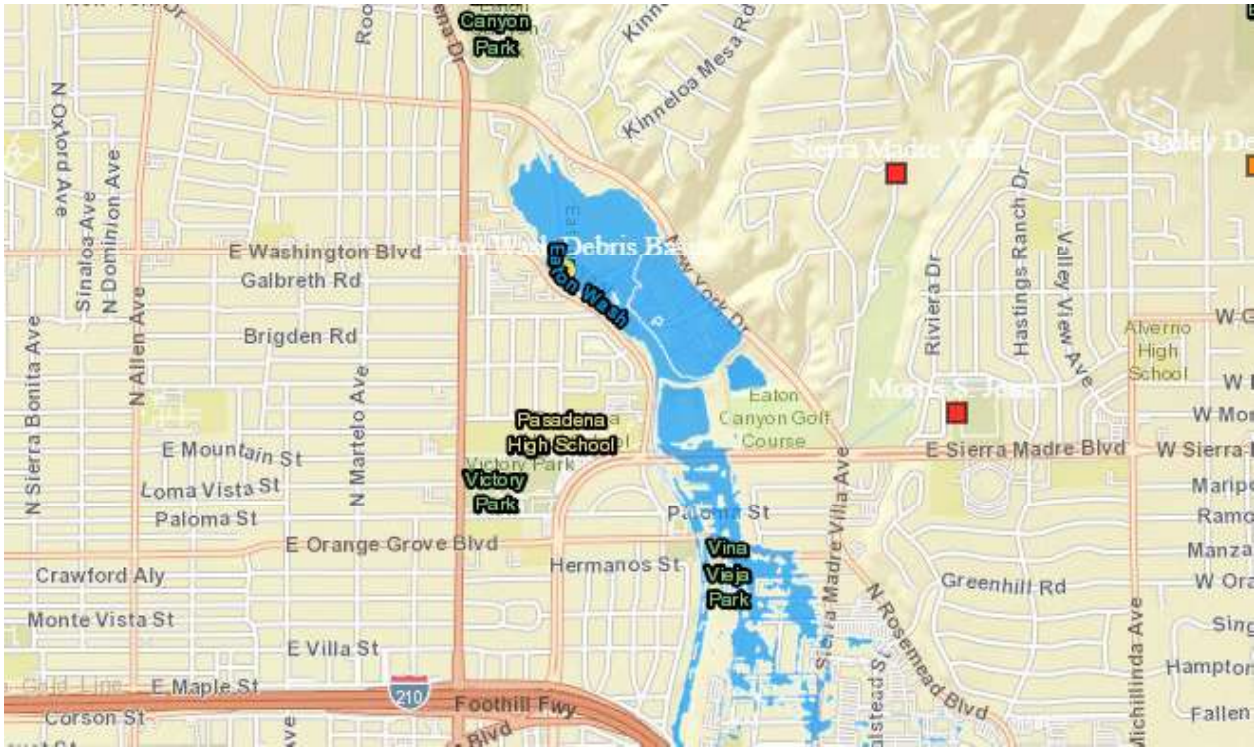


Figure 4-6: Location of Eaton Wash Dam

City Owned Reservoirs

Pasadena Water and Power has 12 active wells that feed natural groundwater into 18 reservoirs throughout the community that also receive some purchased water from the Metropolitan Water District. Jones Reservoir holds about 50 million gallons -- the largest capacity of all Pasadena's reservoirs (Lida Reservoir is the smallest). The blended water (natural groundwater and MWD water) is disinfected and then distributed to customers through a pipeline network of 478 miles of mains throughout the City.

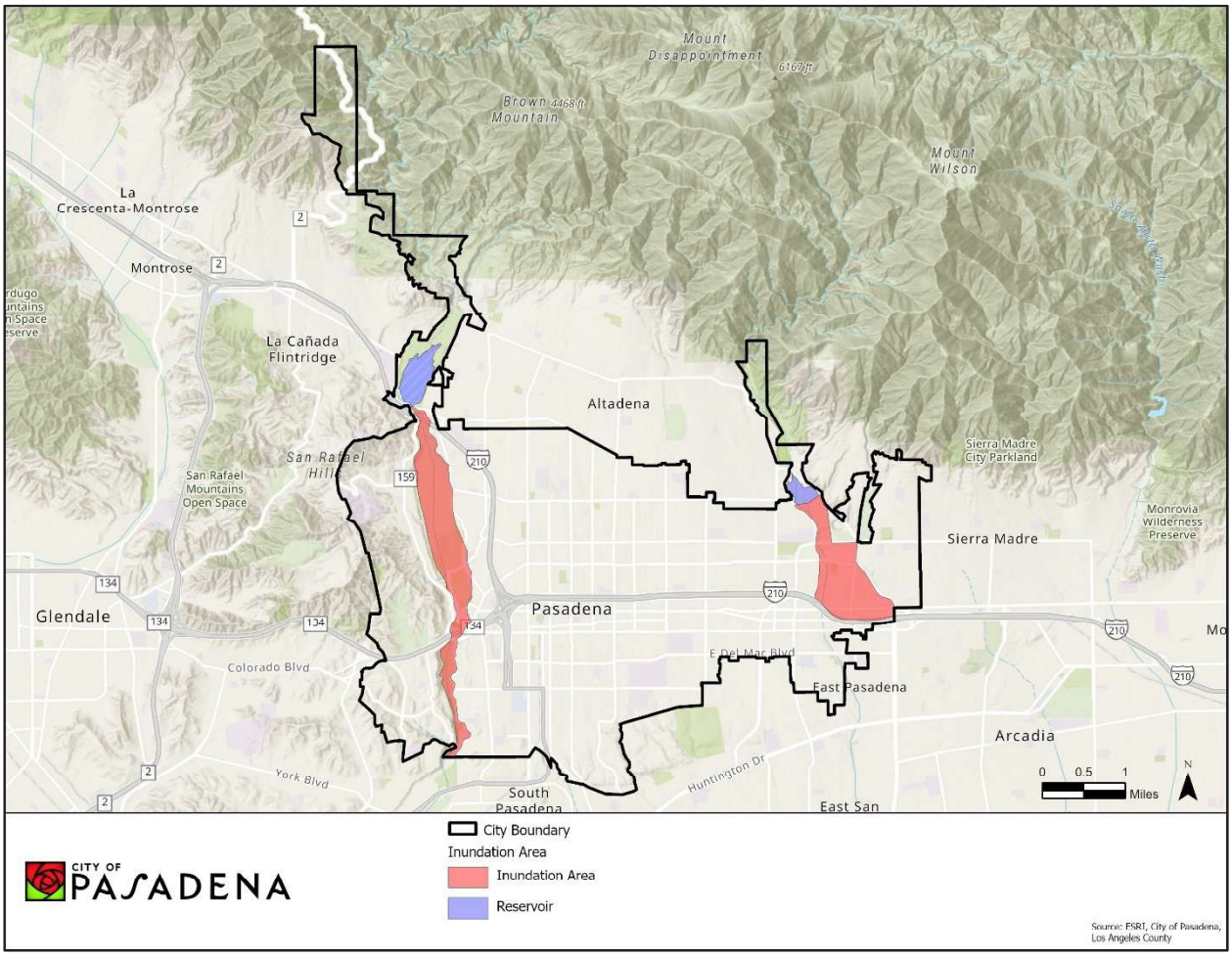


Figure 4-7: Dam Inundation Areas

Extent

DSOD uses a scale for defining the intensity or potential severity of dam failure solely based on potential downstream impacts to life and property. Additionally, the hazard is not related to the condition of the dam or its pertinent structures. This scale has four (4) categories which include the Federal categories and adds a fourth category of "extremely high". Devils Gate Dam is listed as "High" and Eaton Wash is listed as "Extremely High". **Table 4-6** outlines the downstream hazard potential classifications used by DSOD.

Table 4-6: California Department of Water Resources Division of Safety of Dams – Downstream Hazard Classifications

Downstream Hazard Potential Classifications	Potential Downstream Impacts on Life and Property
Low	No probable loss of human life and low economic and environmental losses. Losses are expected to be principally limited to the owner's property.
Significant	No probable loss of human life, but it can cause economic loss, environmental damage, impacts to critical facilities, or other significant impacts.
High	Expected to cause the loss of at least one human life.
Extremely High	Expected to cause considerable loss of human life or would result in an inundation area with a population of 1,000 or more.

Probability of Future Event

Dam failure can result from numerous natural or human activities. Earthquakes, internal erosion, improper siting, structural and design flaws, or rising floodwaters can all result in the collapse or failure of a dam. A dam failure may also be a result of the age of the structure or inadequate spillway capacity. The probability of a future dam failure affecting the City is unknown. While possible, it is unlikely that a dam failure event will occur within the next 10 years. There is less than or equal to 10% likelihood of a dam incident occurring each year.

Regulatory Context

In California, the regulation of dams is primarily overseen by the Division of Safety of Dams (DSOD) under the Department of Water Resources. This division is responsible for the review, approval, and supervision of dam construction, maintenance, and safety protocols to prevent failure and mitigate risks associated with dam operations.

Impact of Climate Change

Severe weather such as more powerful rainstorms are likely to occur as a result of climate change. Atmospheric rivers which can create flooding throughout California may occur more frequently due to warmer weather and more moisture in storm systems. Climate change has the potential to cause more frequent and more heavy precipitation incidents. The results could be additional flows into with the potential for overtopping or other dam failure mechanisms for Devil's Gate Dam and Reservoir and the Eaton Wash (Creek) Dam and Reservoir.

4.5.3 Drought

Hazard Description

Drought is a normal part of virtually every climate on the planet, including areas of high and low rainfall. It is different from normal aridity, which is a permanent characteristic of the climate in areas of low rainfall. Drought is the result of a natural decline in the expected precipitation over an extended period, typically one or more seasons in length. The severity of drought can be aggravated by other climatic factors, such as prolonged high winds and low relative humidity.

Drought is a complex natural hazard which is reflected in the following four (4) definitions commonly used to describe it:

- Meteorological drought is defined solely on the degree of dryness, expressed as a departure of actual precipitation from an expected average or normal amount based on monthly, seasonal, or annual time scales
- Hydrological drought is related to the effects of precipitation shortfalls on stream-flows and reservoir, lake, and groundwater levels
- Agricultural drought is defined principally in terms of naturally occurring soil moisture deficiencies relative to water demands of plant life, usually arid crops
- Socioeconomic drought associates the supply and demand of economic goods or services with elements of meteorological, hydrologic, and agricultural drought. Socioeconomic drought occurs when the demand for water exceeds the supply as a result of a weather- related supply shortfall. It may also be called a water management drought.

A drought's severity depends on numerous factors, including duration, intensity, geographic extent, and regional water supply demands by humans and vegetation. Due to its multi- dimensional nature, drought is difficult to define in exact terms and also poses challenges in terms of comprehensive risk assessments.

Drought differs from other natural hazards in three (3) ways. First, the onset and end of a drought are difficult to determine due to the slow accumulation and lingering effects of an event after its apparent end. Second, the lack of an exact and universally accepted definition adds to the confusion of its existence and severity. Third, in contrast with other natural hazards, the impact of drought is less obvious and may be spread over a larger geographic area. These characteristics have hindered the preparation of drought contingency or mitigation plans by many governments.

Droughts may cause a shortage of water for human and industrial consumption, hydroelectric power, recreation, and navigation. Water quality may also decline, and the number and severity of wildfires may increase. Severe droughts may result in the loss of agricultural crops and forest products, undernourished wildlife and livestock, lower land values, and higher unemployment.

History

Since record-keeping began, California and the western region of the U.S. have experienced several multi-year drought conditions. The City experienced severe drought from April 2007 through December 2009 and severe to exceptional drought from February 2013 through January 2017. A severe to exceptional drought began in 2020 and ended during the winter of 2022-2023. *Source: U.S. Drought Monitor.*

The following maps show the extent of drought conditions in California from February 2025, 2020 and 2015. They also include a chart showing the history of drought conditions in California from 2001 through early 2025.

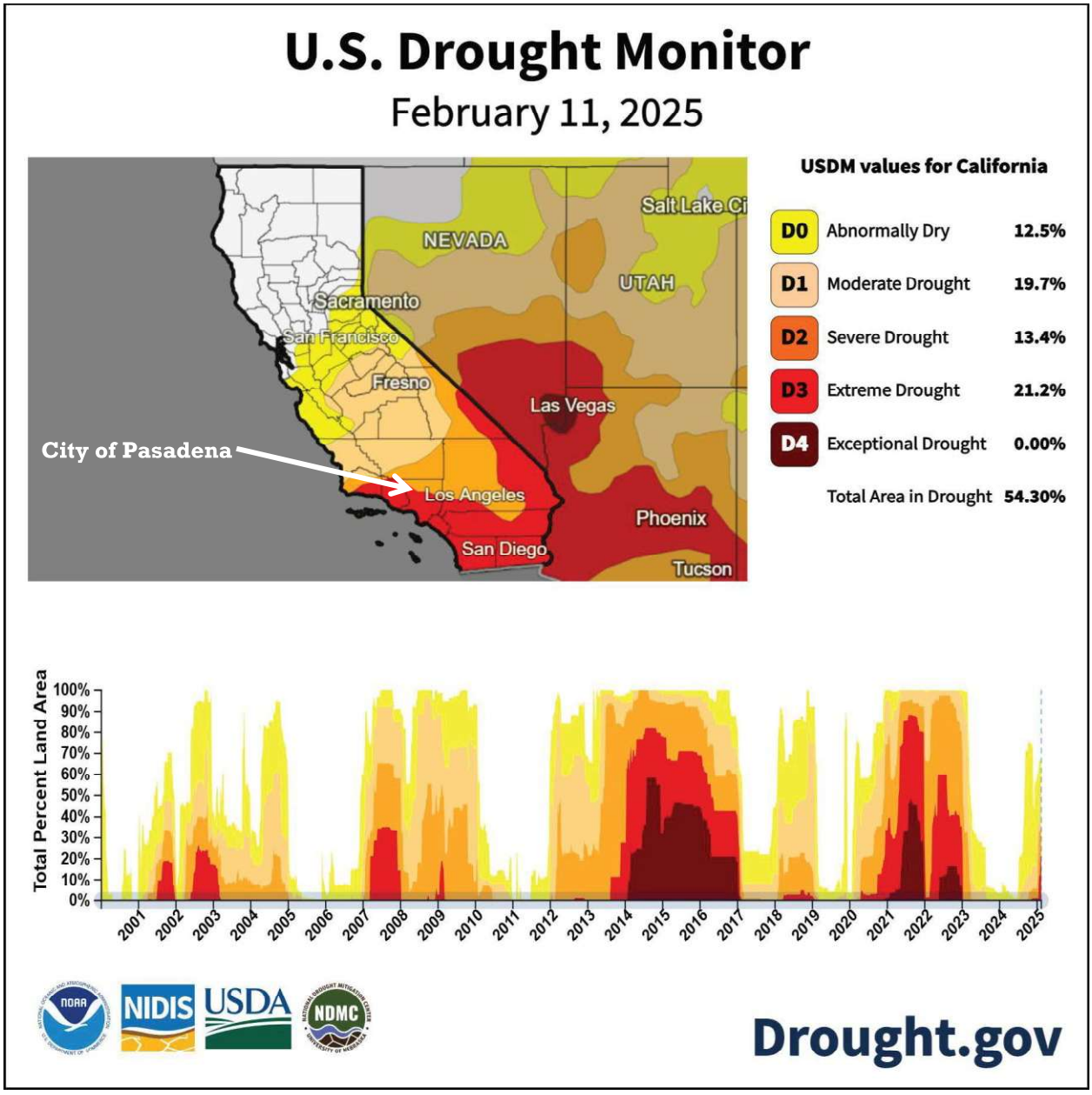


Figure 4.8: California Drought Monitor February 2025

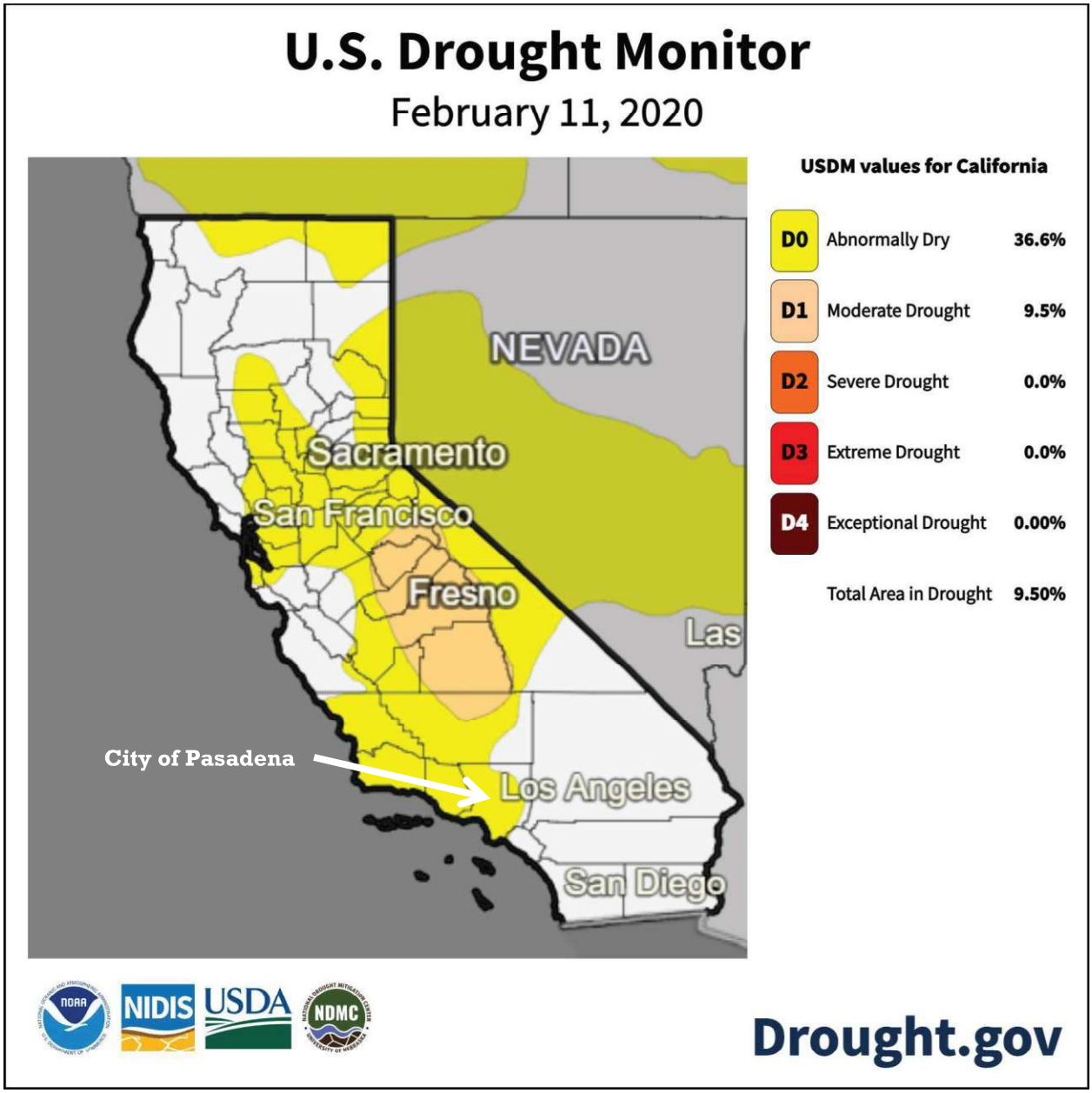


Figure 4.9: California Drought Monitor February 2020

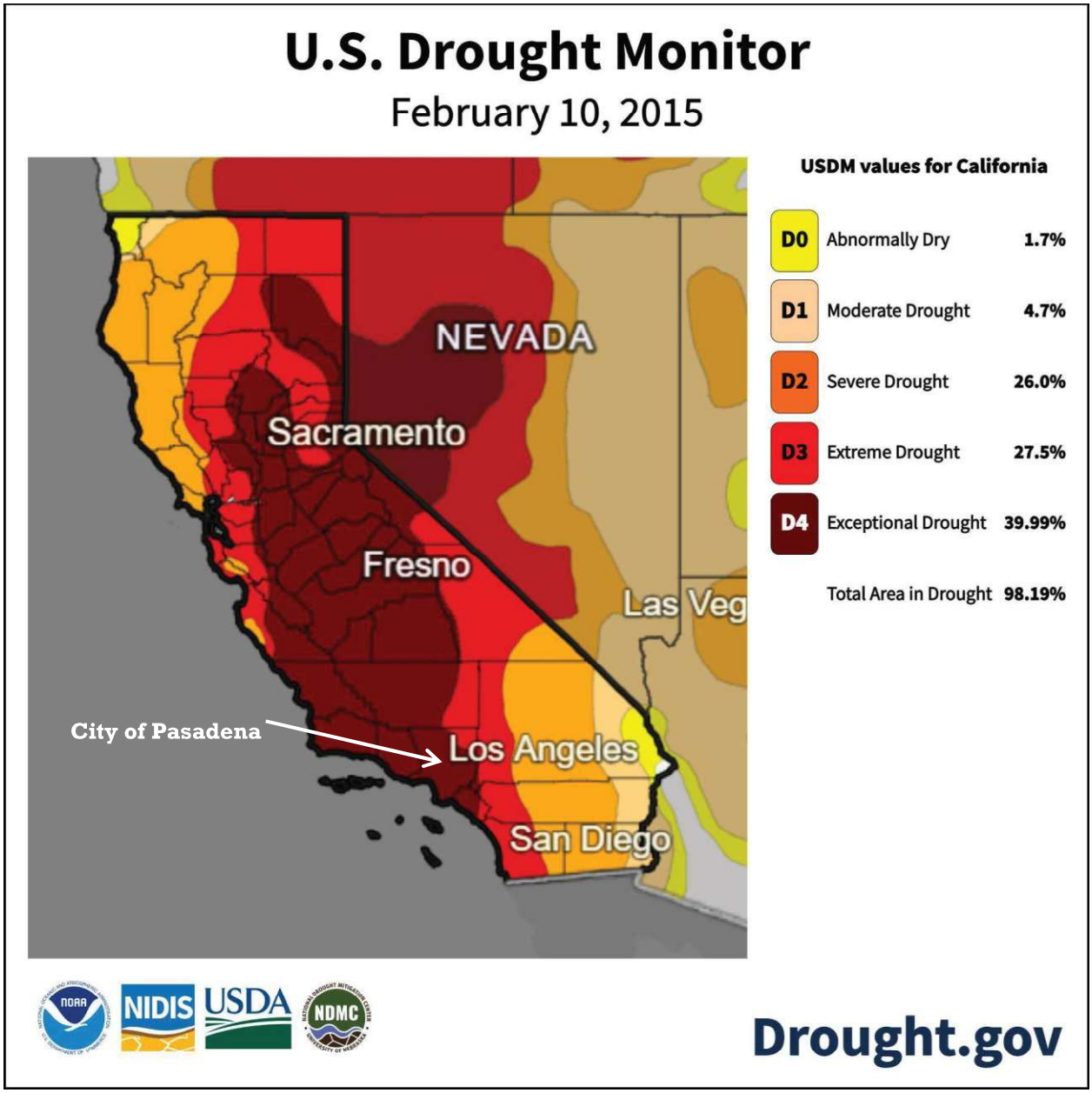


Figure 4.10: California Drought Monitor February 2015

Location

The entirety of the City is affected by all drought conditions affecting Southern California.

Extent

The National Integrated Drought Information System (NIDIS) Act of 2006 (Public Law 109-430) prescribes an interagency approach for drought monitoring, forecasting, and

early warning.[5] The NIDIS maintains the U.S. Drought Portal,[6] a centralized, web-based access point to several drought-related resources, including the U.S. Drought Monitor (USDM) and the U.S. Seasonal Drought Outlook (USSDO).

The primary indicators for these maps for the Western U.S. are the Palmer Hydrologic Drought Index and the 60-month Palmer Z-index. The Palmer Drought Severity Index (PSDI) is a commonly used index that measures the severity of drought for agriculture and water resource management. It is calculated from observed temperature and precipitation values and estimates soil moisture. However, the Palmer Index is not considered consistent enough to characterize the risk of drought on a nationwide basis. Commonly used drought severity classifications are depicted in **Figure 4-11**.

Drought Severity Classification

		Ranges					
Category	Description	Possible Impacts	Palmer Drought Index	CPC Soil Moisture Model (Percentiles)	USGS Weekly Streamflow (Percentiles)	Standardized Precipitation Index (SPI)	Objective Short and Long-term Drought Indicator Blends (Percentiles)
D0	Abnormally Dry	Going into drought: short-term dryness slowing planting, growth of crops or pastures. Coming out of drought: some lingering water deficits; pastures or crops not fully recovered	-1.0 to -1.9	21-30	21-30	-0.5 to -0.7	21-30
D1	Moderate Drought	Some damage to crops, pastures; streams, reservoirs, or wells low, some water shortages developing or imminent; voluntary water-use restrictions requested	-2.0 to -2.9	11-20	11-20	-0.8 to -1.2	11-20
D2	Severe Drought	Crop or pasture losses likely; water shortages common; water restrictions imposed	-3.0 to -3.9	6-10	6-10	-1.3 to -1.5	6-10
D3	Extreme Drought	Major crop/pasture losses; widespread water shortages or restrictions	-4.0 to -4.9	3-5	3-5	-1.6 to -1.9	3-5
D4	Exceptional Drought	Exceptional and widespread crop/pasture losses; shortages of water in reservoirs, streams, and wells creating water emergencies	-5.0 or less	0-2	0-2	-2.0 or less	0-2

Figure 4-11: Commonly Used Drought Severity Classifications

Probability of Future Events

As this HMP is being developed, California is not experiencing severe drought. Extreme drought persisted from 2012 to 2016. After an extremely wet winter during 2017 – 2018, drought conditions returned in 2021 and lasted to 2024.

Drought in California is a common occurrence that can last for multiple years. It is often associated with the El Nino Southern Oscillation (ENSO), when La Nina conditions result in decrease winter precipitation. The regional climate is characterized by a distinct dry season (approximately May to September) and wet season (approximately October to April) defined by a few large precipitation events, though additional peaks in precipitation can occur. There is a high probability that multi-year drought will occur during any 25-year period.

Impact of Climate Change

Climate change is already profoundly impacting California's water resources, as evidenced by changes in snowpack, sea level, and river flows. These changes are expected to continue, and more precipitation will likely fall as rain instead of snow. This potential change in weather patterns will add additional challenges to water supply reliability.

The mountain snowpack provides as much as a third of California's water supply by accumulating snow during wet winters and releasing it slowly during the spring and summer when the need is the greatest. Warmer temperatures will cause snow to melt faster and earlier, making it more difficult to store and use.

By the end of this century, the Sierra snowpack is projected to experience a forty-eight percent (48%) to sixty-five percent (65%) loss from the historical April 1st average. This loss of snowpack means less water will be available for Californians.

Climate change is also expected to result in more variable weather patterns throughout California. More variability can lead to longer and more severe droughts. In addition, rising sea levels will continue to threaten the Sacramento-San Joaquin Delta, the heart of the California water supply system and the source of water for twenty-five (25) million Californians and millions of acres of prime farmland.

Regulatory Context

The State Water Resources Control Board (State Water Board) and the nine (9) Regional Water Quality Control Boards (Regional Boards) protect water quality and allocate surface water rights. The Legislature created the State Water Board in 1967. The mission of the Water Board is to ensure the highest reasonable quality for waters of the State while allocating those waters to achieve the optimum balance of beneficial uses. The joint authority of water allocation and water quality protection enables the Water Board to provide comprehensive protection for California's waters. Regional Boards are semi-autonomous and have broad responsibilities within the framework of State regulatory guidance. The Department of Water Resources manages water usage,

including water delivery to two-thirds of California's population through the State Water Project.

Impacts and Vulnerabilities

Within the City, severe drought may result in water rationing and loss of public and private landscaping. Region-wide, drought results in large-scale tree die-off, increasing the likelihood and severity of wildland fires.

Surrounding communities, also in drought conditions, could increase their demand for water supplies relied upon by the planning partnership, causing social and political conflicts. If such conditions persist for several years, mandatory water rationing could impact residents and City businesses.

Low-income communities are most vulnerable to drought due to potential increases in the cost of water.

4.5.4 Earthquake/Geological Hazards

Hazard Description

An earthquake is the vibration of the earth's surface following a release of energy in the earth's crust. This energy can be generated by a sudden dislocation of the crust or by a volcanic eruption. Most destructive quakes are caused by dislocations of the crust. The crust may first bend and then, when the stress exceeds the strength of the rocks, break and snap to a new position. In the process of breaking, vibrations called "seismic waves" are generated. These waves travel outward from the source of the earthquake at varying speeds.

The City is located in a high seismic risk zone. This region is one of the most seismically active in the world, marked by the number of large, damaging earthquakes that have occurred in the past. The following geologic hazards are associated with earthquakes and may be caused by seismic activity, increasing the resulting damage:

Ground Shaking

Ground shaking caused by a strong earthquake is probably the most important seismic hazard that can be expected anywhere in the City and larger Southern California area. The amount of earthquake shaking at a site is associated with the earthquake magnitude; the type of earthquake fault; the distance between the site and the earthquake source; the geology of the site; and how the earthquake waves decrease or increase as they travel from their source to the site in question. Shaking from the earthquake intensifies with a greater magnitude and closer distance to the epicenter. Softer soils and topographic ridges can also amplify seismic ground motions.

Liquefaction

Soil liquefaction is a phenomenon in which soil's strength and stiffness are reduced by earthquake shaking or other rapid loadings. Liquefaction and related phenomena have been responsible for tremendous amounts of damage in historical earthquakes around the world. Liquefaction can result in the settling and compacting of unconsolidated sediment in the event of a major earthquake. Liquefaction may increase as the ground acceleration and duration of shaking increase.

Areas subject to liquefaction in the City are shown in **Figure 4-12**.

Surface Fault Rupture

Surface rupture is an offset of the ground surface when fault rupture extends to the Earth's surface. Fault rupture almost always follows preexisting faults, which are zones of weakness. Any structure built across the fault is at risk of being torn apart as the two (2)

sides of the fault slip past each other. Normal and reverse surface fault ruptures have vertical motion while strike-slip surface fault ruptures produce lateral offsets.

Subsidence

Land subsidence is defined as the lowering of the land surface. Many different factors can cause the land surface to subside, such as a sinkhole or underground mine collapse, or during a major earthquake. Land subsidence can also occur when large amounts of groundwater have been excessively withdrawn from an aquifer. The clay layers within the aquifer compact and settle, resulting in lowering the ground surface in the area from which the groundwater is being pumped. Over time, as more water is removed from the area, the ground drops and creates a cone. Once the water has been removed from the sediment, it cannot be replaced.

Land subsidence can occur in various ways during an earthquake. Movement that occurs along faults can be horizontal or vertical or have a component of both. As a result, a large area of land can subside drastically during an earthquake. Land subsidence can also be caused during liquefaction. Liquefaction can result in the settling and compacting of unconsolidated sediment in the event of a major earthquake. This can result in the lowering of the land surface.

Expansive Soils

Expansive soils contain mixed-layer clay minerals that increase and decrease in volume upon wetting and drying, respectively. Expansive soils are common throughout California and can damage foundations and slabs unless properly treated during construction.

Landslides

Some soil materials, such as clay minerals, can absorb water, resulting in a reduction of shear strength. The force of gravity can cause landslides when the shear strength of saturated clay is reduced below its minimum stability threshold. Earthquake-induced landslides of steep slopes can occur in either bedrock or soils. Areas at risk from landslides typically have steep slopes (15% or greater), unstable rock or soil characteristics, or other geologic evidence of instability. The City does not have slopes of this steepness.

While ground shaking, liquefaction, surface fault rupture, subsidence, expansive soils, and landslides may all result from an earthquake, the City has taken the approach of developing mitigation activities that address earthquakes as a single hazard. This is based upon the fact that the sub-hazards of landslide and surface fault rupture are unlikely in the City, and that ground shaking, liquefaction, subsidence, and expansive

soils result in damage to structures and facilities. Mitigation actions will be designed to address the sub-hazards as a single hazard.

For this planning cycle, the City has chosen not to develop any mitigation actions specific to these sub-hazards.

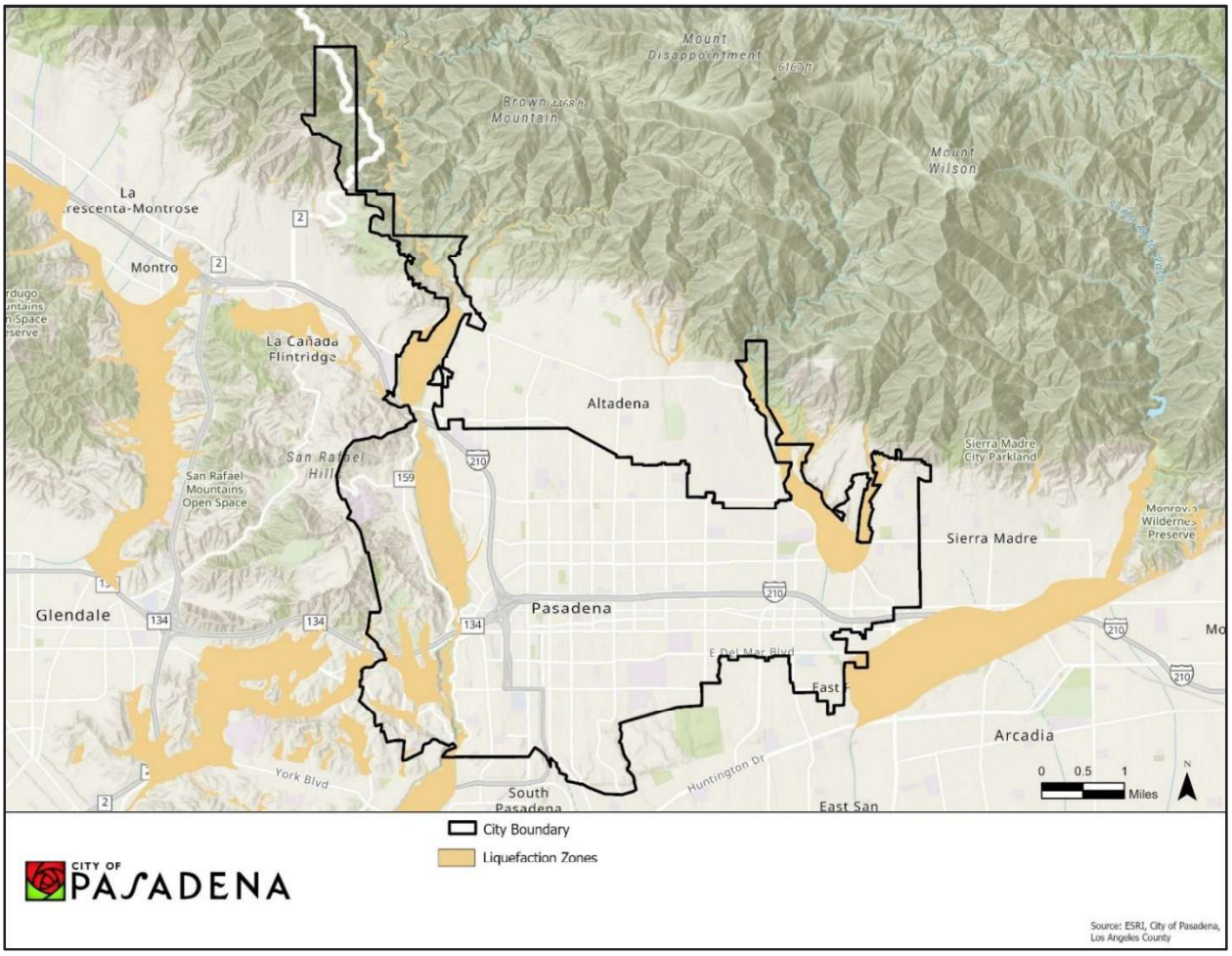


Figure 4-12: Areas Subject to Liquefaction

History

Southern California is one of the most seismically active areas in the U.S. The region has experienced at least 9 earthquakes of Magnitude 6.5 or higher since 1812. Pasadena has not been included in any federal disaster declarations or state emergency proclamations related to earthquake/geological hazards. **Table 4-7** includes historical earthquakes recorded in Southern California greater than magnitude 6.5.

Table 4-7: Historical Earthquakes Recorded in Southern California

Date	Magnitude	Fault Name (Incident Name)
7/5/2019	7.1	Garlock (Ridgecrest)
1/17/1994	6.7	Northridge Thrust (Northridge Earthquake)
2/9/1971	6.5	San Fernando (San Fernando Earthquake)
7/21/1954	7.5	White Wolf
5/18/1949	6.9	Imperial (Imperial Valley Earthquake)
11/4/1927	7.1	Unknown (Lompoc Earthquake)
4/21/1918	6.8	San Jacinto
1/9/1857	7.9	San Andreas (Fort Tejon Earthquake)
12/8/1812	7.5	San Andreas (Wrightwood Earthquake)

Location

The two (2) largest faults in the Pasadena area are the Sierra Madre Fault, a reverse fault on the north boundary of the City, and the Raymond Fault, a left lateral strike-slip fault that extends into the southern and eastern areas of the City. A rupture of either fault would result in major damage to the entire City. Other nearby faults include the Verdugo, Hollywood, Whittier, and Elysian Park fault zones. Any of these faults have the potential to cause serious damage to Pasadena. Fault locations in the City are shown in **Figure 4-14.**

Landslides are not common and affect a small portion of the West and North of the City. Areas subject to landslides in the City are shown in **Figure 4-13.**

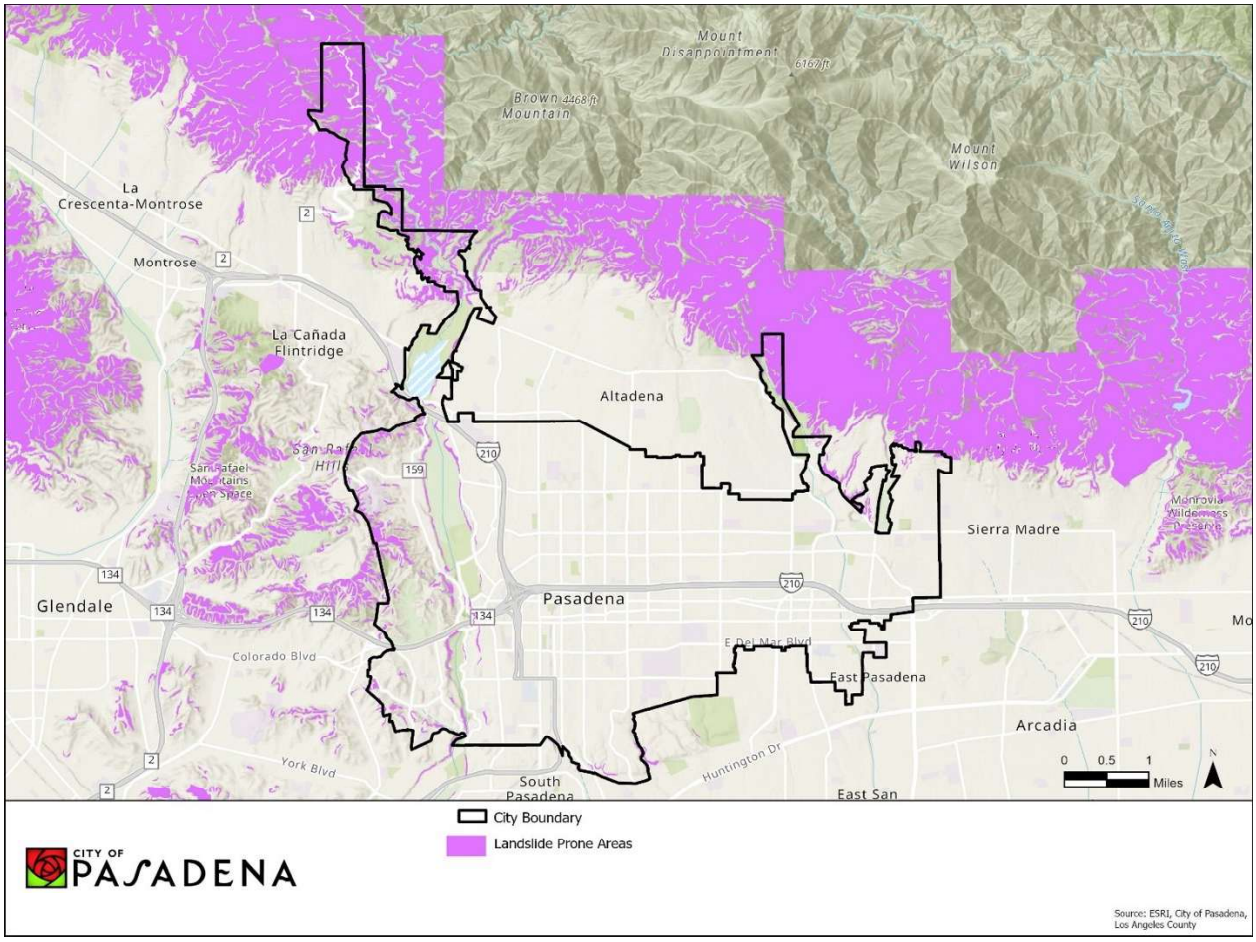


Figure 4-13: Areas Subject to Landslides

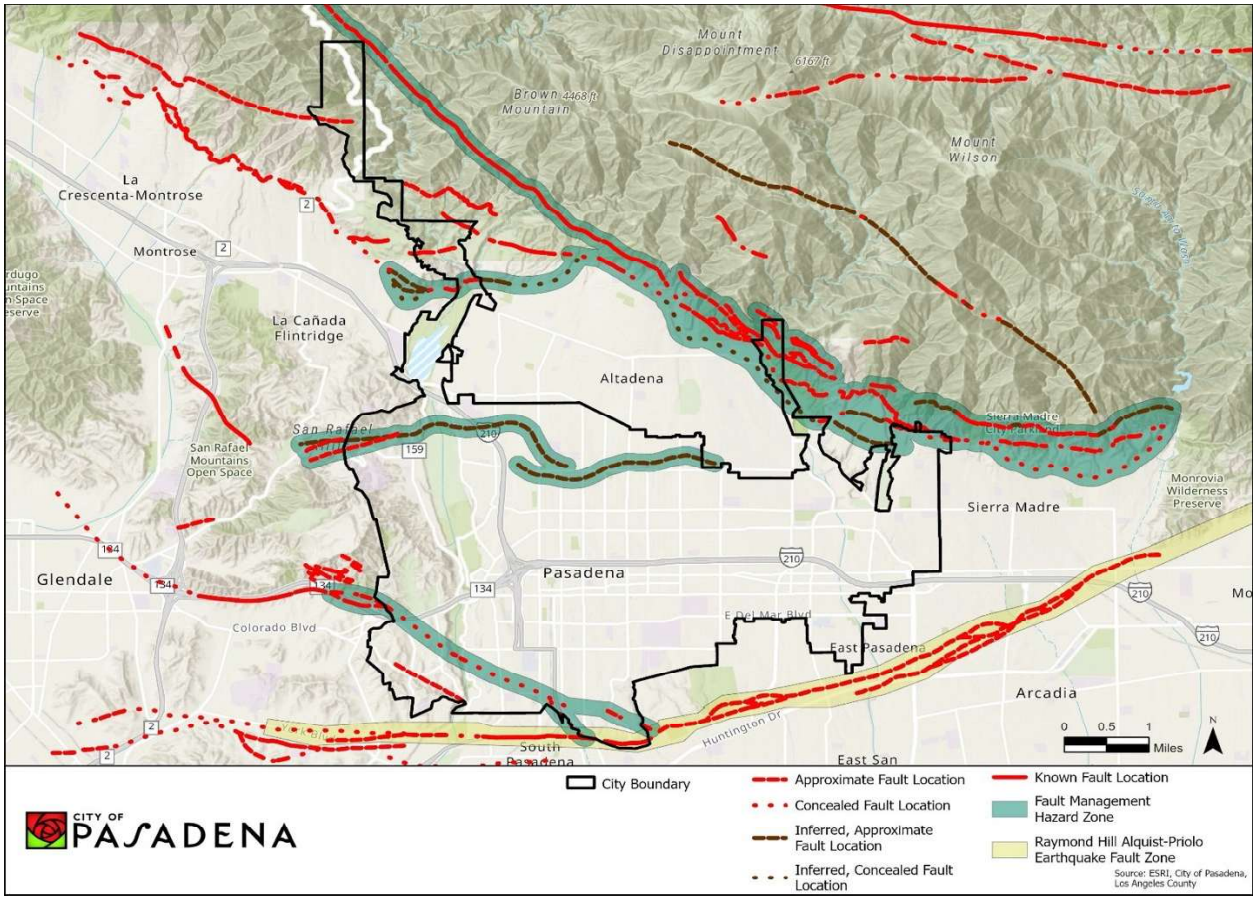


Figure 4-14: Major Faults near the City

Extent

Earthquake

Two (2) scales are used to measure the severity and intensity of an earthquake. The Modified Mercalli Intensity (MMI) Scale measures the ground shaking intensity in terms of acceleration, velocity, and displacement. The Moment Magnitude (Mw) Scale measures the severity of the earthquake by the amount of energy released at the source of the earthquake. The Mw scale, based on the concept of seismic moment, is uniformly applicable to all sizes of earthquakes. The extent of damage from an earthquake is determined by the magnitude of the earthquake, distance from the epicenter, and characteristics of surface geology. **Table 4-8** shows an approximate correlation between the Moment Magnitude (Mw) and the Modified Mercalli Intensity (MMI) Scale and its effects.

Table 4-8: Severity (Mw) and Intensity (MMI) Comparison

Magnitude (Mw)	MMI Scale: Intensity	Abbreviated MMI Scale: Effects	Abbreviated MMI Scale: Effects
1.0 - 3.0	**I**	**I.** Not felt except by a very few under especially favorable conditions.	
3.0 - 3.9	**II – III**	**II.** Felt only by a few persons at rest, especially on upper floors of buildings.	**III.** Felt quite noticeably by persons indoors, especially on upper floors of buildings. Many people do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibrations similar to the passing of a truck. Duration estimated.
4.0 - 4.9	**IV – V**	**IV.** Felt indoors by many, outdoors by few during the day. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound—a sensation like heavy truck striking building. Standing motor cars rocked noticeably.	**V.** Felt by nearly everyone; many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop.
5.0 - 5.9	**VI – VII**	**VI.** Felt by all, many frightened. Some heavy furniture moved; a few instances of fallen plaster—damage slight.	**VII.** Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures; some chimneys broken.

Magnitude (Mw)	MMI Scale: Intensity	Abbreviated MMI Scale: Effects	Abbreviated MMI Scale: Effects
6.0 - 6.9	**VIII – IX**	**VIII.** Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned.	**IX.** Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations.
7.0 and higher	**X - XI**	**X.** Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent.	**XI.** Few, if any (masonry) structures remain standing. Bridges destroyed. Rails bent greatly.
7.0 and higher	**XII**	**XII**. Damage total. Lines of sight and level are distorted. Objects thrown into the air.	

Source: US Geological Survey (USGS): http://earthquake.usgs.gov/learn/topics/mag_vs_int.php

Landslide

Landslides are not common in Pasadena but can occur. They are most likely to occur during and immediately after storms when water saturation of the soil is at highest levels or during a significant earthquake.

There is no standardized classification for size or damage of landslides. The National Atmospheric and Space Administration (NASA) uses these definitions based on the exponential increase in mass of the landslide:

- **Small:** Less than 10 cubic meters of debris. These minimally impact infrastructure and roads though may still hold enough mass to kill a human.

- **Medium:** Between 10 and 1,000 cubic meters of debris. These can block roads for days, damage houses and facilities, and easily kill humans.
- **Large:** Between 1,000 and 100,000 cubic meters of debris. Often cover wide areas with substantial impact to roads and infrastructure, likely displacing people and causing tens to hundreds of casualties.
- **Very Large:** Between 100,000 and 1,000,000 cubic meters of debris. These landslides cover extremely large areas that can cover entire towns and neighborhoods.
- **Catastrophic:** Over 1,000,000 cubic meters of debris. Multiple towns, neighborhoods, and boroughs may be impacted or completely covered. Fatalities might be over 1,000.

Probability of Future Events

Pasadena is in a seismically active area with many faults in the surrounding area and region-at-large. There will be an ever-present danger, of course, posed by any seismic shaking, which could potentially cause damage to buildings and/or infrastructure. It is almost inevitable that an earthquake will occur along one of the adjacent or regional fault lines and cause a major seismic event.

There is 75% likelihood that the City will experience a significant earthquake from one of the known major faults in the next 30 years. In 2015, the Working Group on California Earthquake Probabilities (WGCEP) issued its third Uniform California Earthquake Rupture Forecast (UCERF3) , which determined the likelihood for magnitude 6.7 and larger earthquakes within the next 30 year, somewhere in the region remains near certainty (greater than 99 percent). Within the next 30 years, the probabilities of earthquakes in Southern California are:

- 60% that an earthquake measuring magnitude 6.7
- 46% that an earthquake measuring magnitude 7
- 31% that an earthquake measuring magnitude 7.5

In addition to UCERF3 forecasts, which project the odds of a major earthquake on local and regional faults, the U.S. Geological Survey forecasts the severity of seismic shaking in different locations for various plausible earthquake scenarios.

Although not a significant risk to the city, landslides can occur during periods of extreme weather of after a large earthquake. FEMA's risk index currently lists Los Angeles County as Relatively High.

Impact of Climate Change

Climate change is not expected to have any direct influence on the likelihood, size, and/or severity of any future seismic-related event. landslides and other geological hazards can be more common with the impacts of climate change due to more extreme weather events causing greater water saturation of soils, such as during the 2023 atmospheric river events. More extreme El Niño weather events could also increase the amount of water dumped during each event despite the area becoming dryer on average.

4.5.5 Extreme Weather (Sever Wind, Extreme Heat, Winter Storm)

Severe Wind (Hazard Description)

Windstorms are generally short-duration events involving straight-line winds or gusts of over 50–60 mph, strong enough to cause property damage. Damage from such winds accounts for half of all severe weather reports in the lower 48 states. Wind speeds can reach up to 100 mph and can produce a damage path extending for hundreds of miles. The Beaufort Wind Chart (**Table 4-9**) provides terminology and a description of potential wind impacts at different levels.

The following types of damaging winds represent a hazard within the planning area:

- **Santa Ana Winds**—In Southern California, strong, dry, gusty winds known as Santa Ana winds form when air from a region of high pressure over the desert region of the southwestern U.S. flows westward toward low pressure areas off the California coast. As the wind flows over the Sierra Nevada and Santa Ana mountains, dropping from high elevation to sea level, it becomes compressed and heats up, and its relative humidity drops. Gaps in mountains form wind tunnels that strengthen these winds as they pour warm air east to west through the canyons. Santa Ana winds may occur year-round but are most common from September through March. A Santa Ana wind event can yield sustained winds of 40 miles per hours; isolated wind gusts of over 80 miles per hour have been recorded.
- **Downdrafts**—A downdraft is a small-scale column of air that rapidly sinks toward the ground.
- **Downbursts**—A downburst is a strong downdraft with horizontal dimensions larger than 2.5 miles, resulting in an outward burst or damaging winds on or near the ground. Downburst winds may sometimes produce damage similar to a strong tornado. Although usually associated with thunderstorms, downbursts can occur with showers too weak to produce thunder.
- **Microbursts**—Microbursts are small, concentrated downbursts that produce an outward burst of damaging winds at the surface. Microbursts are generally less than 2.5 miles across and short-lived, lasting only 5 to 10 minutes, with maximum wind speeds up to 168 mph.
- **Tornados**—Tornados are formed by the turbulent mixing of layers of air with contrasting temperature, moisture, density, and wind flow. Tornados have occurred in the planning area but are not common.

Windstorms can result in collapsed or damaged buildings, damaged or blocked roads and bridges, damaged traffic signals, streetlights, and parks, and other damage. Wind speeds as low as 32 mph can cause structural damage, and winds of 100 mph can destroy wood-frame structures. They can also cause direct losses to buildings, people, and vital equipment. There are direct consequences to the local economy resulting from windstorms and the associated physical damage and interrupted services.

Extreme Heat (Hazard Description)

In most of the United States, extreme heat is defined as a period (two [2] to three [3] days) of high heat and humidity with temperatures above 90 ºF. In extreme heat, evaporation is slowed, and the body must work extra hard to maintain a normal temperature, which can lead to death by overworking the human body. Extreme heat can cause heat exhaustion, in which the body becomes dehydrated, resulting in an imbalance of electrolytes. Without intervention, heat exhaustion can lead to collapse and heatstroke. Heatstroke occurs when perspiration cannot occur, and the body overheats. Without intervention, heatstroke can lead to confusion, coma, and death.

Extreme heat often results in the highest number of annual deaths among all weather-related hazards. Older adults, children, and sick or overweight individuals are at greater risk from extreme heat. According to the California Climate Adaptation Strategy, heat waves have claimed more lives in California than all other declared disaster events combined. It can take several days of oppressive heat for a heat wave to have a significant or quantifiable impact. Heat waves do not strike victims immediately, but their cumulative effects slowly cause harm to vulnerable populations.

Excessive heat is the primary weather-related cause of death in the United States, claiming over 100 lives each year. In a 30-year record of weather fatalities across the nation (1990-2019), excessive heat claimed more lives each year than floods, lightning, tornados, and hurricanes (Erdman 2021). Extreme heat events do not typically impact buildings; however, losses may be associated with the urban heat island effect and overheating of heating, ventilation, and air conditioning systems. These extreme heat events can lead to drought, impact water supplies, and lead to an increase in heat-related illnesses and deaths.

Legislation has been introduced in California to rate and name heat waves. The categorization would help communities take measures to reduce the number of heat-related fatalities (Washington Post 2021).

Winter Storm (Hazard Description)

During severe weather events such as strong storms, 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.

History

Table 4-10 summarizes search results from the National Center for Environmental Information Storm Events Database for Los Angeles County storm events over the 20-year period from 2002 through 2025. Based on these results, wind events are likely to happen every year, significant heat events occur multiple times a year. Pasadena has not been included in any federal disaster declarations or state emergency proclamations related to Extreme Weather.

Table 4-10: Los Angeles County Severe Weather Events, January 2002 – August 2025

Event Types Include	Total Number of Events
High Wind, Thunderstorm Wind, Strong Wind, Tornado	423
Excessive Heat	10
Heavy Rain, Lightning, Winter storm	15

Location

Extreme weather events have the potential to happen anywhere in the planning area. Wind events are most damaging to areas where trees and power lines can be knocked down. Extreme heat events may be exacerbated in the City where reduced air flow, reduced vegetation, and temperatures that are several degrees higher than in surrounding less urbanized areas. Additionally, Extreme Heat can lead to loss of power in the planning area. Winter storms can impact the entire planning area, bringing heavy rain which can cause localized flooding.

Extent

Windstorms

Generally, winds are measured using the Beaufort scale, developed in 1805, which categorizes wind events on a force scale from 0 to 12 using their speed and impacts. Any wind classified as force nine (9) or above is generally considered a severe wind event. **Table 4-11** identifies the Beaufort scale, which classifies wind events in detail.

Table 4-11: Beaufort Scale

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

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

Extreme Heat

Extreme heat events will feel different from region to region since different areas have different historic high temperatures. For example, an extreme heat day on the coast will

feel different than an extreme heat day in the High Desert. The reason for this is how humidity 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 4-15** 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 Pasadena. For Pasadena, an extreme heat day involves a temperature that exceeds *103.2°F*. These thresholds are based on a 2% probability event.

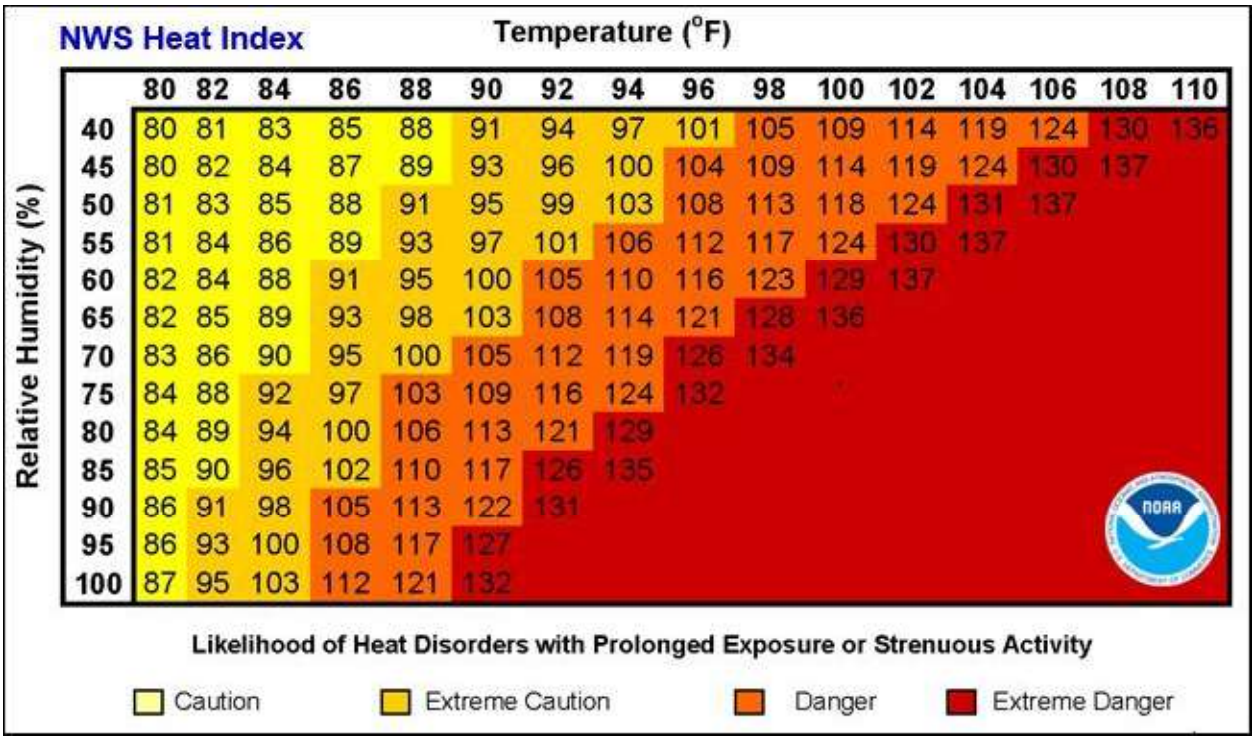


Figure 4-15: NOAA’s National Weather Service Heat Index

Winter Storm

California’s precipitation varies from year to year, 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.

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 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.

Rain events are usually measured by the amount of precipitation that falls. **Table 4-12** categorizes rain events by the amount of precipitation per hour.

Table 4-12: Measuring Heavy Rain Events

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

Probability of Future Events

Based on history, extreme weather events, including Santa Ana winds or microburst tornadic activity can be expected, perhaps annually, across widespread areas of Los Angeles County. In the U.S., average surface temperatures have risen more quickly since the late 1970s (0.36 to 0.55 degrees F per decade), with seven (7) of the top 10 warmest years on record since 1998. This will lead to more days of extreme heat every year.

There is no indication that rainfall or severe rain hazards will abate either in Pasadena or the greater region of Southern California in the future. There is a 70% chance that Pasadena will experience a severe weather event in the next year.

Impact of Climate Change

Climate change is a key driver of severe weather events, including extreme heat and winter storms. Climate change has led to an increase in the earth's surface temperature which has caused hotter days and warmer nights. Winter storms have the possibility of becoming more frequent with the climate temperatures increasing, and the atmosphere becoming more convective.

4.5.6 Flooding

Hazard Description

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

A flood, as defined by FEMA's NFIP, is: "A general and temporary condition of partial or complete inundation of two (2) or more acres of normally dry land area or of two (2) or more properties (at least one of which is the policyholder's property) from:

- Overflow of inland or tidal waters, or
- Unusual and rapid accumulation or runoff of surface waters from any source, or
- Mudflow, or
- Collapse or subsidence of land along the shore of a lake or similar body of water as a result of erosion or undermining caused by waves or currents of water exceeding anticipated cyclical levels."

Floods can be slow or fast rising but generally develop over a period of hours or days. Mitigation includes any activities that prevent an emergency, reduce the chance of an emergency happening, or lessen the damaging effects of unavoidable emergencies. Investing in mitigation measures now, such as: engaging in floodplain management activities, constructing barriers such as levees, and purchasing flood insurance will help reduce the amount of structural damage and financial loss from other types of property damage should a flood or flash flood occur.

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

History

Pasadena has had serious floods throughout its history. Several canyons near the Pasadena area, including Eaton, Zachau, Rubio, and Shields canyons, have flooded in recent recorded history. The continued threat for flooding led the County of Los Angeles and the City to develop a flood management strategy for the Arroyo Seco wash area. The first step was building the Devil's Gate Dam, completed in 1920. While the dam and other flood infrastructure has helped address flooding, it has not eliminated flooding.

Table 4-13 lists these notable floods, detailing the dates, names, affected acres, and the number of deaths or lost structures associated with each event. This historical record underscores the persistent threat of flooding in the region and the importance of ongoing flood management and preparedness measures.

Table 4-13: Historical Records of Large Floods in Pasadena

Date	Description
February 2023	The February 2023 flood was one of the most significant in recent years. Persistent heavy rainfall over a week led to widespread flooding across Pasadena. The total rainfall exceeded 10 inches, making it one of the wettest periods in the City's history. Many residents reported basement flooding and water damage to their properties. The City had to deploy additional resources to manage the situation and provide relief to the affected areas.
November 2023	A less severe but still notable flooding event occurred in November 2023. The region experienced a sudden storm that brought about 4 inches of rain in a single day. While not as devastating as the previous floods, this event caused significant inconvenience, particularly in traffic and public transportation.
March 2020	Intense rainfall in March resulted in temporary road closures and minor property damage.
2017	A series of winter storms caused minor flooding, with Arroyo Seco once again posing a risk to nearby properties.
December 2010	Heavy rains in December led to localized flooding, impacting several neighborhoods.

Date	Description
1997-1998	The El Niño weather phenomenon of 1997-1998 brought unprecedented amounts of rainfall to Pasadena. The heavy rains caused significant flooding, particularly affecting the low-lying areas and homes along riverbanks. Impacts included displacement of hundreds of residents., severe property damage, particularly in flood-prone zones, and Infrastructure strain due to sustained heavy rainfall.
February 1969	In January and February of 1969, Pasadena and surrounding areas were hit by a series of powerful storms that brought heavy rains, leading to significant flooding. The storms caused rivers and streams to swell, inundating neighborhoods and leading to evacuations.

Location

The geographical location, climate, and topography of Pasadena make the City prone to flooding. In Pasadena, floods usually occur during the winter “wet” season, the time of year with the highest precipitation totals or heavy rainfalls. During significant rainfall years, the season is characterized by high intensity rainfalls and rapid runoffs or discharge. These storm events have inundated streams, flooded areas, created debris flows (i.e., sediment, rock, dead trees) that have plugged culverts and damaged bridges/overpasses, and/or eroded or scared the landscape. Two (2) types of flooding primarily affect the City: Riverine Flooding and Urban Flooding. While the entire City is subjective to Urban Flooding, the northern and western parts of the City are the most prone to riverine flooding due to its proximity to the San Gabriel Mountains. Two (2) main north-to-south flowing stream systems drain in the Pasadena area: Arroyo Seco and Eaton Wash. The Arroyo Seco runs along the western edge of the City, while Eaton Wash drains the eastern side of the City. A dam and reservoir system protect both of these streams, but they are still prone to flooding during significant events. Discussion of the dams (and reservoirs) are presented under the Dam Failure hazard. **Figure 4-16** depicts areas in Pasadena prone to flooding.

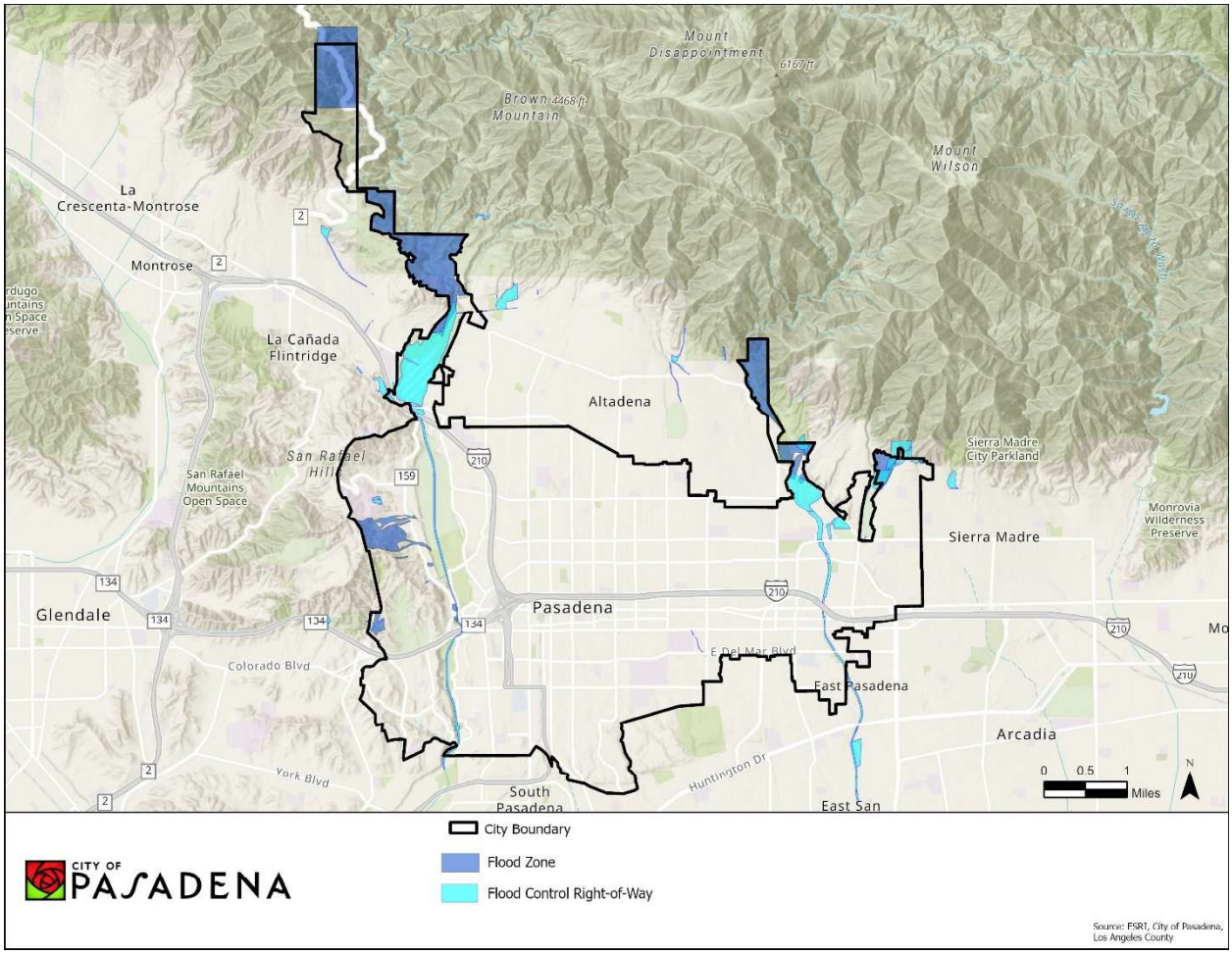


Figure 4-16: City Flood Zones

Below are the FEMA 100/500 Year Flood Maps produced by the FEMA Maps Service Center (MSC) in support of the NFIP.

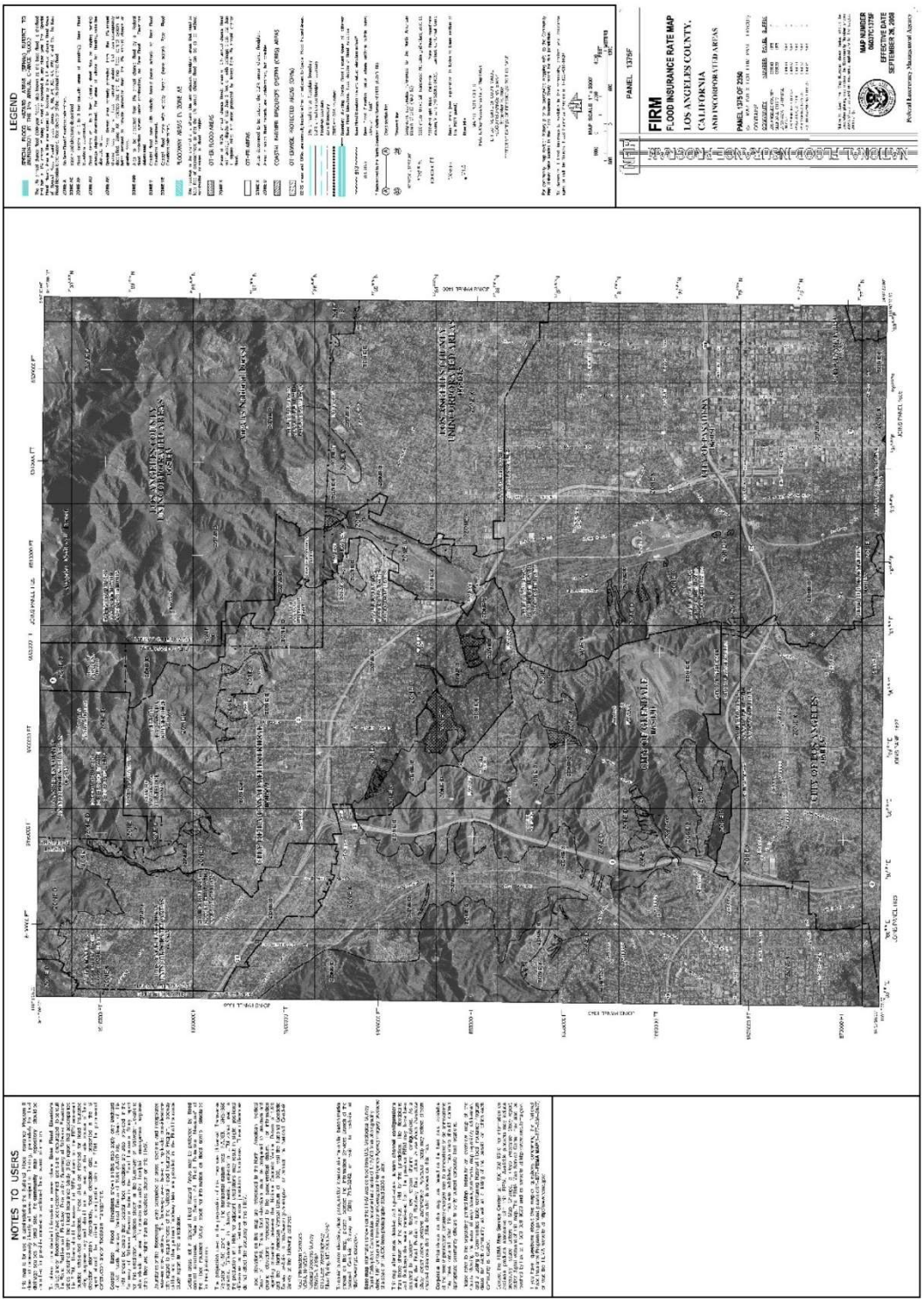


Figure 4-17: FEMA Flood Map1

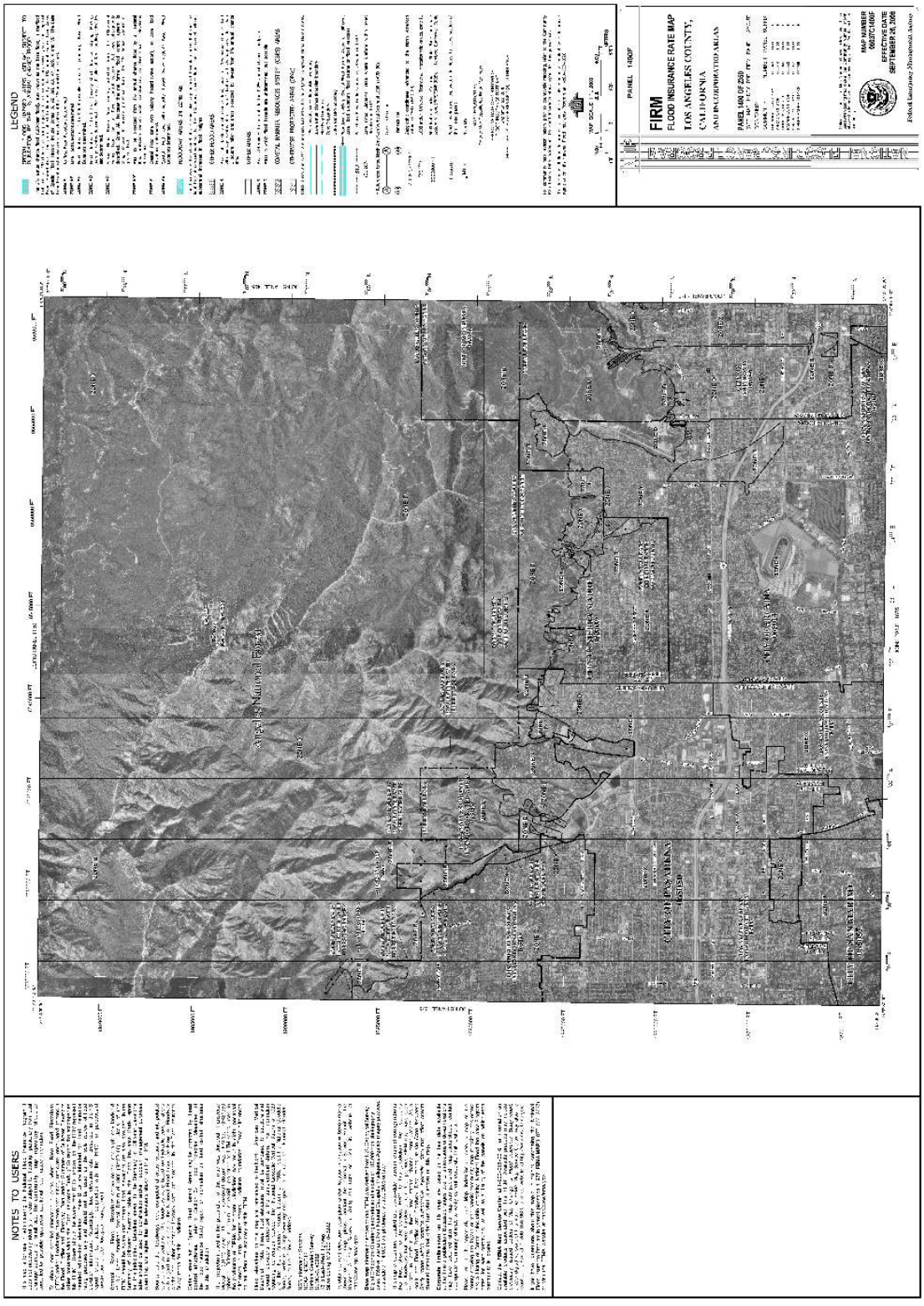


Figure 4-18: FEMA Flood Map 2

Extent

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

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

The three (3) most common designations are:

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

Pasadena, California, like many cities, has areas that are subject to flooding. The Federal Emergency Management Agency (FEMA) provides detailed maps and categories to help communities understand and manage their flood risk. These floodplain designations are crucial for City planning, construction, insurance, and emergency preparedness. **Table 4-14** shows these detailed floodplain categories. FEMA classifies Pasadena under five (5) floodplain categories: A, AE, AH, AO, and X; the location of these floodplains can be seen on the FEMA Flood Hazard Zone Maps.

Table 4-14: FEMA Floodplain Categories

Category	Description
A	Within a 100-year floodplain, but the water height of the 100-year flood is not known.
A1-30 or AE	Within a 100-year floodplain and the water height of the 100-year flood is known.
AO	Within a 100-year floodplain, and the water height of the 100-year flood

Category	Description
	is between one and three feet (3 ft.) but not specifically known.
A99	Within a 100-year floodplain, it is protected by flood protection infrastructures such as dams or levees.
AH	Within a 100-year floodplain, and the water height of the 100-year flood is between one and three feet (3 ft.) and is specifically known.
AR	Within a 100-year floodplain, it is protected by flood protection infrastructure that is not currently effective but is being rebuilt to provide protection.
V	Within a 100-year floodplain for coastal floods, but the height of the flood is not known.
V1-30 or VE	Within a 100-year floodplain for coastal floods and the water height of the flood is known.
VO	Within a 100-year floodplain for shallow coastal floods with a height between one and three feet (3 ft.).
B	Within a 500-year floodplain, or within a 100-year floodplain with a water height less than one foot (found on older maps).
C	Outside of the 500-year floodplain (found on older maps).
X	Outside of the 500-year floodplain (found on newer maps).
X500	Within a 500-year floodplain or within a 100-year floodplain 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.

Probability of Future Events:

The major causes of flooding in the City are short-duration, high-intensity storms. Water courses in the City can flood in response to a succession of intense winter rainstorms, usually between early November and late March. A series of such weather events can cause severe flooding in the City due to the large percentage of impervious area and the age and capacity of the drainage system.

A worst-case scenario is a series of storms that flood numerous drainage basins in a short time, such as those projected by USGS in the CA ARkStorm Scenario (USGS 2018). This could overwhelm response and floodplain management capabilities within the City. Major roads could be blocked, preventing critical access for many residents and critical functions. Additionally, as the grounds become saturated, groundwater flooding issues typical for the City would be significantly enhanced. Due to its low impacts that flooding has in the City, there is a 25% chance that flooding will impact the City within the next year.

Impact of Climate Change

Climate change acts as an amplifier of existing flood hazards. Extreme weather events have become more frequent over the past 40 to 50 years and this trend is projected to continue. Rising sea levels and shifting weather patterns (temperature, winds) are expected to have a significant impact on rainfall frequency, intensity and distribution, which in turn will have a significant impact on the frequency of flood occurrences.

Climate Change can also increase the frequency and/or intensity of mudflows. Changes in precipitation, specifically the increased frequency of intense precipitation, can result in a water content the ground cannot tolerate, and may cause mudflows. These mudflows may happen more frequently due to the increased number of heavy rainfall events.

4.5.7 Public Health Incidents: Pandemics, Epidemics/Infectious Diseases

Hazard Description

Widespread public health emergencies, i.e. pandemics, occur when a disease emerges to which the population has little immunity. Public health experts worry about a pandemic potential of diseases that spill over to humans from other species and are capable of spreading human-to-human. Depending on the nature of such a disease, depending on the nature of the disease a large proportion of the population can become ill. This level of disease activity would disrupt all aspects of society and severely affect the economy.

Vaccines, antibiotics, and improved living conditions resulted in dramatic declines in communicable diseases in the latter part of the 20th Century. However, infectious diseases have become an increasing threat to all persons in Los Angeles County due to a variety of factors such as:

- Population growth—Overcrowding, aging, migration
- Methods of food production—Large scale, wide distribution, importation
- Environmental changes—Drought, encroachment of humans on wild areas, global warming
- Microbial adaptation—Resistance to antibiotics, re-assortment of genetic material
- Changes in health care—Drugs causing immunosuppression, widespread use of antibiotics
- Human behavior—Travel, diet, sexual behavior, compromised immune systems

The Pasadena Public Health Department (PPHD) is responsible for public health in the City. PPHD will coordinate with Los Angeles County Department of Public Health (LAC DPH) during a public health emergency, whether in the City or throughout the county or state. Pasadena Public Health will serve as the lead agency for a pandemic response in Pasadena and would work closely with the County to ensure that:

- Planning efforts are consistent throughout the county
- Official information is provided to cities in a timely manner
- Pharmaceutical distribution is conducted across the county

Outbreaks of infectious diseases following floods, tornados, earthquakes, and other disasters are common in the developing world but are rare in developed countries. Most

post-disaster disease is produced by poor sanitation, a lack of safe drinking water and contaminated food.

Below are the known risks to the City:

Coronaviruses - The current (2020) COVID-19 pandemic is spread by a coronavirus. Coronaviruses cause a large percentage of colds and upper respiratory infections. Coronaviruses are a large family of viruses that usually cause mild upper respiratory infections, including some cases of the common cold. However, three coronaviruses have caused more serious disease in people: SARS coronavirus, MERS coronavirus, and COVID-19. (NIH) Severe acute respiratory syndrome (SARS) is a viral respiratory disease caused by a SARS-associated coronavirus. It was first identified at the end of February 2003 during an outbreak that emerged in China and spread to four (4) other countries.

Influenza - Flu epidemics occur routinely, typically in the fall and winter. Because flu seasons fluctuate in length and severity, a single estimate cannot be used to summarize influenza-associated deaths. The U.S. Centers for Disease Control and Prevention (CDC) estimates that from the 1976-1977 flu season to the 2006-2007 season, flu-associated deaths ranged from a low of about 3,000 to a high of about 49,000.

There have been four flu pandemics in the last 100 years (1918, 1957, 1968, and 2009). (CDC) A flu pandemic is a global outbreak of a new flu A virus in people that is very different from current and recently circulating seasonal flu A viruses.

Insect/Tick-Borne Disease - Insects such as mosquitos and ticks can transmit a variety of diseases. Diseases that can be contracted through an insect bite include:

- Lyme disease
- Malaria
- West Nile virus
- Zika virus
- Typhus Fever
- Dengue Fever

Plague - Plague is caused by the bacteria Yersinia pestis, a zoonotic bacterium usually found in small mammals and their fleas. Plague is transmitted between animals and humans by the bite of infected fleas, direct contact with infected tissues, and inhalation of infected respiratory droplets. There are two (2) primary clinical forms of plague

infection: bubonic and pneumonic. Bubonic plague is the most common form and is characterized by painful swollen lymph nodes or 'buboes.'

Plague can be a very severe disease in people, with a case-fatality ratio of 30% to 60% for the bubonic type and is always fatal for the pneumonic kind when left untreated.

Anthrax - Anthrax is a serious infectious disease caused by gram-positive, rod-shaped bacteria known as Bacillus anthracis. Although it is rare, people can get sick with anthrax if they come in contact with infected animals or contaminated animal products. Anthrax has the potential for and has been used as a biological weapon.

Hemorrhagic Fevers - Viral hemorrhagic fevers are a group of illnesses caused by several distinct families of viruses. In general, the term “viral hemorrhagic fever” is used to describe a severe multisystem syndrome. Characteristically, the overall vascular system is damaged, and the body’s ability to regulate itself is impaired. These symptoms are often accompanied by hemorrhage (bleeding); however, the bleeding is itself rarely life-threatening. While some types of hemorrhagic fever viruses can cause relatively mild illnesses, many of these viruses cause severe, life- threatening disease. Hemorrhagic fevers include Ebola and Yellow Fever.

History

Pasadena has been included in any federal disaster declarations or state emergency proclamations related to Public Health Incidents. The most recent was the COVID-19 pandemic. The Los Angeles County Health Alert Network issued the following recent public health alerts:

- September 17, 2024 - LAC DPH Health Alert: Baylisascaris procyonis (raccoon roundworm)
- September 9, 2024 – LAC DPH Health Alert: Locally Acquired Case of Dengue
- May 10, 2024 – Local Outbreak of Hepatitis A among Persons Experiencing Homelessness
- February 1, 2024 – First LA County Measles Case
- October 3, 2023 – First Locally Acquired Case of Dengue in California Detected in Pasadena
- November 29, 2022 – Reminder to Prescribe COVID-19 Therapeutics
- May 27, 2022 – Contaminated Ecstasy and Accidental Drug Overdoses
- December 2, 2021 – Outbreaks of Flea-Borne Typhus
- November 30, 2021 – SARS-CoV-2 Virus Variant of Concern B.1.1.529 (Omicron)

- March 5, 2021 – Ebola Virus Disease Outbreaks in the Democratic Republic of Congo and Guinea
- March 3, 2021 – Wound Botulism Cases Associated with Heroin Injection
- February 26, 2021 – SARS-CoV-2 virus variants of concern identified in CA
- February 7, 2021 – Measles Outbreak in LA County
- July 23, 2020 – Ebola Virus Disease Outbreak in the Democratic Republic of Congo.
- April 22, 2020 – Measles Outbreak in LA County
- February 19, 2020 – Increase in Clusters of Pertussis in 11 to 18-Year-Olds in LA County

Location

Pandemics occur worldwide. Smaller-scale public health incidents or epidemics may be localized, such as the Ebola outbreak in a region of Africa. All locations are susceptible to pandemics and local public health hazard incidents.

Extent

The World Health Organization pandemic phases were developed in 1999 and revised in 2005. The phases are applicable to the entire world and provide a global framework to aid countries in pandemic preparedness and response planning. Phases 1-3 correlate with preparedness, including capacity development and response planning activities, while Phases 4-6 clearly signal the need for response and mitigation efforts. Below is a description of each phase.

- **Phase 1**: no viruses circulating among animals have been reported to cause infections in humans.
- **Phase 2**: an animal influenza virus circulating among domesticated or wild animals is known to have caused infection in humans and is therefore considered a potential pandemic threat.
- **Phase 3**: an animal or human-animal influenza reassortant virus has caused sporadic cases or small clusters of disease in people but has not resulted in human-to-human transmission sufficient to sustain community-level outbreaks. Limited human-to-human transmission may occur under some circumstances, for example, when there is close contact between an infected person and an unprotected caregiver. However, limited transmission under such restricted circumstances does not indicate that the virus has gained the level of transmissibility among humans necessary to cause a pandemic.

- **Phase 4**: is characterized by verified human-to-human transmission of an animal or human-animal influenza reassortant virus able to cause "community-level outbreaks". The ability to cause sustained disease outbreaks in a community marks a significant upwards shift in the risk of a pandemic. Any country that suspects or has verified such an event should urgently consult with WHO so that the situation can be jointly assessed and a decision made by the affected country if implementation of a rapid pandemic containment operation is warranted. Phase 4 indicates a significant increase in risk of a pandemic but does not necessarily mean that a pandemic is a forgone conclusion.
- **Phase 5**: is characterized by human-to-human spread of the virus into at least two (2) countries in one (1) WHO region. While most countries will not be affected at this stage, the declaration of Phase 5 is a strong signal that a pandemic is imminent and that the time to finalize the organization, communication, and implementation of the planned mitigation measures is short.

Probability of Future Events

Although the timing of the outbreak of a pandemic or other public health emergency is difficult to predict, they will continue to occur continually and have a greater than one percent chance of occurring in any year. There is a 15% chance of a significant public health hazard impacting the City.

Impacts of Climate Change

There are several ways that climate hazards aggravate infectious diseases, both directly and indirectly. These include the slow rise in temperature; changes in environmental conditions that increase the dispersal of disease vectors such as mosquitoes, rodents, and ticks; and the sudden appearance of extreme events such as floods, which contaminate drinking-water sources and trigger the displacement of humans and animals, which can carry and transmit pathogens. According to the CDC, climate change, together with other natural and human-made health stressors, influences human health and disease in numerous ways. Some existing health threats will intensify and new health threats
will emerge.

4.5.8 Fire

Hazard Description

Wildfire

As defined in the California Fire Protection (CAL FIRE) 2010 Strategic Fire Plan, a wildfire event is an unwanted wildland fire including unauthorized human-caused fires, escaped wildfire use events, escaped prescribed wildfire projects, and all other wildfires.

Wildfire hazard is a significant and recurrent threat in the Valley District service area and has the potential to destroy buildings, cause damage to vital infrastructure, injure people, and can result in loss of life, agricultural land, and animals. Wildfire season commences in early spring through late fall every year during the hotter, dryer months. Highly flammable vegetation and warm, dry summers create the potential for wildland fires in Vacaville. The risk of wildland fires is related to a combination of factors, including winds, temperatures, humidity levels, and fuel moisture content. Of these four (4) factors, wind is the most crucial. Steep slopes also contribute to fire hazards by intensifying the effects of wind and making fire suppression difficult. Where there is easy public access to dry vegetation, fire hazards increase due to greater chance of human carelessness. High hazard areas include outlying residential parcels and open lands adjacent to residential areas. Such development has also moved the urban wildland interface (the area where human development meets undeveloped wildland) closer to higher-risk, wildfire hazard areas, increasing the number of people and buildings at risk as illustrated in **Figure 4-19** Pasadena Fire Hazard Severity Zones.

Wildland Urban Interface Fire (WUI)

A WUI fire includes situations in which a wildland fire enters an area that is developed with structures and other human developments. In WUI fires, the fire is fueled by both naturally occurring vegetation and the urban structural elements themselves. According to the National Fire Plan issued by the U.S. Departments of Agriculture and Interior, the wildland-urban interface is defined as "…the line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels."

The WUI fire can be subdivided into three (3) categories (NWUIFPP, 1998): 1) classic wildland-urban interface; 2) the mixed wildland-urban interface; and 3) the occluded wildland-urban interface. The classic wildland-urban interface exists where well-defined urban and suburban development presses up against open expanses of wildland areas. The mixed wildland-urban interface is characterized by isolated homes, subdivisions, and small communities situated predominantly in wildland settings. The occluded wildland- urban interface exists where islands of wildland vegetation occur inside a

largely urbanized area. Generally, many of the areas at risk within the City fall into the classic wildland-urban interface category.

Certain conditions must be present for a wildfire hazard to occur; a large source of fuel must be present, the weather must be conducive (generally hot, dry, and windy), and fire suppression sources must not be able to easily suppress and control the fire. The cause of a majority of wildfires is human-induced or lightning; however, once burning, wildfire behavior is based on three (3) primary factors: 1) fuel; 2) topography; and weather. Fuel will affect the potential size and behavior of a wildfire depending on the amount present, its burning qualities (e.g. level of moisture), and its horizontal and vertical continuity. Topography affects the movement of air, and thus the fire, over the ground surface. The terrain can also change the speed at which the fire travels, and the ability of firefighters to reach and extinguish the fire. Weather as manifested in temperature, humidity and wind (both short and long term) affect the probability, severity, and duration of wildfires. Other factors that create concern are drought conditions and development (the build environment). Drought conditions bring on contributing concerns in that it can lead to relatively drier conditions and leave reservoirs and water tables lower; thus, creating hotter fires and less water to fight the fires. The expansion of the built environment into previously unoccupied areas introduces more people to the hazard and in some cases make response actions more challenging.

History

Pasadena has been included in any federal disaster declarations related to fire and was also included in a state emergency proclamation, as recently as 2025. Below is a list of the most notable fires that have impacted Pasadena and Southern California.

- January 7, 2025 – The Eaton Fire began on the evening of January 7, 2025, in Eaton Canyon in the San Gabriel Mountains. It burned over 14,100 acres and destroyed 9,414 structures and resulted in 17 civilian fatalities.
- January 2025 – The Palisades Fire started in the Santa Monica Mountains of Los Angeles County in Southern California which burned over 23,448 acres, destroying large areas of Pacific Palisades, Topanga, and Malibu. The fire destroyed 6,837 structures and caused 12 fatalities.
- September 6, 2020 – The Bobcat Fire started in the Los Angeles National Forest and burned almost 116,000 acres.
- September 5, 2020 – The El Dorado Fire wildfire in Southern California ignited by a gender reveal party. It burned 22,744 acres, destroyed 20 structures, and killed one firefighter.

- November 8, 2018 – The Woolsey Fire started in Los Angeles County and spread north to neighboring Ventura County. The fire burned 96,949 acres of land, destroyed 1,643 structures, and killed three (3) people,

Location

The City is located along the foothills of the San Gabriel Mountains. These mountains are known for steep topography and extensive vegetation. The area is also intermittently impacted by Santa Ana winds, the hot, dry winds that blow across southern California in the spring and late fall. Because of these characteristics, wildfire is a significant threat to the City. **Figure 4-17** below depicts the mapping within the City limits susceptible to wildfires.

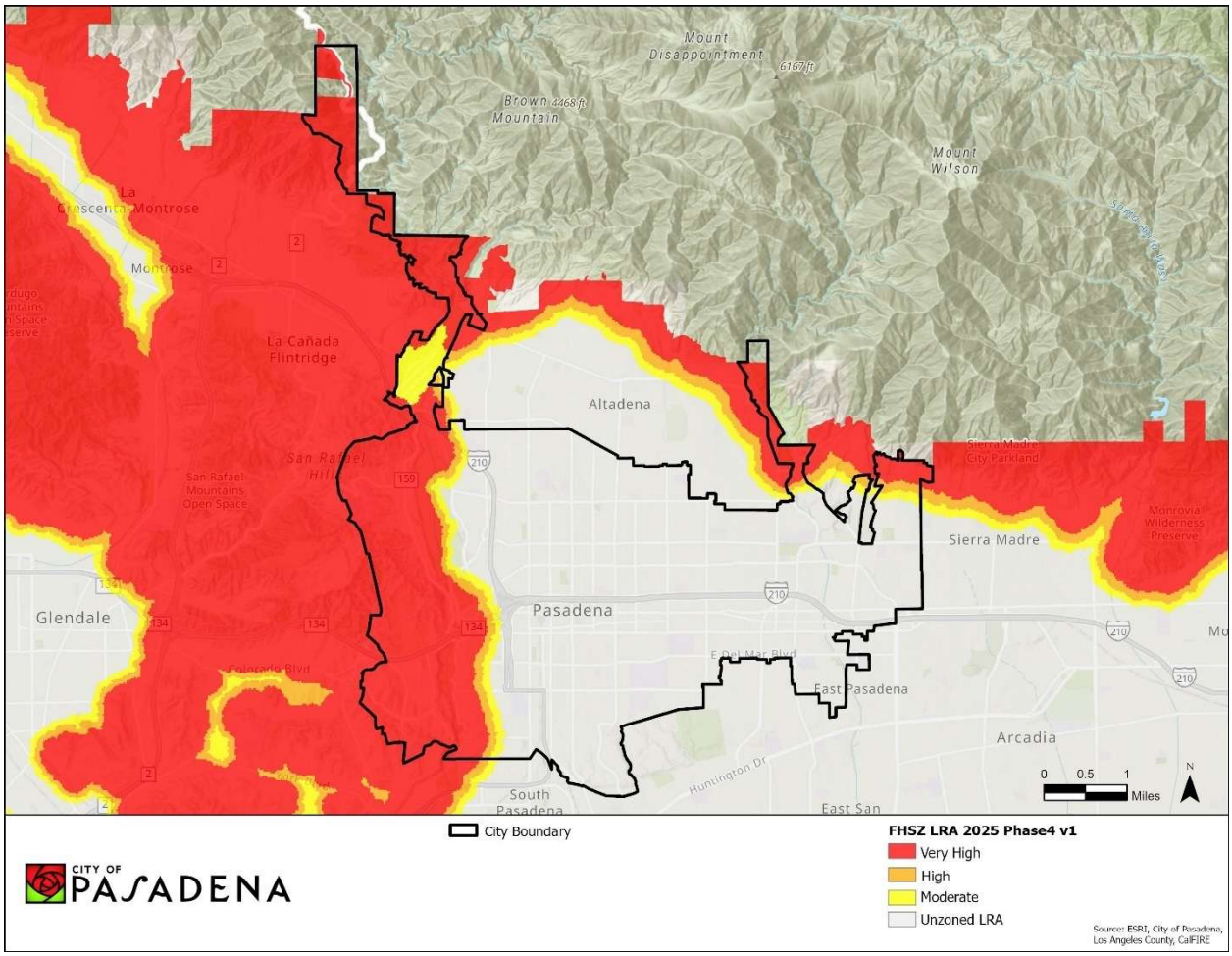


Figure 4-19: City Fire Hazard Severity Zones

The climate, topography, and vegetation in Pasadena are conducive to annual wildfire events. Wildland fires may spread to urban areas resulting in urban fires. Structures within the City are primarily single-family dwellings away from the wildland/urban interface. The areas with the highest risk of wildfire are the Western and northern portions of the City. The remainder of the City is urban/unzoned.

Extent

The State Fire Marshal classifies wildfire hazard lands within state responsibility areas into fire hazard severity zones. Each zone shall embrace relatively homogeneous lands and shall be based on fuel loading, slope, fire weather, and other relevant factors present, including areas where winds have been identified by the department as a major cause of wildfire spread. The State Fire Marshal shall identify areas in the state as moderate, high, and very high fire hazard severity zones based on consistent statewide criteria and based on the severity of fire hazard that is expected to prevail in those areas. Moderate, high, and very high fire hazard severity zones shall be based on fuel loading, slope, fire weather, and other relevant factors including areas where winds have been identified by the Office of the State Fire Marshal as a major cause of wildfire spread.

Urban fires are classified by the number of alarms. The Pasadena Fire Department uses the alarm system below to describe the type and number of resources committed to the incident.

Units Assigned	1st Alarm fire / Box Alarm	1st Alarm fire/ "All Hands" Box Alarm	2nd Alarm fire	3rd Alarm fire	4th Alarm fire	5th Alarm fire
Engine Companies	1 Engine or 1 Truck	4 Engines 2 Trucks 1 ALS 2 BCs	7 Engines 3 Trucks 1 ALS 1 Air Utility 3 BCs	10 Engines 4 Trucks 1 ALS 1 Air Utility 4 BCs	13 Engines 5 Trucks 1 ALS 1 Air Utility 5 BCs	16 Engines 6 Trucks 1 ALS 1 Air Utility 6 BCs

Probability of Future Events

Fires will continue to occur on an annual basis in the City. The size and intensity of future fires and the impacts on City operations are difficult to predict. There is a 85% chance that wildfires will impact the City within the next year.

Impact of Climate Change

Climate change and the associated warmer weather, reduced snowpack, and earlier snowmelt can be expected to increase wildfire risk through fuel hazards and ignition risks. These changes can also increase plant moisture stress and insect populations, both of which affect forest health and reduce forest resilience to wildfires. An increase in wildfire intensity and extent will increase public safety risks, property damage, fire suppression and emergency response costs to government, watershed and water quality impacts, vegetation conversions and habitat fragmentation.

4.5.9 Human-Caused Hazards

Cyber Security Threats

Cyber Security Threats (Hazard Description)

Cyberterrorism and cyberattacks are terms for cybersecurity threats that are often used interchangeably, though they are not the same. All cyberterrorism is a form of cyberattack, but not all cyberattacks are cyberterrorism.

Public and private computer systems can experience a variety of cyberattacks, from blanket malware infection to targeted attacks on system capabilities. Cyberattacks specifically seek to breach information technology security measures designed to protect an individual or organization. The initial attack is followed by more severe attacks to cause harm, steal data or for financial gain. Organizations are prone to different types of attacks that can be automated or targeted.

Any facility that relies on computers, computer systems and programs for their operations could be a target. Generally, attacks last minutes to days, but large-scale events and their impacts can last much longer. As information technology continues to grow in capability and interconnectivity, cyber threats become increasingly frequent and destructive. Cyber threats differ by motive, attack type and perpetrator profile. Motives range from the pursuit of financial gain to political or social aims. Cyber threats are difficult to identify and comprehend. Types of threats include using viruses to erase entire systems, breaking into systems and altering files, using someone's personal computer to attack others, or stealing confidential information. The spectrum of cyber risks is limitless, with threats having a wide range of effects on the individual, community, organizational, and national threat.

Ransomware

The FBI defines ransomware as a type of malicious software, or malware, which prevents you from accessing your computer files, systems, or networks and demands you pay a ransom for their return. Businesses should have a business continuity plan in case of a ransomware attack.

Cyberterrorism

The FBI is the lead federal agency for investigating cyberterrorism. In order for a cyberattack to be considered terrorism, the attack must be premeditated and politically motivated against information, computer systems, computer programs, or data. "Cyberterrorism may be carried out by state and non- state actors which have the capability to steal, alter, or destroy the nations sensitive data and, in the worst of cases, to manipulate from afar the process control systems that are meant to ensure the proper

functioning of portions of the nations' critical infrastructure" (FBI, The Cyber Threat and the FBI's Cyber Program). Critical infrastructure and the nation are becoming more vulnerable to cyberattacks as their dependency on computer networks and systems grows.

Cyber Security Threats (History)

Cyberattacks on U.S. companies occur daily, and the quantity and quality of information being hacked, stolen, destroyed, or leaked is becoming an increasing problem for consumers, government entities, and businesses.

The following list is of recent cyber-attacks that affected government agencies:

- April 2023 – The San Bernardino County Sheriff's Office reported a security breach that encrypted its systems and reduced operations for over two (2) weeks. A member of the Sheriff's Office clicked on a phished link and downloaded ransomware, disrupting emails and dispatch computers. The ransom cost $1.1 million in cryptocurrency.
- February 8, 2021 – A hacker exploited a vulnerability in a desktop sharing platform to access a water utility's treatment plant industrial control system. The hacker increased the quantity of a chemical used in the water treatment process to a dangerous level. An employee of the utility noticed inconsistencies and immediately reduced the chemical levels to normal and notified the IT department.
- December 11, 2021—UKG Kronos was a victim of a ransomware attack that incapacitated Long Beach Fire Department Staffing Program, Telestaff, for approximately 2 months.
- April 30, 2018—In Pasadena, City employee email accounts were compromised through a phishing scheme. Hackers used access to accounts to send out fraudulent emails to City contacts. The City immediately disabled accounts and changed passwords of all City employees and advised residents and associates to take caution when opening emails from City.
- November 22, 2017— 500 Los Angeles Superior Court employees received fraudulent emails leading to fake websites asking for account credentials. Less than a dozen employees fell for the phishing scam. A 31-year-old Texas resident was found to be responsible for the hacking.
- June 27th, 2017—The Los Angeles County Board of Supervisors website homepage displayed pro-ISIS propaganda. The website was one of four (4) U.S. websites hacked the same way.

- December 2016—A virus locked the Los Angeles Community College District's computer network as well as its email and voicemail systems. After consulting with cyber-security experts and law enforcement, the District paid a $28,000 cyber-ransom in bitcoin. The district had a cyber-security insurance policy to cover such attacks.

Cyber Security Threat (Location)

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

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

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

Common types of cyber-attacks include:

- Exploitation of vulnerable software
- Distributed Denial of Service
- MFA fatigue/push notification spamming

Cyber Security Threat (Extent)

The Index of Cyber Security (**Figure 4-20**) can be referenced to understand the status of cyber threats, which identifies the measure of perceived risk. Since 2015, this index has trended upward and appears to have doubled in this timeframe.

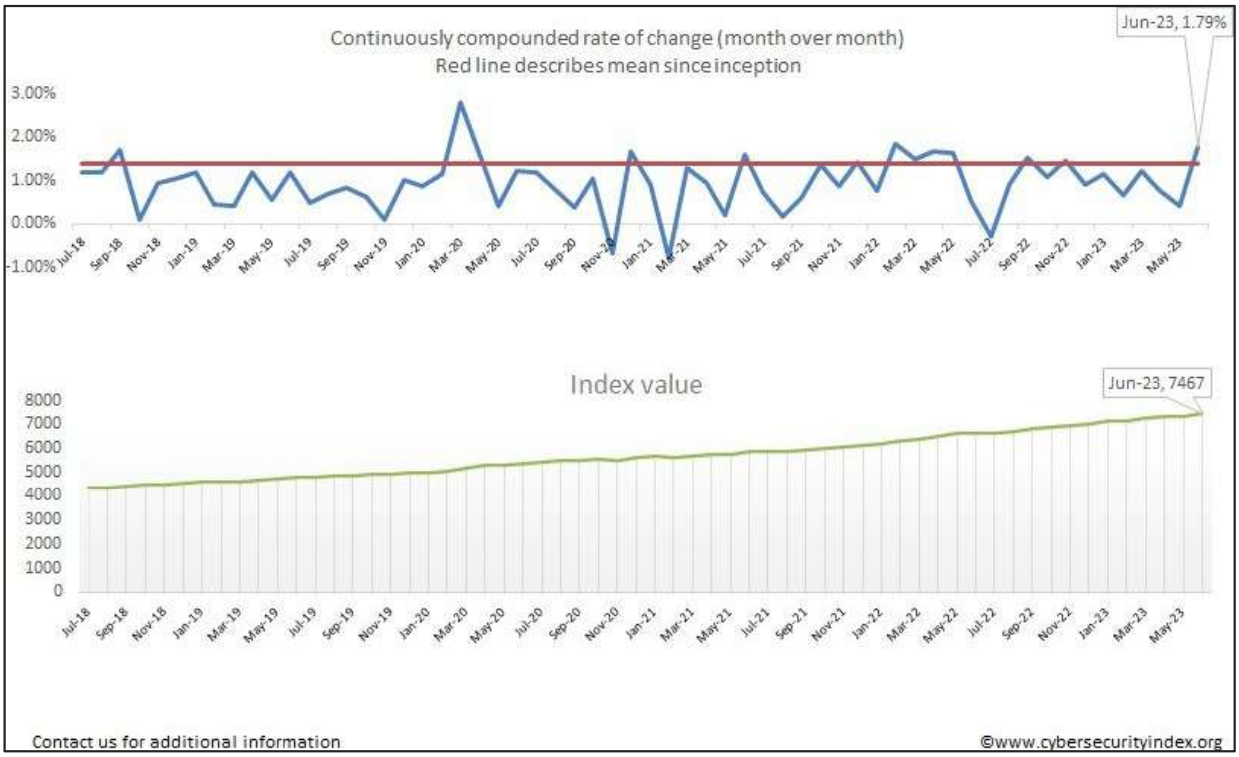


Figure 4-20: Index of Cyber Security

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

- The type of incident (website defacement, denial of service, unauthorized surveillance)
- The use of malicious software
- The level of security countermeasures that failed to prevent the cyber threat
- The duration of the cyber threat (a few hours, a few days, several weeks, etc.)
- The number of identified ransomware gangs
- The rapid rise of Ransomware as a Service (Raas) and other "as a service" cybercriminal ventures
- The growing technical sophistication of cyber criminals

Cyber Security Threat (Possibility of Future Occurrence)

Due to the integrated nature of technology into the everyday lives of Pasadena's residents, businesses, and government operations, it is possible that a cyber threat could emerge in the future. While no cyber threats are publicly known

to have disrupted the City's normal operations in the past, the likelihood of a cyber threat affecting the residents, businesses, and/or governmental operations in the future is increasing.

Civil Disturbance

Civil Disturbance (Hazard Description)

Civil Disturbance is defined as civil disorder, a broad term that is typically used by law enforcement to describe disruption of typical social order; it may involve a strike or protest, and it can be peaceful or involve violence. Both riots and rebellions are forms of civil unrest. Incidents of civil unrest often occur after national or local events incite anger in the populace and may be triggered by various causes such as political protests, racial strife, or sporting events. Civil disorders and disturbances are human-caused events with the potential for endangering life and damaging property.

The Bay Area experienced past episodes of civil unrest. Civil disturbances may be mitigated through planning; mitigation activities for civil disturbance are not solely a police function but are a shared responsibility of elected officials, community leaders, business leaders, service organizations, and community residents.

While basic constitutional rights guarantee free assembly, civil unrest associated with such events can result in injuries, loss of life, and destruction of property. Heightened vigilance, strategic organization, and training on the part of law enforcement can mitigate damage and casualties from civil disturbances.

Civil Disturbance (History)

City police departments in Los Angeles region have often dealt with civil unrest. Recent examples include the October 2014 Major League Baseball San Francisco Giants World Series victory riots, the November 2014 unrest in Oakland following the Ferguson verdict, and Black Lives Matter protestors blocking traffic on the San Francisco-Oakland Bay Bridge on Martin Luther King Jr. Day 2016. Today the combination of professional protestors, anarchists, demonstrations, and counterdemonstrations at many public gatherings has created the potential for civil unrest. Often events deemed to be celebrations can cause civil disturbances and create loss. When dealing with events that have the potential to become incidents of civil unrest, the police departments' most

important goal is safeguarding citizens and property. The following are recent incidents of civil unrest in the Bay Area region:

- George Floyd Killing Protests: At 6:30 p.m. on May 30, protesters gathered at Colorado Blvd and Fair Oaks Avenue. The City proclaimed a local state of emergency and ordered an 8:00 p.m. curfew. On June 6, hundreds of protesters gathered at a Black Lives Matter rally to denounce police violence against Black people and to stamp out systemic racism.
- In January 2025, Pro-Palestinian protesters disrupted the 135th annual Rose Parade for about 20 minutes. A dozen or so protesters sat down on the street at the intersection of Lake Ave. and Colorado Boulevard at the start of the parade.

Civil Disturbance (Location)

The entire region is vulnerable to civil unrest. While no specific hazard zones can be identified or predicted for civil unrest, dense population centers in highly urban areas such as central Los Angeles and Pasadena are more likely to experience this hazard.

Civil Disturbance (Extent)

Civil unrest may result from a wide variety of causes, ranging from local to international. All regional assets are susceptible to being at risk from civil disturbances. Local government facilities, including Pasadena, are considered most at risk since past demonstrations or rallies have originated in these locations. Other police and fire facilities have also been targeted during past events.

Previous experience indicates that Critical Response (police stations, fire stations) also are at risk during periods of civil unrest. In addition, Critical Operating Facilities are at risk of damage or destruction and may be rendered temporarily inoperative for some period of time. Depending upon the nature of the event, communities and any assets owned by local government organizations/agencies may be considered vulnerable to damage or destruction due to civil unrest.

Civil Disturbance (Probability of Future Events)

While it is not possible to make long-term predictions of civil unrest events, it is highly probable that such events will occur in Southern California jurisdictions from time to time. Because of the extreme unpredictability of civil unrest events, no specific estimates can be made concerning potential losses.

Natural Gas Incidents

Natural Gas Incidents (Hazard Description)

The United States is heavily dependent on transmission pipelines to distribute energy and fuel sources. Virtually all-natural gas, which accounts for about 28% of energy consumed annually, is transported by transmission pipelines. Energy demand in the United States continues to increase. Although California is a leader in exploring and implementing alternative energy sources such as wind and solar, the expansion of traditional energy sources, such as natural gas, continues.

Most of the natural gas used in California comes from out-of-state natural gas basins. It is delivered to California via the interstate natural gas pipeline system. In 2012, California customers received 42% of their natural gas supply from basins in the Southwest, 22% from Canada, 23% from the Rocky Mountains, and 12% from California.

Generally speaking, transmission lines are large-diameter steel pipes carrying natural gas at high pressure and compressed to provide higher carrying capacity. Transmission lines are both interstate and intrastate, with the latter connecting to smaller distribution lines delivering gas directly to homes and businesses.

Natural Gas Incidents (History)

No significant historical events to report to date.

Natural Gas Incidents (Location)

Natural gas transported via the interstate pipelines, and some of the California-produced natural gas, is delivered into the Pacific Gas & Electric (PG&E) and Southern California Gas (SoCalGas) intrastate natural gas transmission pipeline systems (commonly referred to as California's "backbone" natural gas pipeline system). Natural gas on the utilities' backbone pipeline systems is then delivered into the local transmission and distribution pipeline systems, or to natural gas storage fields. SoCalGas own and operate several natural gas storage fields that are located in Northern and Southern California. SoCalGas operates a natural gas storage field, Aliso Canyon, located in the north end of the San Fernando Valley area.

Data compiled by the Pipeline and Hazardous Materials Safety Administration (PHMSA) report a total of 115,292 miles of gas pipelines in California, of which 12,414 miles are classified as gas transmission lines, 403 miles are gas-gathering lines, and the majority, 102,475 miles, are for gas distribution. Nearly 40% of gas transmission lines are located in Los Angeles, Kern, and San Bernardino counties. **Figure 4-21** shows the location and

ownership of the natural gas pipeline system. Many of the pipelines are located in areas with high seismic activity, crossing the San Andreas and other active faults.

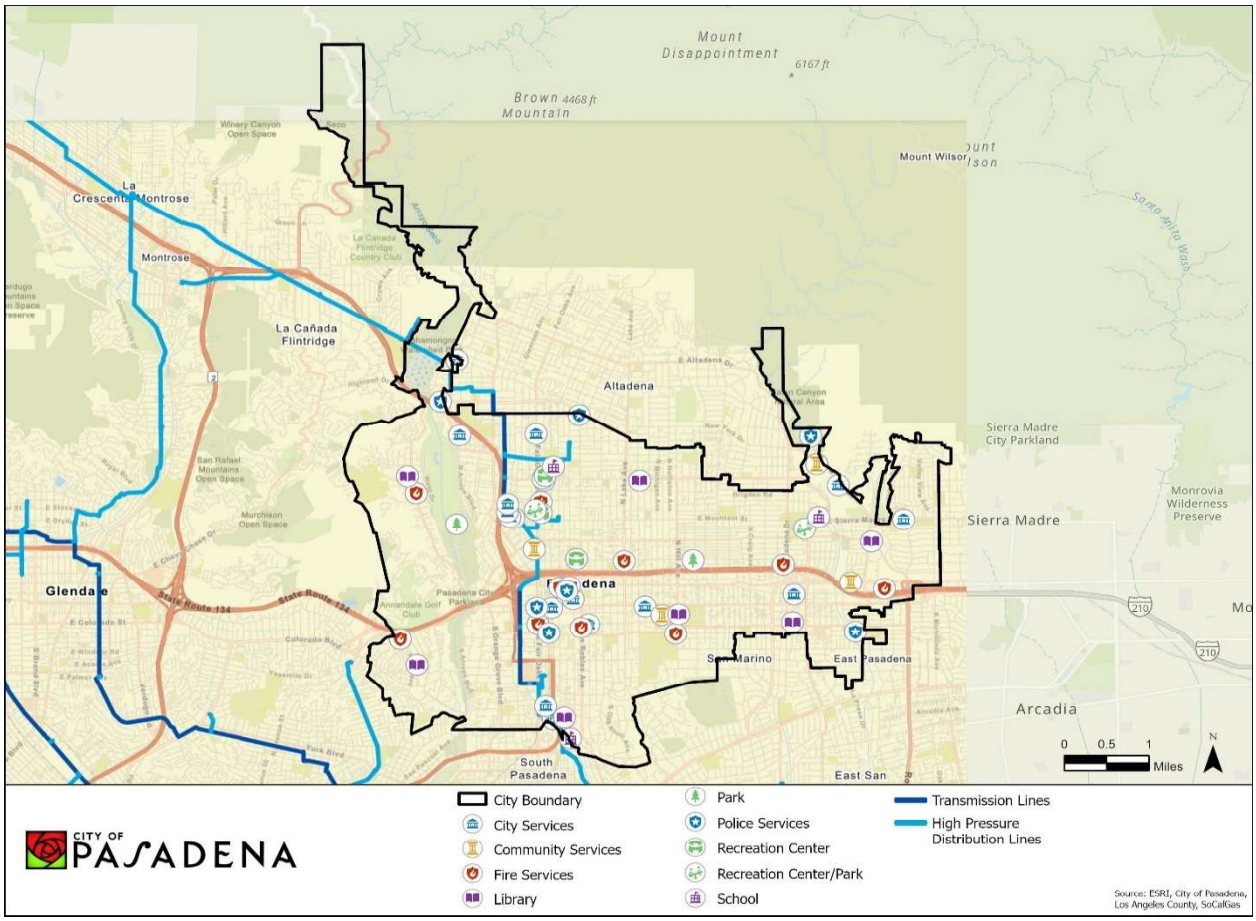


Figure 4-21: Natural Gas Transmission Lines in Pasadena

Natural Gas Incidents (Probability of Future Occurrence)

Increased urbanization is resulting in more people living and working closer to existing gas transmission pipelines that were placed prior to government agencies adopting and implementing land use and other pipeline safety regulations. Compounding the potential risk is the age and gradual deterioration of the gas transmission system due to natural causes. Significant failure, including pipe breaks and explosions, can result in loss of life, injury, property damage, and environmental impacts. Causes of and contributors to pipeline failures include construction errors, material defects, internal and external corrosion, operational errors, control system malfunctions, outside force damage, subsidence, and seismicity. Growth in population, urbanization, and land development near transmission pipelines, together with addition of new facilities to meet new demands, may increase the likelihood of pipeline damage due to human activity and the

exposure of people and property to pipeline failures. Because of this, natural gas pipeline/storage facility failure can occur anytime during the year.

Natural Gas Incidents (Climate Change Consideration)

Climate change will not have a direct effect on natural gas pipelines; however, climate change could increase the demand for natural gas. This increase in demand may require the development of new pipelines, which could increase potential complications.

Natural Gas Incidents (Regulatory Requirements)

The Federal Energy Regulatory Commission (FERC) is the primary regulatory body overseeing the interstate transmission of natural gas. It is responsible for approving pipeline projects, setting tariffs, and ensuring compliance with safety and environmental standards. FERC also enforces the Natural Gas Act and the Natural Gas Policy Act.

Pipeline and Hazardous Materials Safety Administration (PHMSA) under the U.S. Department of Transportation, regulates the safety of pipelines transporting natural gas and other hazardous materials. It develops and enforces safety standards, conducts inspections, and investigates incidents.

Power Outage

Power Outage (Hazard Description)

A power outage is the loss of the electricity supply to an area. In addition to natural hazards, power failure can result from a defect in a power station, damage to a power line or other part of the distribution system, a short circuit, or the overloading of electricity mains.

A power outage may be referred to as a blackout if power is lost completely or as a brownout if some power supply is retained, but the voltage level is below the minimum level specified for the system, and a short circuit indicates a loss of power for a short amount of time (usually seconds). Some brownouts, called voltage reductions, are made intentionally to prevent a full power outage.

Power failures may also be intentionally induced due to high power demand that exceeds supply or due to actions taken by utility companies to de-energize power lines when there is the possibility of energized power lines being downed during fire Red Flag warnings and causing fires.

Power Outage (History)

Following devastating fires in California in 2017 and 2018, utility companies sought regulatory actions to allow them to de-energize power lines when conditions might result in downed lines causing wildfires. The California Public Utilities Commission developed

guidelines for public safety power shutoffs (PSPS) that have affected numerous areas of the State for up to several days.

August 2020 saw the first California electricity providers instituted rolling blackouts since 2001. Hundreds of thousands of people experienced brief power outages through the several evenings after the body that manages most of the state's electric utilities declared a Stage 3 emergency to help reduce stress on the larger grid. Electricity demand surged through the day as temperatures topped the triple digits in many parts of the state, and people cranked up fans and air-conditioning units to try to stay cool. The emergency order was rescinded before midnight, and power was fully restored to all affected households

The 2011 Southwest blackout, sometimes referred to as the Great Blackout of 2011, was a widespread power outage that affected the San Diego–Tijuana area, southern Orange County, the Imperial Valley, Mexicali Valley, and Coachella Valley, and parts of Arizona. It occurred on Thursday, September 8, 2011, beginning at about 3:38 pm PDT and was the largest power failure in California history.

The 2000-2001 California electricity crisis brought to light many critical issues surrounding the State's power generation and distribution system, including its dependency on out-of-state resources. Although California has implemented effective energy conservation programs, the State continues to experience both population growth and weather cycles contributing to a heavy demand for power. The 2000 and 2001 blackouts occurred due to losses in transmission or generation and/or extremely severe temperatures that lead to heavy electric power consumption.

Power Outage (Location)

Power outages can occur throughout the City service area and affect the entire region.

Power Outage (Extent)

Power outages are typically measured by the number of customers without power. This number is two (2) to three (3) times lower than the number of people affected.

Power Outage (Probability of Future Occurrence)

While the location, duration, and number of people affected cannot be predicted, power outages in the City service area are likely to occur on a continual basis with the likelihood of an incident greater than 10 percent in any year.

Power Outage (Impact of Climate Change)

Climate change may affect the number and severity of power outages. The August 2020 rolling blackouts resulted from high energy usage during record-setting heat throughout

the state. As hotter conditions result in more and longer Red Flag warnings and concomitant PSPS, more power outages will occur.

Power Outage (Regulatory Context)

The California Public Utilities Commission (CPUC) plays a pivotal role in regulating privately-owned electric, natural gas, telecommunications, water, railroad, rail transit, and passenger transportation companies. It ensures safe, reliable utility service at reasonable rates and protects against fraud.

Hazardous Material Release

Hazardous Material Release - Pipeline Failure, Transportation Accidents, Oil Spills (Hazard Description)

A hazardous material is any material that, due to its quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment if released. Hazardous materials include but are not limited to hazardous substances, hazardous wastes, and any material that a business or local implementing agency has a reasonable basis to believe would be injurious to the health and safety of persons or would be harmful to the environment if released.

The LHMP does not focus on the hazards contained in everyday products but rather on the hazards associated with potential releases of hazardous substances from transportation corridors and fixed facilities within the City.

Exposure to hazardous materials can cause injury, illness, or death. Effects may be felt over seconds, minutes, or hours (short-term effects) or not emerge until days, weeks, or even years after exposure (long-term effects). Some substances are harmful after a single exposure of short duration, but others require long episodes of exposure or repeated exposure over time to cause harm.

Hazardous materials in the City service area primarily consist of paints, solvents, adhesives, gasoline, household cleaners, batteries, and pesticides and herbicides. The Department of Water and Power has various facilities that use chemicals that if not appropriately contained or during a natural hazard can potentially be released into the air. The toxicity of a specific substance is one important factor in determining the risk it poses, but other factors can be just as important, if not more so. Factors affecting the severity of a hazardous material release include:

- Toxicity
- Quantity
- Dispersal characteristics

- Location of release in relation to population and sensitive environmental areas
- Efficacy of response and recovery actions

Mobile incidents include those that occur on a roadway or a railroad. These incident-related releases are dangerous because they can occur anywhere, including near human populations, critical facilities, or environmentally sensitive areas. Mobile incident-related releases can also be more difficult to mitigate because of the great area over which any given incident might occur and the potential distance of the incident site from response resources.

The release of hazardous substances from stationary sources can be caused by human error, equipment failure, intentional dumping, acts of terrorism, or natural phenomena. Earthquakes pose a particular risk because they can damage or destroy facilities containing hazardous substances. The threat posed by a hazardous-material event can be amplified by restricted access, reduced fire suppression and spill containment capability, and cutoff of response personnel and equipment.

The Los Angeles County Fire Department Health Hazardous Materials Division is the designated Certified Unified Program Agency (CUPA) for the City. The CUPA was created by the California legislature to minimize the number of business inspections and fees imposed on businesses associated with the handling of hazardous materials.

Hazardous Material Release (History)

Los Angeles County, with its vast industrial landscape and densely populated urban areas, faces numerous environmental challenges, including the release of various hazardous materials. These releases can originate from industrial facilities, transportation accidents, and other sources, posing significant risks to public health and the environment. Below is a list of the most resent hazard materials releases.

- Aliso Canyon Gas Leak (2015-2016) - One of the most significant environmental disasters in Los Angeles County was the Aliso Canyon gas leak, which released massive amounts of methane, a potent greenhouse gas. The leak lasted several months, causing health problems for nearby residents and contributing to climate change.
- Exide Technologies Plant (2013) - The Exide Technologies battery recycling plant in Vernon was found to have released hazardous levels of lead and arsenic into the air and soil. This led to the plant's closure and extensive cleanup efforts to protect public health and the environment.

- Refugio Oil Spill (2015) - Although not in Los Angeles County directly, the Refugio Oil Spill off the coast of Santa Barbara impacted the region's environment. Thousands of gallons of crude oil spilled into the ocean, affecting marine life, coastal ecosystems, and local economies.

Hazardous Material Release (Location)

The City like many urban areas, handles and stores various hazardous materials essential for industrial, commercial, and public health applications. The following provides a list of potential sources for hazardous materials releases within the City planning area.

- California Institute of Technology (Caltech)
- Jet Propulsion Laboratory (JPL)
- Huntington Hospital
- Kaiser Permanente Pasadena Medical Offices
- Pasadena Water and Power
- Chevron Pasadena Refinery

Hazardous Material Release (Extent)

The extent of a hazardous material spill may vary from significant impacts causing injuries and evacuation to minor impacts requiring minimal cleanup. Hazardous materials releases can be harmful in the following ways:

- Chemical, biological, and radiological agents can cause significant health risks to those exposed to them; biological agents can be additionally dangerous if they are infectious. Flammable and explosive materials also present life safety concerns when exposed to heat.
- Oil spills can present an immediate fire hazard and can contaminate drinking water supplies. Any release of hazardous material requires a thorough and careful clean-up of the site and decontamination of those exposed. Clean-up and recovery are time and cost consuming.
- Delays caused by hazardous materials releases and the ensuing evacuation and cleanup processes could lead to significant economic losses due to traffic delays (mobile releases) or operational shut-down (fixed facilities).
- Overall, hazardous materials can cause death, serious injury, long-lasting health effects, and damage to buildings, the environment, homes, and other property.

Hazardous Material Release (Probability of Future Occurrence)

Based on previous occurrences, the likelihood of small hazardous materials releases is high and can occur at any time.

Hazardous Material Release (Regulatory Environment)

To address the release of hazardous materials, Los Angeles County has implemented several regulatory measures and public health initiatives. These efforts aim to minimize risks, ensure compliance with environmental laws, and promote community awareness.

- The South Coast Air Quality Management District (SCAQMD) is responsible for regulating air quality in the region. It sets emissions standards, monitors air pollution, and enforces regulations to reduce the release of hazardous air pollutants.
- The. Los Angeles County Department of Public Health (DPH) works to protect public health by monitoring environmental hazards, conducting health assessments, and providing information to the community about potential risks and safety measures.
- The California Environmental Protection Agency (CalEPA) oversees environmental protection efforts statewide, including in Los Angeles County. It enforces regulations related to hazardous waste, water quality, and toxic substances, and provides funding for cleanup and mitigation projects.

Terrorism

Terrorism (Hazard Description)

Terrorism is the use or threat of force to achieve a particular social or political outcome.

The goals of terrorism may sometimes be overturning a government, the reversal of a public policy, political prisoners' release, and other such motives. Acts of terror may overlap with acts of war or hate crimes. Generally, terrorism involves an attempt to kill or seriously harm people or 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 mass destruction weapons, including bioweapons, chemical agents, radioactive materials, or high-yield explosives. It should be noted that these events are infrequent. While incidents of terror caused by foreign individuals or groups receive significant media and public attention, most acts of terror in the United States have been caused by domestic terrorists.

A mass casualty incident describes an incident within the United States where emergency medical service resources, such as personnel and equipment, are overwhelmed by the number and severity of casualties. The more commonly recognized events of this type include building collapses, train and bus collisions, plane crashes, earthquakes, and other large-scale emergencies. The most common types are generally caused by terrorism, mass transportation accidents, or natural disasters. Events such as the Oklahoma City bombing in 1995, the September 11 attacks in 2001, and the 2017 Las Vegas Shooting are well-publicized examples of mass casualty incidents.

Terrorism (History)

The City has been fortunate not to have experienced any acts of terrorism directly.

However, the following acts of terrorism/mass casualty incident events have occurred in California and the County:

- **August 1999 –** On August 10, 1999, an American white supremacist walked into the lobby of the Jewish Community Center in Granada Hills and opened fire with an Uzi sub machine gun, firing 70 bullets into the complex. The gunfire wounded five (5) people.
- **July 2002 –** A man opened fire at the ticket counter at Los Angeles International Airport, killing two (2) people and injuring several others before being shot dead by security personnel.
- **May 2015** - Two (2) Anaheim-based men were arrested at a Transportation Security Administration checkpoint at the Los Angeles International Airport who had reportedly sworn allegiance to the Islamic State of Iraq and Syria (ISIS). One of these men, Muhanad Badawi, was a student at Fullerton College.
- **December 2015 -** A mass shooting and terrorist attack committed by a married couple who had reportedly sworn allegiance to ISIS killed 14 people at a medical facility in the City of San Bernardino.
- **April 2019 –** The Poway synagogue shooting occurred on April 27, 2019, at Chabad of Poway synagogue in Poway, California on the last day of the Jewish Passover holiday, which fell on a Shabbat. Armed with an AR-15–style rifle, the gunman, fatally shot one woman and injured three (3) other people, including the synagogue's rabbi.

Terrorism (Location)

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. Critical locations in Pasadena may be the Rose Bowl, shopping centers, governmental facilities (i.e., City Hall), colleges, medical facilities, parks, and large employers within the City (i.e., Jet Propulsion Laboratory). Acts of terrorism may be located at the locations listed above; however, the perpetrators may also choose high-value targets such as electric-generating facilities, water treatment plants, dams or reservoirs, railroads, highways, and other facilities that could impact governmental operations and services.

Terrorism (Extent)

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

Terrorism (Probability of Future Occurrence)

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 and where an incident could occur. The Rose Bowl is a significant facility with state and national importance. While important, it is anticipated that any 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. Given the presence of this facility as well as large shopping center, numerous schools, and large employers within the City, the potential does exist for mass-casualty incidents/acts of terrorism.

4.6 Capability Assessment

A capability assessment was conducted of the City's authorities, policies, programs, and resources. From the assessment, goals, and mitigation actions were developed. The planning team also developed a plan to prioritize, implement, and administer the mitigation actions to reduce risk to existing buildings and new development.

4.7 Existing Authorities, Policies, Programs, and Resources

An assessment of authorities, policies and programs, and resources was conducted to identify capabilities that reduce vulnerability to hazards. The capabilities include authorities and policies, such as legal and regulatory resources, fiscal resources, and staff (e.g., technical personnel such as planners/engineers with knowledge of land development and land management practices, engineers trained in construction practices related to building and infrastructure, planners and engineers with an understanding of natural or human-caused hazards, floodplain managers, surveyors, personnel with GIS skills, and staff with expertise of the hazards in the planning area). The planning team also considered ways to expand on and improve these existing policies and programs to integrate hazard mitigation into the day-to-day activities and programs of the City. **Tables 4-15**, **4-16, 4-17**, and **4-18** summarize the existing authorities, policies, programs, and resources to implement mitigation actions and projects.

4.7.1 Planning and Regulatory Capabilities

Planning and regulatory capabilities include local ordinances, policies, and laws to manage growth and development. Examples include land use plans, capital improvement plans, transportation plans, emergency preparedness and response plans, building codes, and zoning ordinances. These capabilities may be used to inform and support mitigation planning or may be modified as mitigation action. **Table 4-1** lists City planning and regulatory capabilities. Under the Description column is an explanation of the City's ability to use the LHMP to expand on and improve these existing policies and programs.

Table 4-15: Local Planning and Regulatory Capabilities

Name/Version Date	Hazards Addressed	Description (Effect on Hazard Mitigation)
Arroyo Seco Flood Hazard Warning and	Flooding	Mitigate flooding risk and effects to population. Expansion and Improvement: The HMP and the

Name/Version Date	Hazards Addressed	Description (Effect on Hazard Mitigation)
Contingency Plan (2018)		Arroyo Seco Flood Hazard Warning and Contingency Plan should be closely correlated. As both plans are updated, mitigation measures should be incorporated.
Pasadena Water and Power Integrated Resource Plan (2021)	Climate Change	Reduce City carbon footprint and minimize cost of service to ratepayers. Expansion and Improvement: The HMP and this plan should correlate, specifically in regard to Climate Change and the mitigation measures associated with the HMP.
Pasadena Adopted Budget (2025)	All	City's Budget Expansion and Improvement: Future budget will include hazard mitigation projects as part of the general fund budget.
Capital Improvement Program (2025-2028)	All	A compilation of infrastructure and major maintenance projects designed to expand, enhance and/or preserve the foundation of this great City. Expansion and Improvement: Future iterations of the CIP will incorporate hazard mitigation activities.
Capital Improvement Program Water System (2022-2026)	Earthquake, Drought,	A compilation of infrastructure and major maintenance projects designed to expand, enhance, and preserve the water system. Expansion and Improvement: Future iterations of the plan will ensure projects align with the hazard mitigation activities.
Pasadena Climate Action	Climate Change,	This is a Greenhouse Gas Reduction document for the City to help achieve its goals of reducing

Name/Version Date	Hazards Addressed	Description (Effect on Hazard Mitigation)
Plan (2018)	Drought, Extreme Weather, Fire,	greenhouse gases that contribute to climate change impacts. The plan may be found at the following link: https://www.cityofpasadena.net/planning/planning-division/community-planning/climate-action-plan/ Expansion and Improvement: The HMP and Climate Action Plan should be closely correlated. As the Climate Action Plan is updated, mitigation measures from the new HMP can be incorporated.
Pasadena Economic Strategic Plan (2025)	Flooding, earthquake, Fire	To provide Pasadena a five(5)-year economic development strategic plan that guides priorities, policies, programs, and services.
Pasadena General Plan Land Use Element (2015)	All	The Land Use Element designates the general distribution, location, and extent (including standards for population density and building intensity) of the uses of land for housing, business, industry, agriculture, open space, public facilities, and other categories of public and private uses.
Pasadena General Plan Safety Element (2002)	Natural Hazards	Addresses these safety issues, with emphasis on the naturally occurring conditions that pose a hazard to Pasadena, and provides goals, policies, and programs aimed at reducing the City's risk from these hazards. Expansion and Improvement: Align the HMP with the future iteration of the Safety Element.
Pasadena Code	Multiple	Local laws enacted by Pasadena, created to address matters of local concern that are not

Name/Version Date	Hazards Addressed	Description (Effect on Hazard Mitigation)
of Ordinances		covered by state or federal laws. The codes itemized below have been adopted and may have been amended by the City of Pasadena. • 2022 California Building Code (Volume 1 & 2) • 2022 California Residential Code • 2022 California Electrical Code • 2022 California Mechanical Code • 2022 California Plumbing Code • 2022 California Energy Code • 2022 California Green Building Standards Code • 2022 California Fire Code Expansion and Improvement: Ensure ordinances align with industry standards and look at the implications of adding additional restrictions that improve mitigation City wide.
City Urban Water Management Plan (UWMP)	Drought, Climate Change	The UWMP provides urban water suppliers (including the City) with a planning document for long-term resource planning to ensure adequate water supplies are available to meet existing and future water supply needs. In addition, the UMWP incorporates water supply reliability determinations resulting from potentially prolonged drought, regulatory revisions, and/or changing climatic conditions. Expansion and Improvement: The UWMP and HMP will be aligned in describing and developing mitigation actions to address climate change and drought. Water demand reduction strategies contained in the UWMP should be considered for inclusion as mitigation activities in the HMP.
Wildfire Mitigation Plan	Wildfire	Identifies and puts into action wildfire prevention strategies.

Name/Version Date	Hazards Addressed	Description (Effect on Hazard Mitigation)
(2020)		Expansion and Improvement: The Wildfire Mitigation Plan and HMP will be aligned in describing and developing mitigation actions to the impacts of wildfire.
Cybersecurity Strategic Plan	Cybersecurity	The cybersecurity strategic plan identifies and puts into action initiatives that improve overall City cybersecurity awareness, practices, and controls.

4.7.2 Administrative and Technical Capabilities

Administrative and technical capabilities include community (including public and private) staff and their skills and tools that can be used for mitigation planning and implementation. This capability includes engineers, planners, emergency managers, GIS analysts, building inspectors, grant writers, and floodplain managers. Some communities may rely on other government entities such as counties or special City's for resources. These capabilities may be used when planning mitigation activities to support project feasibility studies, designs, estimates, and construction.

Table 4-16: Administrative and Technical Capabilities

Resource Name	Lead Department	Description (Effect on Hazard Mitigation)
Communications	City Manager's Office	The City's Public Information Office provides outreach and information to the public, creative services to all internal departments, and videography for the City; also handles all website administration. Expansion and Improvement: Strengthen ties with community organizations and businesses to ensure key content and information is timely and relevant. Create additional communications platforms to ensure information and content reaches community members.

Resource Name	Lead Department	Description (Effect on Hazard Mitigation)
City Clerk's Office and Records Management	City Manager's Office	The City Clerk / Records Management Department Supervises and coordinates City elections; serves as Filing Officer for City appeals as designated by various sections of the Pasadena Municipal Code; prepares and updates the City's Conflict of Interest Code, and serves as Filing Officer for the Fair Political Practices Commission; receives and opens all sealed bids and formally releases bid bonds; receives, processes and maintains claims, public record requests, special event applications, summonses and complaints; assists the public and City staff by providing information and research assistance; and directs the retention and destruction of official records in accordance with applicable laws and regulations. Expansion and Improvement: Prioritize new initiatives that support mitigation activities within the City.
Code Compliance	Planning and Community Development	Code Compliance is responsible for enforcement of the city's zoning and housing and environmental codes.. The Pasadena Municipal Code regulates parking on private property, zoning, property maintenance, weed abatement on undeveloped lots and other substandard conditions on residential, commercial, and industrial properties. Expansion and Improvement: Utilize code compliance as a means of incorporating mitigation into structures and improvements conducted by residents and businesses.

Engineering	Public Works	The department is charged with overseeing, planning, designing, and implementation of infrastructure projects. Some of the department's functions include: • Act as the lead agency for construction and public works contracts within the Right-of- Way. • Program, plan, design and administer the construction of the annual Capital Improvement Program. • Issue encroachment and traffic control permits for any work within the Right-of-Way. • Inspect construction within the Right-of-Way to verify conformance with the permit conditions and compliance with the latest City codes. • Review all proposed residential, commercial and industrial development projects and provide engineering input as well as conditions of approval for proposed projects. • Plan check all development plans including those that impact other department functions. • Manage the NPDES program activities, such as business inspection, construction site inspection, public education, and outreach, etc. • Manage traffic engineering and transportation planning activities. • Provide support for other departments working within the Right-of-Way. <u>Expansion and Improvement:</u> Work with Engineering to identify soft structures within the City boundary and develop mitigation strategies to make improvements.
Public Works	Public Works	The City of Pasadena Public Works

Resource Name	Lead Department	Description (Effect on Hazard Mitigation)
		Department is responsible for maintaining and improving the City's vital infrastructure, including streets, sidewalks, parks, landscaping, sewers, storm drains, and public facilities. Services are divided into three (3) subdivisions: Integrated Waste (provides refuse collection services to resident and businesses), Municipal Services (maintains City and community facilities and provides City fleet services), and Parks and Street Maintenance. These services include maintenance of public buildings and facilities, landscaping and park upkeep, street and sidewalk maintenance and repair, storm drain and sewer servicing, and graffiti abatement. Expansion and Improvement: Improve the understanding of the role that daily activities play in hazard mitigation. Develop hazard mitigation projects that aid in mitigation.

Resource Name	Lead Department	Description (Effect on Hazard Mitigation)
Information Technology	Information Technology	The role of the IT Department is to support the operational departments with reliable systems and information daily. The most critical support required of IT being network, communications and applications support. The IT department provides short- and long-term direction in planning, researching, selecting and deploying future technologies. IT strives to accommodate improved business process automation, self-service and quality customer service through a variety of hardware and software solutions. The IT Department also leads cybersecurity efforts, including increasing cybersecurity awareness in staff through training and assessments, risk assessment of procurements involving IT systems or technologies, recommendations for improvements, internal IT audits, and the development of policies and standards supporting confidentiality, integrity and availability of information systems. Expansion and Improvement: Increase system redundancy and resiliency through improvements to technologies and connectivity.

Resource Name	Lead Department	Description (Effect on Hazard Mitigation)
Utilities	Water and Power	Pasadena Water and Power is a community enterprise that has always been essential to the health, economy and quality of life in the City. Today, PWP provides electricity to more than 65,000 customers within Pasadena and delivers water to almost 38,000 households and businesses in Pasadena and adjacent communities in the San Gabriel Valley. Expansion and Improvement: Increase system redundancy and resiliency through enhanced systems operations and additional connections within and outside of the City.
Public Safety	Police Department	Pasadena Police Department is tasked with protecting life and property while preserving the peace. This department is responsible for conducting public safety activities, investigating criminal activity, and directing traffic. Expansion and Improvement: Provide training to Officers to better enable them to see potential hazards and take action to report them.

Resource Name	Lead Department	Description (Effect on Hazard Mitigation)
Public Health	Public Health Department	Pasadena Public Health Department is responsible for helping protect, maintain and improve the health of the Pasadena community. The City of Pasadena is one of only three (3) cities in the state of California that maintains its own independent local health jurisdiction with responsibility for a wide variety of services that support the three (3) core public health functions of assessment, policy development and assurance. Expansion and Improvement: Increase coordination and collaboration with Fire, Police and County agencies to mitigate future public health hazards from spreading.
Emergency Management	Fire	Develops, coordinates, and manages programs that prevent, prepare for, respond to, recover from, and mitigate natural and human-caused disasters and emergencies. Expansion and Improvement: Increase coordination and collaboration with other City departments, especially during annual budgeting.
Fire Department	Fire	Pasadena Fire Department has 202 authorized positions comprised of 172 sworn personnel and 30 non-sworn. Expansion and Improvement: Proactively identify opportunities to coordinate and collaborate with neighboring jurisdictions to increase City and region-wide capabilities.

Resource Name	Lead Department	Description (Effect on Hazard Mitigation)
Housing	Housing	The Housing Department administers funds the City receives from the United States Department of Housing and Urban Development (HUD). These funds are authorized under HUD's Community Development Block Grant (CDBG) program and used to benefit low- and moderate-income families and aid in the rehabilitation and development of blighted areas within the City. Expansion and Improvement: Integrate mitigation actions and strategies into low- and moderate-income areas to reduce blight and potentially spur further investment.
Planning	Planning and Community Development	The Planning and Community Development Department plays a critical role in achieving the City Council's goals and objectives related to land use, urban design, and the quality and sustainability of the built environment. 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.

Resource Name	Lead Department	Description (Effect on Hazard Mitigation)
Building	Planning and Community Development	The Planning and Community Development Department provides professional plan review and inspection services to ensure buildings and projects are built and developed in compliance with all applicable municipal and state code requirements. 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.
Financial Services	Finance	The Finance Department is tasked with maintaining reliable accounting records, payment of approved demands against the City treasury, financial statement reporting, preparation of the annual budget, prudent fiscal planning, payroll processing, and debt administration. Expansion and Improvement: Assist with key mitigation activities associated with cost tracking hazard events and disasters, identifying grant funding opportunities, grant reporting and administration, and establishing financial risk calculations that can help assist with budgeting of operations, maintenance, and capital improvements.

Resource Name	Lead Department	Description (Effect on Hazard Mitigation)
Human Resources	Human Resources	The Human Resources Department plans, coordinates and administers a comprehensive human resources management program for the City of Pasadena and its employees. This includes the recruitment and retention of highly qualified employees, maintenance of a competitive employee compensation program, implementation and use of current technology for the City's human resources, organizational and employee development, and employee/labor relations. Identifies, evaluates and manages the City's risk and liability programs. This includes claims administration, the maintenance of liability/insurance coverage as well as the compliance with governmental regulation. In addition, the department administers the City's workers' compensation and employee safety programs. Expansion and Improvement: Increase knowledge and information through better data collection and tracking.

Resource Name	Lead Department	Description (Effect on Hazard Mitigation)
Floodplain Manager	Planning and Community Development Department	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	Planning and Community Development Department	The Planning Commission is responsible for reviewing proposed residential and commercial development projects, subdivisions, and land use requests on private property, to determine their compliance with applicable City regulations. The Commission has the authority to approve various development project addition. The Commission makes recommendations to the City Council with respect to the City's General Plan, Zoning Code, Specific Plans and other matters related to development within the City. The Commission may be responsible for implementing mitigation items pertaining to the Commission's scope. 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.

Resource Name	Lead Department	Description (Effect on Hazard Mitigation)
City Attorney	City Manager's Office	Reviews and approves resolutions and ordinances. Expansion and Improvement: Provide opportunities for the City Attorney to review updates to regulatory information to provide expert review of City resolutions and ordinances that may address hazard mitigation
GIS	Department of Information and Technology	Provides complex mapping and data management of City facilities, land use, and potential hazards. Supports 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.

4.7.3 Financial Capabilities

Financial capabilities include grants, general funds, property sales, income taxes, development impact fees, or stormwater utility fees. Based on procedures for each resource, these financial resources may be used to support mitigation activities.

Table 4-17: Financial Capabilities

Resource Name	Administrator	Description (Effect on Hazard Mitigation)
General Fund **https://www.cityofpasadena.net/finance/general-fund/**	Department Specific	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	Fund specific	The City operates a variety of Special Revenue Funds. Special Revenue Funds are used to account for revenue derived from specific taxes or other revenue sources that are restricted by law or administrative action to be expended for specified purposes. Expansion and Improvement: Where permissible, Special Revenue Funds may be considered during the annual budgeting process for funding mitigation projects.

Resource Name	Administrator	Description (Effect on Hazard Mitigation)
Community Development Block Grants (CDBG)	Fund Specific	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)	Emergency Management	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.
Flood Mitigation Assistance grant program (FMA)	Grant Funding	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.

4.7.4 Education and Outreach Capabilities

These capabilities include fire safety programs, hazard awareness campaigns, and public information or communications offices. Education and outreach capabilities can be used to inform the public on current and potential mitigation activities.

Table 4-18: Education and Outreach Capabilities

Resource Name	City Leads	Description (Effect on Hazard Mitigation)
Public Information Officer	City Managers Officer	Develops and delivers outreach and engagement programs that promote hazard awareness. Expansion and Improvement: Provide additional information to the community about hazard mitigation activities.
City Web Sites ***https://www.cityofpasadena.net*** ***https://www.cityofpasadena.net/fire/***	Various	Provides easily accessed information about the City. Used for LHMP public outreach and engagement. Expansion and Improvement: Use the City website to provide additional information to the community about hazard mitigation activities.

Resource Name	City Leads	Description (Effect on Hazard Mitigation)
City Social Media Accounts ***https://www.instagram.com/cityofpasadena*** ***https://x.com/pasadenagov*** ***https://www.facebook.com/cityofpasadena*** ***https://www.instagram.com/pasadenafiredepartment/*** ***https://www.facebook.com/PasadenaFD***	Various	Provides easily accessed information about the City. Used for LHMP public outreach and engagement. Expansion and Improvement: Use the City social media platforms to provide additional information to the community about hazard mitigation activities.

4.8 National Flood Insurance Program Participation

The City of Pasadena adopted the Model Floodplain Management Ordinance within the City to maintain eligibility within the National Flood Insurance Program. **Table 4-19** contains information from the FEMA Community Status Book Report for communities participating in the NFIP.

Table 4-19: City of Pasadena NFIP Information

CID	Community Name	County	Initial FHBM Ident	Initial FIRM Ident	Current Eff Map	Date Reg-Emer Date
065050C	City of Pasadena	Los Angeles	05/02/1972	09/26/08	(NSFHA)	09/07/1984

Since 1968 the NFIP has provided federally funded flood insurance to homeowners, renters, and businesses in communities that adopt and enforce floodplain management ordinances to reduce future flood damage. The adoption of Pasadena Municipal Code (PMC) Chapter 14.27, passed in 2006, allows residents of the City to remain eligible to purchase flood insurance through the National Flood Insurance Program. The Ordinance meets the minimum standards set forth in Title 44, Section 60.3 of the Code of Federal Regulations. The City of Pasadena participates in the Community Rating System.

The Floodplain Management Ordinance's effect is limited to requiring that any new construction or substantial improvement to existing structures will have to comply with the standards of construction identified in the Ordinance. The City's continued involvement in NFIP supports this plan. Currently, the City of Pasadena implements a floodplain management program designed to protect the people and property of the City and implements activities such as public information and outreach activities, mapping and regulatory activities, and flood damage reduction activities.

The floodplain administrator (City Manager or designee shall obtain, review, and reasonably utilize any base flood data available from federal or state agencies or other source to identify flood-prone areas within the boundaries of the city of Pasadena. This data will be on file at the city of Pasadena Department of Planning and Community Development, 175 North Garfield Avenue, Pasadena, California 91101.

The City does not have any repetitive loss properties.

SECTION 5: RISK ASSESSMENT

A risk assessment involves evaluating vulnerable assets, describing potential impacts, and estimating losses for each hazard. The intention of a risk assessment is to help the community understand the greatest risks facing the City. The risk assessment defines and quantifies vulnerable staff, buildings, critical facilities, and other assets at risk from hazards and is based on the best available data and the significance of the hazard. The risk assessment further examines the impact of the identified hazards on the City, determines which areas of the City are most vulnerable to each hazard, and estimates potential losses to City facilities for each hazard.

5.1 Critical Facilities and Facilities of Concern

Critical facilities (CF) consist of properties and structures that play important roles in government operations and the services they provide to the community. Examples of CFs include local government offices and yards, community centers, public safety buildings like police and fire stations, schools, and 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. Critical Facilities are often owned by the City, but some may also be owned and operated privately, such as some utilities and telecommunication infrastructure. Facilities of Concern (FOC) are similar to critical facilities; however, the City may not own them, or their purpose and function are not as important to the function of the City after a disaster. These facilities are identified to ensure the City understands their potential vulnerability to the hazards of concern.

The HMPC identified a total of 157 facilities [107 CFs and 50 FOC] in Pasadena that fall into 4 categories based on their function or characteristics. **Table 5-1** shows the number of CFs and FOC in each category, the total estimated replacement value for these facilities, and examples of the type of facility in each category. **Figure 5-1** shows the locations of the mapped CFs and FOC in Pasadena.

The potential loss values identified in subsequent tables are based on the City's total insured value using the City's Insured Asset Inventory. It is intended to provide an estimate of the replacement cost if the property/ structure is completely or severely damaged. The actual costs of repair could be smaller or larger than the provided estimate. Since the data comes from the City's Insured Asset Inventory, no facilities not owned by the City will not have a replacement value listed. Where this occurs, "N/A" has been used within the table.

Based on the available data provided by the City, a minimum of $1,261,099,373.00 worth of City-owned assets were analyzed. The total potential loss value of all City-owned and non-City-owned assets is much higher but is unknown due to data limitations.

The greatest potential for loss among City-owned assets comes from the Recreational Facilities category, which includes but is not limited to the Rose Bowl Stadium, libraries, cultural centers, community centers, and a museum located throughout the City. The next critical facility category with the greatest potential for loss would be City owned utilities, which include the power plant, reservoirs, substations, and pumpstations. The next category is Emergency Operations facilities which include Police and Fire Department facilities and equipment, while City owned residential property is the fourth highest potential loss among City owned facilities.

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, we identified different tiers of impact that could occur. It is reasonable to assume that impacts would not exceed 50% of the total asset value city-wide during a single event. The following are parameters to help understand how much a proposed investment/improvement compares to the existing assets within the City:

- 1% Impact - $12,620,993
- 5% Impact – $63,054,968
- 10% Impact – $126,109,937
- 20% Impact - $252,219,874
- 50% Impact - $630,549,686

The possibility that all facilities will be completely damaged simultaneously is extremely rare. Based on the hazard, most impacts are anticipated to be isolated to certain locations. This estimate does not include the value of the City's underground infrastructure and surface drainage facilities.

Table 5-1 lists the number of facilities and their associated potential replacement values.

Table 5-1: Critical Facilities and Facilities of Concern in Pasadena

Category	# of Facilities - Critical	# of Facilities - Concern	Examples	Potential Loss
Government Operations, Modular	18	13	City Hall, City Hall East, City Hall Annex, Support Buildings, Corporate Yard, Modular Buildings, Schools, Armory Building, Parking Garage, Train Station	$459,064,100
Emergency Operations	11	0	Police Station, Fire Stations, Fire Equipment (Engines)	$76,963,985
Water and Wastewater Infrastructure, Power Distribution System	57	0	Reservoirs, Holding Tanks, Pump Houses/Stations, Booster Stations, Pressure Reducing Systems, Power Plant, Substation	$88,266,275
Recreational, Cultural, and Community Centers	5	37	Stadium, Museum, Libraries, Golf Courses, Parks, Community Centers, etc.	$628,752,079
Residential	16	0	Rental Housing Units	$8,052,934
Total	**107**	**50**	**---**	**$1,261,099,373**

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

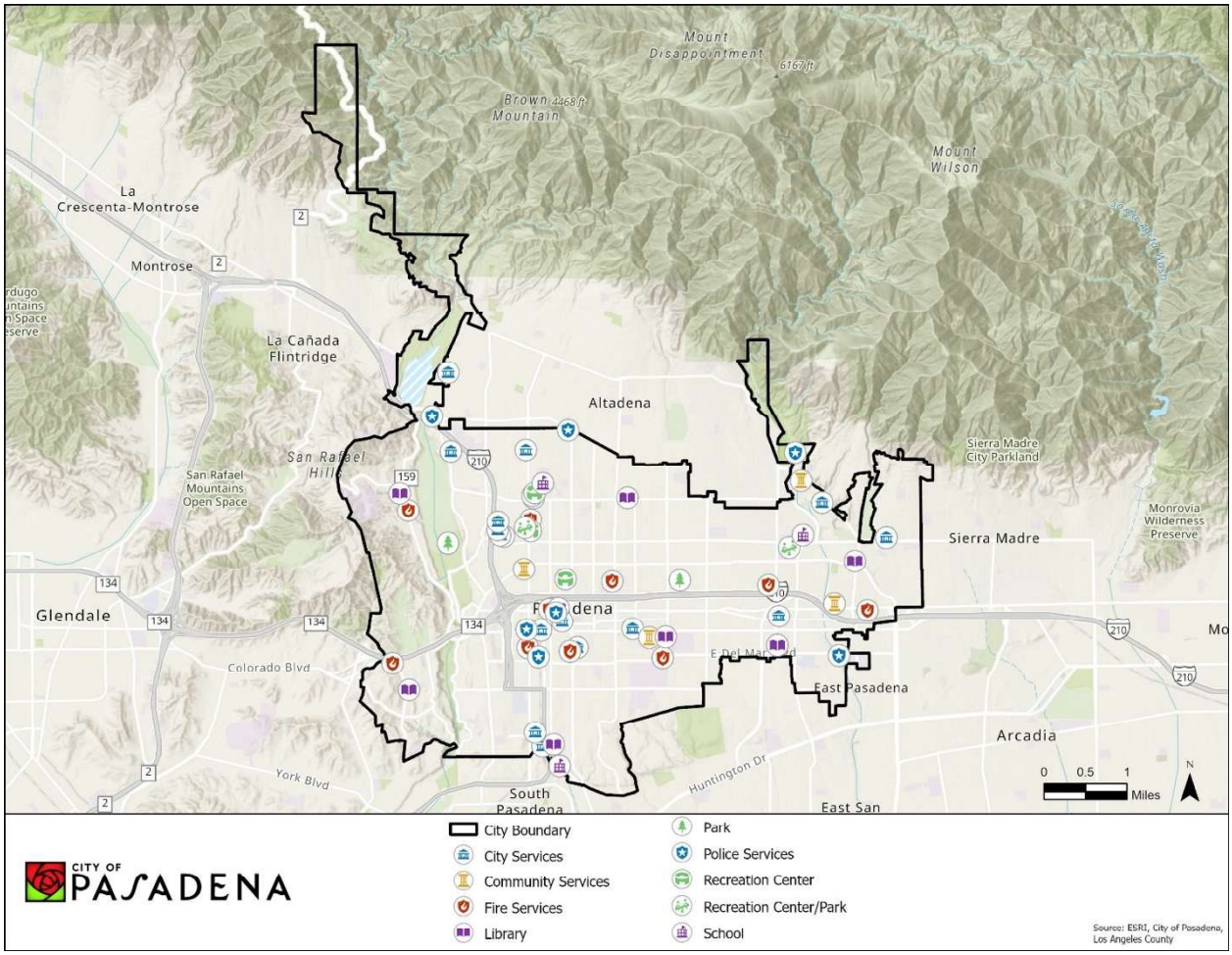


Figure 5-1: Critical Facilities and Facilities of Concern

5.2 Vulnerable Populations

Factors such as age, physical and/or mental condition, socioeconomic status, access to key services, and many other factors affect the ability of people to prepare for and protect themselves and their property from a hazard event. Even though some hazard events may impact all parts of Pasadena with equal severity, different people may experience the impacts differently. Higher-income households, for instance, are likely more able to afford the cost of retrofitting their homes to resist flooding or, alternatively, move to a location that is less prone to flooding than a lower-income household. As a result, the higher-income household is less likely to experience significant damage during a flood event than the 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 Pasadena 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 often have reduced mobility and experience difficulties living independently. As a result, they may have little or no ability to prepare for and mitigate hazard conditions without assistance from others. **Figure 5-2** below demonstrates the total number of people with a disability by census tract in the City of Pasadena.
- **Income levels:** Lower-income households are less likely to have the financial resources to implement mitigation activities on their residences. They may also struggle with having the necessary time to find and access educational resources discussing hazard mitigation strategies. Furthermore, lower-income households are less likely to be able to move to safer areas that are less at risk of being impacted by a hazard.
- **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 5-2 shows the number of people in Pasadena who meet at least one of the criteria for threatened or vulnerable populations. For more detailed demographic information, please refer to **Section 3. Figures 5-3 – 5-5** provide further information of vulnerable populations in the City of Pasadena.

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 is not readily available, there is no definitive way to determine the amount of these persons in areas of elevated risk, so this assessment will discuss how these other threatened groups may be affected on a general level.

Table 5-2: Pasadena Threatened-Population Metrics

Threatened Population Metric	Community-Wide Data
Population	144,388
Households	57,226
Median household income	$76,264
Renter Households	61%
Percentage of households with at least one person living with a disability	9.4%
Percentage of households living under the poverty limit	13.8%
Percentage of households with one-member aged 65+	9.1%

Source: U.S. Census Bureau (2023), 2019 American Community Survey
Pasadena Health Assessment for People Living with Disabilities (2019)

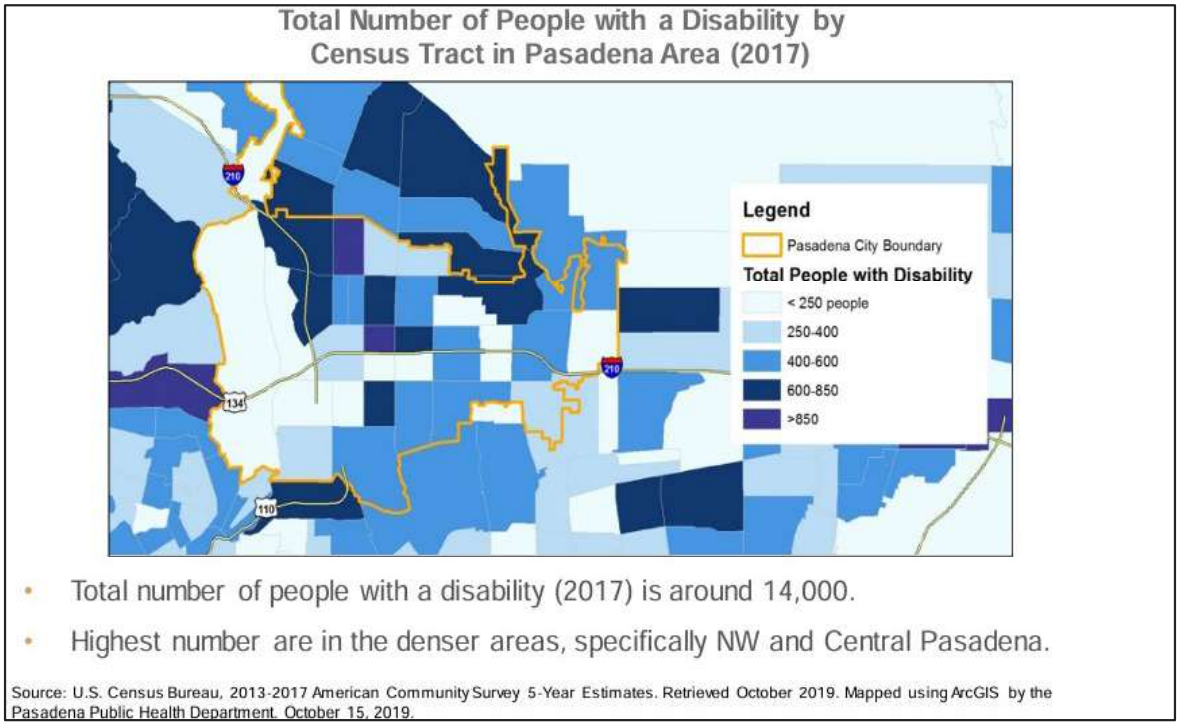


Figure 5-2: Total Number of People with Disability by Census Tract in the City of Pasadena

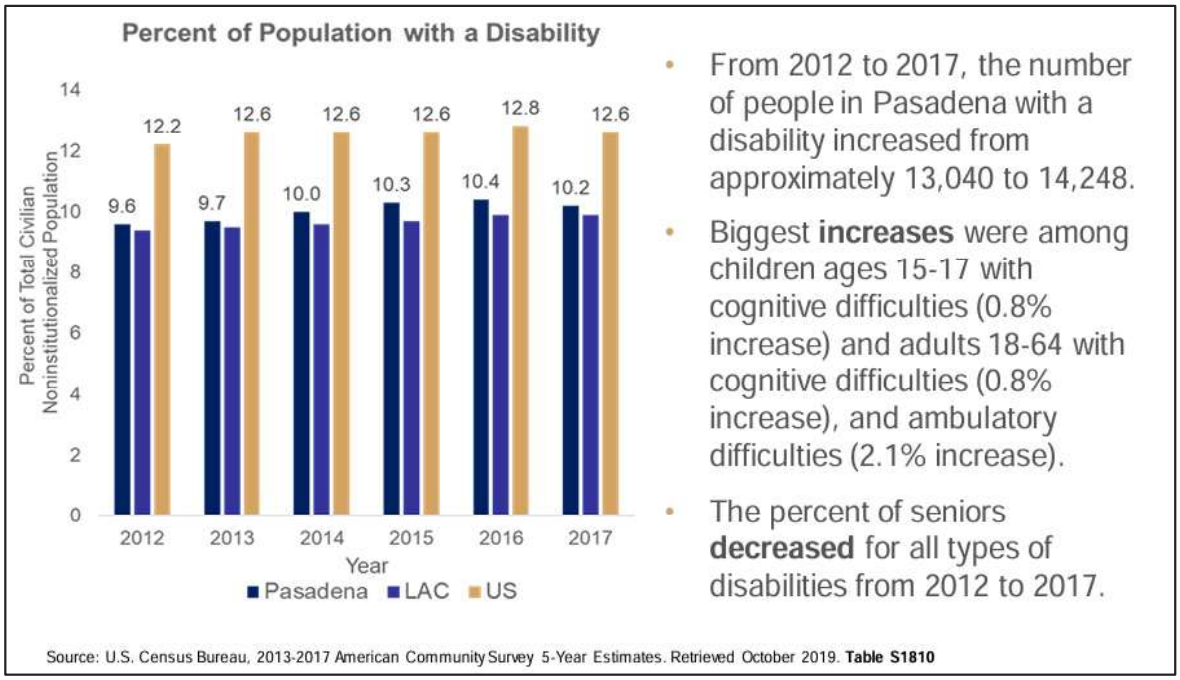


Figure 5-3: Percent of People with a Disability in Pasadena

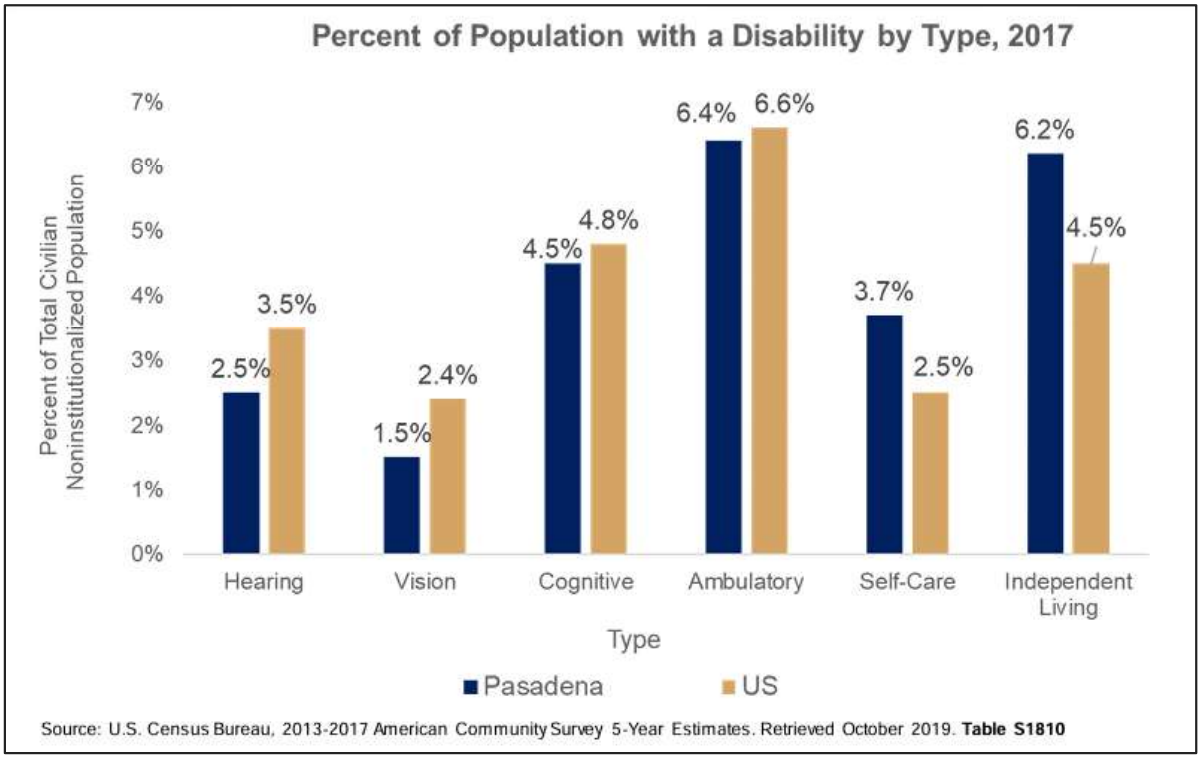


Figure 5-4: Percent of Population with a Disability by Type

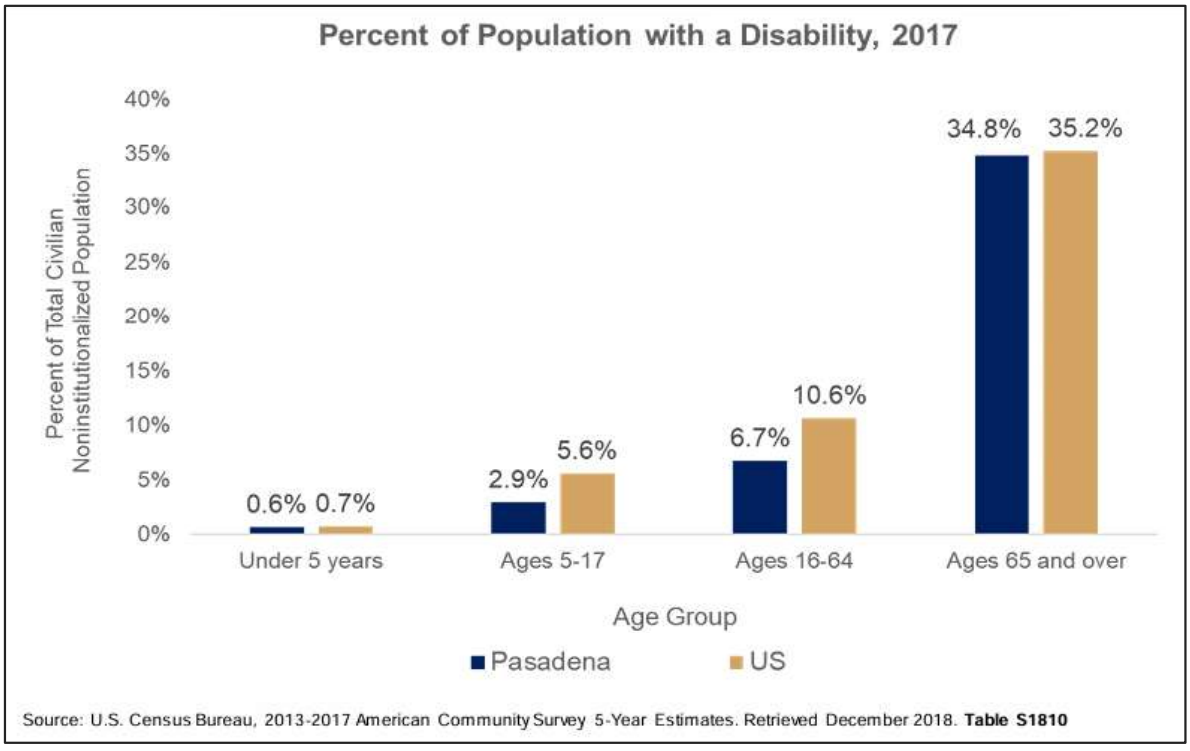


Figure 5-5: Percent of Population with Disability by Age

5.2.1 Data Limitations and Notes on Vulnerability Figures

The planning team used City provided demographic data to determine the percentage of residents with a disability. This 2017 data (the latest available) showed that 10.2 % (percent) of the population had a disability. The team also considered using the 2020-23 U.S. census data for this purpose. The census data listed 5.3% (percent) of the population with a disability. Census data only provides information on disabilities for persons under 65. The planning team selected the 2017 data point as being more inclusive. Both data sets used the Six Standard Questions Census criteria for determining a disability.

5.3 Identification of Critical Facilities and Assets

The location and operations of high-risk facilities such as critical infrastructures and key assets in or near the City are a significant concern with respect to a disaster. The planning team used FEMA's “Public Assistance Guide” (FEMA 322) 22 that defines critical facilities like data centers, utility plants, or highly hazardous materials facilities. They also used the FEMA Hazard Mitigation Handbook, which describes three (3) categories of facilities for analysis to revise this list: critical facilities for City operations; high potential loss facilities and facilities with hazardous materials; and critical infrastructure such as police/fire stations, streets and bridges, reservoirs, and pump stations.

5.4 Other Assets

In addition to the City’s designated inventory of CFs/FOC and vulnerable populations, hazard events could threaten other important assets to Pasadena. 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.

5.5 Risk Assessment and Potential Loss

The risk assessment and potential losses for physical damage for City facilities are listed in the tables below. Because the City provides a critical lifeline infrastructure support system, potential losses beyond physical damage must be considered. Loss of potable water service due to non-destructive events results in community hardship, economic loss, and reputational damage. Computing potential losses from these risks is beyond the scope of this LHMP and must be considered in the context of the impact on the entire City.

5.6 Analysis of Potential Losses by Hazard

Dam Failure

Physical Threat

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 Pasadena are threatened. Devils Gate Dam and Eaton Wash Dam have large storage capacities that could cause localized inundation in Pasadena if the reservoir waters are released due to a dam breach. **Table 5-3** identifies the physical assets in Pasadena that are threatened by the potential failure of Devils Gate and Eaton Wash Dam. Based on this analysis, dam inundation would affect 4 CFs and 2 FOCs within the City, with the potential to cause approximately $437 million in damages, based on available information. **Figure 5-6** shows the location of the identified CFs and FOCs within these dam inundation zones.

Table 5-3: Critical Facilities and Facilities of Concern (Dam Failure)

Category	# of Facilities - Critical	# of Facilities - Concern	Potential Loss**
Government Operations, Emergency Operations	4	0	$45,427,589
Recreational, Cultural, Community Centers	0	2	$5,484,509
Total	**4**	**2**	**$50,912,098**

*** Based on the City of Pasadena insured replacement values.*

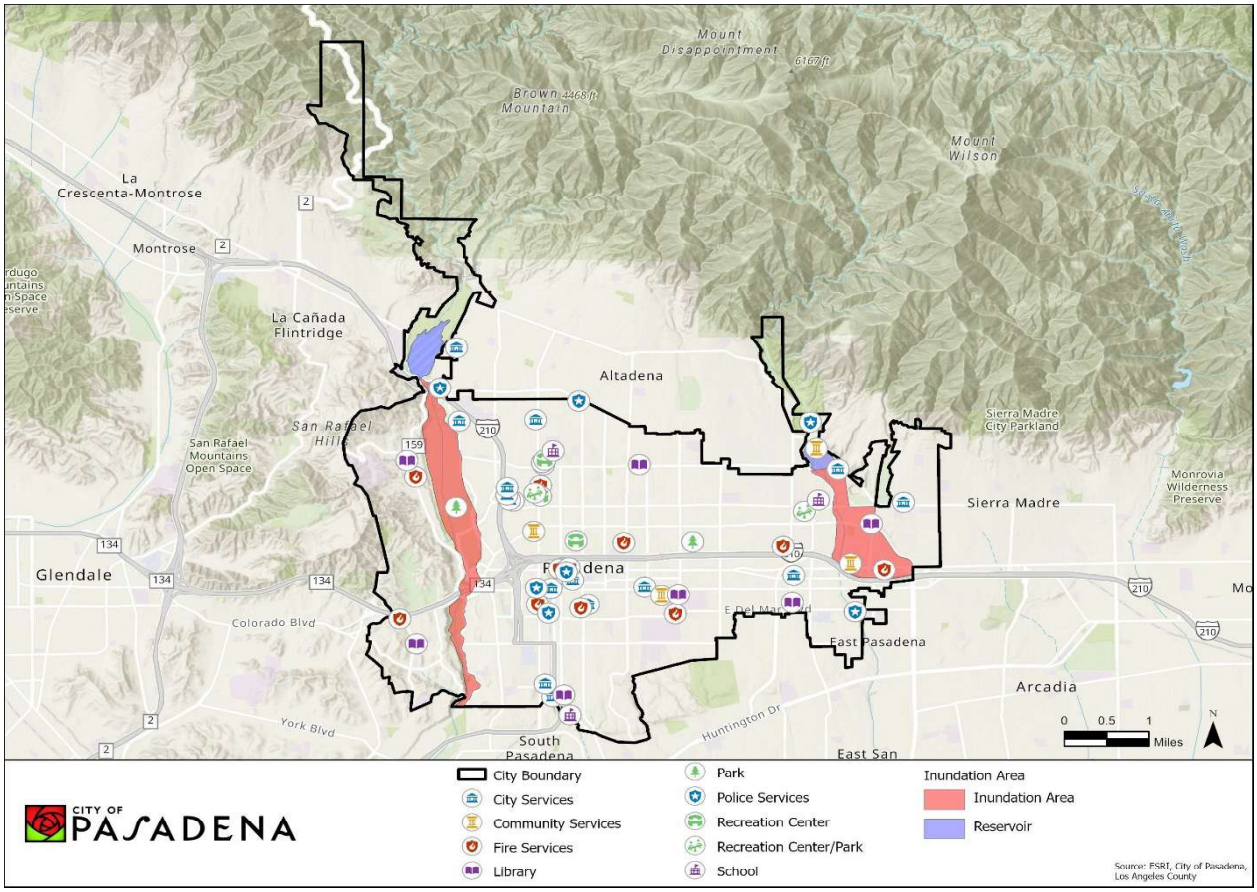


Figure 5-6: Critical Facilities and Facilities of Concern in Dam Inundation Zones

Social Threat

Dam failure hazards in the City would impact various downstream properties and the residents that live there. **Table 5-4** identifies these potential dam failure impacts caused by the Devils Gate and Eaton Wash Dam. Failure of the two (2) dams would affect almost 10% of the population and inundate 5% of the acreage in the City of Pasadena.

Table 5-4: Dam Failure Threatened Populations

Threatened Population Metric	Eaton Wash/ Devils Gate Dam	City
Population	14,438	144,388
Households	5,722	57,226

Threatened Population Metric	Eaton Wash/ Devils Gate Dam	City
Median household income	$126,012	$76,264
Percentage of households living under the poverty limit	3.54%	13.8%

** Percentages are estimates only, as exact values for some statistics were not available. Actual percentages might be greater than the estimate presented in this table.*

*** Based on the City insured replacement values*

Other Threats

Dam failures are often triggered by other events (e.g., seismic shaking, intense rainstorms, etc.). There would most likely be service disruptions in Pasadena if this type of event occurred. Floodwaters could quickly inundate the city, disrupting utilities such as water, power, and other services (communications or transportation infrastructure). Residents may find street lighting and traffic signals are temporarily disabled. Debris carried by the rapid inundation may result in injury of death, destroyed structures and facilities and damage to transportation systems .

Changes in Population Patterns and Land Use and Development

Population in the inundation zone may choose to move out of the City or out of the inundation area if the impacts of dam failure are great enough. Those renting homes within the City (61% of households within the City) have little control over the rebuilding process of a home that has been affected by inundation and, therefore, may be forced to move out of the inundation area or out of the City.

Dam failure is unlikely to affect land use and development because the development review process will take steps to mitigate or minimize flood-related impacts. Areas inundated within the City would not be significantly altered, requiring changes in land use and development patterns

Drought

Physical Threat

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

Social Threat

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

Other Threats

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

Changes in Population Patterns and Land Use and Development

Droughts occur periodically (primarily during the Summer/Fall months) and generally do not affect populations to the degree that they would need to migrate in and out of the City. The anticipated population growth in Pasadena is unlikely to have any significant effect on population growth.

It is unlikely that drought will affect land use and development because the development review process will take steps to mitigate or minimize the impacts and vulnerability of drought in Pasadena.

Earthquake

Physical Threat

Seismic Shaking

Many physical assets in the City are estimated to experience the same seismic shaking intensity, ranging from 85 to 95% (shaking intensity in relation to the earth's gravity). Therefore, all facilities could be damaged during a significant seismic event, which would 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 $252 million. Underground physical assets, like pipelines or utilities, could be damaged if seismic shaking were strong enough to cause a rupture. In such a scenario, natural gas and water delivery service to Pasadena homes and businesses would be incapacitated until repairs are completed. **Table 5-5** displays these potential scenarios and losses that could incur should shaking reach the described threshold. **Figure 5-7** displays the CFs and FOCs within the City's seismic shaking potential hazard zones.

Table 5-5: Critical Facilities and Facilities of Concern (Seismic)

Category	# of Facilities - Critical	# of Facilities - Concern	Total Potential Loss**
Government Operations, Modular	18	13	$459,064,100
Emergency Operations (Police, Fire)	11	0	$76,963,985
Water and Wastewater Infrastructure, Pressure Reducing Systems	57	0	$88,266,275
Recreational, Cultural, Community Centers	5	37	$628,752,079
Residential (City Owned)	16	0	$8,052,934
Total	**107**	**50**	**$1,261,099,373**

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

*** Based on the City of Pasadena insured replacement values*

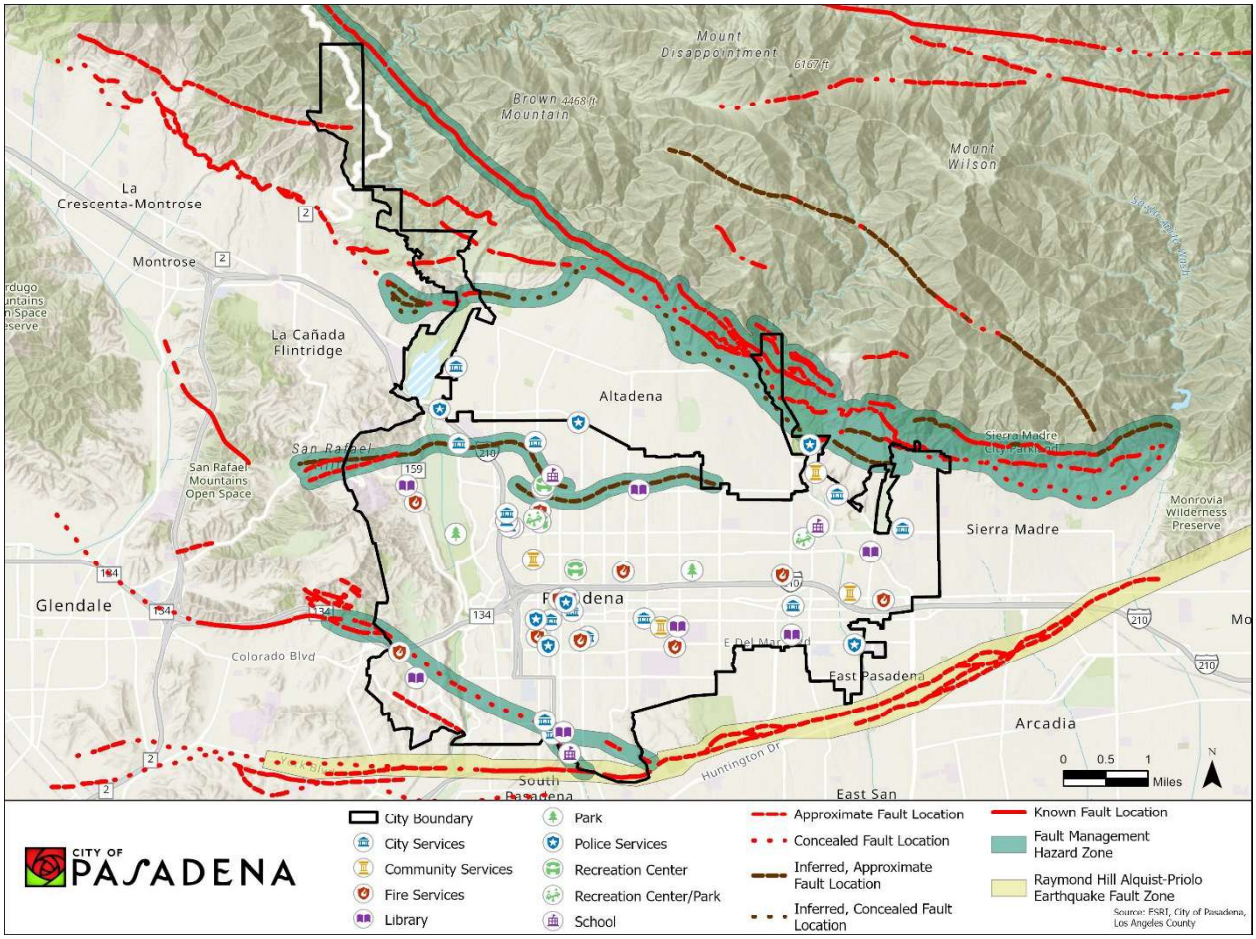


Figure 5-7: Earthquake Threat Map with City infrastructure

Subsidence

Subsidence can influence both the built and natural environment. Because water lines are gravity-driven, a change in elevation due to subsidence could make the system more inefficient. Structures built in areas that experience subsidence may require retrofitting or relocation. Subsidence could also irreversibly decrease an aquifer's capacity to store water. **Table 5-6** shows 107 CF, and 50 FOC could be affected by land subsidence in the City, resulting in a loss of almost $1,261,099,373. **Figure 5-8** displays the CFs and FOC within the City's land subsidence hazard zones.

Table 5-6: Critical Facilities and Facilities of Concern (Land Subsidence)

Category	# of Facilities - Critical	# of Facilities - Concern	Total Potential Loss**
Government Operations, Modular	18	13	$459,064,100
Emergency Operations (Police, Fire)	11	0	$76,963,985
Water and Wastewater Infrastructure, Pressure Reducing Systems	57	0	$88,266,275
Recreational, Cultural, Community Centers	5	37	$628,752,079
Residential (City Owned)	16	0	$8,052,934
Total	**107**	**50**	**$1,261,099,373**

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

*** Based on the City insured replacement values*

Social Threat

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

Seismic Shaking

Seniors, pregnant women, and persons with disabilities are more threatened by seismic shaking since they may have limited mobility and may be unable to reach shelter in time. Even if these groups reach shelter in time, they may find themselves trapped if furniture or building components have fallen around them. Renters and low-income people are also more threatened by seismic shaking since these groups may live in homes that are not properly retrofitted to survive the stresses of a seismic event. These groups may not be able to absorb the costs associated with repairing their homes or looking for new housing should their existing one be too damaged for occupancy. **Table**

5-7 displays the threatened populations in Pasadena associated the seismic shaking scenarios.

Subsidence

While subsidence can cause significant issues with physical infrastructure, many of the social impacts can be related to where people live and work. Subsidence can impact the safety of homes and businesses. Buildings could gradually sink due to subsidence, causing minor issues such as cracks or misalignments of doors and windows or more costly problems such as sinkholes. These issues could impact residents living in older homes, which may not have been built with foundations reinforced with steel. Because insurance companies may not cover damages caused by subsidence or other geologic hazards, lower-income households may find it financially difficult to cope with subsidence. **Table 4-26** displays the populations characteristics of those in Pasadena threatened by land subsidence. Approximately 80% of the City's residents live in an area with land subsidence and share similarities with the demographics of the entire City.

Other Threats

Seismic Shaking

With early earthquake warning systems becoming operational, it can be expected that utilities will take advantage of these advance warnings to shut off gas, water, and power transmission to control any potential leaks following the seismic shaking. Authorities may have enough time to halt the use of infrastructure or move workers to safe locations away from hazardous conditions. Workers could cease their activity and take shelter until they can be safely evacuated. Therefore, all services could be non-operational during the shaking event and remain inactive until authorities are confident that it is safe to reactivate utilities and return employees to their workplaces. The length of this time would vary depending on the magnitude of the event. A significant earthquake would likely put utilities out of commission and halt any employment activity in the City for a few hours or several days. The City and the region would experience reduced economic activity during the outage period, which would not be felt for weeks, months, or years later. Structures such as telephone poles or power transmission towers felled by the shaking could block roadways and prevent emergency response teams from reaching victims or evacuees who need assistance.

Subsidence

If subsidence occurred in Pasadena, causing impacts to homes and businesses, the City would need to identify the locations of impact and potential triggering event. Damage to roads, rail lines, and underground pipes (water, wastewater, and natural

gas) is likely to be impacted during a subsidence event. As a result, the areas impacted by these effects could experience a loss of City services and potential congestion if roadways are impacted.

Changes in Population Patterns and Land Use and Development

Seismic Shaking

It is not anticipated that population patterns will change over the next 20 years. 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 may be impacted more severely than newer structures in the City.

Subsidence

Although subsidence is being monitored throughout the City, its effects happen very slowly, and the impacts cause minor damage to structures that can be repaired. Because of this, subsidence is unlikely to cause changes in population patterns as well as land use and development. The City's development review process will identify steps to mitigate or prevent future subsidence.

Extreme Weather (Severe Winds, Extreme Heat, Severe Rainstorms)

Physical Threat

Severe Winds

Intense winds likely present the greatest threat to physical structures, particularly from trees or branches that fall on buildings/vehicles, causing 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. Often utility poles and trees suffer impacts during high wind events if they occur after a significant rain event. During these events, saturated soils around the base of the tree/pole may be unable to hold up to the strains placed on it by strong winds causing it to fall over.

Trees, tree branches, and other objects have the potential to fall on powerlines and other electrical infrastructure during a severe windstorm, causing power outages throughout the City. Another physical threat of severe wind is wildfire impacts during the summer months.

Extreme Heat

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

and other electrical grid components become less effective in higher temperatures and may be damaged due to stress during extreme heat events. Urban heat islands occur when natural land cover is replaced with concentrations of pavement, buildings, or other surfaces that absorb and retain heat. 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 the summer when solar radiation is strongest.

Severe Rainstorms

Physical threats associated with severe rainstorms are similar in nature to those identified in the Flood discussion below.

Social Threat

Severe Wind

Severe wind events can harm people throughout Pasadena but have a greater effect on the safety of people experiencing homelessness and those working outdoors. Populations that work outside or have respiratory illnesses may be impacted by severe wind events as they can generate dust and other contaminants that can affect the health of residents and workers. Lower-income residents, who may not have the financial resources to purchase homes (or are renting homes) that are not 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 Pasadena homelessness count, in 2025, there were approximately 556 individuals experiencing homelessness in the City, with 57% percent unsheltered. This population is very vulnerable to heatstroke during a heatwave, 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 power outages due to heat/rolling blackouts. 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.

Sever Rainstorm

Social threats associated with sever rainstorms are similar in nature to those identified in the Flood discussion below. The following populations are most vulnerable to severe weather:

- Households with financial instability.
- Persons that spend an extended amount of time outdoors.
- Persons with existing health conditions or limited mobility.
- Persons with language barriers and citizenship uncertainty.
- Persons living in mobile homes.
- Overcrowded households.

Other Threats

Severe Wind

Southern California and the City all suffer from seasonal Santa Ana Winds and will for the near future. Extreme wind events can worsen other risks, such as wildfires.

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 extreme wind, it can cause or spread urban fires and jeopardize additional neighborhoods/ communities.

Severe Rainstorm

Other threats associated with sever rainstorms are similar in nature to those identified in the Flood discussion below. Severe rain can lead to debris flows in wildfire affected areas of the City and cause significant property damage to areas of the City.

Changes in Population Patterns and Land Use and Development

Severe Wind

Severe winds 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 the northern part of the City may be impacted more severely than newer structures in the southern part of the City. The northern part of the City has overhead powerlines and mature trees, and older structures may not comply with current building codes.

Extreme Heat

Based on the recent update to TOP 2050 (General Plan), it is not anticipated that population patterns will change over the next 20 years. There could be minor changes in population patterns due to extreme heat if people cannot continue to live in older structures with limited insulation and older cooling units.

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 extreme heat. While it is unlikely that extreme heat will affect land use and development, it is possible that additional investment in older parts of the City will occur to modify structures to handle these conditions.

Severe Rainstorm

Severe rainstorms occur periodically (primarily during the winter months) and generally do not affect populations to the degree that they would need to migrate in and out of the City. However, in rare circumstances, there may be the need to evacuate households for a short period of time until the flooding recedes.

Flooding

Physical Threat

No portions of the City are located within the 100-year flood zone (1.0% Annual Chance of Flooding) and the 500-year flood zone (0.2% Annual Chance of Flooding). Although not a "priority" hazard, it is worth to note aspects of the Flood hazard. Flooding in the City of Pasadena is generally related to urban flooding, not riverine flooding. Although the City has gone through several flood events in which properties have experienced repetitive loss, there are no properties that fall under the NFIP definition of Repetitive Loss Properties. The City of Pasadena has two (2) repetitive loss properties, both residential properties. One property has two (2) claims and is located on the southern boundary of Eaton Canyon Park; the other property has three (3) claims and is located just west of the Rose Bowl.

Any physical assets within these mapped boundaries can potentially be inundated if enough precipitation falls, exceeding the storm drain infrastructure design capacity in these areas. Electronic or mechanical equipment on the ground could be impacted causing it to fail. **Table 5-8** identifies that one (1) physical asset within the City is located in the 100-year flood zone. Table 5-8 - 5-9 identifies 3 physical assets within the City located in the 500- year flood zone. In total, these facilities are valued at over $12 million. **Figure 5-9** depicts the locations of CFs and FOCs located in FEMA- designated flood zones, which include the 100-Year Flood Hazard (blue), 500-Year Flood Hazard (orange), and Areas with Reduced Flood Risk Due to Levee (yellow).

Table 5-8: Critical Facilities and Facilities of Concern (100-Year Flood)

Category	# of Facilities - Critical	# of Facilities - Concern	Total Potential Loss**
Government Operations Emergency Operations	1	0	$10,000,000-
Recreational, Cultural, Community Centers	0	0	0-
Total	**1**	**0**	**$10,000,000-**

** Based on the City of Pasadena insured replacement values*

** Percentages are estimates only, as exact values for some statistics were not available. Actual percentages might be greater than the estimate presented in this table.*

Table 5-9: Critical Facilities and Facilities of Concern (500-Year Flood)

Category	# of Facilities - Critical	# of Facilities - Concern	Total Potential Loss**
Government Operations, Emergency	1	0	$10,000,000
Recreational, Cultural, Community Centers	0	2	$2,000,000
Total	**0**	**0**	**$12,000,000**

** Based on the City of Pasadena insured replacement values*

** Percentages are estimates only, as exact values for some statistics were not available. Actual percentages might be greater than the estimate presented in this table.*

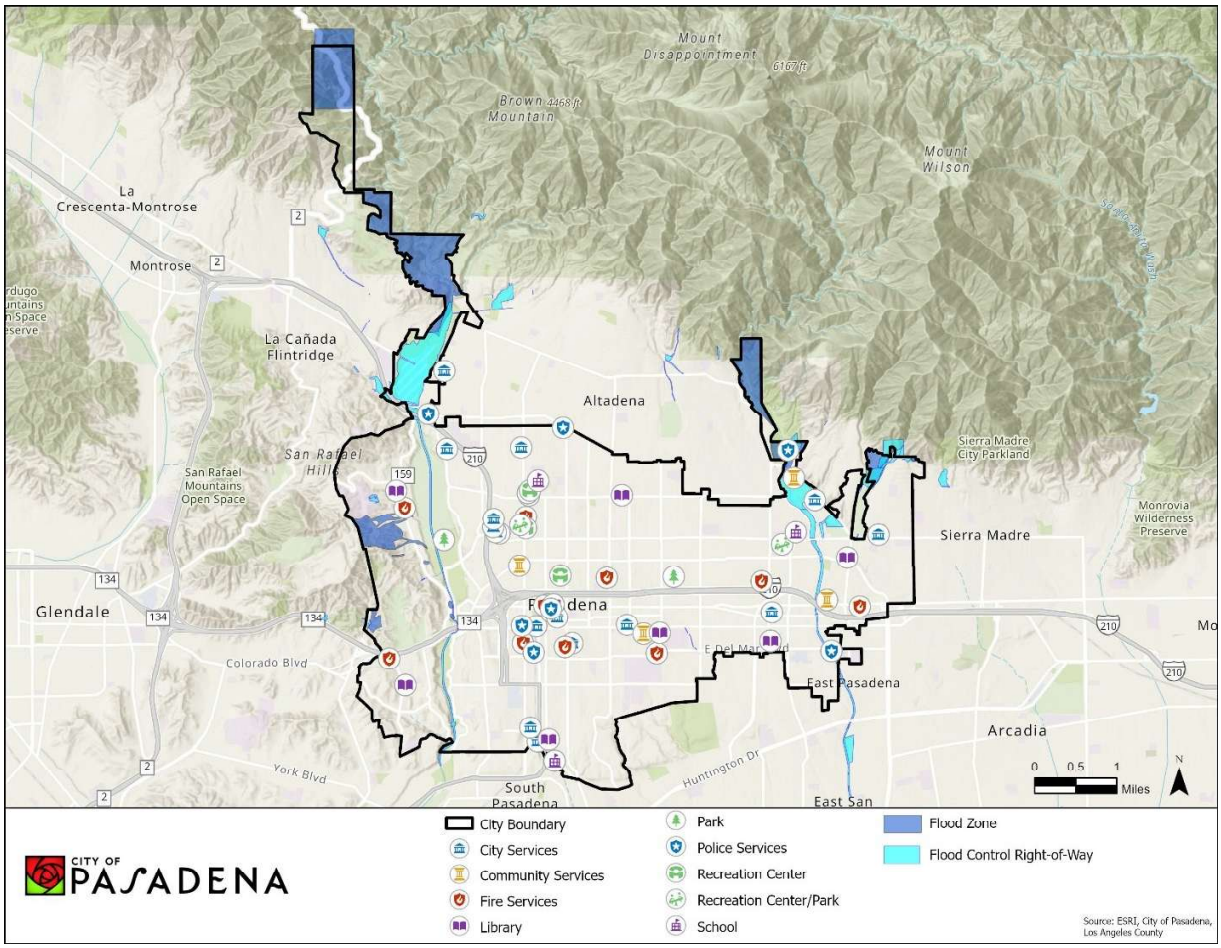


Figure 5-9: Critical Facilities and Facilities of Concern in FEMA Flood Zones

Social Threat

Floodwaters in both the 100-year zone and the 500-year zone are anticipated to rise to a depth of no more than one foot above the base flood elevation. 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 impacted during these events. **Figure 5-9** shows the proportion of Pasadena's vulnerable populations that face a greater threat from a flood event. Based on the information in **Table 5-10**, the median household income in both the 100-year and 500-year flood zones is higher than the citywide average.

Persons experiencing homelessness who are outside during flood conditions may experience property damage or be unable to access shelter. Though floodwaters in Pasadena are not expected to exceed a depth of one foot in many areas, six inches (6 in.) of floodwater may render any makeshift structures uninhabitable during a flood event. Possessions such as sleeping bags or electronic devices may be damaged or swept away by these floodwaters.

Additionally, the 2022 Vulnerability Assessment has identified the following populations as flood-threatened populations:

- Households with financial instability.
- Persons that spend an extended amount of time outdoors.
- Persons with existing health conditions or limited mobility.
- Persons with language barriers and citizenship uncertainty.
- Persons living in mobile homes.
- Overcrowded households.

Other Threats

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, depending on the velocity. A severe flood situation may prevent people who own smaller vehicles from driving to work, leading to reduced economic activity. Severe flooding that causes serious damage to homes and businesses may also reduce economic activity until repair work is completed.

Changes in Population Patterns and Land Use and Development

It is unlikely that flooding will affect land use and development patterns in affected areas because the median income in impacted areas is higher than the City average. Additionally, the development review process ensures flood related impacts are mitigated or minimized.

Table 5-10: Flood-Threatened Populations

Threatened Population Metric	Flood Hazard	City
Population	4500	144,388
Households	1,700	57,226
Median household income	$134,981	$76,264
Renter Occupied Households	3%	10%
Percentage of households with at least one person living with a disability	3%	9.4%
Percentage of households living under the poverty limit	4.83%	13.8%
Percentage of households with one-member aged 65+		**9.1%**

** Percentages are estimates only, as exact values for some statistics were not available. Actual percentages might be greater than the estimate presented in this table.*

*** Based on the City insured replacement values*

Public Health Incidents: Pandemics, Epidemics

Physical Threat

Public Health events will not harm buildings or infrastructure within the City. However, the regional or global nature of public health incidents might incur indirect costs through personnel death and disease, absenteeism, and reduced efficiency. Public health incidents will likely threaten the city's administrative and facilities operations, whereas automated services and infrastructure itself will not be significantly impacted.

Social Threat

Pandemics can overwhelm healthcare systems, creating shortages of medical supplies and causing significant morbidity and mortality. In addition to the physical health impacts such as respiratory distress, organ failure, and long-term complications for survivors, healthcare workers face an increased risk due to their exposure to infected individuals. Beyond these immediate health impacts, pandemics disrupt daily life, leading to school closures, business interruptions, and economic downturns. The psychological toll on individuals and communities can be profound, with increased levels of anxiety, depression, and stress. These factors contribute to changes in population, influencing migration patterns, birth rates, and mortality rates, thereby altering the demographic landscape.

Fire

Physical Threat

Wildland Fire

The California Department of Forestry and Fire Protection has mapped Very High Fire Hazard Severity Zones (VHFHSZ) within the City's Local Responsibility Area (LRA). The LRA is a government-designated area where a local agency, City, or county, NOT the State, is responsible for fire protection. An SRA is the opposite, where the State has responsibility for wildland fire protection. **Figure 5-10** 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.

All structures located within this zone are at an elevated risk of wildfire impacts. **Table 5-11** identifies 4 CFs and 7 FOC within the wildfire hazard zone, resulting in a potential loss of approximately $145 million based on available replacement values. Additional losses associated with the loss of homes and schools in these areas could also occur resulting in a significant amount of cost.

While these areas have a high degree of vulnerability to wildfire, other areas of the City may also be susceptible to ember cast. These areas, typically referred to as the WUI

(Wildland Urban Interface), are vulnerable if the right conditions exist. Typically, the WUI is impacted if adequate fuels are combined with dry conditions and strong winds. Sometimes, the ignition of a wildfire may occur if power lines around overgrown trees cause a spark and catch the tree on fire.

Table 5-11: Critical Facilities and Facilities of Concern (Wildfire)

Category	# of Facilities - Critical	# of Facilities - Concern	Total Potential Loss**
Government Operations, Emergency Operations	4	4	$130,424,000
Recreational, Cultural, Community Centers	0	3	$15,000,000
Residential (City owned)	0	0	$0
Total	**4**	**7**	**$145,424,389**

** Based on the City insured replacement values*

**Percentages are estimates only, as exact values for some statistics were not available. Actual percentages might be greater than the estimate presented in this table.*

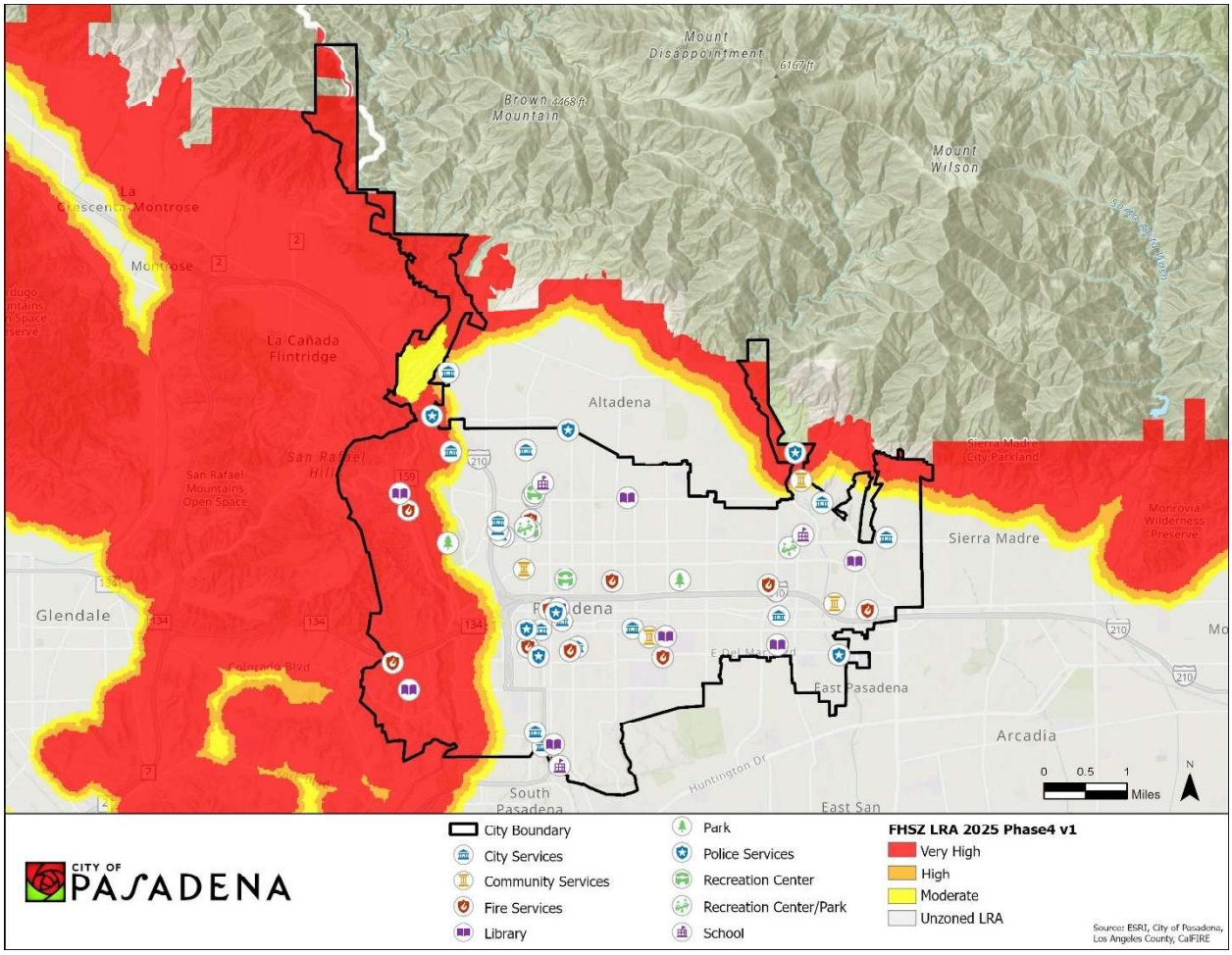


Figure 5-10: Critical Facilities and Facilities of Concern (2025 Map has not been adopted by City Council)

Urban Fire

Structures and physical assets in Pasadena 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, or may not meet current code requirements and regulations. While all structures can be impacted by urban fire, older structures may have increased vulnerability to this hazard. Power lines located around overgrown trees, where the tree crown envelops part or all the power lines, are also at risk of catching fire. When the wires overheat, they may ignite a fire in the tree, spread back to the power lines themselves, and burn the power line infrastructure. Underground utilities, like water delivery systems, residential electrical systems, or natural gas pipelines, are not threatened by the occurrence of fire since any urban fires that emerge in Pasadena are likely to occur on the surface.

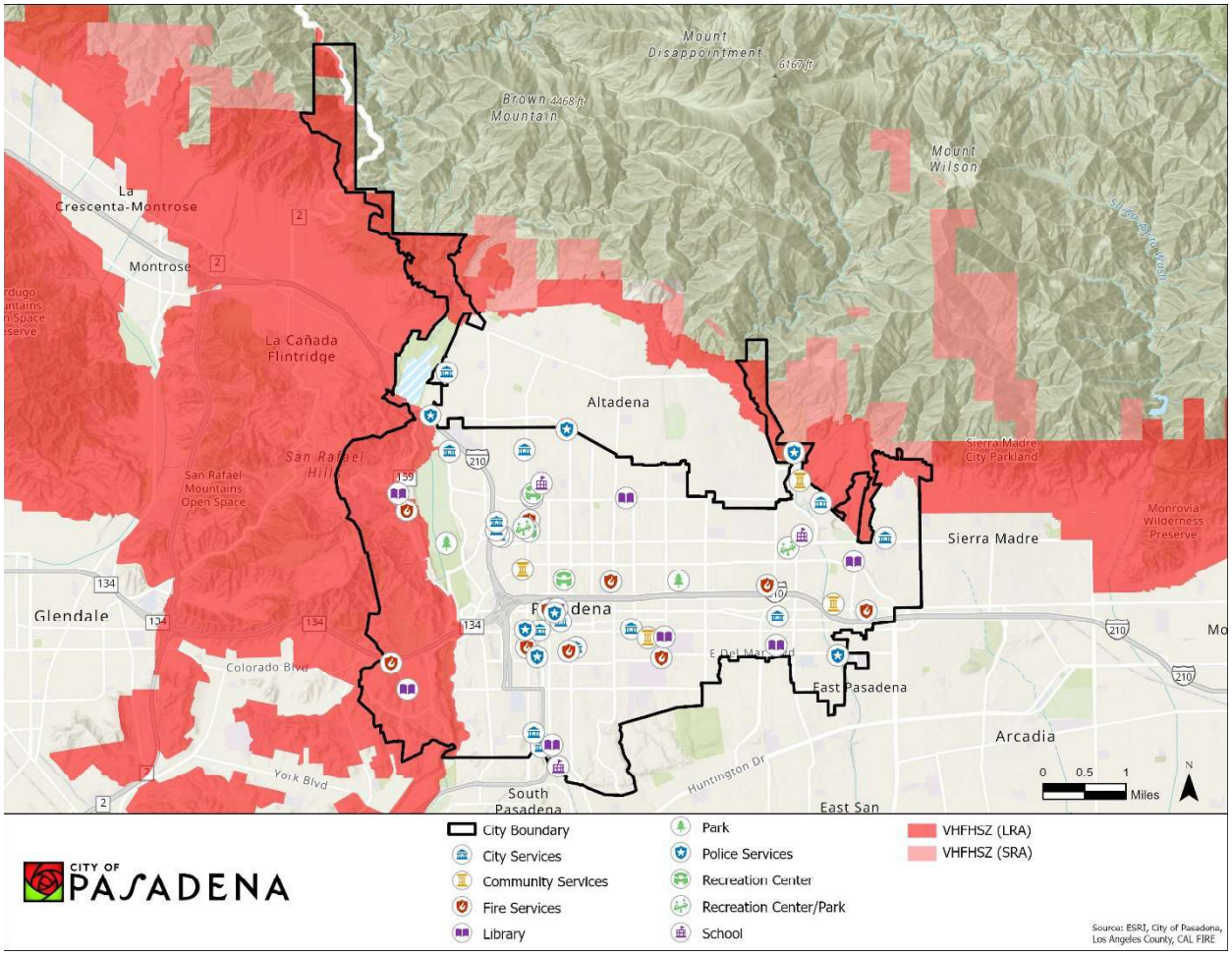


Figure 5-11: Critical Facilities and Facilities of Concern (Previous adopted fire hazard map)

Social Threat

A fire hazard most immediately threatens seniors and persons with disabilities. These groups may have limited mobility and reduced environmental awareness. For example, a senior who lives alone may not be aware that a fire has been ignited in their house until the room begins to fill with smoke or even flashover, at which point escape may be more difficult or impossible. Therefore, a fire that starts in or spreads to any senior residences in Pasadena could be highly threatening to those populations. Persons with disabilities may require special mobility devices or caregiver assistance to go outside, which may not be readily available if a fire occurs. Other groups with increased threat levels include lower- income persons and renters. These persons 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

maintained electrical or heating systems that could lead to a fire. Additionally, these groups may not possess enough financial resources to rebuild their homes or search for new homes after a fire occurs.

Other Threats

Fires can consume power lines and force utility operators to shut off electrical and gas transmission activity, leading to utility outages in Pasadena homes and businesses. Any streets surrounded by blazes or blocked by burning debris would hinder transportation, prevent people from evacuating, and block emergency response crews from reaching the source of the fire. Anyone living at the end of a cul-de-sac faces an elevated threat of being trapped if the fire occurs or spreads in a way that blocks evacuation. Fires that destroy trees or vegetation (especially within parks and open space areas) could limit or prevent the use of these areas, affecting future recreational opportunities for residents.

Outreach to residents and businesses to help them understand and prepare for these future events will become an important aspect of the City's overall hazard mitigation strategy.

Changes in Population Patterns and Land Use and Development

If a large urban fire were to occur, it is feasible that changes in population patterns could occur. Land use and development patterns could change if a large urban fire were to occur that impacted older parts of the City. After that type of event, the City would rely on a redevelopment process to determine how best to rebuild.

Human-Caused Hazards

Physical Threat

Air Quality

Air pollution exposure is associated with oxidative stress and inflammation in human cells, which may lay a foundation for chronic diseases and cancer. In 2013, the International Agency for Research on Cancer of the World Health Organization (WHO) classified air pollution as a human carcinogen. Short-term exposure to higher levels of outdoor air pollution is associated with reduced lung function, asthma, cardiac problems, emergency department visits, and hospital admissions.

Air pollution and climate change affect each other through complex interactions in the atmosphere. Air pollution is intricately linked with climate change because both problems come largely from the same sources, such as emissions from burning fossil fuels. Both are threats to people's health and the environment worldwide.

Civil Disturbance

A civil disturbance, depending on the cause and effect, could have a considerable impact on the population, built environment, lifeline infrastructure, economy, and the environment. Downtown Los Angeles is a frequent site of demonstrations due to its high profile and presence of government buildings. It is conceivable that a demonstration could turn to violence and begin spreading into neighboring communities. While the City does not have a history of riots, it also has a high profile and has several events which attract large crowds. This coupled with increased causes creating disharmony within society may provide opportunities for some individuals.

Cyber Attack

A significant cyber event could have considerable impact on the population, built environment, lifeline infrastructure, environment, environment, and the economy. Most jurisdictions have several levels of security in place, dependent upon security levels of individuals and the geographical locations (onsite or remote). Many also have redundant dispatch centers with separate systems that can function if the primary center isn't functioning.

A cyber-attack can infiltrate many institutions including banking, medical, education, government, military, and communication and infrastructure systems. The majority of effective malicious cyber- activity has become web based. Recent trends indicate that hackers are targeting users to steal personal information and targeting computers to cause system failures. The duration of a cyber-attack is dependent on the complexity of the attack, how widespread it is, how quickly the attack is detected, and the resources

available to aid in restoring the system. A cyber-attack could be geared toward one organization, one type of infrastructure and/or a specific geographical area. The affected area could range from small to large scale. Cyber-attacks generated toward large corporations can negatively affect the economy. A 2014 report from the MacAfee Corporation stated that the annual global loss to the global economy is between $375B and $500B. Attacks geared toward critical infrastructure and hospitals can result in the loss of life and the loss of basic needs, such as power and water, to the public. Cyber-attacks can lead to the loss of operational capacity.

Hazardous Materials Release (Pipeline Failure, Oil Spill, Transportation Incident)

Hazardous materials can cause damage to physical assets in Pasadena if they are released into the environment. Corrosive hazardous materials can damage the exteriors of buildings or structures. Flammable hazardous materials can be ignited and cause damage to nearby structures. Generally, sites closer to the origin of the release of the hazardous materials are more at risk than those further away.

The total potential losses associated with these assets are over $59 million based on replacement costs.

Transportation incidents typically threaten infrastructure like roadways, bridges, and utilities that may be adjacent or co-located with these facilities. Depending on the nature of the event surrounding structures and uses may also be impacted; however, to what degree is difficult to identify at this time. While many incidents within the City may be considered minor, if one were to occur at a key intersection or interchange, traffic, and commerce within the affected area could be impacted significantly for hours or days, depending on the severity of the incident.

Power Outage

Energy shortage/outages (disruptions) are considered a form of lifeline system failure and could have a significant impact on the population, built environment, infrastructure, and the economy. Disruptions can be the consequence of another hazard, or can be the primary hazard, absent of an outside trigger. Pasadena and Southern California as a whole have experienced a population growth, coupled with changes to daily lifestyles and weather have contributed to a heavy demand for power over recent years.

There are two (2) factors to consider: 1) increased demand within the City; and 2) increased demand elsewhere. Because Pasadena is connected to the Southern Californian Edison (Edison) power grid, increases in other parts of the state could curtail the energy available to Pasadena. This vulnerability is compounded by the reality that our communities have become more reliant on power for gadgets and appliances to perform basic daily activities. This loss of power will not only be an inconvenience but

could become a life-threatening experience. Many citizens rely on power to operate medical machinery to survive (i.e., oxygen tanks, dialysis machines).

Climate change considerations indicate that as the weather conditions change, there could be an increase in energy needs. This could be from both potential increase in heat and cold. These predicted increases will put ever greater strain on Pasadena's energy supply.

Terrorism

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

Social Threat

Air Quality

Air pollution exposure is associated with oxidative stress and inflammation in human cells, which may lay a foundation for chronic diseases and cancer. In 2013, the International Agency for Research on Cancer of the World Health Organization (WHO) classified air pollution as a human carcinogen. Many studies have established that short-term exposure to higher levels of outdoor air pollution is associated with reduced lung function, asthma, cardiac problems, emergency department visits, and hospital admissions. Mortality rates related to air pollution are also a concern. Exposure to the air pollutant PM2.5 is associated with an increased risk of death. Public health concerns related to high air pollution exposures include cancer, cardiovascular disease, respiratory diseases, diabetes mellitus, obesity, and reproductive, neurological, and immune system disorders.

Civil Disturbance

Since civil disturbance events can occur anywhere in the City, all groups are potentially threatened by the impacts of these incidents; however, the extent of the threat would be much greater to businesses. For example, in May of 2020, the George Floyd protest turned into civil disturbance and impacted hundreds of businesses in Southern California. Additionally, there have been isolated incidents of individuals ransacking businesses around the Country.

Cyber Security Incident

Cities like Pasadena are an attractive target for criminals and cyber threat actors to exploit vulnerable systems to steal critical infrastructure data and proprietary information, conduct ransomware operations, or launch destructive cyberattacks. Successful cyberattacks against cities could lead to disruption of infrastructure services, significant financial losses, exposure of citizens' private data, erosion of citizens' trust in the smart systems themselves, and physical impacts to infrastructure that could cause physical harm or loss of life.

Hazardous Materials Release (Pipeline Failure, Transportation Accidents, Oil Spills)

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, sewer mains, and transportation incidents that produce hazardous material spills. **Table 4-14** shows the city's vulnerable populations living within 500 feet of a hazardous materials storage/waste site. The median household income in these locations is almost **$25,000** less than the rest of the city. This suggests that lower-income populations may be living near locations that store or use hazardous materials. Pasadena residents living next to major transportation infrastructure such as highways or major roadways also face a greater risk of being affected by a hazardous materials release if vehicles transporting these materials accidentally release their contents into the environment. Groups such as the elderly, low-income, and renters face a greater risk of exposure since they may not have the financial resources necessary to retrofit their homes against infiltration by hazardous materials or relocate to a home farther from the potential sources of hazardous materials.

Residents and businesses located near major transportation infrastructure may be at greater risk of impact from these types of incidents. For residents that rely on the transportation network to get to work, any closures or impacts to that network could have a negative impact on their daily lives and well-being. At the same time, businesses could be impacted if employees and customers are unable to reach their place of business due to an incident. While many incidents would be short-term, reducing impacts to the community, if a significant issue were to occur, the impacts could be longer, which could have economic impacts for both residents and businesses.

Power Outage

Power outages most immediately threaten seniors, persons with disabilities, and those with home medical equipment. These groups often face the greatest threat during a power outage, during extreme heat.

Terrorism

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

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

Changes in Population Patterns and Land Use and Development

The hazards identified under human-caused hazards will not affect population patterns or land use and development, as no connection can be drawn between these hazards and changes in population patterns or land use and development.

It is not anticipated that population patterns will change over the next 20 years. A change in population pattern would only occur if a hazardous materials release was severe enough to require people to move for a prolonged period of time due to soil contamination.

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. Through this process, as well as the development review process, it is not anticipated that land use and development patterns will change.

SECTION 6: MITIGATION STRATEGY

Federal regulations require local mitigation plans to identify goals for reducing long-term vulnerabilities to the identified hazards in the planning area (Section 201.6(c)(3)(i)).

A hazard mitigation plan's primary focus is the mitigation strategy. It represents the efforts selected by the City to reduce or prevent losses resulting from the hazards identified in the risk assessment. The strategy includes mitigation actions and projects to address the risk and vulnerabilities discovered in the risk assessment. The mitigation strategy consists of the following steps:

- Identify and profile hazards and risk within the City
- Identify projects and activities that can prevent or mitigate damage and injury to the population and buildings
- Develop a mitigation strategy to implement the mitigation actions
- Develop an action plan to prioritize, implement, and administer the mitigation actions
- Implement the LHMP mitigation action plan

A capability assessment was conducted of City authorities, policies, programs, and resources. Based upon this assessment and the hazard analysis and risk assessment, goals, and mitigation actions were developed. The planning team also developed a process to prioritize, implement, and administer the mitigation actions to reduce risk to existing facilities and new development

6.1 Hazard Mitigation Statement

The 2025 LHMP represents the City's commitment to create a safer, more resilient community by taking actions to reduce risk and by committing resources to lessen the effects of hazards on the people and property of the city.

6.2 Hazard Mitigation Goals and Objectives

Mitigation goals are guidelines that represent what the community wants to accomplish through the mitigation plan. Goals are broad statements that represent a long-term, community-wide vision. The planning team reviewed the example goals and objectives from the previous LHMP and determined which goals best met the City's objectives for mitigation. In addition to the overarching hazard mitigation goals, the City worked to

develop the strategies aligned with the CIP and other planning mechanisms that relate to hazard mitigation. Overall, mitigation priorities did not change for the City of Pasadena, the city continues to be very concerned about wildfire and earthquake risks. The 2025 LHMP was revised to focus on the communities' priorities as they relate to Climate Change, Wild/Urban Fire, and their commitment to involving vulnerable populations to the planning process. **Table 6-1** lists the goals for the 2020 LHMP.

Table 6-1: Hazard Mitigation Goals

2025 Goals
Goal 1: Protect life and property, and reduce potential injuries from natural, technological, and human-caused hazards
Goal 2: Improve public understanding, support of, and need for hazard mitigation measures
Goal 3: Promote disaster resilience for the City's natural, existing, and future built environment
Goal 4: Strengthen partnerships and collaboration to implement hazard mitigation activities
Goal 5: Enhance the City's ability to effectively and immediately respond to disasters

6.3 Mitigation Actions/Projects and Implementation Strategy

Mitigation actions are specific activities or projects that serve to meet the goals that the community has identified. Mitigation actions and projects are more specific than goals or objectives and often include a mechanism, such as an assigned timeframe, to measure the success and ensure the actions are accomplished. The planning team conducted a review of the mitigation actions and strategies from the State Hazard Mitigation Plan and from other cities' planning efforts to develop new mitigation actions and projects to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure.

The requirements for prioritization of mitigation actions, as provided in the federal regulations implementing the Stafford Act as amended by DMA 2000, are described below.

Based on these criteria, the City prioritized potential mitigation projects and included them in the action plan discussed below in Table 6-3. The mitigation action plan

developed by the planning team includes the action items that the City intends to implement during the next five (5) years, assuming funding availability. The action plan includes the implementing department, an estimate of the timeline for implementation, and potential funding sources.

6.4 Previous Mitigation Actions/Projects Assessment

The 2018 HMP contained 62 mitigations actions. Many of the mitigation actions were completed or carried out to some degree or are considered ongoing. Some of the mitigation actions were duplicative, others were better categorized as emergency preparedness or recovery activities, and others were either not addressed during the time period or were not feasible to accomplish. **Table 6-2** provides the status of mitigation actions from the 2018 HMP.

Table 6-2: 2018 Hazard Mitigation Plan Mitigation Action Status

#	Mitigation Action	Status (Complete, Ongoing, Planned, Not Completed)
1	Make the City Local Hazard Mitigation Plan available on the website	Completed
3	Establish and conduct annual employee training on privacy and security policies and incident response procedures.	Ongoing – Added to 2025 Plan. #5
4	Develop a policy to ensure the City's LHMP is reviewed during the development of capital improvement plans.	Ongoing – Added to 2025 Plan. #3
5	Upgrade Traffic Signal, Street Lighting Poles, and Systems citywide to meet or exceed modern loading requirements.	Ongoing – Added to 2025 Plan
6	Seismic Retrofit of City-owned Essential Buildings, including Fire Stations and Evacuation Centers.	Planned
7	Develop a policy to ensure the annual review of potential landslide areas in the City of Pasadena.	Planned

#	Mitigation Action	Status (Complete, Ongoing, Planned, Not Completed)
8	Develop a Public Outreach Plan geared towards providing hazard education, emergency management, and mitigation action activities.	Completed
9	Review and revise the Emergency Operations Plan (EOP) to reflect response and recovery Concept of Operations best practices	Completed
10	Purchase supplies, equipment, and other resources to enable critical facilities identified in the EOP to be able to function as needed	Completed
11	Review area-wide evacuation plans/routes to identify changes and determine if changes need to be incorporated in the City Emergency Operations Plan (EOP) and/or Evacuation Plan	Completed
12	Develop a Disaster Communications Plan	Completed
13	Develop an EOP scenario-based Annex light rail accident	Completed
14	Develop an EOP scenario-based Annex for active shooter events	Completed
15	Develop a planning team to work with local school districts and universities to prepare both scenario-based and functional-based plans	Completed
16	Develop and adopt a soft-story retrofit ordinance; possibly administer an implementation program for the ordinance.	Planned
17	Evaluate and take necessary actions to ensure robust cyber-security of utility infrastructure and protection of critical information systems from cyber-attacks/incidents.	Ongoing – Added to 2025 Plan #41

#	Mitigation Action	Status (Complete, Ongoing, Planned, Not Completed)
19	Develop a policy and/or possibly a Memorandum of Understanding (MOU) with the County Department of Public Works, neighboring jurisdictions, Metrolink, and the California	Completed
20	Department of Transportation to ensure coordination and maintenance of the emergency transportation routes	Completed
21	Establish a Disaster Coordination group and establish a regular meeting schedule. Include both public and private members; and federal, state, county, and local partners. Part of the duties will include the review, evaluation, and monitoring of the LHMP	Planned
22	Provide information to the public regarding hazard mitigation and emergency planning at events promoted by the City.	Completed
23	Develop a policy that encourages incorporation or consideration of vegetation and restoration practices that assist in enhancing and restoring the natural and beneficial functions of the watershed when mitigation against hazards	Completed
24	Develop a policy to ensure the City's Building Codes are reviewed annually to reflect changes and best practices in hazard science (flood, earthquake).	Ongoing
25	Develop a Debris Removal Plan.	Completed
26	Develop a landslide area building ordinance. Review local ordinances for building in potential landslide areas based on proposed development plans and current environmental conditions	Planned

#	Mitigation Action	Status (Complete, Ongoing, Planned, Not Completed)
27	Develop an EOP functional-based Annex for evacuations	Completed
28	Identify City-service, mission critical tasks and develop Business Continuity Plans for each service	Completed
29	Utility infrastructure improvements against earthquake and other hazards including seismic upgrade of power and water facilities, Sunset reservoir improvements, and other critical water infrastructure and upgrades and replacements of local generating units.	Completed
31	Integrate the LHMP into the City's General Plan	Completed
32	Integrate hazard mitigation material into public safety information and training programs (e.g. Citizen's Academy, Community Emergency Response Team Program)	Complete
33	Prepare an inventory of major urban drainage problems and identify causes and potential mitigation actions for urban drainage problem areas.	Ongoing – Added to 2025 Plan
34	Assess and evaluate critical facilities identified in the EOP	Completed
35	Evaluate and retrofit critical facilities identified in the EOP	Ongoing
36	Develop an EOP scenario-based Annex for terrorist events	Completed
37	Implement measures to bolster local water supply to meet demand, create a sustainable water supply, while meeting environmental mandates.	Ongoing – Added to 2025 Plan #12
38	Seismic Retrofit of City-owned Bridges	Ongoing

#	Mitigation Action	Status (Complete, Ongoing, Planned, Not Completed)
39	Restoration of habitat, improvements to the watershed, and enhancement of spreading activities of water runoff to enhance the flood protection systems and preserve the natural systems	Completed
40	Evaluate and implement protective measures of critical utility buildings, plants and facilities against natural hazards (fire, flood, windstorm)	Completed
41	Develop and implement a program to develop Business Continuity Plans of utility mission critical tasks. Potentially purchase of equipment, mobile electrical sub-stations, and emergency backup generators for utility facilities; emergency transmission and distribution system replacements to ensure continuous functionality after disaster events	Completed
43	Develop a Floodplain Management/Flood Plan.	Completed
44	Develop an EOP functional-based Annex for mass casualties	Completed
45	Develop an EOP functional-based Annex for Mass Shelter	Completed
46	Develop an EOP scenario-based Annex for civil unrest events	Completed
47	Develop a Dam Mitigation Plan.	Completed
48	Develop a Vegetation Management Plan.	Planned
49	In accordance with the 2020 Water system Resources Plan, develop and implement alternative sources of water to meet Pasadena's annual water supply (non-potable water project)	Ongoing – Added to 2025 Plan #13

#	Mitigation Action	Status (Complete, Ongoing, Planned, Not Completed)
50	Upgrade the Arroyo Seco stream water intake structure (Arroyo Secon Canon Project) and implement the Devil's Gate Pump back project to improve our ability to capture more stream water and to recharge the groundwater basin.	Ongoing – Added to 2025 Plan #11
51	Vegetation management on City lands in the watershed for water supply enhancement and fire reduction; Improvements to the Arroyo Seco Canyon; Azusa Hydro upgrades and replacements; and rainwater capture and recycling	Completed
52	Develop guidance to provide resources regarding business continuity planning for local businesses	Planned
53	Evaluate and implement necessary retrofits and upgrades to the diversion facilities in Arroyo Canyon	Completed
54	Evaluate and implement security and protective measures of critical utility buildings, plants and facilities from man-made hazards (terrorist)	Completed
55	Identity the libraries role as a critical facility during response and recovery efforts. Assess the current facilities and retrofit as needed (i.e., fire systems, seismic upgrades) to ensure the integrity of library buildings for use as critical facilities during multi-hazard events. Purchase equipment, supplies, and other resources necessary to carry out the intended role.	Completed
56	Develop a Landslide Management Plan.	Ongoing – Added to 2025 Plan #22
57	Raise Park roadways where necessary to improve the flow of water downstream.	Ongoing – Added to 2025 Plan #27

#	Mitigation Action	Status (Complete, Ongoing, Planned, Not Completed)
58	Find an alternate or new EOC location that allows for ease of access during an emergency. Current location has limitations and safety concerns.	Planned
59	Install earthquake early warning systems o city-owned critical facilities	Planned
60	Develop citywide guidance on mitigation grant application	Planned
61	Annually review and update Department Emergency and COOP Plans	Planned
62	Create a volunteer program that will enhance our community lifeline planning that will bolster our ability to respond to hazards.	Planned

6.4.1 New Mitigation Actions

Mitigation actions are specific activities or projects that serve to meet the goals that the community has identified. Mitigation actions and projects are more specific than goals or objectives and often include a mechanism, such as an assigned time period, to measure the success and ensure the actions are accomplished. The planning team conducted a review of the mitigation actions and strategies from the 2018 HMP. With information from the risk assessment, capability assessment, and status of the actions implemented since the 2018 HMP, the planning team developed 32 new ongoing mitigation actions and projects to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure.

Table 6-3 lists the initial, potential mitigation actions developed by the planning team. For each mitigation action, the following information is listed: type of mitigation project; hazard(s) addressed, type of development affected by action; and the source of the mitigation project idea.

Table 6-3: Potential Mitigation Actions 2025

Goal	Action Item #	Action Description	Mitigation Type	Related Hazards	Implementing Organizations
Goal 1: Protect life, property, and reduce potential injuries from natural caused hazards	1.1	Assess and implement flexible piping joints at above-ground storage reservoirs as appropriate	Prevention	Seismic	Operations
	1.2	Continue to identify and ensure that pipe specifications are compatible with GIS and earthquake specifications	Prevention	Seismic	Operations
	1.3	Identify funding and acquire a mobile command and communications vehicle	Response	All	Operations
	1.4	Continue to include back-up power	Preparedness	Loss of Power/ PSPS	Operations

6.4.2 Mitigation Action Plan

The mitigation action plan developed by the planning team includes the action items that the City intends to implement during the next five (5) years, assuming funding availability. The action plan, shown in **Tables 6-4** to **6-13,** includes the implementing department, an estimate of the timeline for implementation, and potential funding sources.

The new mitigation actions include a broad range of approaches to hazard mitigation such as retrofitting, code enforcement, development of new regulations, public education, development of redundant facilities, and others. Measures are included to mitigate risks to existing buildings and infrastructure, as well as new buildings and infrastructure. The mitigation action plan assigns primary responsibility for each of the action items to an implementing department. The implementing department is the controlling department that will assign funding and oversee activity implementation, monitoring, and evaluation.

The planning team does not presume the expertise to prescribe which projects will be implemented. The prioritization of projects in the LHMP is a means to provide a basis for implementing the mitigation strategies, but all new mitigation actions and projects will be formally prioritized and selected by the implementing department. This will accommodate the project funding, schedule of the department, staff requirements, and ability to integrate the new project into existing and ongoing projects. Departments will consider the funding source, the cost-effectiveness of the project, alternative projects, the compatibility of the new project with ongoing projects, the extent to which the project addresses the risks assessed in Section 4, and the potential of economic and social damage.

Prioritization

To assist with implementing the mitigation action plan, the planning team used the following ranking process to provide a method to prioritize the projects for the Action Plan. Designations of High, Medium, and Low priorities have been assigned to each action item using the following criteria.

Does the action

- Solve the problem?
- Address vulnerability assessment?
- Reduce the exposure or vulnerability to the highest priority hazard?
- Address multiple hazards?
- Offer benefits that equal or exceed costs?
- Implement a goal, policy, or project identified in the General Plan or Capital Improvement Plan?

Can the action

- Be implemented with existing funds?
- Be implemented by existing state or federal grant programs?

- Be completed within the five (5)-year life cycle of the LHMP?

Will the action

- Be implemented with currently available technologies?
- Be accepted by the community?
- Be supported by community leaders?
- Adversely affect segments of the population or neighborhoods?
- Require a change in local ordinances or zoning laws?
- Result in a positive or neutral impact on the environment?
- Comply with all local, state, and federal environmental laws and regulations?

Is there

- Sufficient staffing to undertake the project?
- Existing authority to undertake the project?

Each positive response is equal to one point. Answers to the criteria above determined the priority according to the following scale:

1–6 = Low priority

7–12 = Medium priority

13–18 = High priority

Benefit-Cost Analysis

Conducting benefit/cost analysis for a mitigation activity can assist the City in determining whether a project is worth undertaking now in order to avoid disaster-related damages later. Cost- effectiveness analysis evaluates how to best spend a given amount of money to achieve a specific goal. Determining the economic feasibility of mitigating hazards can provide decision-makers with an understanding of the potential benefits and costs of an activity, as well as a basis for comparing alternative projects.

Funding

The funds required to implement the mitigation action plan will come from a variety of sources, including Federal Hazard Mitigation Grants, City budget, bonds, fees and assessments, and others. Some projects are (or will be) included in capital improvement budgets, while some, especially ongoing projects, are included in department operating budgets.

Prior to beginning a project or when federal funding is involved, the implementing department will use a FEMA approved benefit/cost analysis approach to identify the actual costs and benefits of implementing these mitigation actions. For non-structural projects, implementing departments will use other appropriate methods to weigh the costs and benefits of each action item and then develop a prioritized list.

Implementation

Mitigation projects were assigned one of three (3) categories as a tentative schedule for implementation: short-range, mid-range, and long-range. Projects that are currently being implemented by various departments are assigned to the ongoing category. Implementation of short-range projects will typically begin within the next three (3) years. Mid-range projects will require some planning and likely require funding beyond what is currently allocated to the various departments in the City's Operations and Maintenance budget. Projects in the mid-range category will generally begin implementation in the next three (3) to five (5) years. Long-range projects will require great planning and funding and will generally begin implementation within five (5) years and beyond.

Incorporation into Other Plans

The 2025 LHMP will be coordinated with and integrated into the following other planning mechanisms.

- The City EOP contains a list of hazards. The LHMP provides a similar, more detailed description of these hazards. Updates to the LHMP can inform revisions to the EOP. Hazards in both plans should be corroborated.
- The American Water Infrastructure Act Risk required Risk and Resiliency Assessment (RRA) and the LHMP both should use the same source data and similar language to describe hazards that are contained in both. Hazard analysis and risk/vulnerability updates to one document should be reviewed for inclusion in both. For the 2021 LHMP, the planning team used portions of the RRA to develop new mitigations actions.
- The City will review the mitigation action plan in the LHMP as it updates its CIP. Several mitigation actions address facility improvement and resiliency. Grant funding for these projects may support CIP project.

Table 6-4: Mitigation Action Implementation Plan - Multiple Hazards

#	Mitigation Action	Funding Sources	Responsible Department	Relative Cost*	Time Frame	Priority
1	Install energy efficient equipment and harden emergency backup power at critical facilities deemed necessary. Prioritize installations for facilities that serve as key cooling/warming centers and evacuation centers/shelters. (Hazards addressed: All)	General Fund, HMGP Grants	Public Works	$$	2-5 years	Medium
2	Develop a list of key facilities. Conduct a feasibility assessment of installing solar and battery backup systems at critical facilities within the City. (Hazards addressed: All)	General Fund, HMGP Grants	Public Works	$	2 years	Medium
3	Upgrade power and water facilities, to include Sunset reservoir, to improve resiliency due to power loss, flooding, and seismic activity.	General Fund, HMGP Grants	Water and Power	$$$	Ongoing - Yearly	High

#	Mitigation Action	Funding Sources	Responsible Department	Relative Cost*	Time Frame	Priority
4	Initiate a project to develop Business Continuity Plans for utility mission critical functions. Create a long-range budget to purchase emergency/standby equipment such as mobile electrical sub-stations, and emergency backup generators for utility facilities; and emergency transmission and distribution system replacements to ensure continuous functionality after disaster events (Hazard addresses: Power Loss)	General Fund, HMGP Grants	PWP	$$$	2 years	High
5	Develop a policy to ensure the City's LHMP is reviewed during the development of capital improvement plans/projects. (Hazards addressed: All)	General Fund, HMGP Grants	Fire	$	1 year	Medium
6	Develop a Public Outreach Plan geared towards providing hazard education, emergency management, and mitigation action activities. Create and Integrate hazard mitigation material into public safety information and training programs (e.g. Citizen's Academy, Community Emergency Response Team Program) (Hazards addressed: All)	General Fund, HMGP Grants	Fire	$	Ongoing - yearly	Low

#	Mitigation Action	Funding Sources	Responsible Department	Relative Cost*	Time Frame	Priority
7	Integrate the LHMP into the City's General Plan by complying with AB 2140. (Hazards addressed: All)	General Fund, HMGP Grants	Planning	$	Ongoing - yearly	Low
8	Develop a policy to ensure the City's Building Codes are reviewed annually to reflect changes and best practices in hazard science (Hazards Addressed: Flood, Earthquake).	General Fund, HMGP Grant	Planning	$	3 years	Medium
9	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)	General Fund, HMGP Grants	Fire/ Planning	$	2 years	Medium

Table 6-5: Mitigation Action Implementation Plan – Climate Change

#	Mitigation Action	Funding Sources	Responsible Department	Relative Cost*	Time Frame	Priority
10	Integrate climate change mitigation and adaptation information and analysis into future LHMP updates and others. (Hazards addressed: Climate Change)	General Fund, HMGP Grants	Fire	$	Ongoing - Yearly	High

Table 6-6: Mitigation Action Implementation Plan – Drought

#	Mitigation Action	Funding Sources	Responsible Department	Relative Cost*	Time Frame	Priority
11	Upgrade the Arroyo Seco stream water intake structure (Arroyo Seco Canon Project) and implement the Devil's Gate Pump Back project to improve our ability to capture more stream water and to recharge the groundwater basin. (Hazards addressed: Drought)	General Fund, HMGP Grants	Water and Power	$$$	2 years	High
12	Implement measures to bolster local water supply to meet demand, create a sustainable water supply, while meeting environmental mandates. (Hazards addressed: Drought)	General Fund, HMGP Grants	Water and Power	$$$	3 years	High

#	Mitigation Action	Funding Sources	Responsible Department	Relative Cost*	Time Frame	Priority
13	In accordance with the 2020 Water System Resources Plan, develop and implement alternative sources of water to meet Pasadena's annual water supply (non-potable water project) (Hazards addressed: Drought)	General Fund, HMGP Grants	Water and Power	$$	2 years	Medium
14	Develop public messaging about water conservation to address climate change-induced drought for posting on websites, social media, and other platforms. (Hazards addressed: Drought)	General Fund, HMGP Grants	Water and Power	$	Ongoing - Yearly	Low

Table 6-7: Mitigation Action Implementation Plan – Earthquake/Geologic Hazards

#	Mitigation Action	Funding Sources	Responsible Department	Relative Cost*	Time Frame	Priority
15	Implement and enforce the soft-story retrofit ordinance; (Hazards addressed: Seismic)	General Fund, HMGP Grants	Planning	$	2 years	Medium

#	Mitigation Action	Funding Sources	Responsible Department	Relative Cost*	Time Frame	Priority
16	Conduct an educational campaign, incentivize and promote medium-scale seismic retrofits, such as window films to minimize shattering, anchors for rooftop-mounted equipment, bracing for masonry chimneys, and other preventative measures to reduce damage to private buildings. (Hazards addressed: Seismic)	General Fund, HMGP Grants	Planning	$	2 years	Medium
17	Develop a Landslide Management Plan that identifies areas at risk and mitigation strategies and develop a policy to ensure the annual review of potential landslide areas in the City of Pasadena. (Hazards addressed: Landslide)	General Fund, HMGP Grants	Fire/ Planning/ Public Works	$	5 years	Low
18	Conduct a seismic analysis of all City-owned key facilities and retrofit vulnerable facilities. (Hazards addressed: Seismic)	General Fund, HMGP Grants	Public Works	$	Ongoing - yearly	High

#	Mitigation Action	Funding Sources	Responsible Department	Relative Cost*	Time Frame	Priority
19	Seismically retrofit the City main public library.	General Fund, HMGP Grants	Planning/ Public Works/ Library	$$$$	3 years	High
20	Initiate a program to schedule installation of resilient (seismically appropriate) piping for new or replacement water distribution pipelines. (Hazards addressed: Seismic)	General Fund, HMGP Grants	Water and Power	$$$$	Ongoing - Yearly	High
21	Develop a landslide area building ordinance that restricts building in hazard prone areas. Review local ordinances for building in potential landslide areas based on proposed development plans and current environmental conditions. (Hazards addressed: Landslide)	General Fund, HMGP Grants	Planning/ Fire	$	5 years	Low
22	Identify and retrofit key critical facilities with seismically rated window film treatments that ensure glass windows do not shatter during a strong seismic event. (Hazards addressed: Seismic)	General Fund, HMGP Grants	Planning/ Public Works	$$	5 years	High

Table 6-8: Mitigation Action Implementation Plan – Flooding

#	Mitigation Action	Funding Sources	Responsible Department	Relative Cost*	Time Frame	Priority
23	Investigate the use of permeable paved and landscaped swales for new construction and replacement of City-owned hardscaped areas. [Identify which locations] (Hazards addressed: Flood)	General Fund, HMGP	Public Works	$$	3 years	Medium
24	Retrofit roadway medians to capture stormwater during rain events. Prioritize improvements along major arterials/ roadways throughout the City. (Hazards addressed: Flood)	General Fund, HMGP Grants	Public Works	$$$	4 years	Medium
25	Prepare an inventory of major urban drainage problems and identify causes and potential mitigation actions for urban drainage problem areas. (Hazards addressed: Flood)	General Fund, HMGP Grants	Public Works	$	2 years	Low

#	Mitigation Action	Funding Sources	Responsible Department	Relative Cost*	Time Frame	Priority
26	Raise Park roadways or build culverts where necessary to improve the flow of water downstream. (Hazards addressed: Flood)	General Fund, HMGP Grants.	Public Works	$$$	3 years	Low
27	Track areas where ponding frequently occurs during heavy rainfall and install new drainage systems or upgrade existing ones to reduce water ponding. (Hazards addressed: Flood)	General Fund, HMGP Grants	Public Works	$	Ongoing - yearly	Medium

Table 6-9: Mitigation Action Implementation Plan – Extreme Weather (Severe Winds, Extreme Heat, Severe Rainstorms)

#	Mitigation Action	Funding Sources	Responsible Department	Relative Cost*	Time Frame	Priority
28	Remove or trim trees determined to be susceptible to blowing over during a severe wind event and underground power lines, where feasible. (Hazards addressed: High Winds, Severe Rainstorm)	General Fund, HMGP Grants	Parks/ Public Works	$	Ongoing - yearly	Medium
29	Increase the use and construction of shade structures within new developments, City facilities, parks, and trails to reduce heat impacts. (Hazards Addressed: Extreme Heat)	General Fund, HMGP Grants	Planning/ Public Works/ Parks	$	Ongoing - yearly	Medium

#	Mitigation Action	Funding Sources	Responsible Department	Relative Cost*	Time Frame	Priority
30	Evaluate the long-term capacity of designated cooling centers and shelters in the City to provide sufficient relief from extreme heat. Assess the need to expand services as the frequency, length, and severity of future heatwaves potentially change as a result of climate change. (Hazards addressed: Extreme Heat)	General Fund, HMGP Grants	Fire	$	Ongoing - Yearly	Medium
31	Upgrade HVAC within City facilities to more efficient systems that may include split systems or decentralized systems that allow for heating and cooling the spaces needed, not entire buildings. (Hazards addressed: Extreme Heat)	General Fund, HMGP Grants	Public Works	$$	Ongoing – yearly	Medium

Table 6-10: Mitigation Action Implementation Plan – Fire

#	Mitigation Action	Funding Sources	Responsible Department	Relative Cost*	Time Frame	Priority
32	Educate and promote the proper maintenance and separation of power lines from trees and other hazards.	General Fund, HMGP Grants	Fire/ PWP	$	Ongoing - Yearly	High

#	Mitigation Action	Funding Sources	Responsible Department	Relative Cost*	Time Frame	Priority
33	Conduct regular fuel modification projects to reduce fire hazard risks, such as clearing out dead vegetation in parks, open spaces, right-of-way embankments, and other areas that could become fuel for fires. (Hazards addressed: Wildfire)	General Fund, HMGP Grants	Parks/ Public Works	$	Ongoing - Yearly	High
34	Adopt a wildfire mitigation ordinance to limit the use and development of wildfire hazard areas to mitigate risk to life and property. (Hazards addressed: Wildfire)	General Funds	Fire	$	2 years	High

Table 6-11: Mitigation Action Implementation Plan – Dam Inundation

#	Mitigation Action	Funding Sources	Responsible Department	Relative Cost*	Time Frame	Priority
35	Coordinate with County Public Works to collectively identify threats to the City and implement an early warning system/protocol that notifies downstream communities in the event of a potential dam failure incident.	General Fund, HMGP Grants	Public Works	$	2 years	Low

Table 6-12: Mitigation Action Implementation Plan – Human-caused Hazards

#	Mitigation Action	Funding Sources	Responsible Department	Relative Cost*	Time Frame	Priority
36	Evaluate all critical facilities, facilities of concern for potential human-caused hazard vulnerabilities and integrate counterterrorism design elements and building materials, where feasible. (Hazards addressed: Terrorism)	General Fund, HMGP Grants	Police	$	Ongoing - Yearly	Medium
37	Continuously inspect businesses and other properties storing hazardous materials and create an inventory of storage locations that require updates, maintenance, or renovation. (Hazards addressed: Hazardous Materials)	General Fund, HMGP Grants	Fire	$	Ongoing - Yearly	Medium
38	Expand the installation of fiber optics infrastructure and conduit (for future services) to enhance the city's communications systems and economic opportunities. (Hazards addressed: Terrorism)	General Fund, HMGP Grants	IT	$$	Ongoing - Yearly	Medium

#	Mitigation Action	Funding Sources	Responsible Department	Relative Cost*	Time Frame	Priority
39	Establish and provide annual cyber-security risk briefings to City officials. Leverage the Department of Homeland Security's State, Local, Tribal, and Territorial Cyber security engagement programs. (Hazards addressed: Cyber Attack)	General Fund, HMGP Grants	IT	$	2 years	High
40	Evaluate and take necessary actions to ensure robust cyber-security of utility infrastructure and protection of critical information systems from cyber-attacks/incidents.	General Fund, HMGP Grants	IT	$$	Ongoing - Yearly	High

Table 6-13: Mitigation Action Implementation Plan – Pandemic

#	Mitigation Action	Funding Sources	Responsible Department	Relative Cost*	Time Frame	Priority
41	Develop and coordinate planning with partners for dispensing of medications or vaccines. Coordinate infection control planning with partners.	General Fund, HMGP Grants	Public Health	$$	Ongoing - Yearly	Medium

SECTION 7: PLAN MAINTENANCE PROCEDURES

Implementation and maintenance of the plan is critical to the overall success of hazard mitigation planning. This section details the process that the City will use to monitor, update, and evaluate the plan within the five-year cycle of the plan's revision to ensure the LHMP remains an active and relevant document. The format of the plan aligns with the regulation checklist and is divided into sections of information. When it is time to maintain or revise the LHMP, data can be easily located and incorporated, resulting in an easy method to keep the plan current and relevant.

The planning team represents City staff from each department and other stakeholders that contributed to the development of the 2025 LHMP. The planning team oversaw the development of the plan and made recommendations on key elements of the plan, including the maintenance strategy.

It was important to the City that each department be represented in the planning team and given the opportunity to provide input during the plan's development. This philosophy will be continued for future plan revisions through evaluations, maintenance, and updates of data, processes, and programs. The planning team will convene annually to perform annual reviews of the LHMP and its implementation. The planning team will include representation from residents, citizen groups, partner agencies and stakeholders within the planning area.

If planning team members can no longer serve on the planning team, the City Manager will assign another staff person to be on the planning team so that every City department is represented.

7.1 Monitoring and Evaluation

The hazard mitigation plan includes a range of action items to reduce losses from hazard events. Together, the action items provide a framework for activities that the City can choose to implement over the next five years. The effectiveness of the plan depends on the incorporation of the action items into existing City plans, policies, and programs. Although the City Fire Department will have primary responsibility for the LHMP's continual review, coordination, and promotion, plan implementation, and evaluation will be a shared responsibility among all departments and agencies that contributed to the mitigation action plan.

The City Emergency Manager and Department Supervisors will be jointly responsible for the plan's implementation and maintenance through existing City programs. Department Supervisors will be responsible for implementing mitigation strategies and

actions specific to their department operations. The City Emergency Manager will assume the lead responsibility for facilitating plan maintenance and coordinating the planning team.

Each April, the planning team will begin the process of reviewing the LHMP and the implementation of mitigation actions to develop an annual progress report. This process can also assist the budget review process by providing information on mitigation projects and activities that have been completed or implemented. The annual progress report process will serve to align annual reviews of the hazard mitigation plan and to incorporate information. As updates to the LHMP are completed, the public will be made aware of the changes to the LHMP and make recommendations or comments.

The planning team will monitor and evaluate the hazard mitigation strategies during the year, and at a meeting held in January of each year, team members will provide information for the evaluation of the progress of the 2025 LHMP. The Emergency Manager will convene the planning team and lead the effort for the annual evaluation. This evaluation will include:

- A summary of any hazard events that occurred during the prior year and their impact on the planning area
- A review of successful mitigation initiatives identified in the 2025 plan
- A brief discussion about the targeted strategies that were not completed
- A re-evaluation of the action plan to determine if the timeline for identified projects needs to be amended, and the reason for the amendment, e.g., funding issues
- Any recommendations for new projects
- Any changes in or potential for new funding options (grant opportunities)
- Any impacts of other planning programs or initiatives in the City that involve hazard mitigation

The planning team will write a progress report that will be provided to the City's budget planning team for review and incorporation in the budget process as mitigation projects are completed or implemented. The hazard mitigation plan progress report will also be posted on the City website on the page dedicated to the hazard mitigation plan, provided to the local media through a press release, and presented in the form of a report to the City Council. The planning team will strive to complete the progress report process by March of each year.

7.2 Plan Update

Section 201.6.d.3 of 44CFR requires that local hazard mitigation plans be reviewed, revised as appropriate, and resubmitted for approval in order to remain eligible for benefits awarded under the Disaster Mitigation Act. The City intends to update its hazard mitigation plan on a five-year cycle. Based on needs identified by the planning team, the update will, at a minimum, include the following elements:

- The hazard risk assessment will be reviewed and updated using the most recent information and technologies
- The action plan will be reviewed and revised to account for any initiatives completed, dropped, or changed and to account for changes in the risk assessment
- Any new City policies identified under other planning mechanisms, as appropriate
- The draft LHMP update will be sent to appropriate agencies and organizations for comment
- The public will be given an opportunity to comment on the updated version prior to adoption
- The City Council will adopt the updated plan

At a minimum of six months before the expiration date of the 2025 LHMP, the planning team will implement a plan revision schedule to formally update the 2025 plan. The plan will be revised using the latest FEMA hazard mitigation guidance documents, such as the Mitigation Planning Tool and Regulation Checklist, to ensure compliance with current hazard mitigation planning regulations.

The overall success of the LHMP is through implementation of the plan's hazard mitigation strategy and activities to reduce the effects of hazards, protect people and property, and improve the City's efforts to respond to and recover from disasters. Members of the public and the City will ultimately benefit from the implementation of the LHMP and must be given the opportunity to provide input to the continuous cycle of LHMP planning.

7.3 Continued Public Involvement

The overall success of the LHMP is through implementation of the plan's hazard mitigation strategy and activities to reduce the effects of hazards, protect people and

property, and improve the City's efforts to respond to and recover from disasters. Members of the public and the City will ultimately benefit from the implementation of the LHMP and must be given the opportunity to provide input to the continuous cycle of LHMP planning.

The City will strive to keep the public aware of hazard mitigation projects that take place as a result of the LHMP. Public information will be released through press releases, City website announcements, public hearings as required, council meetings, social media, and press releases.

Projects that mitigate hazards are included in the City's annual budget planning process. The public is made aware of the planning through City Council meetings and press releases during this time. The budget planning process will serve as an annual opportunity to conduct outreach to the public on updates to the hazard mitigation planning process.

A survey can be conducted to gather input on how the community feels about the progress being made on LHMP activities. The City will also provide press releases and information about hazard mitigation projects to the public regularly. At a minimum, the public will be engaged to learn about current LHMP activities and given the opportunity to provide comments and information on an annual basis to update and maintain the LHMP. The City PIO and the City Emergency Manager will be responsible for ensuring the public is included and involved in the annual public plan update and outreach.

When the time comes to begin revising the 2025 LHMP, the plan update process will be implemented, which will include continued public involvement and input through attendance at designated public meetings, web postings, through press releases to local media, community fairs, and events, and surveys. As part of this effort, a series of public meetings will be held, and public comments will be solicited on the revisions to the LHMP according to the five (5)-year cycle. **Table 7-1** summarizes successful public involvement efforts previously conducted by the City, as well as proposed activities for public involvement and dissemination of information that shall be pursued whenever possible and appropriate.

Table 7-1: Past and Proposed Continued Public Involvement Activities or Opportunities Identified by the City

Department	Public Involvement Activity or Opportunity - Past	Public Involvement Activity or Opportunity - Proposed

Administration	LHMP Survey was conducted online and given out at City events in person.	Conduct annual surveys to be completed online and at the annual Public Safety Event.
All		Place more emphasis on the risks associated with natural and manmade hazards at public awareness campaigns conducted by various City departments. Consider developing and distributing public education materials for natural hazards.
Fire Department		Conduct yearly presentations to the Accessibility & Disability Commission to update on progress of the mitigation activities.

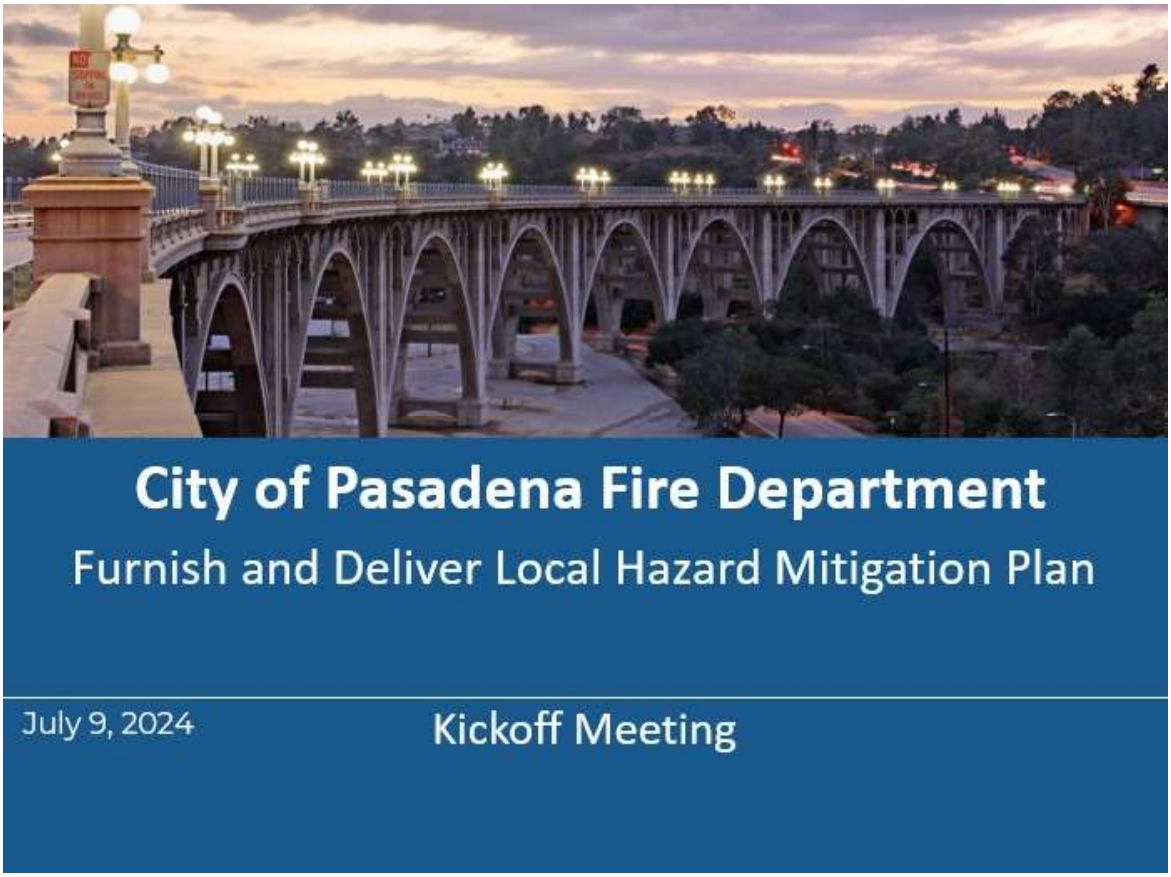
APPENDIX A – LOCAL MITIGATION PLAN REVIEW TOOL

APPENDIX B – PLANNING TEAM MEETING DOCUMENTATION

Appendix B contains documentation of the planning process for the LHMP Planning Team, including meetings, presentations, emails, etc.

Date	Activity	Documentation
7/9/2024	Project Kick-off Meeting	• Presentation (cover only) • Meeting minutes
8/29/2025	Planning Team Meeting #1	• Invitation to stakeholders • Sign-in sheet • Presentation (cover only) • Meeting minutes
11/14/2025	LHMP Planning Team Meeting #2	• Invitation to stakeholders • Presentation (cover only) • Meeting minutes
2/18/2025	LHMP Planning Team Meeting #3	• Presentation (Cover Only) • Meeting minutes • Participant Roster

PROJECT KICKOFF MEETING PRESENTATION (Cover Slide)



PROJECT KICKOFF MEETING NOTES

July 10, 2024

To: Nallely Procopio
From: Lee Rosenberg

Project Kick-Off Meeting

The City of Pasadena Fire Department hosted a virtual Kick-off Meeting with Navigating Preparedness Associates (NPA) on July 9, 2024, at 1:00 PM to discuss project deliverables and timeline.

Attendees

Attendee	Organization/Division
Nallely Procopio	City of Pasadena Fire
Anthony James	City of Pasadena Fire
Lee Rosenberg	Navigating Preparedness
Francisco Soto	Navigating Preparedness

Summary of Discussion

- Meeting attendees introduced themselves. Attendees are listed above.
- NPA provided a presentation that addressed the LHMP development process, project management implementation, project schedule and project data needs. The group reviewed the following items:

1. The project team – An alternate GIS analyst will replace Aaron Cole.
2. Scope of Work – The project is comprised of 5 tasks that are sequenced to result in an approved and adopted LHMP. The tasks are:
    a) Organization and Planning Process
    b) Conduct a Risk Assessment
    c) Develop a Mitigation Strategy
    d) Implementation and Maintenance of the plan
    e) Plan Approval and Adoption
3. Schedule – The group reviewed the proposed schedule. While the draft plan will be completed by November 2024, the Cal OES and FEMA reviews may take several months. Both agencies have a large backlog of plans to review.

4. Review challenges – The group discussed the requirements of the new FEMA guidance and the additional effort required to meet FEMA and CalOES requirements.
5. Project Management – The group discussed the components of the project management plan including budget/invoices, risks/mitigations and quality, deliverable review and client/consultant communications.
6. Next Steps
    a) Form the Project Planning Team
    b) Finalize the Project Management Plan
    c) Begin the information collection process and TOC/Outline
    d) Create & Initiate Outreach Plan
7. Discussion and Questions – NPA provided the following items to consider:
    a) Selection of a file sharing platform –Pasadena Fire uses MS Teams and has set up a group that can be used to share files and communicate.
    b) Web pages and social media – Facebook, Instagram, Twitter, LinkedIn
    c) Participants on the planning team – Nallely is working on compiling the planning team and should have it completed by Thursday, July 18, 2024.
    d) There are two dams that if a failure occurs can cause damage to the city.
        I. Devil's Gate
        II. Eaton Canyon Wash

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Action Items

Action Item	Responsible Party	Due Date	Status
Provide email where NPA can send monthly invoices	Nallely Procopio	7/19/2024	Open
Provide list of City social media sites that will be used to conduct outreach	Nallely Procopio	7/19/2024	Open
Provide contact list of LHMP planning team	Nallely Procopio	7/19/2024	Open
Invite the Rose Bowl, Convention Center, County Public Works, and JPL to take part in the LHMP Planning Team	Nallely Procopio	7/19/2024	Open
Provide feedback on the Project Management Plan	Nallely Procopio	7/19/2024	Open
Deliver meeting minutes to Pasadena	Lee Rosenberg	7/16/2024	Complete

Points of Contact

For concerns or questions regarding these notes, please contact:
Lee Rosenberg, (925) 381-0583 or lee.rosenberg@navigatingpreparedness.com

HMPC MEETING #1 PRESENTATION (Cover Slide)

CITY OF PASADENA HAZARD MITIGATION PLAN UPDATE

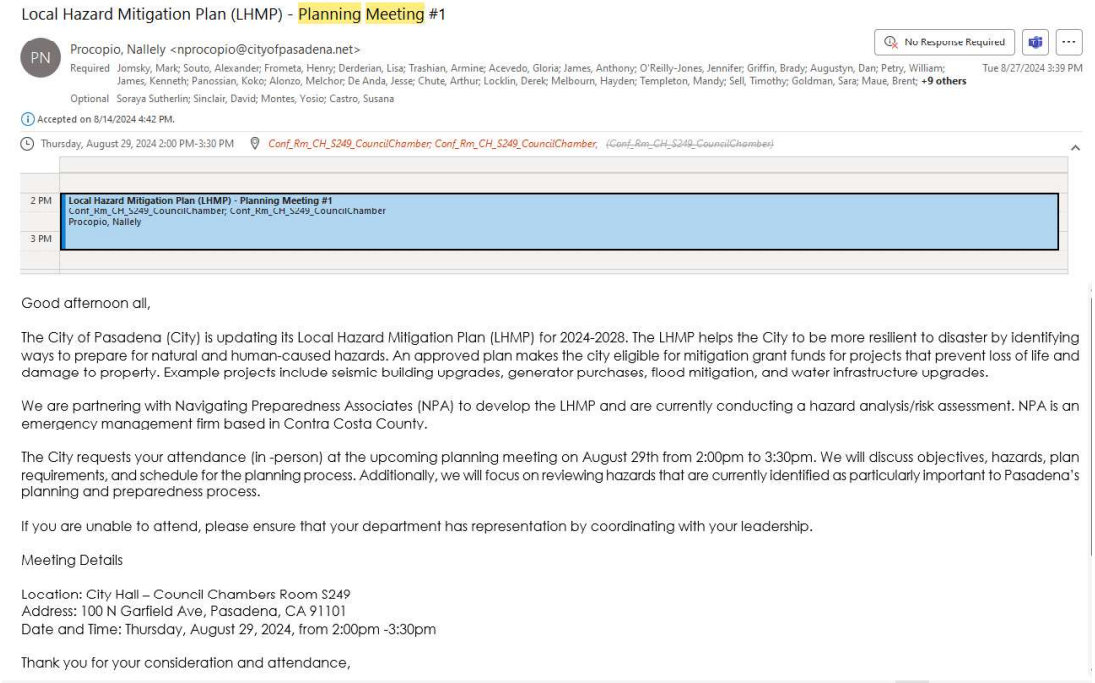
Planning Team Meeting Nr. 1

August 29, 2024

PASADENA FIRE DEPARTMENT

1

HMPC MEETING #1 PRESENTATION (Invitation)



Local Hazard Mitigation Plan (LHMP) - Planning Meeting #1

PN Procopio, Nallely <nprocopio@cityofpasadena.net>

No Response Required

Required Jomsky, Mark; Souto, Alexander; Frometa, Henry; Derderian, Lisa; Trashian, Armine; Acevedo, Gloria; James, Anthony; O'Reilly-Jones, Jennifer; Griffin, Brady; Augustyn, Dan; Petry, William; James, Kenneth; Panossian, Koko; Alonzo, Melchor; De Anda, Jesse; Chute, Arthur; Locklin, Derek; Melbourn, Hayden; Templeton, Mandy; Sell, Timothy; Goldman, Sara; Maue, Brent; **+9 others**

Tue 8/27/2024 3:39 PM

Optional Soraya Sutherlin; Sinclair, David; Montes, Yosio; Castro, Susana

Accepted on 8/14/2024 4:42 PM.

Thursday, August 29, 2024 2:00 PM-3:30 PM Conf_Rm_CH_S249_CouncilChamber; Conf_Rm_CH_S249_CouncilChamber; ~~(Conf_Rm_CH_S249_CouncilChamber)~~

2 PM **Local Hazard Mitigation Plan (LHMP) - Planning Meeting #1**
Conf_Rm_CH_S249_CouncilChamber; Conf_Rm_CH_S249_CouncilChamber
Procopio, Nallely

3 PM

Good afternoon all,

The City of Pasadena (City) is updating its Local Hazard Mitigation Plan (LHMP) for 2024-2028. The LHMP helps the City to be more resilient to disaster by identifying ways to prepare for natural and human-caused hazards. An approved plan makes the city eligible for mitigation grant funds for projects that prevent loss of life and damage to property. Example projects include seismic building upgrades, generator purchases, flood mitigation, and water infrastructure upgrades.

We are partnering with Navigating Preparedness Associates (NPA) to develop the LHMP and are currently conducting a hazard analysis/risk assessment. NPA is an emergency management firm based in Contra Costa County.

The City requests your attendance (in -person) at the upcoming planning meeting on August 29th from 2:00pm to 3:30pm. We will discuss objectives, hazards, plan requirements, and schedule for the planning process. Additionally, we will focus on reviewing hazards that are currently identified as particularly important to Pasadena's planning and preparedness process.

If you are unable to attend, please ensure that your department has representation by coordinating with your leadership.

Meeting Details

Location: City Hall – Council Chambers Room S249
Address: 100 N Garfield Ave, Pasadena, CA 91101
Date and Time: Thursday, August 29, 2024, from 2:00pm -3:30pm

Thank you for your consideration and attendance,

HMPC MEETING #1 NOTES

PASADENA FIRE DEPARTMENT

City of Pasadena
Local Hazard Mitigation Plan Update

September 3, 2024

To: Nallely Procopio
From: Lee Rosenberg

Planning Meeting #1

The City of Pasadena Fire Department hosted an in person Planning Meeting with Navigating Preparedness Associates (NPA) on August 29, 2024, at 2:00 PM.

Attendees

Attendee	Organization/Division
Nallely Procopio	Pasadena Fire
Lori Chu	City Safety
Adrienne Kim	Pasadena Public Health
Kenny James	Parks, Recreation, and Community Services
Gloria Acevedo	Finance
Armine Trashian	Finance
Dan Augustine	Information Technology
Alex Souto	Deputy City Manager
Varoojan Avedian	Water and Power
Brent Maue	Assistant City Engineer
Mark Jomsky	City Clerk
Jennifer O'Reilly-Jones	Homeless Programs Coordinator
Bill Petry	Library
Melchor Alonzo	Parks, Recreation, and Community Services
Yosio Montes	Public Information
Marina Ovanessian(?)	Acting Accessibility Coordinator
Anita Cerna	Planning and Community Development
Derek Locklin	Police Department
Anthony James	Pasadena Fire
Art Chute	Deputy Chief of Police
Sean Dawkins	Commander, Police Department
Brady Griffin	Human Resources
Hayden Melbourn	Public Works
Lee Rosenberg	Navigating Preparedness
Francisco Soto	Navigating Preparedness

Navigating Preparedness Associates
"Charting A Clear Course"

LHMP Planning Meeting 1 | 1

Summary of Discussion

- Nallely Procopio provided an introduction to the planning team.
- Lee Rosenberg provided an introduction and gave an overview of why the planning team is here.
- Meeting attendees introduced themselves. Attendees are listed above.
- NPA provided a presentation that addressed the LHMP development process, project management implementation, project schedule and project data needs. The group reviewed the following items:
    a. Hazard Mitigation Overview
    b. Planning Process
    c. Hazard Mitigation Goals
    d. Public Outreach
    e. Hazards Review
    f. Mitigation Examples
- The planning team believes the reason Air Pollution was added to the LHMP is because its correlation with Climate Change.
- Water and Power has large machinery that can produce hazardous chemicals in the air. This can be included in the Hazardous Materials section.
- Hamilton Park Reservoir might need to be addressed in the plan under Dam Failure. Public Works has a list of additional reservoirs in the city.
- The city continues to be at risk of Civil Disturbance. The George Floyd protest was the last time that this hazard impacted the city.
- The Department of Water and Power has underground transformers that contain oil that can cause an oil spill. Some have containment systems but there are a few that might benefit from mitigation funding to obtain and mitigate potential oil spills.
- The planning team would like to include terrorism as a Human Caused Hazard. There are multiple high target events in the city. Include Active Shooter as a part of the Terrorism hazard description.
- CalTech has hazardous material on site that can be described in the Hazardous Materials hazard description. The fire department has a list of all hazardous materials in the city. Add the fire department's hazardous materials team as a capability.

- The City of Pasadena started tracking when they opened their cooling centers. This data will be added to the Climate Change hazard description.
- The city has multiple residential landslide areas of concern
- The Department of Water and Power, and the Fire Department have a Wildfire Prevention Plan that can be added to the Capabilities Section.
- Obtain a list of incident responses for Hazardous Materials release from the Fire Department.
- Pasadena Water and Power does not have any PSPS circuits, but Pasadena gets most of their Power from SCE which might have PSPS Circuits in the City. Obtain PSPS Circuits from SCE.
- Pasadena Fire Department has a Wildfire Evacuation Plan that we can add as a capability. They also provide home inspections for homes in wildfire areas.
- Discussion and Questions from the planning team
  - Will Terrorism be added as a Hazard? Yes
  - Can the City use Hazard Mitigation Grant Funds for human caused hazards? No, you can only use Hazard Mitigation Grant Funds for natural hazards
  - Can the City do targeted social media outreach? Yes

Action Items

Action Item	Responsible Party	Due Date	Status

NPA to provide a list of GIS layers to obtain from the city.	NPA	Friday, September 13	Open
Obtain a list of all reservoirs located in the City.	Nallely Procopio/ Public Works	Friday, September 13	Open
Obtain Wildfire Prevention Plan information. Document title, description, and date last updated.	Nallely Procopio	Friday, September 13	Open
Obtain a list of incident responses for Hazardous Materials release from the Fire Department.	Nallely Procopio	Friday, September 13	Open
Obtain PSPS Circuits from SCE.	NPA	Friday, September 13	Open
Obtain Wildfire Evacuation Plan information. Document title, description, and date last updated.	Nallely Procopio	Friday, September 13	Open
Does the City of Pasadena have a COOP?	Nallely Procopio	Friday, September 13	Open

Points of Contact

For concerns or questions regarding these notes, please contact:
Lee Rosenberg, (925) 381-0583 or lee.rosenberg@navigatingpreparedness.com

HMPC MEETING #2 PRESENTATION & INVITATION

CITY OF PASADENA HAZARD MITIGATION PLAN UPDATE

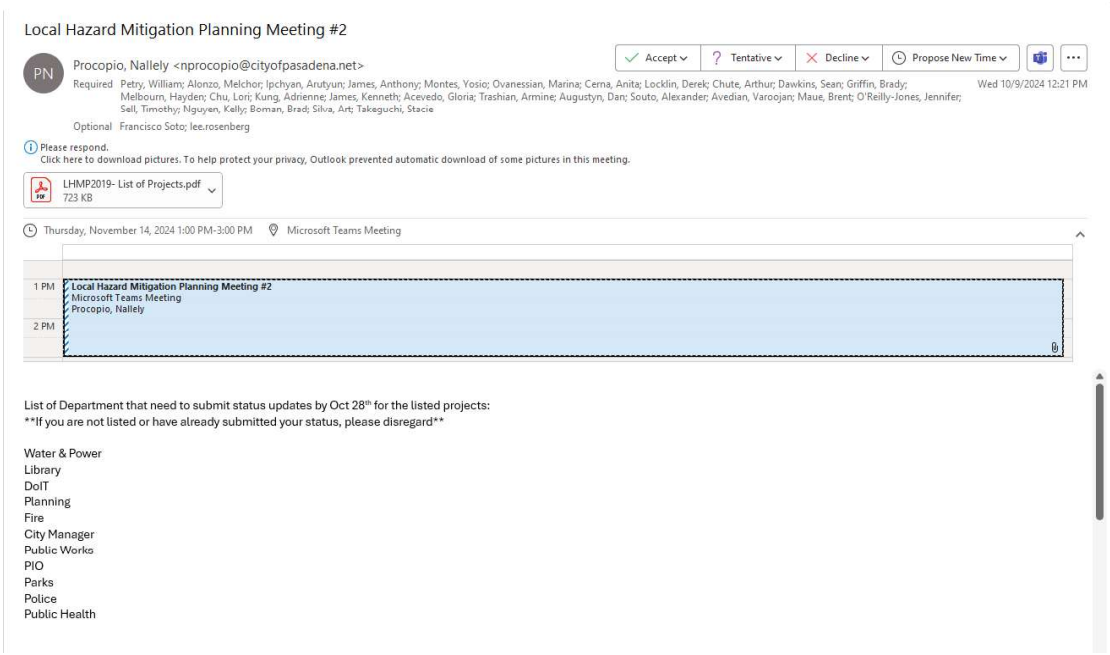
Project Team Meeting #2

November 14, 2024

PASADENA FIRE DEPARTMENT

1

HMPC MEETING #2 PRESENTATION (Invitation)



Local Hazard Mitigation Planning Meeting #2

PN Procopio, Nallely <nprocopio@cityofpasadena.net>

Accept | Tentative | Decline | Propose New Time

Required Petry, William; Alonzo, Melchor; Ipchyan, Arutyun; James, Anthony; Montes, Yosio; Ovanessian, Marina; Cerna, Anita; Locklin, Derek; Chute, Arthur; Dawkins, Sean; Griffin, Brady; Melbourn, Hayden; Chu, Lori; Kung, Adrienne; James, Kenneth; Acevedo, Gloria; Trashian, Armine; Augustyn, Dan; Souto, Alexander; Avedian, Varoojan; Maue, Brent; O'Reilly-Jones, Jennifer; Sell, Timothy; Nguyen, Kelly; Boman, Brad; Silva, Art; Takeguchi, Stacie

Wed 10/9/2024 12:21 PM

Optional Francisco Soto; lee.rosenberg

Please respond.
Click here to download pictures. To help protect your privacy, Outlook prevented automatic download of some pictures in this meeting.

LHMP2019- List of Projects.pdf
723 KB

Thursday, November 14, 2024 1:00 PM-3:00 PM Microsoft Teams Meeting

1 PM Local Hazard Mitigation Planning Meeting #2
Microsoft Teams Meeting
Procopio, Nallely

2 PM

List of Department that need to submit status updates by Oct 28th for the listed projects:
If you are not listed or have already submitted your status, please disregard

Water & Power
Library
DoIT
Planning
Fire
City Manager
Public Works
PIO
Parks
Police
Public Health

HMPC MEETING #2 NOTES

PASADENA FIRE DEPARTMENT

City of Pasadena
Local Hazard Mitigation Plan Update

November 18, 2024

To: Nallely Procopio
From: Lee Rosenberg

Planning Meeting #2

The City of Pasadena Fire Department hosted a virtual Planning Meeting with Navigating Preparedness Associates (NPA) on November 14, 2024, at 1:00 PM.

Attendees

Attendee	Organization/Division
Nallely Procopio	Pasadena Fire
Jonathan Robinson	GIS Administrator
Jenny Diaz	Human Resources
Adrienne Kim	Pasadena Public Health
Gloria Acevedo	Finance
Armine Trashian	Finance
Scott Gregowske	Public Works
Jennifer O'Reilly-Jones	Homeless Programs Coordinator
Bill Petry	Library
David Sinclair	Planning and Community Development
Marina Ovanessian	Acting Accessibility Coordinator
Anita Cerna	Planning and Community Development
David Bratzler	Pasadena Water and Power
Henry Frometa	Risk/Safety
Derek Locklin	Police Department
Kelly Knuven	Power Company
Brad Boman	Pasadena Water and Power
Anthony James	Pasadena Fire
Art Chute	Deputy Chief of Police
Catherine Christensen	Caltech
Sean Dawkins	Commander, Police Department
Antonio Sanchez	Pasadena Public Health
Chief Dollarhide	Pasadena Fire
Brady Griffin	Human Resources
Harry Ipchyan	Building and Safety Planning
Hayden Melbourn	Public Works
Lee Rosenberg	Navigating Preparedness
Francisco Soto	Navigating Preparedness

Navigating Preparedness Associates
"Charting A Clear Course"

LHMP Planning Meeting 2 | 1

Summary of Discussion

- Nallely Procopio introduced the new external partners who participated in the planning meeting.
- Lee Rosenberg provided an introduction and gave an overview of the meeting.
    a. During the planning meeting we reviewed the following:
        i. Provided planning updates since meeting #1
            1. Hazard Descriptions Finalized
            2. Finalized Capabilities Assessment
            3. Finalized Risk Assessment
            4. Developed Hazard Maps with City infrastructure
        ii. NPA provided an overview of the plan development timeline.
        iii. Currently, the planning team is in the Mitigation Strategy Development phase.
            1. The planning team will be reviewing the 2018 mitigation activities and developing new mitigation activities for the updated plan.
        iv. NPA provided an update on the public outreach process and activities.
        v. NPA reviewed the natural and human caused hazards that will be incorporated into the updated plan.
        vi. The planning team reviewed the risk assessment maps overlayed with City infrastructure.
        vii. NPA provided the group with example mitigation activities.
        viii. NPA reviewed next steps in the planning process
            1. Commence the public engagement process
            2. Disseminate the public survey
            3. Finalize the risk assessment
            4. Develop mitigation activities
            5. Distribute a draft Hazard Mitigation Plan

- Possible outreach events include:
  a. December 6 – Holiday Tree lighting ceremony
  b. December 31- Jan 2 will boost social media post around that time

Action Items

Action Item	Responsible Party	Due Date	Status
Distribute HPM Survey	Nallely Procopio	November 20, 2024	Open
Post information on City website.	Nallely Procopio	November 20, 2024	Open
Distribute HMP Press Release	Nallely Procopio	November 20, 2024	Open
Add City logo to the printed survey	NPA	N/A	Complete
Send outreach material to the Housing Department	Nallely Procopio	November 20, 2024	Open
Distribute draft Hazard Mitigation Plan to the Planning Team	NPA	December 6, 2024	Open

Points of Contact

For concerns or questions regarding these notes, please contact:
Lee Rosenberg, (925) 381-0583 or lee.rosenberg@navigatingpreparedness.com

HMPC MEETING #3 PRESENTATION & MEETING NOTES W/PARTICIPANTS

CITY OF PASADENA HAZARD MITIGATION PLAN UPDATE

Project Team Meeting #3

February 18, 2024

PASADENA FIRE DEPARTMENT

1

February 21, 2025

To: Nallely Procopio

From: Lee Rosenberg

Planning Meeting #3

The City of Pasadena Fire Department hosted a virtual Planning Meeting with Navigating Preparedness Associates (NPA) on February 18, 2025, at 3:00 PM.

- **Attendees**

Attendee	Organization/Division
Nallely Procopio	Fire Department
Yosio Montes	Public Information – City Manager's Office
Dan Augustyn	Information Technology
Sara Goldman	City Manager's Office
Anthony James	Fire Department
David Sinclair	Fire Department
Melchor Alonzo	Parks, Recreation, and Community Services
Antonio Sanchez	Public Health
William Petry	Library
Michael Oshiro	Public Health
Anita Cerna	Planning and Community Development
Hayden Melbourn	Public Works
Sean Dawkins	Police Department
Jenny Diaz	Human Resources
Adrienne Kim	Pasadena Public Health
Gloria Acevedo	Finance
Alexander Souto	City Manager's Office
Jennifer O'Reilly-Jones	Homeless Programs Coordinator
Lee Rosenberg	Navigating Preparedness
Francisco Soto	Navigating Preparedness

- **Summary of Discussion**
  - Nallely Procopio introduced the new external partners who participated in the planning meeting.
  - The meeting was convened to expedite the submission of the plan due to the recent fire event.

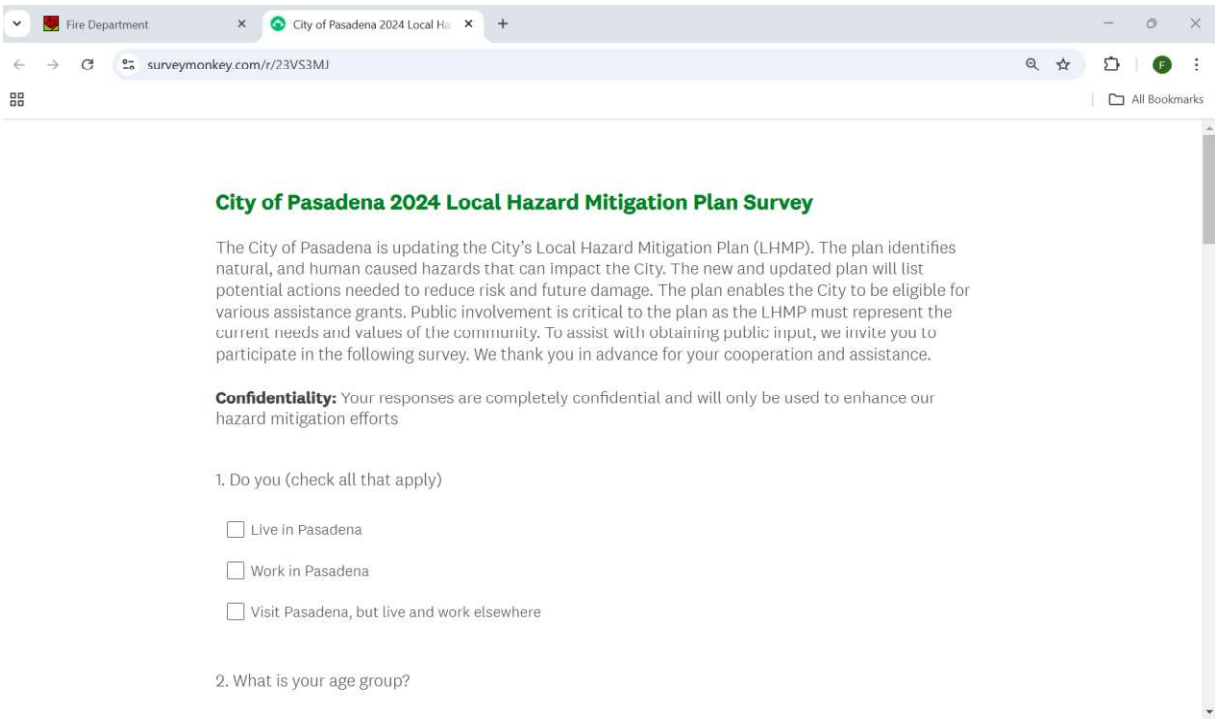
APPENDIX C – PUBLIC ENGAGEMENT DOCUMENTATION

Appendix C contains documentation of the planning process including meetings, presentations held for the stakeholders and public, and other stakeholder/public outreach efforts.

Date	Activity	Documentation
November 19, 2024 - Present	Survey posted on City Website with links provided in social media accounts. General Hazard Mitigation documents.	Documentation 1 – Survey Documentation 2 – Posting on City Instagram Account Documentation 3 – Posting on City Facebook Account Documentation 4 – News release Documentation 5 – Google Search Documentation 6 – Posting on City website Documentation 7 – LHMP Flyer (English) Documentation 8 – LHMP Flyer (Spanish) Documentation 9 – LHMP Flyer (Chinese) Documentation 10 – Survey (Spanish) Documentation 11 – Survey (Chinese) Documentation 12 – City website presentation and newsletter Documentation 15 – Flyers at facilities
November 19, 2024	Public Meetings	Documentation 13: Accessibility & Disability Commission Presentation Agenda

Date	Activity	Documentation
3 months	Public hazard mitigation survey conducted.	Documentation 14: Survey results
Ongoing	Outreach Materials at Public Facing Facilities	Documentation 15: Outreach Materials at Public Facing Facilities
6/9/2025	Draft LHMP provided for public review.	Documentation 16: Survey Distribution for Feedback
Ongoing	Survey Results to Public Review Draft Feedback	Documentation 17: Survey Distribution for Feedback
6/24/2025	Draft LHMP provided to neighboring jurisdiction for review and comment.	Documentation 18: Distribution Email/Feedback

DOCUMENTATION 1: SURVEY



DOCUMENTATION 2: INSTAGRAM ACCOUNT

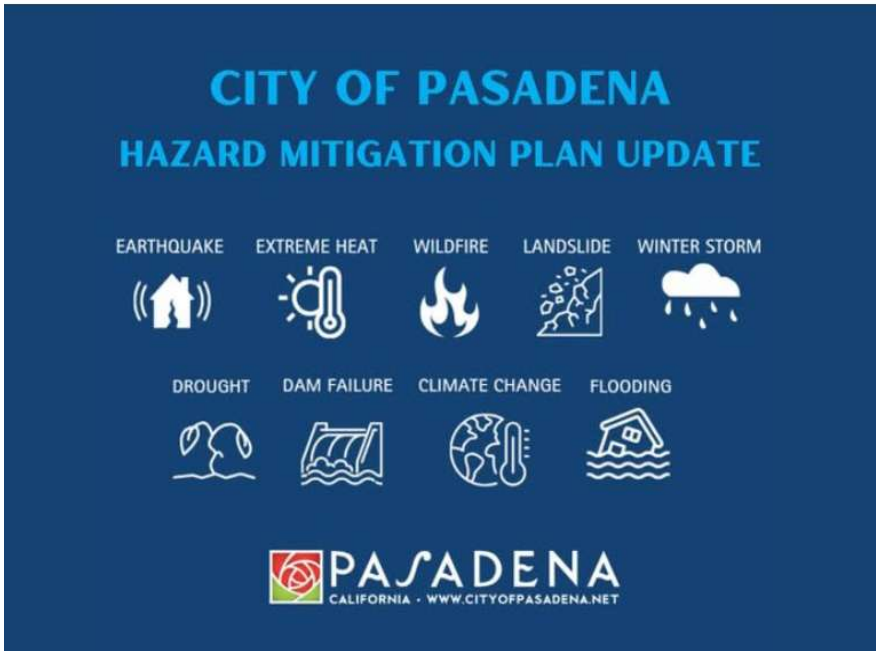
DOCUMENTATION 3: FACEBOOK POST

City of Pasadena - Public Agency
November 21, 2024 ·

The City of Pasadena is in the process of updating its 2019 Local Hazard Mitigation Plan (LHMP). The purpose of the City's LHMP is to identify goals, objectives, and mitigation strategies for reducing the impact of hazards such as earthquakes, wildfires, and flooding. If you live or work in the City of Pasadena, we would like your feedback to help us in the planning process.

To take the survey, visit Bit.ly/PasadenaHazardSurvey2024

View the full news release at Bit.ly/CityofPasadenaNews.



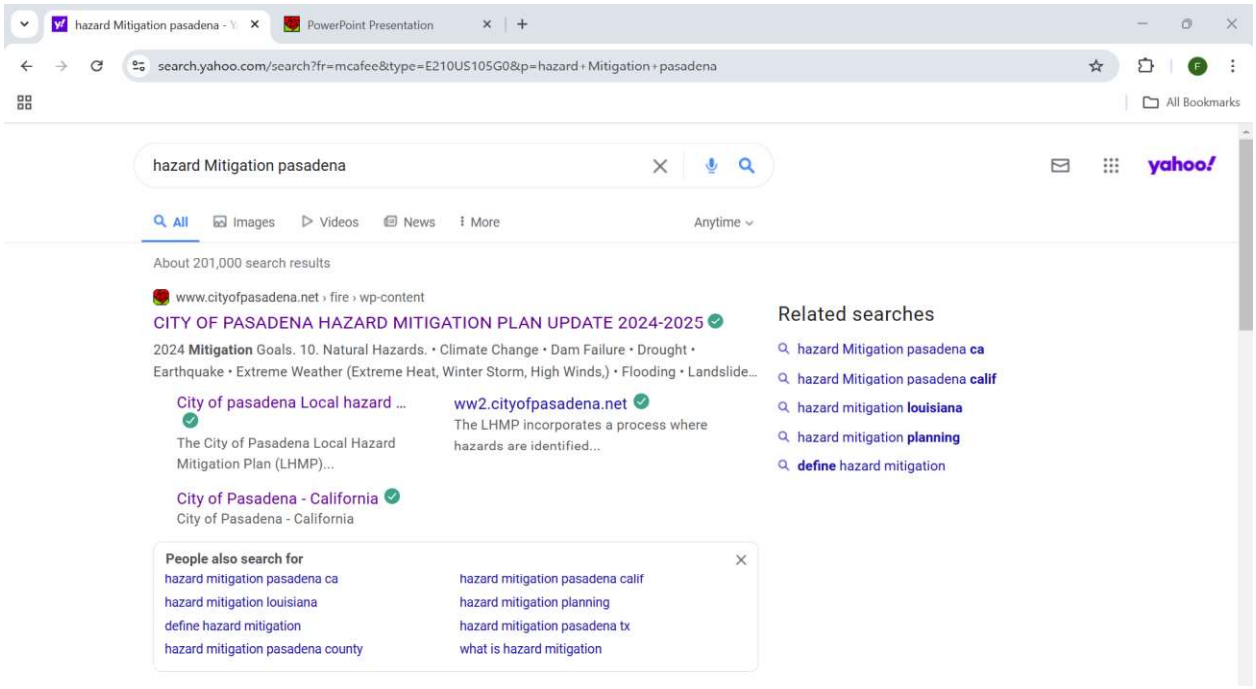
DOCUMENTATION 4: NEWS RELEASE

Community Feedback Needed To Update City of Pasadena 2019 Local Hazard Mitigation Plan

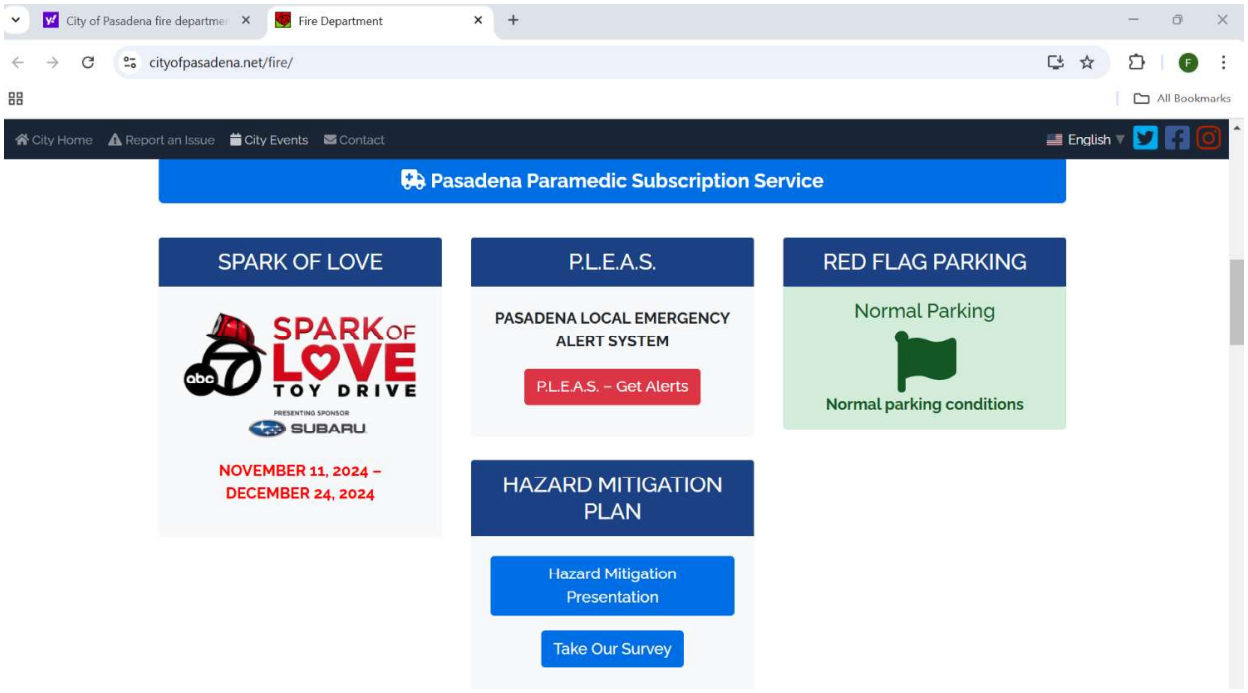
November 21, 2024 News

PASADENA, Calif.— The City of Pasadena is in the process of updating its 2019 Local Hazard Mitigation Plan (LHMP). The purpose of the City's LHMP is to identify goals, objectives, and mitigation strategies for reducing the impact of hazards such as earthquakes, wildfires, and flooding. If you live or work in the City of Pasadena, we would like your feedback to help us in the planning process.

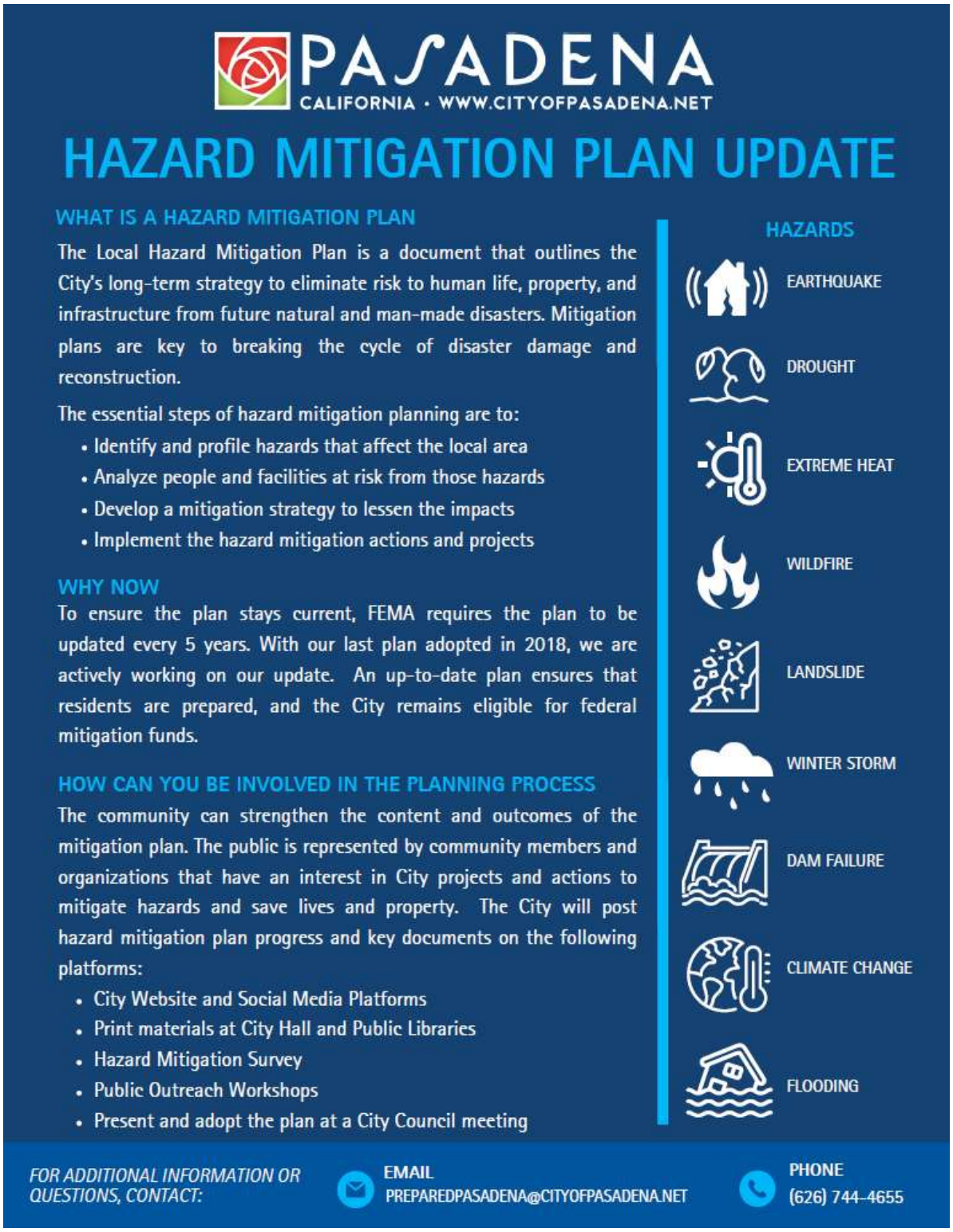
DOCUMENTATION 5: GOOGLE SEARCH



DOCUMENTATION 6: FIRE WEBPAGE



DOCUMENTATION 7: LOCAL HAZARD MITIGATION PLAN FLYER (English)



DOCUMENTATION 8: LOCAL HAZARD MITIGATION PLAN UPDATE FLYER/SURVEY (SPANISH)

DOCUMENTATION 9: LOCAL HAZARD MITIGATION PLAN UPDATE FLYER (Chinese)

DOCUMENTATION 10: Survey (Spanish)

La Ciudad de Pasadena está actualizando el Plan Local de Mitigación de Riesgos (Local Hazard Mitigation Plan, LHMP) de la ciudad. El plan identifica los riesgos naturales y los causados por el hombre que pueden tener un impacto en la ciudad. El plan nuevo y actualizado enumerará las posibles acciones necesarias para reducir el riesgo y daños en el futuro. El plan le permite a la ciudad ser elegible para varios subsidios de asistencia. La participación pública es fundamental para el plan, ya que el LHMP debe representar las necesidades y los valores actuales de la comunidad. Para ayudar a obtener la opinión del público lo invitamos a participar en la siguiente encuesta. Le agradecemos de antemano su cooperación y asistencia.¶

1. Usted (marque todas las opciones que correspondan)¶
   a. Vive en Pasadena¶
   b. Trabaja en Pasadena¶
   c. Visita Pasadena, pero vive y trabaja en otro lugar¶
   ¶
2. ¿Cuál es su grupo de edad?¶
   a. Menor de 18 años¶
   b. 18-24¶
   c. 25-34¶
   d. 35-44¶
   e. 45-54¶
   f. 55-64¶
   g. 65+¶
   h. Prefiero no responder¶
   ¶
3. Si mañana se produjera un gran terremoto o un incendio forestal...¶
   a. Estoy seguro de que sé cómo protegerme durante la emergencia. ¶
   b. No estoy seguro de cómo protegerme durante la emergencia.¶
   c. Otro: _____¶
   ¶
4. ¿Qué tan preparado está su hogar para un peligro natural (por ejemplo, incendio forestal, inundación, terremoto) en una escala del 1 al 5, donde 1 es no preparado y 5 es muy preparado?¶
   a. 1¶
   b. 2¶
   c. 3¶
   d. 4¶
   e. 5¶
   ¶
   ¶
   ¶

5. El Plan de Mitigación de Riesgos de la Ciudad de 2018 ha identificado una variedad de peligros naturales que representan una amenaza para la ciudad. Seleccione el peligro natural que más le preocupa.
   a. Cambio climático
   b. Terremoto
   c. Inundación
   d. Deslizamiento de tierra
   e. Incendio forestal
   f. Sequía
   g. Peligros para la salud pública
   h. Falla de presa
   i. Contaminación del aire
   j. Clima extremo (tormentas de viento, calor extremo, granizadas)

6. ¿Qué medidas ha tomado su hogar para mitigar los peligros naturales? (Marque todas las que correspondan)
   a. Compró un generador de emergencia
   b. Podó árboles para evitar que las ramas cayeran sobre la casa durante las tormentas
   c. Fijó los calentadores de agua y otros electrodomésticos grandes para evitar que se vuelquen
   d. Compró un seguro contra terremotos y/o inundaciones
   e. Instaló válvulas de cierre automático para el gas y el agua
   f. Otro (especifique)

7. Elija las formas que prefiere para encontrar información sobre amenazas futuras o en desarrollo.
   a. Redes sociales (X, Facebook, Instagram)
   b. Sitio web del gobierno local
   c. Notificación a la comunidad
   d. Sistema de alerta de emergencia local de Pasadena, o PLEAS
   e. Conferencias de prensa de la Ciudad
   f. Otro (especifique)

8. A continuación, proporcione comentarios o ideas adicionales sobre cómo se deben mitigar los peligros naturales locales.

[Cuadro de texto]

Gracias por tomarse el tiempo para completar esta encuesta.

DOCUMENTATION 11: Survey (CHINESE)

帕萨迪纳(Pasadena)市正在更新其《当地减灾计划》(Local Hazard Mitigation Plan, LHMP)。该计划确定了可能影响本市的自然灾害和人为灾害。新的更新计划将列出减少风险和未来损害所需的潜在行动。该计划使本市有资格获得各种援助补助金。公众参与对该计划至关重要，因为LHMP必须代表社区的当前需求和价值观。为了协助获取公众意见，我们邀请您参与以下调查。我们提前感谢您的合作和协助。¶

1.→您是否（选中所有适用的选项）¶
- a.→在帕萨迪纳居住¶
- b.→在帕萨迪纳工作¶
- c.→参观帕萨迪纳，但在其他地方生活和工作¶

¶

2.→您的年龄段是多少？¶
- a.→18岁以下¶
- b.→18-24¶
- c.→25-34¶
- d.→35-44¶
- e.→45-54¶
- f.→55-64¶
- g.→65岁以上¶
- h.→不想回答¶

¶

3.→如果明天发生大地震或野火……¶
- a.→我有信心知道在紧急情况下如何保护自己。¶
- b.→我不确定在紧急情况下如何保护自己。¶
- c.→其他：_____¶

¶

4.→您的家庭对自然灾害（例如，野火、洪水、地震）的准备程度如何（采用1到5分制，其中1分表示没有准备，5分表示准备充分）？¶
- a.→1¶
- b.→2¶
- c.→3¶
- d.→4¶
- e.→5¶

¶

¶

¶

5.→《2018年城市减灾计划》确定了一系列对城市构成威胁的自然灾害。选择您最关心的自然灾害？¶

a.→气候变化¶
b.→地震¶
c.→洪灾¶
d.→山体滑坡¶
e.→野火¶
f.→干旱¶
g.→公共卫生危害¶
h.→溃坝¶
i.→空气污染¶
j.→极端天气（风暴、酷热、冰雹）¶
¶

6.→您的家庭采取了哪些措施来减轻自然灾害的影响？¶
（选中所有适用的选项）¶
a.→购买了备用发电机¶
b.→修剪树木，以防暴风雨时树枝掉到房子上¶
c.→固定热水器和其他大型电器，防止倾倒¶
d.→购买了地震保险和/或洪水保险¶
e.→安装煤气和水的自动关闭阀¶
f.→其他（请注明）¶
¶

7.→选择您喜欢的方式来查找有关即将来临或正在进行的威胁的信息？¶
a.→社交媒体（X、Facebook、Instagram）¶
b.→当地政府网站¶
c.→社区通知¶
d.→帕萨迪纳当地紧急警报系统(PLEAS)¶
e.→城市新闻发布会¶
f.→其他（请注明）¶
¶

8.→请在下面就如何减轻当地自然灾害提出任何补充意见或见解。¶
¶
[文本框]¶
¶
¶

感谢您抽出时间完成本次调查。¶

DOCUMENTATION 12: CITY WEBSITE PRESENTATION & NEWS ARTICLE

Community Feedback Needed To Update City of Pasadena 2019 Local Hazard Mitigation Plan

November 21, 2024 News

PASADENA, Calif.— The City of Pasadena is in the process of updating its 2019 Local Hazard Mitigation Plan (LHMP). The purpose of the City's LHMP is to identify goals, objectives, and mitigation strategies for reducing the impact of hazards such as earthquakes, wildfires, and flooding. If you live or work in the City of Pasadena, we would like your feedback to help us in the planning process.

What is a Local Hazard Mitigation Plan?

The Local Hazard Mitigation Plan is a document that outlines the City's long-term strategy to eliminate risk to human life, property, and infrastructure from future natural and human-caused disasters. To ensure the plan stays current, **FEMA requires the plan to be updated every 5 years.** With our last plan adopted in 2019, we are actively working on our update. An up-to-date plan ensures that residents are prepared and the City remains eligible for federal mitigation funds.

DOCUMENTATION 13: ACCESSIBILITY & DISABILITY COMMISSION AGENDA

Agenda
Special Meeting
Accessibility and Disability Commission
Tuesday, November 19, 2024
5:30 P.M.
Jackie Robinson Community Center
1020 North Fair Oaks Avenue, Pasadena, CA 91103

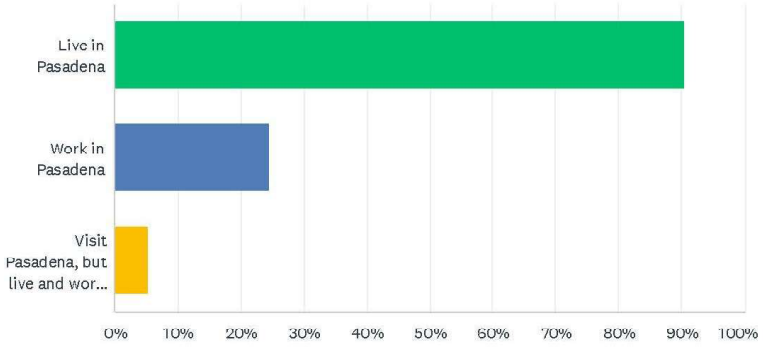
1. **Call to order**
2. **Roll call**
3. **Public comments for Items not on the agenda**
4. **Approval of minutes**
   - October 22, 2024, Regular Meeting minutes*
5. **New business**
   Information items
   - Hazard Mitigation Plan presentation; Tandem Solutions
6. **Old business**
   Action items
   - Discussion and approval of Workplan updates & Presentation Calendar
7. **Reports / comments from the Chair**
8. **Comments from Commissioners**

DOCUMENTATION 14: SURVEY RESULTS

City of Pasadena 2024 Local Hazard Mitigation Plan Survey SurveyMonkey

Q1 Do you (check all that apply)

Answered: 188 Skipped: 1

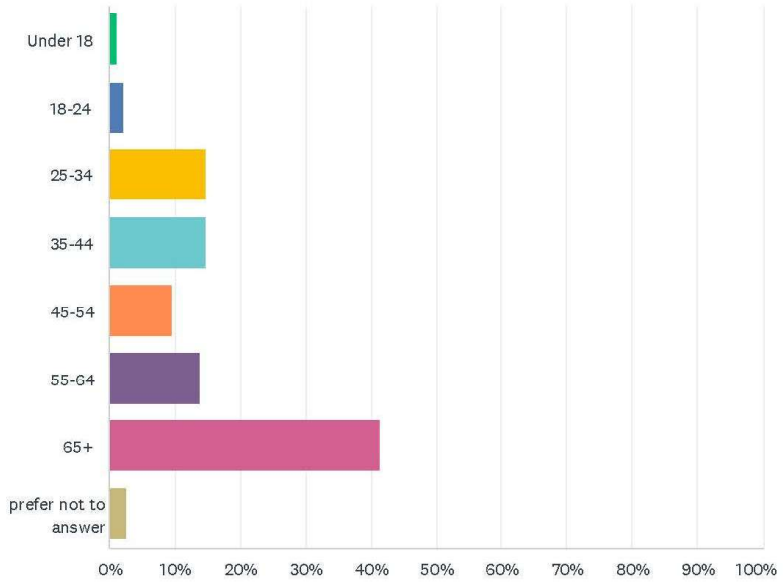


ANSWER CHOICES	RESPONSES	
Live in Pasadena	90.43%	170
Work in Pasadena	24.47%	46
Visit Pasadena, but live and work elsewhere	5.32%	10
Total Respondents: 188		

1 / 9

Q2 What is your age group?

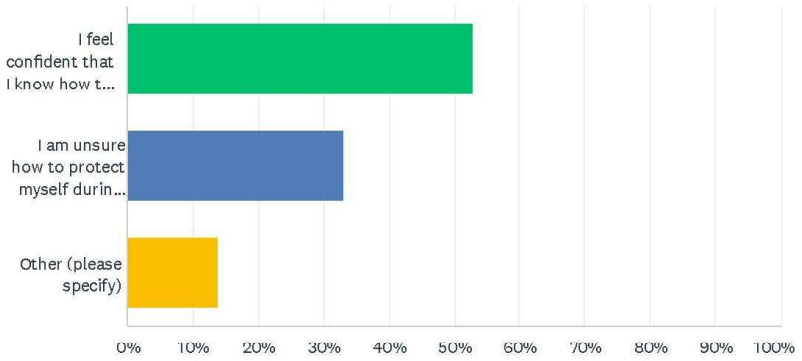
Answered: 189 Skipped: 0



ANSWER CHOICES	RESPONSES	
Under 18	1.06%	2
18-24	2.12%	4
25-34	14.81%	28
35-44	14.81%	28
45-54	9.52%	18
55-64	13.76%	26
65+	41.27%	78
prefer not to answer	2.65%	5
TOTAL		189

Q3 If a large earthquake or wildfire were to strike tomorrow……

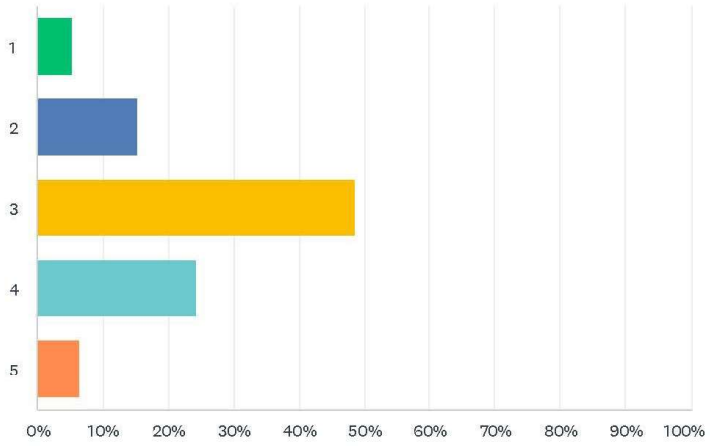
Answered: 187 Skipped: 2



ANSWER CHOICES	RESPONSES	
I feel confident that I know how to protect myself during the emergency.	52.94%	99
I am unsure how to protect myself during the emergency	33.16%	62
Other (please specify)	13.90%	26
TOTAL		187

Q4 How prepared is your household for a natural hazard (for example, wildfire, flood, earthquake) on a scale of 1 to 5 with 1 being not prepared and 5 being very prepared?

Answered: 189 Skipped: 0

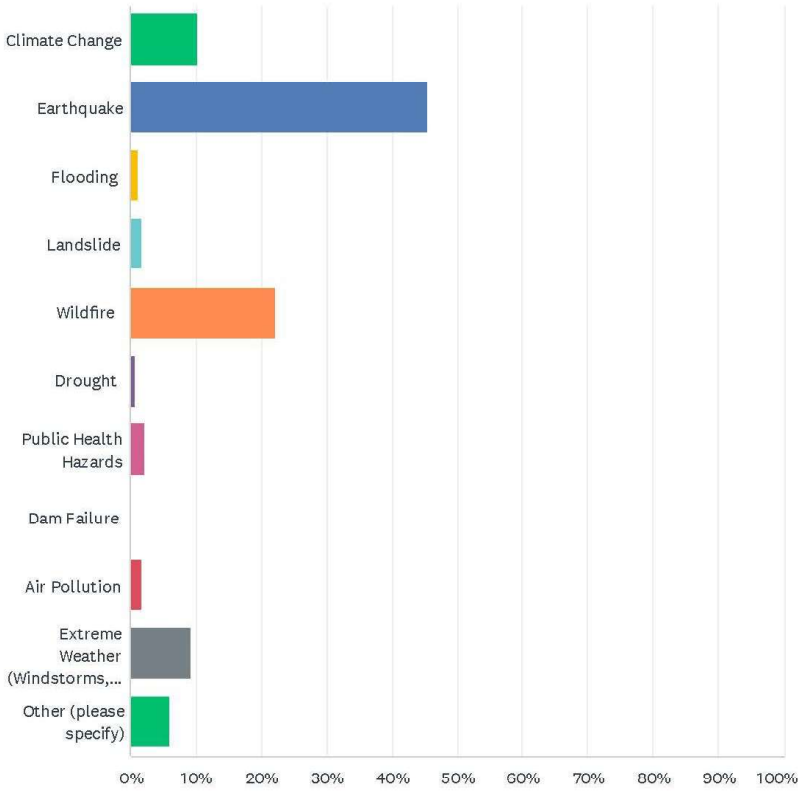


ANSWER CHOICES	RESPONSES	
1	5.29%	10
2	15.34%	29
3	48.68%	92
4	24.34%	46
5	6.35%	12
TOTAL		189

City of Pasadena 2024 Local Hazard Mitigation Plan Survey SurveyMonkey

Q5 The City 2019 Local Hazard Mitigation Plan has identified a range of natural hazards posing a threat to the City. Select the natural hazard that concerns you the most?

Answered: 185 Skipped: 4



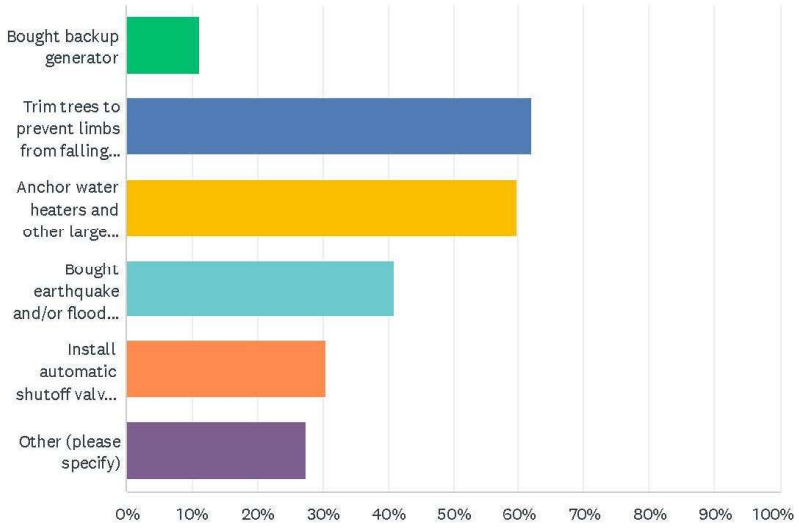
5 / 9

City of Pasadena 2024 Local Hazard Mitigation Plan Survey SurveyMonkey

ANSWER CHOICES	RESPONSES	
Climate Change	10.27%	19
Earthquake	45.41%	84
Flooding	1.08%	2
Landslide	1.62%	3
Wildfire	22.16%	41
Drought	0.54%	1
Public Health Hazards	2.16%	4
Dam Failure	0.00%	0
Air Pollution	1.62%	3
Extreme Weather (Windstorms, Extreme Heat, Hailstorms)	9.19%	17
Other (please specify)	5.95%	11
TOTAL		185

Q6 What steps has your household taken to mitigate against natural hazards? (Check all the apply)

Answered: 171 Skipped: 18

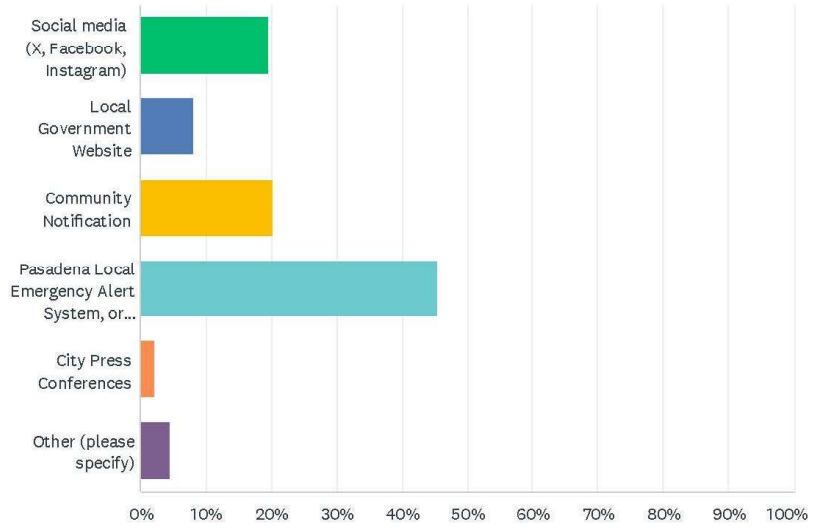


ANSWER CHOICES	RESPONSES	
Bought backup generator	11.11%	19
Trim trees to prevent limbs from falling onto the house during storms	61.99%	106
Anchor water heaters and other large appliances to prevent tipping	59.65%	102
Bought earthquake and/or flood insurance	40.94%	70
Install automatic shutoff valves for gas and water utilities	30.41%	52
Other (please specify)	27.49%	47
Total Respondents: 171		

City of Pasadena 2024 Local Hazard Mitigation Plan Survey SurveyMonkey

Q7 Choose the ways you prefer to seek information about incoming or ongoing threats?

Answered: 183 Skipped: 6



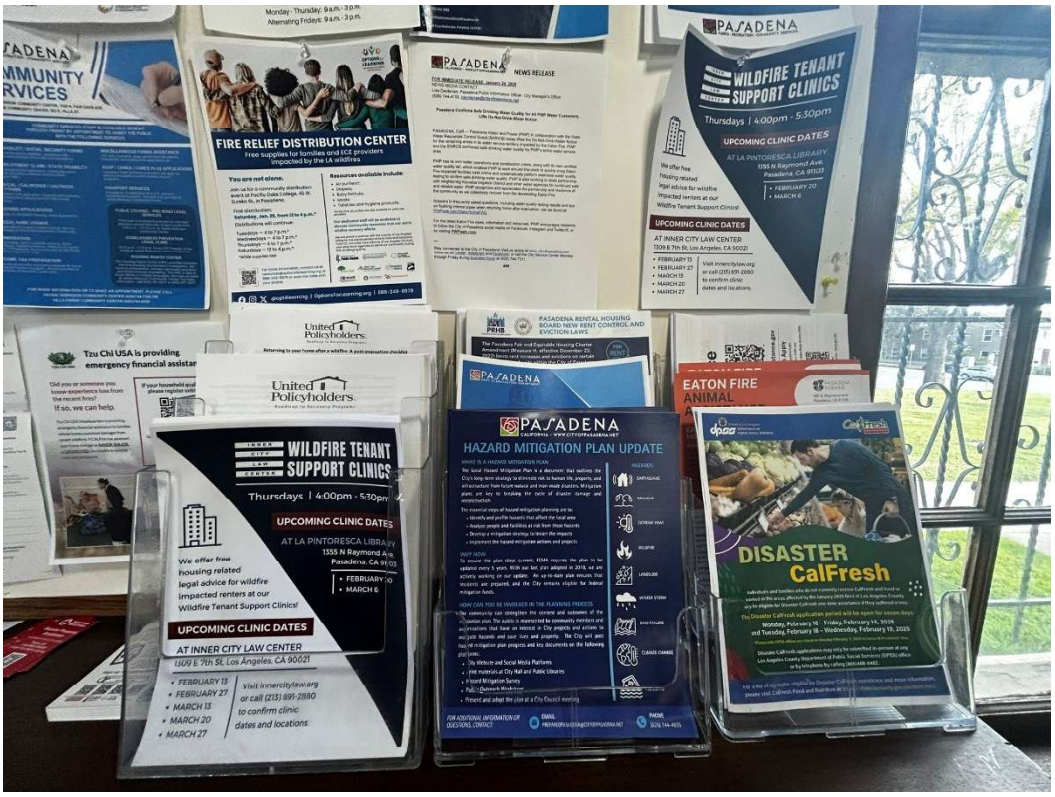
ANSWER CHOICES	RESPONSES	
Social media (X, Facebook, Instagram)	19.67%	36
Local Government Website	8.20%	15
Community Notification	20.22%	37
Pasadena Local Emergency Alert System, or PLEAS	45.36%	83
City Press Conferences	2.19%	4
Other (please specify)	4.37%	8
TOTAL		183

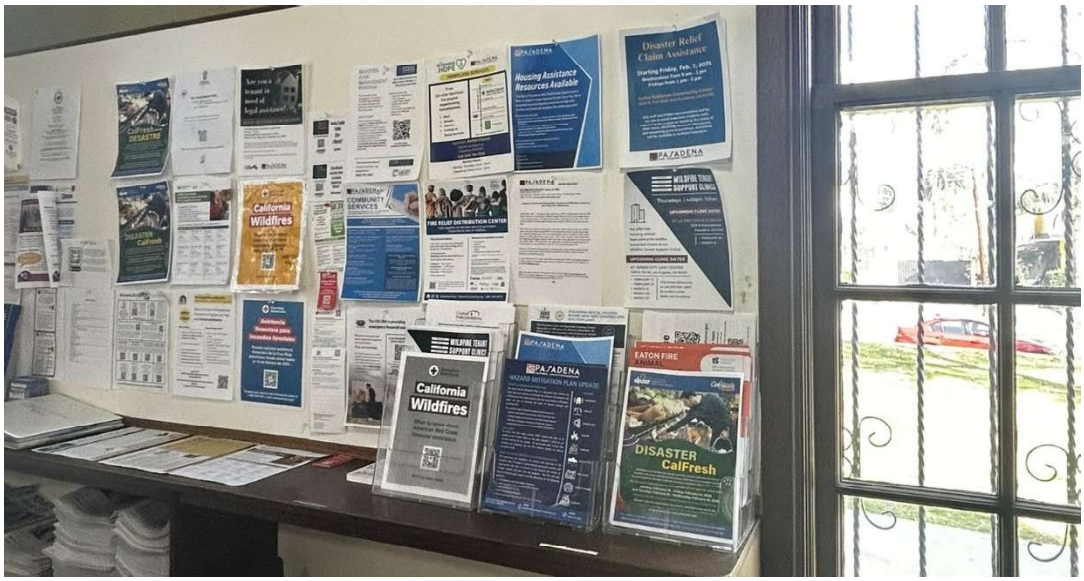
8 / 9

Q8 Please provide any additional comments or insight below into how local natural hazards should be mitigated.

Answered: 64 Skipped: 125

DOCUMENTATION 15: OUTREACH MATERIALS AT PUBLIC FACING OFFICES





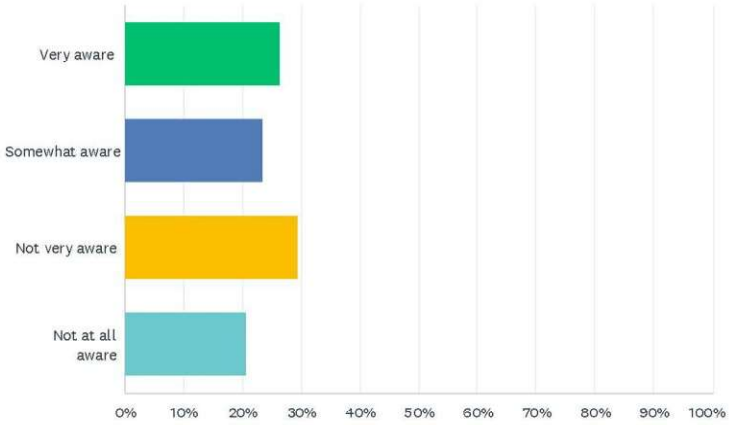
DOCUMENTATION 16: SOCIAL MEDIA POST SURVEY DISTRIBUTION FOR FEEDBACK

DOCUMENTATION 17: PUBLIC REVIEW DRAFT SURVEY RESULTS

City of Pasadena 2025 Local Hazard Mitigation Plan Community Feedback SurveyMonkey

Q1 How aware are you of the local hazard mitigation plan?

Answered: 34 Skipped: 0

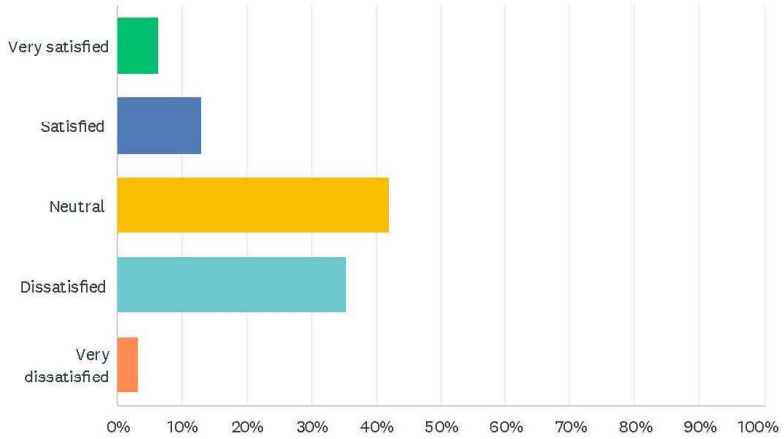


ANSWER CHOICES	RESPONSES	
Very aware	26.47%	9
Somewhat aware	23.53%	8
Not very aware	29.41%	10
Not at all aware	20.59%	7
TOTAL		34

1 / 5

Q2 How do you feel about the updated 2025 Local Hazard Mitigation Plan?

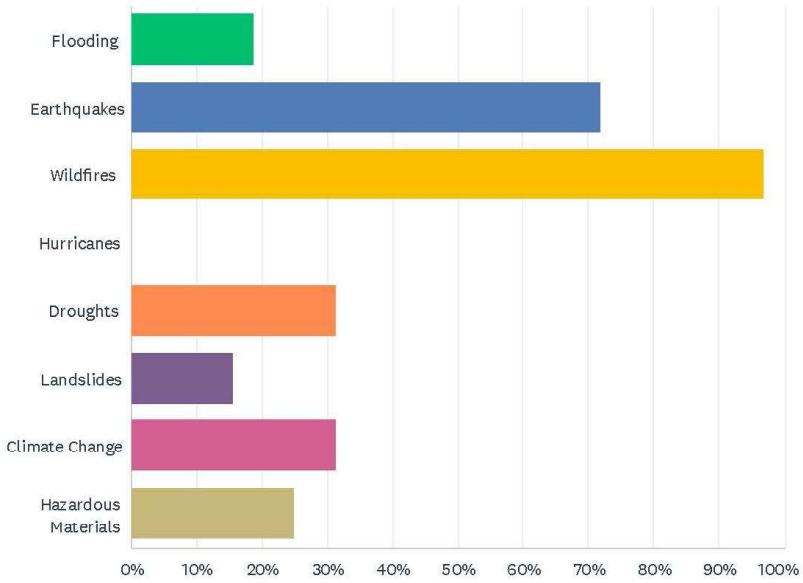
Answered: 31 Skipped: 3



ANSWER CHOICES	RESPONSES	
Very satisfied	6.45%	2
Satisfied	12.90%	4
Neutral	41.94%	13
Dissatisfied	35.48%	11
Very dissatisfied	3.23%	1
TOTAL		31

Q3 Which hazards do you think should be prioritized in the mitigation plan? (Select all that apply)

Answered: 32 Skipped: 2

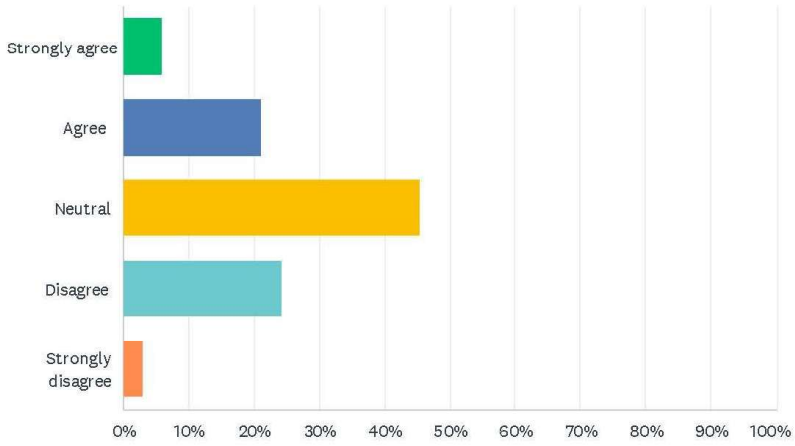


ANSWER CHOICES	RESPONSES	
Flooding	18.75%	6
Earthquakes	71.88%	23
Wildfires	96.88%	31
Hurricanes	0.00%	0
Droughts	31.25%	10
Landslides	15.63%	5
Climate Change	31.25%	10
Hazardous Materials	25.00%	8
Total Respondents: 32		

City of Pasadena 2025 Local Hazard Mitigation Plan Community Feedback SurveyMonkey

Q4 Do you feel the plan addresses the most significant hazards in our community?

Answered: 33 Skipped: 1

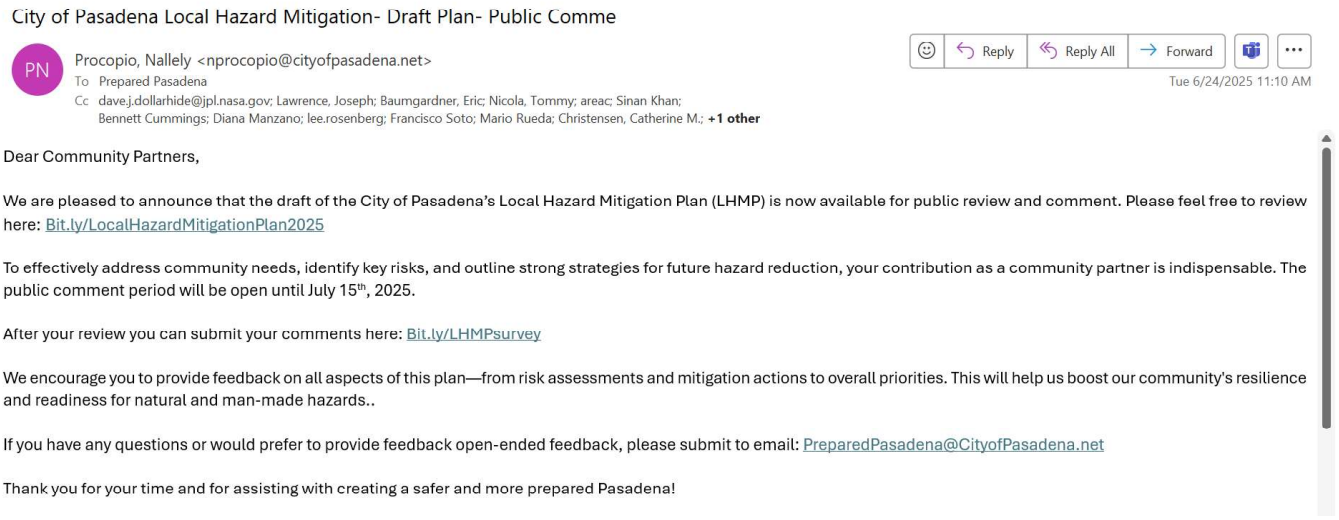


ANSWER CHOICES	RESPONSES	
Strongly agree	6.06%	2
Agree	21.21%	7
Neutral	45.45%	15
Disagree	24.24%	8
Strongly disagree	3.03%	1
TOTAL		33

Q5 Do you have any additional comments or concerns about the hazard mitigation plan?

Answered: 23 Skipped: 11

DOCUMENTATION 18: DISTRIBUTION EMAIL/FEEDBACK



City of Pasadena Local Hazard Mitigation- Draft Plan- Public Comme

PN

Procopio, Nallely <nprocopio@cityofpasadena.net>
To Prepared Pasadena
Cc dave.j.dollarhide@jpl.nasa.gov; Lawrence, Joseph; Baumgardner, Eric; Nicola, Tommy; areac; Sinan Khan; Bennett Cummings; Diana Manzano; lee.rosenberg; Francisco Soto; Mario Rueda; Christensen, Catherine M.; **+1 other**

Reply | Reply All | Forward

Tue 6/24/2025 11:10 AM

Dear Community Partners,

We are pleased to announce that the draft of the City of Pasadena's Local Hazard Mitigation Plan (LHMP) is now available for public review and comment. Please feel free to review here: Bit.ly/LocalHazardMitigationPlan2025

To effectively address community needs, identify key risks, and outline strong strategies for future hazard reduction, your contribution as a community partner is indispensable. The public comment period will be open until July 15th, 2025.

After your review you can submit your comments here: Bit.ly/LHMPsurvey

We encourage you to provide feedback on all aspects of this plan—from risk assessments and mitigation actions to overall priorities. This will help us boost our community's resilience and readiness for natural and man-made hazards..

If you have any questions or would prefer to provide feedback open-ended feedback, please submit to email: PreparedPasadena@CityofPasadena.net

Thank you for your time and for assisting with creating a safer and more prepared Pasadena!

APPENDIX D – ACRONYMS AND ABBREVIATIONS

Acronym	Definition
BRIC	Building Resilient Infrastructure and Communities
Cal OES	California Governor's Office of Emergency Services
CDAA	California Disaster Assistance Act
CIP	Capital Improvement Plan
CO2	Carbon Dioxide
CPRI	Calculated Priority Risk Index
DMA 2000	Disaster Mitigation Act of 2000
EAP	Emergency Action Plan
EOP	Emergency Operations Plan
FEMA	Federal Emergency Management Agency
FMA	Flood Mitigation Assistance
HMA	Hazard Mitigation Assistance
HMGP	Hazard Mitigation Grant Program
LHMP	Local Hazard Mitigation Plan
NFIP	National Flood Insurance Program
NWS	National Weather Service
PDM	Pre-Disaster Mitigation
RFC	Repetitive Flood Claims

Acronym	Definition
STAPLEE	Social, Technical, Administrative, Political, Legal, Economic, Environmental
UCERF3	(the third) Uniform California Earthquake Rupture Forecast
USDM	U.S. Drought Monitor
USSDO	U.S. Seasonal Drought Outlook
UWMP	Urban Water Management Plan
NIDIS	National Integrated Drought Information System
WUI	Wildland Urban Interface