

# Draft Los Angeles General Plan Safety Element

2021 Update

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# Introduction

Since 1975 State law has required city general plans to include a safety element which addresses the issue of protection of its people from unreasonable risks associated with disasters, e.g., fires, floods, earthquakes. It did not intend that a safety element address police matters, except in the context of disasters. In 1984, the State deleted the seismic safety element from its list of mandated general plan elements and incorporated the seismic provisions under the safety element provisions.<sup>1</sup> The subject Safety Element provides a contextual framework for understanding the relationship between hazard mitigation, response to a disaster and initial recovery from a disaster. It replaces the previous Safety Element, adopted in 1996.

An important premise of the Safety Element is that Los Angeles is a built city that is integrally connected to its neighbors geographically and by natural disasters which recognize no boundaries. Therefore, the Element outlines the historic evolution in Los Angeles of local, State and federal roles, particularly relative to mitigation of and response to disasters. The last section of the Element contains goals, objectives, policies and broadly Stated programs.

The Safety Element is a component of the Los Angeles General Plan, maintained by the Department of City Planning. The Safety Element offers a high level overview of how the City plans for disasters, and references readers to other documents where they can find more detailed information. The General Plan is implemented by several city departments, through the goals and policies (Chapter 3) as well as detailed in the Implementation Programs Chapter (Chapter 4). Several city departments draft and implement additional long range plans and code provisions that address safety and disaster planning. Through this element the City assists readers to navigate this collection of interrelated resources.

Additional resources referenced throughout this document include:

- The **Los Angeles General Plan** is a collection of policy documents that serve as a blueprint for the future of the city by informing land use decisions. In addition to the Safety Element, Los Angeles has General Plan elements on topics including: housing, mobility, noise, growth and infrastructure, and several others. This element makes reference to related elements, most commonly the Plan for a Healthy LA (Healthy and Wellness Element) and the Housing Element. The General Plan is maintained and updated by the City Planning Department..
- The **Local Hazard Mitigation Plan (LHMP)** guides the city in reducing risks from disasters to people, property, economy and environment. The LHMP complies with federal and State hazard mitigation planning requirements to establish

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<sup>1</sup> Three previously adopted elements of the City's General Plan: the Safety Element, Fire Protection and Prevention Element, and Seismic Safety Element were revised and consolidated in the Safety Element when previously updated in 1996.

eligibility for funding under the Federal Emergency Management (FEMA) grant programs. The current LHMP was adopted in 2018, and is due to be updated in 2022. Throughout this document numeric references are made to specific sections within the LHMP. These references are based on the 2018 version of the plan. The full LHMP is available on the website of the Emergency Management Department.

- The **Emergency Operations Plan (EOP)**, including Appendices and Annexes, outline the interdepartmental tactical procedures for a number of specific emergencies and aspects of disaster prevention, response and recovery. This collection of plans is also maintained by the Emergency Management Department.
- The **2020 Floodplain Management Plan (FMP)** identifies and addresses the impacts caused by flood hazards and provides specific mitigation measures to help protect properties and their occupants. The FMP is maintained by the Bureau of Engineering and updated with corresponding land use regulations adopted by the Department of City Planning. In accordance with FEMA requirements the plan is updated every five years.
- The **Green New Deal/Sustainability pLAn (the pLAn)** was first published by The Office of Mayor Eric Garcetti in 2015, formalizing a commitment to addressing the climate emergency. The pLAn includes a series of targets and strategies across different city sectors and departments to reduce greenhouse gas (GHG) emissions, consistent with the Paris Climate Agreement. The plan is updated every four years through an extensive public engagement campaign, with the latest version re-titled “L.A.’s Green New Deal” (GND). Throughout this document this ongoing planning effort is referred to as “the pLAn” or the “GND.” By integrating the goals and policies outlined in the pLAn into the Safety Element, Los Angeles will ensure that our ambitious commitment to climate mitigation and adaptation is embodied in the Los Angeles General Plan.
- The **Resilient Los Angeles (Resilient LA)** plan is also produced and maintained by the Office of Mayor Eric Garcetti. The Resilient LA plan details how individual and regional partners can work collectively to protect themselves against sudden and unexpected events, while also addressing underlying chronic stresses in the region. Many of the hazard planning requirements set by the State are addressed through the Resilient LA plan, last updated in March 2018. Ideas and strategies outlined in this plan, but not yet captured in the 1996 Safety Element, have been incorporated throughout this document.
- The **Los Angeles Municipal Code (LAMC)**, including the zoning code, building code, and fire code, outlines baseline regulations and requirements around hazards mitigations.
- The **California Government Code (CA Govt. Code)** sets State requirements for local municipalities in the update, maintenance, and implementation of long range planning efforts.

Chapters 1, 3 and 4 of this Safety Element outline the scope of the City’s on-going

efforts to use experiences and new information to improve the City's hazard program. Chapter 2 outlines the City's historic commitment to improving its prevention of controllable disasters, mitigation of impacts associated with disasters and response to disaster events.

# Chapter 1: Background

## Planning Area

The Safety Element relates to the entire City of Los Angeles. Within the City's boundaries are approximately 473 square miles of land area, including approximately 214 square miles of hills and mountains. The San Gabriel and Santa Susana Mountains bound the City on the north, the Santa Monica Mountains extend across the middle of the City. The Palos Verdes Hills and Pacific Ocean are on the south and west. Because disaster events, geologic features and potential hazards relate to each other and transcend the City's boundaries, this Element takes into account other jurisdictions and governmental entities. For more information on the geography and physical setting of Los Angeles see Chapter 4 of the Local Hazard Mitigation Plan (LHMP) *City of Los Angeles Profile*.

## Demographics

In 2019, The US Census American Community Survey 5-year estimate reported a population of 3,966,366 in the City of Los Angeles. A detailed demographic profile of the City of Los Angeles is included in the 2021-2029 Housing Element, *Chapter One: Needs Assessment*. An additional community demographic profile can be found in the LHMP Chapter 4, including the mapping of vulnerable communities as identified through the State CalEnviroScreen. More detailed information on demographic data and how it creates different types of vulnerability for communities across Los Angeles can be found in the Plan for a Healthy Los Angeles Map Atlas. Finally, the Department of City Planning maintains detailed demographic reports based on the latest Census data, available online.

## Emergency Operations Organization and Emergency Management Division

The City's emergency response is coordinated through the Emergency Operations Organization (EOO). The EOO is the operational department of the City of Los Angeles responsible for the City's emergency preparations (planning, training and mitigation), response and recovery operations. Unique in design, it is a "department without walls" which comprises all agencies of the City's government. The EOO centralizes command and information coordination to enable a unified chain-of-command to operate efficiently and effectively.

The EOO designates a hierarchy of city staff from among agencies and departments who respond to safety emergencies and other local disasters following pre-established procedures. The EOO, along with other emergency plans and response resources, is administered by the Emergency Management Department (EMD), which includes its own dedicated staff in addition to the EOO. This section provides greater detail on the

current structure and function of the EOO and EMD, as well as their coordination with other departments and agencies at local and higher levels of government.

**Background and History.** After every significant emergency, City personnel evaluate the effectiveness of response, ways to improve response and how to reduce potential loss of life, injury and property damage in future similar events. Natural disasters within the City, as well as disasters in other parts of the world, have added to existing knowledge about disaster preparedness. Historically most jurisdictions rely on emergency personnel (police, fire, gas and water) to respond to and handle emergencies. In many jurisdictions, emergency agencies work independently of one another; situations which can lead to command and effectuation conflicts and inefficiencies.

In the late 1970s it was recognized that Los Angeles enjoyed a significant number of public and private resources which could be mobilized to respond to emergencies and provide assistance to victims. However, most of the services operated independently of each other. To evaluate how to make better use of government and private resources, Mayor Tom Bradley convened a task force to study the situation and recommend a plan of action. The task force recommended establishment of a unified, streamlined chain of command to maximize the limited City resources which were available for response to emergency situations. To accomplish this goal the City, in 1980, adopted the Emergency Operations Ordinance (Ordinance No. 153,772) which established a multi-agency Emergency Operations Organization (EOO) under the direction of the Mayor, and administration of an Emergency Operations Board (EOB) and Emergency Operations Center (EOC). At the time, it was the only city organization of its kind in the United States.

In 2000 the division responsible for coordination of the EOO, EOB, and EOC (then housed in the Office of the City Administrator) was expanded to become an independent department, called the Emergency Management Department (EMD).

**Emergency Management Department (EMD).** The Emergency Management Department has five divisions, comprised of administrative staff and specialists that work with City departments, other municipalities and an array of community-based organizations to ensure that the City and its residents have the resources and information they need to prepare, respond to and recover from emergencies, disasters and significant events.

EMD operates the Emergency Operations Center (EOC) and houses the Emergency Operations Organization (EOO) and Emergency Operations Board (EOB). The EOB is composed of leadership from each of the City Departments that coordinate emergency procedures and implement the programs described in the Local Hazard Mitigation Plan (LHMP) and Emergency Operations Plan (EOP).

The work of EMD is captured through it's five divisions:

- The **Administrative Services** division manages budgets, grant administration, and EMD personnel. Division staff act as a liaison to other government and non-profit agencies and provide staff support for the Emergency Operations Board and Emergency Management Committee.
- The **Community Preparedness and Engagement** division works with community groups, schools, Council District offices, and the Mayor's Office to promote individual, household, and neighborhood resilience across the city. The division's "Ready Your LA Neighborhood" (RYLAN) program is coordinated through City Departments, outside agencies, and communities to help families and neighbors prepare for disasters.
- The **Operational Readiness** division ensures that the Emergency Management Department and Emergency Operations Center (EOC) are prepared at all times to respond to an emergency by coordinating EOC activations and staffing. The Operational Readiness division rapidly disseminates crisis information and establishes and maintains media relationships and public affairs protocols for Departments.
- The **Planning** Division maintains the City's Emergency Operations Plan (EOP), Local Hazard Mitigation Plan (LHMP) and coordinates with other city Departments on their long range emergency planning efforts. The LHMP qualifies the City to receive Federal Emergency Management Agency (FEMA) funding to reduce vulnerability to disasters. The EOP and its related Plan Annexes and Appendices total 45 documents that detail the tactical role of EMD and the relevant agencies to prepare for specific emergencies and response. The division also ensures that all emergency plans in the City of Los Angeles are ADA compliant, accountable, and provide all possible mitigation measures.
- The **Training and Exercise** division develops programs to ensure EMD staff, other emergency responders, and the EOC are prepared to respond to emergency and disaster situations; conducts training exercises at the EOC; supports City departments' training efforts; and trains City employees in Standardized Emergency Management System (SEMS) and National Incident Management System (NIMS) concepts and practice.

**Emergency Operations Organization (EOO), Emergency Operations Board (EOB), and Emergency Operation Center (EOC).** EMD manages daily operations related to disaster prevention and preparedness in Los Angeles, but in the event of a declared emergency the Emergency Operation Organization (EOO) assumes primary management responsibilities. The EOO was created by ordinance in 1980 as an operational department of the City pursuant to City Administrative Code Division 8, Chapter 3. It is a "department without walls" which is comprised from many agencies of the City's government. It is a chain of command and protocols activated by the Mayor and/or



declaration of Local Emergency which centralizes command and information coordination to operate efficiently and effectively in deploying resources.

The Emergency Operations Board (EOB) supervises the EOO (i.e., City) emergency preparedness, response and recovery. It is comprised of the heads of the City's critical emergency operations agencies, e.g., Board of Public Works, Fire and Police departments, etc. The Chief of Police is chair of the EOB, the General Manager of the Emergency Management Department is designated as the Emergency Operations Organization Coordinator, and the City Attorney is the legal advisor to the EOB.

The Mayor, in times of emergency, directs the operational divisions of the EOO. Each division is responsible for carrying out specific tasks for coordinating emergency actions which are essential in abating the impacts and limiting the scope of a catastrophe; responding to life threatening situations and safety needs of the population; maintaining and reestablishing essential services, transportation and communication networks; aiding dislocated people; and planning for recovery. The operational divisions of the EOO currently include Airports, Animal Services, Building and Safety, Fire Suppression and Rescue, General Services, Harbor, Information and Technology, Personnel and Recruitment, Police, Public Works, Public Welfare and Sheltering, Recovery and Reconstruction, Transportation, and Utilities.

An Emergency Management Committee (EMC) provides staff to support the EOB. Over two dozen City agencies, other governmental agencies and private organizations participate in activities of the EMC. The EMC develops plans and programs and conducts training exercises to promote integrated disaster planning, response and mitigation efforts.

An Emergency Operations Center (EOC) of the EOO provides a centralized coordination facility for emergency response activities. The EOC is equipped with vital communications and backup power, food and other supplies necessary to provide for the needs of the EOO emergency response coordinating team. The EOC resources, including the Main Coordination Room with 90 responder work areas, are organized according to National Incident Management System (NIMS) and Incident Command System (ICS) standards and designed for maximum survivability. Also co-located in this facility are a new Fire Dispatch Center, Fire Department Operations Center and the Police Department Real-Time Analysis and Critical Response (RACR) Division and Operations Center. A mobile EOC unit is available in the event the primary center is inaccessible or to provide additional disaster response coordination capability. It is comprised of a fleet of vehicles which contain portable offices, communications, self-sustaining power, rest rooms and other resources to enable the mobile EOC unit to operate at any location to which it is sent.

The EOC operates a local and wide-area information management network with backup and satellite communication systems. It is connected to external video systems

including LAPD, LAFD, and LADOT and receives frequent seismic and weather updates. To enhance communications and provide additional communications back-up, the City, as a member of the Operational Area Satellite Information System (OASIS), through the EOO is linked to the Governor's Office of Emergency Services (OES) by satellite.

**Emergency Activation Procedures.** In the event of a major disaster or emergency, the Mayor assumes emergency powers, as defined by law. City agencies follow procedures contained in their emergency plans, under the direction of the Mayor and Chief of Police, pursuant to EOO protocols set forth in the EOO ordinance and plans.

Upon receipt of an official warning of an impending emergency or upon the proclamation of a Local Emergency by the Mayor, the EOO is immediately activated and convened with the EOB. Each department is required to operate as outlined in their Emergency Operations Plan and its related annexes. The Emergency Operations Plan describes the citywide response functions, responsibilities, and capabilities. Each Department's specific plans, the EOP Hazard Annexes, and the EOP Functional Annexes (such as the Evacuation Annex or the Mass Care and Shelter Annex) are written in consideration of all the activities identified in the EMD Emergency Operations Plan. The Declaration of Local Emergency, chain of command should the Mayor be unable to act, and the distribution and powers of the EOO are also outlined in Los Angeles Administrative Code Division 8, Chapter 3.

**Other Interagency Coordination.** The California Office of Emergency Services (CAL OES) is designated by law to provide coordination and State resources to regions or local areas which are declared disaster areas by the Governor. The Federal Emergency Management Agency (FEMA) is designated by federal law to coordinate and provide Federal resources to State and local government relative to disasters declared by the President. To facilitate rapid response to wildfires in brush and forest areas, the U.S. Forest Service has agreements with the County and City fire services for simultaneous dispatch of personnel and equipment to fight fires in designated geographic areas. The Public Works Mutual Aid Agreement, conceived by Los Angeles County in the late 1980s, provides for sharing of personnel and public works equipment between signatory cities and counties within the State during times of emergency. In addition, sometimes the City provides a specific service by contract to another jurisdiction. For example, for a set fee, the City provides fire and emergency medical services to the City of San Fernando which is geographically surrounded by Los Angeles.

Jurisdictional infrastructures, such as roads and emergency services, have become increasingly interrelated. Therefore, local jurisdictions are encouraged by the State to coordinate their general plans with neighboring jurisdictions. The Los Angeles County Safety Element includes all of the cities and unincorporated areas within the County and interrelates the critical service systems, evacuation routes, etc. for the entire county. The subject Element and its associated graphic exhibits utilize and are consistent with the County Safety Element.

Mutual aid and other agreements provide for voluntary cooperative efforts and for provision or receipt of services and aid to or from other agencies or jurisdictions when local capabilities are exceeded by an emergency event. Through mutual aid agreements, the EOO and individual City agencies coordinate emergency response planning with adjacent cities, the County of Los Angeles, the State, federal agencies and other public and private organizations, such as the Los Angeles Unified School District and the American Red Cross. In addition they share information so as to improve hazard mitigation efforts and coordinate resources for disaster response and recovery. The current LHMP recognizes the mutual benefit conferred to stakeholders by interagency multi-hazard activities and requests that mutual aid be coordinated in the event that local personnel or equipment is unable to respond to a hazard or emergency.

Following the disastrous Oakland-East Bay Hills fire of 1991 the State legislature directed the OES, in coordination with other State agencies and interested local emergency management agencies, to establish by regulation the Standardized Emergency Management System (SEMS). The SEMS became effective September 1994 (Government Code Section 8607). It is a command management system which is based upon the Incident Command System (ICS). Like ICS, the SEMS is not a physical agency, it is a procedure for integrating emergency response functions. It sets forth a system and framework within which response agencies which utilize the SEMS can function in an integrated fashion, in effect becoming a single response entity. The SEMS outlines a chain of authority (command) for organization of all public emergency response functions within the State. As its name implies, the SEMS provides guidelines for standardization of procedures and approaches to emergency response; facilitation of the flow of information and resources between organizational levels (field, local government, operation area, regional and State); coordination between responding agencies; and rapid mobilization, deployment, use and tracking of resources. Cities and counties are encouraged to utilize the SEMS in order to qualify for State funds for emergency response activities.

In addition to agreements between government entities, private organizations play a key role in disaster planning and response. In particular, the American Red Cross, Salvation Army, churches and other non-profit organizations provide food, shelter, clothing, health care, volunteer labor and other emergency services to disaster victims, in coordination with the governmental agencies. A variety of private sector organizations have been formed to coordinate community emergency preparedness efforts, to heighten public awareness and understanding of the need for disaster preparedness and to encourage private disaster preparedness activities. Los Angeles Unified School District and City park facilities are the designated assembly and coordination locations for emergency sheltering and assistance efforts coordinated by the Red Cross, the State and/or FEMA. In addition, the Red Cross provides interagency emergency response planning and training support.

## California State Safety Element Requirements

**General Plan Requirements.** City and county general plans are required to contain a Safety Element which addresses disaster hazards. This Safety Element fulfills this State requirement. It should be noted that the term “safety” does not mean “police.” Safety, in the context of the General Plan law and the subject Safety Element, addresses hazards associated with fire, flood, earthquake, landslides and other hazards as described in the Local Hazard Mitigation Plan. The second chapter of this Safety Element details how specific State requirements are satisfied across the Safety Element, Local Hazard Mitigation Plan and other related LA City resources.

Local officials have the authority to declare a local emergency and to invoke emergency regulations to facilitate response to the emergency. Planning and preparedness are critical in mitigating the extent of the impacts of a disaster, through pre-disaster abatement, pre-disaster response preparation and post-disaster recovery plans. The State identifies local safety elements and local hazard mitigation plans as key tools for assisting local jurisdictions in organizing their hazard mitigation, disaster response and recovery efforts.

In 1975, the State mandated that general plans contain safety elements. The general plan law was amended in 1984 to remove seismic elements from the list of required elements and to incorporate seismic provisions within the safety element provisions. CA Government Code Section 65302 (g)(1) requires a safety element that protects “the community from any unreasonable risks associated with the effects of seismically induced surface rupture, ground shaking, ground failure, tsunami, seiche, and dam failure; slope instability leading to mudslides and landslides; subsidence; liquefaction; and other seismic hazards identified pursuant to Chapter 7.8 (commencing with Section 2690) of Division 2 of the Public Resources Code, and other geologic hazards known to the legislative body; flooding; and wildland and urban fires.” In addition to policies that address relevant hazards, State law requires mapping of these hazards, including “mapping of known seismic and other geologic hazards.” The City, through its EOO, has developed integrated operational, contingency and long range plans to address all aspects of potential emergency and disaster situations. Therefore, Los Angeles already goes far beyond the intent of the State general plan law and Governor’s guidelines relative to a comprehensive City Safety Element.

These components need not be contained within the same document. A safety element is intended to be the primary vehicle for relating local safety planning to land use planning and decisions. While the safety element is intended to be the primary document to demonstrate compliance with State law, it is one of many documents to satisfy State requirements. When a State requirement is met in a related plan this document will include a reference to that information.

The City Planning Department reviewed the County Safety Element and determined that

it did not contain sufficient City-oriented information to be adopted as the City's safety element. The background data and information relative to the County and its immediate environs provided excellent technical information. The City will continue to work alongside the County to achieve regional safety goals, especially those goals that require consistent collaboration to mitigate the impacts of climate change.

**Safety Element Update Timeline.** Several recent statutes (SB 1241, SB 1035, AB 747) require local governments to incorporate new requirements for the safety element concurrently with the housing element update. The 2021 Safety Element is being adopted alongside the 2021-2029 Housing Element, with targeted amendments to ensure compliance with all new State legislation.

**State Required Mapping.** The State sets requirements for mapping and information that must be included in relation to specific hazards. More information on these requirements and LA City compliance is available in Chapter 2: *Existing Conditions, Hazard Issues, and Mitigation History*.

**State Required Consultation.** This Safety Element is submitted for review to several State agencies, in keeping with State law. The draft element was shared with the State Fire Board and local fire agencies, including the Los Angeles Fire Department and LA County Fire Department. The draft element was additionally shared with the California Geologic Survey. Finally the draft document was shared with the California Office of Emergency Services, which is not required by State law but serves as a meaningful coordination exercise. The related Environmental Impact Report, which covers both the Safety and Housing Elements, was additionally circulated to several State and local agencies.

**State Guidance on Format.** In addition to State law, the Governor's Office of Planning and Research (OPR) issues "General Plan Guidelines." The document provides guidance for preparation of local general plans. The Guidelines, under which this Safety Element was prepared, advise that a general plan contain goals, objectives, policies, programs and implementation monitoring. According to OPR General Plan Guidelines Appendix A:

*A goal is a general direction-setter. It is an ideal future end related to the public health, safety, or general welfare. A goal is a general expression of community values and, therefore, may be abstract in nature. Consequently, a goal is generally not quantifiable or time dependent.*

*An objective is a specified end, condition, or state that is an intermediate step toward attaining a goal. It should be achievable and, when possible, measurable and time-specific. An objective may pertain to one particular aspect of a goal or it may be one of several successive steps toward goal achievement. Consequently, there may be more than one objective for each goal.*

*A policy is a specific statement that guides decision-making. It indicates a commitment of the local legislative body to a particular course of action. A policy is based on and helps implement a general plan's vision. Programs can be short or long term groupings of projects or services that help achieve policy goals. Actions are specific methods to achieve policy goals. In this appendix, policies, programs, and actions are listed together.*

The three Safety Element goals parallel three of the primary phases of disaster planning: hazard mitigation (pre-disaster), emergency response (disaster event) and recovery (post-disaster). For the purposes of this Element, planning and training are incorporated under each of these phases. The three categories identify the three steps needed for urban safety relative to potential disasters: (1) pre-disaster mitigation of potential hazards which could cause loss of life and property damage during a disaster, procedures for mitigating disruption, provisions for back-up systems necessary for keeping essential City services and systems operational in the event of a disaster. As of 2021 this also includes efforts to prevent and mitigate climate change and its related impacts; (2) protection of life and property and provision of temporary assistance to disaster victims during and immediately following a disaster; and (3) post-disaster elimination of disaster-created hazards, re-establishment of private and public services and systems and general recovery.

The Element complies with State law by providing a contextual framework and overview of the City's hazards, hazard mitigation and emergency response operations. It is not intended to be as comprehensive as the EOP and associated plans insofar as the Element is an informational rather than operational document. The EOP and its related documents provide comprehensive (including police) operational protocols and plans. They are reviewed and approved not only by the EOO Board but by the Mayor and City Council and, therefore, are City policy. More importantly, they are operational documents, and they are updated continuously.

**Other Legislation and Requirements.** Additional information on legislation that regulates hazard planning, at the Federal, State and local level, is available in the Local Hazard Mitigation Plan, Chapter 4: *City of Los Angeles Profile*.

## Element Scope

**Prior General Plan Elements.** The 2021 Safety Element is similar in scope and content to the 1996 Safety Element. State law required that the Safety Element be updated alongside the 2021-2029 Housing Element, which limited the scope of the update process by instituting a statutory adoption deadline of October 2021. Update efforts were focused on removing outdated information and adding in new information to ensure compliance with all current State requirements. Additionally, this update is more concise than the 1996 Safety Element, as text and exhibits that were found to be repetitive with other long range city documents were replaced by reference.

**Jurisdiction.** Element implementation programs focus on programs which are within the authority and responsibility of the City of Los Angeles, though State and federal agencies are often involved in the implementation of local programs.

**Land Use.** The City's programs, including the subject Element, emphasize mitigation of potential hazard impacts. In addition to mitigation the City also considers land use strategies to reduce the number of structures in hazard areas. Hazard information informs zoning decisions during the Community Plan update process, and areas with considerable hazards are required to meet additional criteria during the land use entitlement process. As planning for future hazards, particularly those related to climate change and stressors, increases at the State and local level, the City will increasingly look to additional land use restrictions as preventative measures in hazard prone areas. These measures can also include considerations that advance sustainability and resilience goals.



## Chapter 2: Existing Conditions, Hazard Issues and Mitigation History

Much of the City of Los Angeles is built within old flood plains and mountains or adjacent to the Pacific Ocean. The City is developed with dense centers of population near public transportation hubs and major job centers, connected by lower density, predominantly residential neighborhoods. Most of the flat lands of the City have been developed with some urbanized land use. Remaining undeveloped land tends to be concentrated within floodplains or along steep hillside and drainage water courses which typically have been designated as public park land, recreational, flood control or low intensity uses, consistent with State law. Vulnerability to fire and flood has increased as development has encroached into remaining undeveloped areas.

When a catastrophic disaster strikes, it may trigger secondary events. An earthquake may trigger a landslide or cause rupture of gas mains or hazardous materials enclosures. Disruption of gas mains could contribute to or cause fires. If winds are present, fires could become wildfires. Fires can denude hillsides and, thereby, exacerbate potential flood hazard and inundation conditions. For purposes of evaluating hazards addressed by this Safety Element, the following sections provide a brief history of the measures taken to mitigate individual hazards in Los Angeles.

### General Disaster Prevention, Response and Recovery

The Safety Element includes the high level framework of Goals, Objectives, Policies and Programs that pertain to the safety of the City. The Local Hazard Mitigation Plan (LHMP) contains information related to hazard identification and planning in Los Angeles. The Emergency Operation Plan (EOP) and related Annexes details tactical information on disaster response and recovery. This update incorporates the LHMP and EOP into the City's General Plan by reference and outlines compliance with state regulations across all documents, in addition to other specific long range planning documents. In addition to the hazard specific sections below, these plans include several points of information relevant to hazards more generally:

**Local Context and History.** The LHMP provides an account of the history and physical setting of the Los Angeles area, including a chronology of major federal declared disaster events, in LHMP *Chapter 4: City of Los Angeles Profile*. This Chapter additionally details major regulations and regulating bodies at the local, State and Federal level as they pertain to safety. Some of these laws are further referenced below as they pertain to state requirements around specific disasters. A more detailed version of this local history, context, and legislative framework is provided in each chapter, focused on



specific hazards, in the LHMP.

**Critical Facilities.** The LHMP discusses three types of critical facilities in *Chapter 4: City of Los Angeles Profile*. “Critical Operating Facilities” are office buildings that house the city personnel required for the day to day operation of the city. “Critical Response Facilities” are necessary for hazard event response. They include fire stations, police stations, hospitals and evacuation centers. “Critical Infrastructure” is divided into two categories. “Transportation Infrastructure,” such as freeways, streets, bridges, airports and the harbor, are required for evacuation and egress. “Utilities Infrastructure,” which includes water, electric, gas and communications systems, are required to sustain the population during and after an emergency. These facilities are mapped in LHMP Figures 4-2 through 4-15. The City works to locate critical facilities outside of hazard areas (including fire and flood zones) whenever possible. Where applicable, the LHMP includes a detailed discussion of when critical facilities are located in designated hazard areas. In addition to the LHMP discussion on critical facilities, the City maintains the EOP Critical Facilities Annex.

**Vulnerable Communities.** SB 1000 requires municipalities to identify “disadvantaged communities” that experience unique and compounding health risks as a result of disproportionate exposure to environmental hazards. This is done through several documents in the City of Los Angeles. The LHMP *Chapter 4* details communities identified through the Red Cross’ Prepare LA Vulnerable Communities Project, which relies on Cal EnviroScreen data. The Plan for a Healthy LA, which contains most of the City’s SB 1000 compliance measures, includes the LA City Health Atlas. The Health Atlas provides different indices of health access and outcomes, which determine a community’s relative vulnerability and resilience. Some maps visualize individual data sets, like linguistic isolation or air quality, while others overlay data sets to create an index of topics, such as pollution burden and community health.

**Risk Assessment.** In addition to identifying how best to plan for and mitigate many specific disasters, the LHMP includes a risk assessment, which identifies hazards of concern and their likely impact and magnitude. This risk assessment can be found in *Chapter 5: Hazards of Concern, Risk Assessment Methodology*. This Risk Assessment serves as the City’s current vulnerability assessment, and will be expanded to further address climate change impacts during the next update of the LHMP.

**Sheltering.** The City has several plans and procedures related to mass sheltering, rebuilding and reconstitution of critical facilities immediately following a disaster. City facilities, including recreation centers, schools and tourism facilities, have been pre-identified as emergency shelters. In addition to sheltering residents the City has planned to shelter animals and ensure access to food and water for all affected populations. The City’s EOP details a citywide, departmental approach to sheltering. Seven annexes are focused on mass care, including traditional and non-traditional sheltering, large and small animal sheltering, and feeding and health/medical needs.

**Evacuation.** California Government Code Section 65302(g)(1) specifies the need to plan for swift evacuation in the event of a fire or other emergency. The City of Los Angeles includes a wide range of physical environments and dramatic differences in population density based on the time of day or day of the week. To better accommodate the variety of evacuation scenarios, the City has developed a dynamic approach to evacuation response, one that can respond to different conditions. As specified in the City EOP Evacuations Annex “primary evaluation routes consist of the major interstates, highways, and primary arterials within the City and Los Angeles County.” However, in response to a more localized emergency, like a hillside wildfire, the LAFD works in coordination with the Los Angeles Department of Transportation and Los Angeles Police Department to identify the most appropriate local egress option and direct individuals to those routes. Potential routes have been pre-selected based on a number of considerations, but potential evacuation routes will vary based on the type and location of hazard/disaster. For instance, Tsunami Evacuation Routes are signed in coastal areas of the city. Other routes are shared in real time depending on which disaster and suitable evacuation routes are identified. The related Transportation Appendix and Evacuation Annex of the EOP detail how to facilitate movement of the public and incident related resources during an emergency event.

## Wildland and Urban Fire

Fire was the first hazard to be addressed by El Pueblo de Los Angeles which was founded in 1781. The hot, arid climate, especially during the summer and fall, dried out vegetation. Dry brush was prone to fires caused by lightning strikes and spontaneous combustion. New sources of fire came with the advent of human habitation. By the early 1800s Los Angeles was an agricultural community with a small population. Buildings generally were constructed of adobe and tile. Individual properties experienced fires such as hay mounds igniting spontaneously, roofs being set afire by sparks from cooking stoves or fires due to carelessness. The primary fire hazard was storage of large quantities of hay. As the City grew and buildings were established in close proximity to each other, entire blocks could burn in a matter of hours due to the lack of adequate water storage and delivery systems. Given these potentially catastrophic hazards, it is not surprising that some of the earliest City building regulations addressed fire hazards.

The Los Angeles City Fire Department was established on February 1, 1886. Thirty firefighters, most of them former volunteers, were hired to man four leased firehouses. In addition, volunteer units were retained in the less populated areas outside the central city, including the San Fernando Valley. From the beginning the Department was an innovative, progressive agency which sought to secure the latest equipment, utilize the latest techniques and to develop better methods for fire fighting and prevention.

After World War II the Department expanded dramatically in response to a commercial,

industrial and population boom. Around the turn of the century, insurance companies played a significant role in the improvement of fire standards throughout the nation. Facing high costs from poorly managed fire systems, the fire underwriters joined together in an association which established fire rating systems to assess efficiency and effectiveness of local fire hazard mitigation and fire fighting agencies. Insurance rates were established accordingly. Cities could lower their fire insurance rates if they improved their hazard mitigation and fire fighting systems. This economic incentive spurred nationwide interest in fire prevention and suppression and continues to do so to this day. These efforts to map and quantify insurance risk also played a role in “redlining” practices that drove systemic disinvestment in communities of color. More information on these practices, and how they continue to shape our housing landscape, is available in the 2021-2029 Housing Element.

Fire prevention measures often were adopted following fires which resulted in loss of life or significant property loss so as to prevent similar occurrences in the future. Sometimes it took more than one tragic event to trigger public support for changes. Below is additional information on these prevention measures, and some history on their passage.

**Mapping.** For many years Los Angeles has identified and mapped areas of greater fire risk. In 1943 the City adopted a series of land use designations, called Fire Districts 1, 2, 3 and 4 to designate geographies with elevated fire risk. In 1944 Fire District 3 and 4 were removed from the code, and Fire District 2 was eventually replaced by the “Mountain Fire District.” Today Fire District 1 is still used to designate areas of significant urbanization that face an elevated fire risk. Fire District 1 includes some of the most significant regional centers in the City: Downtown, Hollywood, Century City, the Grove and Farmers Market, Baldwin Hills Crenshaw Plaza, and Wilshire Boulevard. The boundaries of Fire District 1 can be found in Los Angeles Municipal Code (LAMC) Section 91.7201.1.

The “Mountain Fire District” was established in January 1963 as a direct result of the November 1961 Bel Air Fire. In April of 1971, the “Fire Buffer Zones” were established as a direct result of the wind driven Chatsworth Fire. In 1993, as a result of the Oakland Hills Fire, the Bates Bill No.337 was enacted requiring local jurisdictions to identify and establish Very High Fire Hazard Severity Zones. The Los Angeles Fire Department’s Bureau of Fire Prevention and Public Safety joined with the Planning Section to conduct a survey utilizing the criteria established by the State Fire Marshal.

The “Very High Fire Hazard Severity Zone” (VHFHSZ) was first established in the City of Los Angeles in 1999 and replaced the older “Mountain Fire District” and “Buffer Zone.” The VHFHSZ is determined and updated according to California State Law. The Very High Fire Hazard Severity Zone comprises most of the hilly and mountainous regions of the City of Los Angeles. It includes portions of the following communities: Baldwin Hills, Bel Air Estates, Beverly Glen, Brentwood, Castellammare, Chatsworth, Eagle Rock, East

Los Angeles, Echo Park, El Sereno, Encino, Glassel Park, Granada Hills, Hollywood, Lake View Terrace Los Angeles, Los Feliz, Montecito Heights, Monterey Hills, Mount Olympus, Mount Washington, Pacific Palisades, Pacoima, Palisades Highland, Porter Ranch, San Pedro, Shadow Hills, Sherman Oaks, Silver Lake, Studio City, Sunland, Sun Valley, Sylmar, Tarzana, Tujunga, West Hills, Westwood, Woodland Hills.

Each local fire station has a detailed map showing exactly which parcels of property are in the VHFHSZ. A map of VHFHSZs is available as figures 13-3 through 13-10 in the Local Hazard Mitigation Plan (where they are described as “Wildfire Severity Zones”). The Zoning Information Map System (ZIMAS) also details which parcels are located in a VHFHSZ. Very High Fire Severity Hazard Zones are considered a Fire District per the Los Angeles Building code (LAMC 91.7201.2). The boundaries of the Very High Fire Hazard Severity Zone are set in LAMC 57.4908, contained in Chapter V: Public Safety and Protection. These mapping efforts satisfy the requirement of CA Government Code Section 65302, which requires local mapping of State Responsibility Zones.

The State additionally requires cities to detail the location and distribution of existing and planned development in State Responsibility Areas in Very High Fire Hazard Severity Zones (VHFHSZs). Within the LHMP the City provides estimates for population, structures, land use, and critical facilities and infrastructure within Very High Fire Hazard Severity Zones (tables 13-1, through 13-4 in 2018 LHMP). The City considers hazard designations when making zoning decisions, so land within the VHFHSZ is generally designated for low density residential development and open space. At the time this update was undertaken, the State adopted SB 99 that directs jurisdictions to map parcels without two means of egress in hazard areas. In response, the City formed a task force led by BOE and including DOT and DCP to study this situation.

**Urban Fires.** Improved building construction engineering, materials and mechanisms made possible construction of increasingly taller buildings. The first four-story wood frame building was constructed in Los Angeles in 1882. By 1888 seven story buildings with brick bearing walls were permitted and fire escapes were required for buildings four stories or more in height. With the advent of elevators and minimal masonry reinforcement, the City in 1903 allowed the construction of its first 13-story office building. In 1905 the fire escape ordinance was made retroactive and enforcement was delegated to the Building Department. Subsequently, water connections were required in new multi-story buildings to facilitate fire fighting. In 1910 the height limit was set at 150 feet (13 stories) for steel frame office buildings, the maximum possible under then available engineering techniques, and five stories for residential buildings, including hotels. After building technological advances enabled construction of taller buildings, the height limit was retained to assure that the proposed City Hall would be the City’s tallest building. City Hall was dedicated in 1928 and at 452 feet in height (over 28 stories) it remained the tallest building until the 1957 floor area ratio ordinance replaced the height ordinance. The 1957 ordinance allowed unlimited height with a maximum floor area in order to encourage provision of open space and more imaginative building design. In 1962 the 32-story Occidental Tower (later TransAmerica Building) was

constructed in the Central City community. It became the first building to exceed the height of City Hall. Hundreds of high rise buildings have since been constructed in the City. This has necessitated entirely new techniques for fire mitigation, suppression and rescue. Today, the city's primary approach to preventing and mitigating urban building fires is through the Municipal Code, which includes the Fire Code (section 57) and Building Code (section 91). More information on building mitigations is available below.

More information on urban fires is available in Chapter 15 of the LHMP: *Critical Infrastructure, High-Rise/High Occupancy Building Fire, Special Events*.

**Wildfire / Brush fires.** Brush fires (also called wildfires) continue to be a major threat to life and property throughout the region due to unique fuel, terrain and climatic conditions. The hazard is especially great when the dry "Santa Ana" winds arrive, usually in the fall and winter seasons. The desert blown Santa Anas turn vegetation to tinder and spread localized fires quickly.

In 1924 a civilian Mountain Fire Patrol was established to improve fire safety in hillside areas. The Patrol counseled private property owners in fire prevention and encouraged them to maintain burlap bags and other fire fighting material to protect their homes which often were distant from fire stations or were not served by adequate roads. Boxes of fire fighting tools were placed at strategic locations along Mulholland Drive and fire breaks, fire trails and fire roads were maintained to slow movement of fires and provide access for fire fighters. However, the fire breaks proved ineffective with major fires. Wind conditions, including those generated by a fire, could carry burning embers and materials far beyond fire breaks.

To date, the 1961 Bel Air fire storm in the Santa Monica Mountains is ranked as one of the City's most costly brush fires. The 50 mile an hour Santa Ana winds, combined with fire-generated winds, carried burning debris and set new fires far from the main front. The fire lasted two days, destroyed over 500 structures and burned 6,090 acres of watershed within a 19-mile perimeter. Even with this loss, 78% of all the homes within the perimeter were saved. A direct result of the fire was the phasing out of the Mountain Fire Patrol, rebuilding the two existing fire stations and constructing two new stations along Mulholland Drive, the road which runs along the ridge of the Santa Monica Mountains. In addition, the Mountain Fire District and Buffer Zone boundaries (today called Very High Fire Hazard Severity Zones) were expanded to include a greater area.

Between October 25 and November 10, 1993 an unprecedented series of 22 devastating wildfires occurred in the six county Southern California region (from Ventura to San Diego County). The fires were caused by arson (12 fires), arcing power lines (6), campfires (2) and undetermined sources and were fanned by Santa Ana winds and fueled by a combination of dead undergrowth resulting from a seven-year drought and heavy new growth caused by recent rains. The fires burned 197,277 acres, destroyed over 1,170 structures and killed three people. They were battled by a force of 9,476 fire fighting personnel from 458 agencies from around the nation. The last and largest of

the fires was in the Topanga-Malibu area.

Due to climate change the region today is subject to more frequent and severe wildfires. As of 2020, eight of the ten largest fires in California history occurred during the past decade. The 2009 Station Fire is the largest wildfire on record in LA County, with 160,557 acres burned. The 2020 Bobcat Fire burned 115,796 acres and contributed to hazardous air quality across the region, a challenge compounded by the surging Covid-19 pandemic, which kept many from seeking relief in communal facilities.

Today the City's approach to preventing and mitigating wildfire risk includes building standards, brush clearance, roadway requirements, parking restrictions, zoning limitations, and many more interventions detailed below.

More information on wildfire, including a history of major events, a map of Very High Fire Hazard Severity Zones, and details on secondary impacts, can be found in the LHMP Chapter 13: *Urban / Wildland Interface Fires*. Specific tactical measures related to brush fires can be found in the Brush Fire annex of the Emergency Operations Plan.

**Brush Clearance.** A brush clearance program was instituted in 1920 using paid civilians to clear vacant lots of debris and rubbish. The program significantly reduced brush fires. In April of 1981 the Los Angeles Fire Department established the Brush Clearance Unit to coordinate and conduct inspection sweeps of the Mountain Fire District (now VHFHSZ) and to contract noncompliant properties to be cleared of hazardous brush.

In April of 1997, section 57.322.1 of the Los Angeles Municipal Code was amended to increase the clearance of hazardous vegetation to a total distance of 200 feet from any structure unless otherwise specified by the Fire Chief. The Amendment further added criteria for maintenance of landscape vegetation in such a condition as not to provide an available fuel supply to augment the spread or intensity of a fire. These criteria included, but were not limited to eucalyptus, acacia, palm, pampas grass, and conifers such as cedar, cypress, fir, juniper, and pine. In February of 1999 section 57.21.07 of the Los Angeles Municipal Code was again amended, this time establishing a fee for inspections of properties in the City of Los Angeles to determine if a violation of this section exists.

**Building Codes and Infrastructure.** Fire prevention long has been recognized as the best method for reducing fire incidence and devastation. As the Fire Department became more organized and better accepted, the City adopted fire regulations and authorized fire fighters, police and other officials to enforce them. Increasingly comprehensive ordinances were passed to regulate building design, materials and occupancies so as to better contain fires and reduce fire hazards.

The first regulations applied to Fire Districts which were established in 1869 in the most



densely developed sections of the City. In the 1880s concern regarding spread of fire and loss of life resulted in requirements for separate exits for large assembly halls, fire walls between adjoining buildings, exit aisles and swinging doors. In some districts, such as what is now the Central City, wooden structures were prohibited and masonry structures were required. Wood remained the most common construction material for buildings outside of the fire districts. In 1907 water connections were mandated for new and existing homes. With the advent of electrical wiring, fire hazards increased, leading to the establishment of electrical safety codes.

In 1964 Operation High Rise was instituted. It used empty buildings to study the propagation, effects and spread of fires and to develop systematic response and suppression procedures for high rise fires. Procedures developed by this unique program and subsequent programs have been used by emergency response agencies throughout the world. The first significant local test of Operation High Rise was in 1968 for a fire in the 9-story U.S. Borax and Chemical Corporation building in the Westlake area. Heat activated elevator buttons caused elevators to be called to and to remain at the fire involved floor, resulting in the death of one fire fighter. Emergency alarm systems failed to work and hand held walkie talkies proved ineffective inside the building. Out of this tragedy came new building construction requirements and fire fighting procedures, including banning of heat activated elevator buttons by Los Angeles and establishment of a new Department procedure requiring fire fighters to use stairs instead of elevators to gain access to a fire involved floor. The first major high rise fire in the nation, the One New York Plaza fire of 1970, triggered a national review of hazards associated with high rise buildings. The California State Legislature in 1974 adopted high rise fire safety regulations which included requirements for automatic sprinkler systems in any new buildings which were 75 or more feet in height.

The 1979 fire on the 11th floor of the Bunker Hill West Tower (Hope and Third Streets, Central City) was the City's first major fire in a residential high rise building. Following this tragedy, rescue procedures were improved and, in 1980, smoke detectors were required in all new residential high rise buildings and any high rise buildings which were issued remodeling permits.

Devastating brush fires have resulted in establishment of more fire stations and facilities in hillside areas and in more stringent requirements for fire hydrant installation, hillside brush clearance, fire access road systems, home sprinklers, fire resistant construction and landscaping materials, and development of improved firefighting strategies and equipment. In 1962 the Department acquired its first helicopter with water dropping capability. Subsequently, aircraft became important equipment for fighting brush fires. They were used for dropping water and chemicals on targeted fire areas. Flammable roofs long had been identified by fire agencies as major contributors to property damage and the spreading of fire storms in developed areas near brush lands. In 1970, following the Chatsworth fire in which 113 homes were damaged or destroyed, the City required that new homes in Mountain Fire Districts (now VHFHSZs)

treat combustible roof materials so as to make them more resistant to fire. Following the devastating December 1989 Sesnon (Granada Hills) fire which destroyed or damaged 30 dwellings, combustible roofing material was banned from use in construction of new homes in Mountain Fire Districts (now VHFHSZs).

Today, structures in Fire Districts (including Very High Fire Hazard Severity Zones and Fire District 1) are required to meet specific building and fire code requirements pertaining to fire safety. The provisions of Building Code Section 91.7203, which include standards around projections, sprinklers, canopies, and non-conforming buildings, apply to both Fire District 1 and Very High Fire Hazard Severity Zones. Buildings in Very High Severity Zones are also subject to the requirements of Building Code Section 91.7207, which includes additional restrictions on unenclosed under floor areas, utilities, attic openings and roofing. Within Fire District 1 only Types I, II, and III construction are allowed, while types IV and V, which generally involve more combustible materials, are prohibited. Openings of exterior walls (i.e. windows and doors) must have additional fire resistant protection. There are additional code requirements related to roof coverings and structure, structural fire rating, exterior walls, and architectural details.

Several other factors have helped to bolster safety within Very High Fire Hazard Severity Zones. The Los Angeles Fire Department has acquired equipment specifically to better fight fires in hillside areas, including smaller fire and response vehicles that are better able to navigate narrow hillside streets. The Los Angeles Fire Department designates “Red Flag Day” curb zones, which prohibit parking on high fire risk days to ensure adequate space for fire fighting equipment should a fire break out. When feasible, new essential public facilities are located outside of fire zones. The few essential facilities that are located in VHFHS zones have mitigation measures.

**Port of Los Angeles (POLA).** With the annexation of San Pedro and Wilmington in 1909, including property which would become the future Port of Los Angeles (POLA), the Fire Department began to develop capabilities for fighting dock and other harbor fires. To facilitate response, the Department has entered into cooperative arrangements with federal, State, and county agencies, as well as the adjoining Port of Long Beach for response to fires, hazardous materials spills and other emergencies in the harbor area.

LAFD provides fire protection and emergency services for the Port. Fire protection capabilities are based on the distance from the emergency to the nearest fire station and the number of simultaneous emergency or fire-related calls. In the port area, which includes the Port’s coastal zone boundary, LAFD facilities include land-based fire stations and fireboat companies. Battalion 6 is responsible for all of San Pedro and its waterfronts, Terminal Island and all of the surrounding water, Wilmington, Harbor City, and Harbor Gateway. There are 10 fire stations within these geographical areas, with fire boats, hazardous material squads, paramedic and rescue vehicles, three-truck companies, and urban search and rescue team, and a foam tender apparatus.



More information on the Port of Los Angeles fire protection and emergency response service can be found in Port of Los Angeles Master Plan Update 3.10.4.

**Los Angeles World Airports (LAWA).** Airport expansion resulted in the establishment of fire stations at the Los Angeles International (LAX) and Van Nuys airports in 1956 (both of which are managed by LAWA). As with the harbor operations, special equipment, tactics and training were instituted to prevent, suppress and contain fires and to rescue potential victims. Today both the port and airports have on-site fire fighting operations and special equipment designed for the unique needs of those facilities, and maintain separate emergency plans that detail fire prevention and response.

The terrorist attacks of September 11, 2001 greatly changed America's aviation landscape. With a renewed focus on safety, LAWA developed the LAX Master Plan to serve approximately 78.9 million annual passengers (MAP) and 3.1 million tons (MAT) of cargo and is intended to guide development of the airport. In order to accommodate the pressing need for modernization and improved levels of service, the LAX Master Plan includes enhancements to safety and security measures in order to address the very real demand for increased security that is vital to protecting critical airport infrastructure and providing for passenger safety and convenience. More information on the LAX Master Plan fire protection and emergency services can be found in the LAX Master Plan Final EIS/EIR 4.26.1 Fire Protection. LAWA additionally works to implement similar safety regulations at the Van Nuys Airport.

**Rescue/medical (EMS).** Rescue and provision of medical care to victims of fires has been an important function of the Los Angeles Fire Department. A Rescue Squad began operating in 1922 to provide breathing apparatus and to attend to fire fighters at fire scenes. In 1930 a fleet of six ambulances was purchased to transport injured firemen to hospitals. The service soon was expanded to serve civilian fire victims. By 1957 the fleet included Department ambulances and ambulances operated by private companies. The first paramedic ambulance service was established in 1970. In that year, other City operated ambulances and their crews were transferred to the Fire Department by executive order of Mayor Sam Yorty. The Department reorganized the service and reassigned ambulances and crews to all areas of the City so as to facilitate efficient response. By 1973 all contract services with private ambulance companies had been phased out and the Department had assumed authority over all first care (response) medical service within the City. The operation was upgraded and became the Bureau of Emergency Medical Services. All of the Department's fire fighting personnel are trained in emergency medical skills so as to enable any fire fighting team to respond to an emergency medical call. By the 1990s more calls were received for medical services than for fire fighting services, e.g., approximately 77 percent of the all calls received in 1993-94 were for medical services. Last year approximately [XXX] percent of all calls were for medical services.

**Fire Department Planning Division.** Long range planning for fire risk is handled across several departments. Every two years the Los Angeles Fire Departments releases a strategic plan that outlines upcoming challenges and priorities, covering both wildfires and urban building fires. The current plan, called “A Safer City 2.0” focuses on strategies to provide exceptional public safety and emergency service, creating a healthy work environment with opportunities for personal growth, and enhancing sustainability and community resiliency. The LAFD is currently working on a Standards of Cover document [updated text to follow].

As described previously, the Local Hazard Mitigation Plan includes sections on both wildfires and building fires. The Emergency Operations Master Plan includes a Brush Fire Annex, which details specific response procedures in the event of the brush fire.

**Interagency Coordination.** The State requires that each city identify agencies with responsibility for fire protection in these areas (including federal, State, local, special districts, and local offices of emergency services). The City of Los Angeles has its own Fire Department, the Los Angeles Fire Department (LAFD), which handles fire and Emergency Management Services (EMS) response. The LAFD is the primary agency responsible for fire response within the City of Los Angeles. The LAFD regularly coordinates with other agencies that have responsibility for fire protection in these areas, including California Department of Forestry and Fire Protection (Cal Fire). State guidance also specifies the need for cooperative working relationships among public agencies with responsibility for fire protection. The City's commitment to this principle is articulated in Policy 2.1.1, which focuses on intergovernmental coordination.

Because the City of Los Angeles surrounds other cities, e.g., Beverly Hills and West Hollywood, and adjoins other cities as well as the county, State and federally controlled lands, it has joined in a variety of agreements with other jurisdictions for cooperative response and management of fires and other emergency incidents. Containment and suppression of a fire within an adjoining jurisdiction protects the City from encroachment and damage from the fire, thereby protecting the population as a whole. Most of the agreements are voluntary.

When a major disaster strikes, local, State, federal and private agencies respond under mutual aid agreements and federal, State and local disaster response procedures. The City's Emergency Operations Organization is the primary City organization under which City agencies join together in emergency preparation, response and recovery planning. In addition, the fire and police departments and other emergency response personnel participate with like agencies in other jurisdictions in training exercises and network coordination. More information on interagency coordination as it pertains to wildfire response is available in the Brush Fire Annex of the Emergency Operations Plan.

The fire fighting experiences of the 1970s resulted in establishment by the U.S. Forestry Service of a partnership of local, State and federal fire agencies to develop improved

coordination for fire suppression management and emergency response. The partnership evolved into the Fire Resources of Southern California Organized for Potential Emergencies (FIRESCOPE) program. FIRESCOPE developed the Incident Command System (ICS) and Multi-Agency Coordination System (MACS) which were designed to improve multi-agency response to multi-hazard events, including earthquakes, floods and fires. The Los Angeles City Fire Department was a leader in developing these programs and one of the first to make them operational. The programs established plans and procedures for improved interagency coordination, including common terminology, organizational structures (chain of command) and response procedures and for compatible communications (e.g., radio frequencies) and equipment systems (e.g., hose connections). The goal was to make agency personnel and equipment readily interchangeable within and between jurisdictions and command levels so as to facilitate effective deployment and efficient utilization of limited resources between federal, State, regional, district and local agencies and operational levels. When incidents exceed or are anticipated to exceed the resources at a particular response level, assistance is requested from the next level which in turn evaluates the needs and assembles and allocates personnel and other resources.

**Training.** The Department long has been known for its innovative leadership in the field of fire fighting techniques and strategies. In the early days, firemen responded in an ad hoc fashion to fire incidents. The ad hoc approach to fire fighting was inefficient and sometimes resulted in injury to firemen. To improve efficiency, safety and effectiveness the Department established a unique Fire College. The program included classroom training as well as exercises under simulated emergency and fire conditions. It was the first such educational program in the nation. Instructors were required to have at least seven years of fire fighting experience and a teaching credential from the University of California at Los Angeles. The first class graduated in 1925. The Fire College transformed the Department into one of the most professional in the nation and was credited with a significant reduction in property losses and loss of life due to fire.

In 1957 the Emergency Operational Procedures Manual was developed to provide coordinated ground and air procedures for fighting brush fires. The manual was the precursor of the Incident Command System which provides coordinated procedures for multi-unit response to emergency events. Exercises were conducted to assure that personnel were familiar with the procedures, thereby increasing efficiency and effectiveness.

Unlike fire agencies in many other jurisdictions, all Fire Department emergency personnel, including fire fighters, inspectors and an increasing number of emergency medical personnel, are trained firefighters and all are given emergency medical and other training. This enables an efficient mobilization in event of major emergencies and has resulted in a department in which fire fighters are multi-skilled. Firefighters receive on-going skills training to familiarize them with new techniques and equipment and to refresh their skills. Within the LAFD there are also personnel with specialized training in

topics including Urban Search and Rescue and River Rescue.

Following the 1985 Mexico City and 1987 Whittier earthquakes, the City recognized that its personnel alone were insufficient to provide all assistance needed during and following a major disaster. To address this issue a Disaster Preparedness Division was established within the Fire Department to train City and private sector personnel in disaster response techniques and procedures. One of the programs is the Community Emergency Response Program (CERT) which trains volunteer community, business and City employee representatives in earthquake awareness, disaster fire suppression techniques, light search and rescue operations and team organization and management. The goal of CERT is to create a well-trained civilian emergency work force as an adjunct to professional forces. CERT trains people to establish neighborhood self-sufficiency during extended emergencies (such as earthquakes) and in situations where the numbers and scope of events overwhelms government emergency forces. The volunteers are trained to perform independently, to train other neighborhood or work area volunteers, to operate teams within their work areas or communities and to work with professional forces in other disaster areas to which they might be assigned. As of 1994 the CERT Program had trained over 12,000 people and its techniques had been adopted by other agencies, including FEMA, to train volunteers throughout the nation [to be updated].

**Safety Element Review.** A city or county that contains a State Responsibility Area and a Very High Fire Hazard Severity Zone must provide a draft of its safety element or amendment of its safety element to the State Board of Forestry and Fire Protection for review before adoption, and the Board may recommend changes regarding uses of land, policies, or strategies for reducing fire risk (Government Code Section 65302.5[b], AB 3065). This Element has been submitted to Cal Fire and local fire agencies.

**Policies.** The Safety Element must identify and include policies for the protection of the community from any unreasonable risks associated with wildland and urban fires in State Responsibility Areas within Very High Fire Hazard Severity Zones (Government Code Section 65302[g][3]). These Policies can be found in Chapter 3, which broadly details how the City prevents, responds to, and recovers from disaster events including fires. Specifically, Policy 1.1.3 and 3.1.4 both reference strategies for redundancy to ensure adequate water in the event of a disaster. Given the prominence of fire risk in this region Policy 2.1.6 also focuses specifically on fire suppression, noting the specific need to regulate peak water supply and the width and clearance of egress roads. Policy 1.1.5 details the need to reduce potential risk hazards due to natural disasters, including fires.

## Flood and other Water Hazards

Water action hazards include major and localized flooding, erosion and landslides as well as potential inundation from water storage facility failure, seiches, mud and debris flows, tsunamis and other ocean wave related hazards. Mitigation of water action

hazards is a cooperative, multi-jurisdictional effort. It also is related to geologic conditions, seismic, fire and hazardous materials mitigation. To provide a comprehensive overview, this section provides a summary of the historic evolution of the roles of various levels of government and how Los Angeles City fits into the overall hazard mitigation efforts.

In general, flood control authority can be summarized as follows: (1) the United States Army Corps of Engineers oversees construction of projects associated with navigable bodies of water, including the Los Angeles River-related flood control systems and ocean harbors; (2) the Los Angeles County Department of Public Works oversees construction of ancillary Los Angeles County Flood Control District facilities and designs and/or maintains the flood control drainage facilities, including the Los Angeles River system to mitigate 100- and 500-year storms; (3) the City Bureau of Engineering oversees construction and maintenance of the City's storm drainage system which is designed to mitigate 50-year magnitude storms; and (4) the Los Angeles Department of Water and Power (LADWP) oversees and manages dams throughout the City in coordination with Los Angeles County Flood Control District. Various City agencies implement development permit, slope stability and watershed protection regulations.

The flood control and storm drainage systems include the following principal features: (1) debris basins at the mouths of canyons to slow the flow of water and trap boulders, rocks and debris and to prevent clogging of the flow channels; (2) flood control basins (dams) at the upstream portions of the rivers to contain water and regulate downstream flow; (3) containment of over 400 miles of river and tributary systems within mostly open concrete flood control channels; (4) streets, gutters and catch basins to collect and route surface flows to storm drains which carry urban run-off to larger tributary systems and, ultimately, to the flood control channels and ocean; (5) spreading grounds in the San Fernando Valley to impound storm water and allow it to percolate into the ground where it replenishes the underground water system; (6) associated bridges, reservoirs and water storage facilities; (7) and soft infrastructure such as parkway bioswales and rain barrels distributed across the city.

Before the flood control system was built, the Los Angeles River and its tributaries flowed freely from the Santa Susana, Santa Monica and San Gabriel Mountains to the sea, flooding large portions of the basins south of the mountains. The Los Angeles basin between the Santa Monica Mountains and Wilmington-San Pedro (future site of the harbor) was dotted with swamp lands and marshes fed by the rivers and streams. Local Spanish names derive from this marshy landscape including "arroyo" (water course), "ciénega" (marsh), "zanja" (ditch) and "redondo" (willow). A swamp existed in what is now the Central City. Figueroa Street was called Grasshopper Street and the area became known as "Grasshopper Gulch" due to the insects which lived in the swamp and plagued that part of the community. Today ground water still is very close to the surface in the Wilshire District, feeding the La Brea tar pits, which once entrapped pre-historic animals, and requiring special building design considerations to protect

against flooding of subsurface structures. “Brea” is Spanish for “tar.”

**Mapping.** California Government Code section 65302[g][2] requires municipalities to map areas of elevated flood hazard. Maps of 100 year and 500 year floodplains, in addition to maps of repetitive loss areas, are available in the Local Hazard Mitigation Plan Chapter 10: *Flood*. This chapter also includes maps of critical infrastructure within flood hazard areas. Through the Floodplain Management Plan maps of FEMA 10, 50, 100 and 500 year flood scenarios are available on the Bureau of Engineering website. Tsunami inundation is mapped in the LHMP Chapter 12 *Tsunami* and the Tsunami Annex of the EOP, which also includes maps of evacuation routes. Dam locations are mapped in Chapter 7 of the LHMP. Data on dam inundation areas is available through the California Department of Water Resources. Levee locations are mapped in the Floodplain Management Plan (Figure 6.1).

**Capital floods.** Major storms which cause a high magnitude of water flow can be devastating to a wide geographic area. They are the most dramatic and potentially the most hazardous water activity confronting the City. The Los Angeles region is a semi-arid region with rainfall that can have dramatic variation from year to year. Rains tend to occur in heavy, short duration storms between November and April. Severe storms are periodic and may not occur for several years. Paving of the City with structures and impermeable surfaces has reduced natural ponding areas which allowed water to percolate into the soil. This has facilitated water run-off and velocity of runoff thereby increasing the potential for flooding. Water rushes from streets and other impermeable surfaces along the path of least resistance to the ocean.

Between 1815 and 1938 seventeen major floods were recorded. The 1815 flood cut across what is now the Central City, diverting the Los Angeles River to the Pacific Ocean via Ballona Creek. The flood of 1825 diverted the river from Ballona Creek to its present course. After the 1825 flood, the City was reestablished in the 1815 flood plain without thought of potential future flooding. The floods of 1867-8 destroyed the City's new water system, including a reservoir and a dam intended to divert water for domestic and irrigation needs, changed the course of the San Gabriel River and convinced the City Council to hire the first City Engineer. The 1865-71 droughts devastated farms and the cattle ranches which had characterized the region for a century. To recover losses, ranches, orchards and farms were subdivided and sold. The smaller plots began to be developed with homes, businesses and urban infrastructure. Railroads were extended into the region in 1865, spurring a development boom and accelerating in-migration from the eastern United States. Prior to 1914 there was little interest in providing protection from flooding because the City was rural in character, development was dispersed and major permanent infrastructures had not been constructed. Flooding tended to be localized or occurred in areas not yet inhabited or utilized. As Los Angeles became more urbanized, permanent structures were installed, the population became more concentrated, impermeable surfaces caused more and swifter runoff and flooding increased the threat to life and property.



The first public program in the area to address flooding was the Los Angeles harbor construction project of 1898 which included flood water and silt diversion to protect the harbor. On December 31, 1898 the Army Corps of Engineers, which was charged with the responsibility of improving navigable waterways of the United States, established a 19 man team to plan and build a deep water harbor for the City.

Flood control initially was not within the authority of the Corps, except as it pertained to harbor improvement. The harbor project was completed in 1914. In 1914 over 19 inches of rain fell in four days causing streams and rivers to overflow, turning sections of the Los Angeles basin into islands, severing communications and causing \$10 million in property damage, including damage to the harbor. In response, the State, in 1915, created the Los Angeles County Flood Control District to prepare and carry out a flood control plan. Major flooding in 1916 resulted in passage of a County bond issue for the Army Corps to construct the first phase of the flood control system. The project, the Dominguez Narrows by-pass, was completed in 1921. It diverted Los Angeles River flood waters and eliminated harbor silting by emptying flood waters into what is now the Long Beach harbor. Between 1917 and 1939, dams, reservoirs and debris basins were constructed in local mountains, along with some river channel enclosures, but the construction did not keep pace with the explosion in urban growth and was not sufficient to protect the populace. A series of devastating floods between 1921 and 1938 demonstrated the need to establish and carry out a comprehensive flood control plan and resulted in a series of federal acts which gradually expanded the role of the Army Corps and provided funds to construct local drainage systems. The most devastating flood ever experienced by Los Angeles occurred on March 2, 1938. Two days of flooding caused over \$40 million in damage and the deaths of 113 people, disrupted the City and again severed communications systems. The disaster resulted in the establishment of the first local emergency plan and adoption of the Drainage Act of 1938 which mandated the Army Corps to prepare a flood control plan for the entire Los Angeles County Drainage Area. The plan was adopted by Congress in 1941 and construction of the system was authorized.

Between 1935 and 1970 the Army Corps oversaw the construction of a system of drainage projects designed to contain the Los Angeles, San Gabriel, Rio Hondo and Santa Ana Rivers as well as Ballona Creek, the Dominguez Channel and other waterways so as to prevent future flooding in the Los Angeles basin from 100-year and 500-year magnitude storms. Two three-day storms in 1943 led to enactment of the National Flood Control Act of 1948 which permitted construction of small flood control projects and performance of emergency work without authorization of Congress. As each phase of the flood control system was completed, except for the dams and dam basins, it was placed under the authority of the Los Angeles County Flood Control District which was charged with maintaining the system (including 58 miles of the Los Angeles River which runs through 13 cities from Calabasas to Long Beach). The principal function of this massive system was to prevent flooding by channeling storm

waters so they would be carried as quickly as possible to the sea.

Fire-flood cycles in recent years have increased flood hazards. Rains regenerate growth of vegetation on hillside slopes. The hot summer climate dries out vegetation, creating fuel for fires which destroy the vegetation. Lacking vegetation to slow water flow and enhance water absorption, rain water rushes unimpeded down the fire denuded slopes causing erosion and flooding. Such cycles have resulted in flooded and washed out streets, destruction of bridges, loss of life, landslides which destroyed hill- side and coastal properties, localized but destructive flooding and mud and debris flow inundation of properties below denuded areas.

Since 1940, the City and County have become increasingly urbanized, adding more impermeable surfaces which have increased storm water runoff which in turn has taxed the capacity of the current system during major storms. In 1980 a levee of the Los Angeles River flood control channel near the City of Long Beach was threatened with overtopping by flood waters. This raised concerns about the adequacy of the capacity of the southern sections of the channel to protect adjacent cities. Destructiveness of recent floods and the issue of system capacity have contributed to a re-evaluation of the flood control system by the Army Corps and County Department of Public Works (which in 1985 took over the Flood Control District). The City's Floodplain Management Plan, updated in 2020, outlines an overall strategy of programs, projects, and measures aimed at reducing the adverse impacts of flood hazards on the community. Furthermore, the City also updated its Floodplain Hazard Management Plan and Flood Hazard Management Ordinance (formerly Specific Plan for the Management of Flood Hazards) to reflect FEMA's most current regulations in line with the National Flood Insurance Program in April 2021. Both of these updates account for the increased storm water runoff resulting from added impermeable surfaces in our urbanized areas and include strategies to minimize flood risk for new development.

More information on flooding, including a history of major flood events, the local flood control system, and exposure is available in the Local Hazard Mitigation Plan Chapter 10: *Flood*. Specific information on interdepartmental response to flooding events can be found in the Urban Flooding Annex of the Emergency Operations Plan.

**Mud and debris slides and localized flooding.** Watershed protection is a primary concern of the City, especially in hillside areas. Permeable soil soaks up rain and irrigation water, proper grading and drainage systems channel and collect water to protect slopes from saturation and slippage, catch basins divert surface water to street gutters which divert the water to storm drains and flood control channels so as to reduce erosion and flooding. The Bureau of Engineering, Building and Safety Department, Planning Department and Fire Department coordinate development permit review and issuance to assure proper grading, drainage, irrigation and landscaping so as to preserve slope stability, provide erosion control and reduce potential for flooding and fire hazard.



Following major brush fires, federal or State agencies typically seed denuded areas with wild plant seeds which rapidly germinate thereby encouraging regeneration of vegetation which will hold the soil and protect the watershed from erosion. Remedial measures, such as sandbagging and erection of temporary erosion control measures, are instituted in anticipation of storms so as to protect road systems and property from potential landslides, flooding and mud and debris flows. To reduce fire hazards and protect slopes, the City requires vegetation clearance and encourages hillside property owners to plant appropriate vegetation and to implement proper irrigation and slope maintenance measures.

Specific information on debris flow, including interagency management of debris flow and removal, is available in the Debris Management Appendix and Debris Flow Annex of the Emergency Operations Plan.

**Beach erosion.** Beach erosion mitigation is under the auspices of the Army Corps. Management of flood waters of the Los Angeles River and draining of marshes, dredging, construction of breakwaters and creation of new land masses for development of the harbors changed ocean wave action and reduced the flow of natural sediments (sand) to the sea. Change in wave action and lack of sand to replenish beaches resulted in erosion of the coastline, undermining of cliffs and reducing or eliminating beaches. Undermining of cliffs sometimes resulted in landslides and loss of homes and property. Initially local jurisdictions were responsible for beach protection. In the 1930s the Bureau of Engineering Hydraulic Research Laboratory evaluated sand migration to identify causes of erosion and means of mitigating erosion and protecting roadways and properties. It became clear that the primary cause of beach erosion was due to the breakwaters and other Army Corps constructed modifications of wave action along the coast. Mitigation generally was beyond the expertise and resources of local jurisdictions. In 1956 damage had become so serious that Congress expanded the role of the Corps to include responsibility for beach erosion management, e.g., beach protection and replenishment.

**Sea Level Rise.** With the advancing effects of climate change, sea level rise is an increasing concern in Los Angeles. The Local Hazard Mitigation Plan includes a high level introduction to sea level rise, including an assessment of vulnerability to climate change risks, in Chapter 14 *Climate Change and Sea Level Rise*. There are several localized programs to address Sea Level Rise. The Venice Local Coastal Program will be implemented as part of the Venice Community Plan Update. The Port of Los Angeles has adopted a specific Sea Level Rise Adaptation Plan. Finally, the City of Los Angeles is coordinating with LA County on countywide efforts to evaluate vulnerability and mitigations.

**Tsunamis and large ocean waves.** Tsunamis are large ocean waves which are generated by major seismic events. Storms at sea also can generate heavy waves. Both

have the potential of causing flooding of low lying coastal areas. Hazardous tsunamis are rare along the Los Angeles coast. However, storm generated waves have caused considerable damage to property and beaches along the ocean perimeter, a challenge that will be exacerbated as climate change progresses. The City Flood Hazard Management Ordinance sets forth design criteria for development in coastal zones, including increased base building elevations. The Army Corps is responsible for constructing and maintaining the breakwaters which are designed to mitigate damaging wave action, particularly in the harbor area. POLA works cooperatively with the Army Corps relative to maintenance and protection of the breakwater facilities. Along with the fire and police departments, it participates in the federal tsunami alert program to warn potentially affected properties and harbor tenants of tsunami threats and to advise them concerning protective response actions.

More information on the response to a tsunami event can be found in the Tsunami Annex of the Emergency Operations Plan. This annex includes a map of LAPD tsunami evacuation routes, which are also noted through a system of publicly posted signage.

**Seiches, dam failure and inundation (water storage facilities).** A seiche is a surface wave created when a body of water is shaken. Seiches are of concern relative to water storage facilities because inundation from a seiche can occur if the wave overflows a containment wall, such as the wall of a reservoir, water storage tank, dam or other artificial body of water. Mitigation of potential seiche action has been implemented by the Department of Water and Power through regulation of the level of water in its storage facilities and providing walls of extra height to contain seiches and prevent overflow. Dams and reservoirs are monitored during storms and measures are instituted in the event of potential overflow. These measures apply to facilities within the City's borders and facilities owned and operated by the City within other jurisdictions.

Inundation due to water storage facility failure also is a potential hazard. The Baldwin Hills dam failure of December 14, 1963 and near collapse of the Van Norman Dam during the 1971 San Fernando earthquake resulted in strengthening of the federal, State and local design standards and retrofitting of existing facilities. Thirteen dams in the greater Los Angeles area moved or cracked during the 1994 Northridge earthquake. The most seriously damaged was the Pacoima Dam which was located approximately eight miles from the epicenter. However, none were severely damaged. This low damage level was due in part to completion of the retrofitting of dams and reservoirs pursuant to the 1972 State Dam Safety Act following the San Fernando quake. The Act also required the preparation of inundation maps.

Data on dam failure, including history, regulatory oversight and exposure, is available in the LHMP chapter 7: *Dam Failure*. More information can also be found in the Dam Reservoir Failure Appendix of the Emergency Operation Plan. Dams and dam inundation areas are mapped by the California Department of Water resources.

**Drainage.** Within the broad context of regional flood control the City's primary role is the construction and maintenance of a storm drainage system within the City's boundaries. The first drainage system was constructed by settlers after the City was established in 1784. Zanjias (ditches) were dug to trap and guide water for drinking, irrigation and drainage. During the 19th Century, wooden (typically redwood) and pottery pipes were added. The first large publicly constructed drainage system may have been the system installed by the Army Corps during the Civil War to drain ponds and wet lands and supply water to the Army's Drum Barracks at Wilmington.

Los Angeles City committed itself to construction of a drainage system after the devastating floods of 1867-68. Contrary to common practice of the time, the storm drainage system was separated from the sewer (i.e., waste water) system and remains separate today, except for treated waste water which is discharged into the flood control system or directly into the ocean. The separation was established following an 1870 report by Frank Lecouvreur, the City's first Engineer, that separation would prevent overwhelming of the sewer system by flood waters associated with periodic major storms. By 1879 a sewer system to take waste water from what is now the civic center to the ocean was under construction. In addition, Lecouvreur designed an east-west street system to assist the flow of rain waters via a street gutter system. The gutters carried storm and daily run off water via the zanjias to ponds and other natural collection areas or to rivers.

The City has used various methods of obtaining dedications for public streets and facilities that support drainage. Some decisions were challenged in court and resulted in the most current approach to how the City obtains new public dedications, easements, facilities and access.

A City's right to withhold building permits for non-compliance with public dedication requirements was upheld by the California Supreme Court in 1966 (Southern Pacific Railroad versus the City of Los Angeles). This decision strengthened the City's ability to secure drainage facilities in conjunction with new development. Local authority was further strengthened by the California Environmental Quality Act of 1971, which required development projects to mitigate potential environmental impacts of proposed projects. Under the State Subdivision Map Act (California Government Code Sections 66410ff), environmental mitigation and City regulations, the City in recent times has required owners of proposed development projects to construct drainage systems to accommodate runoff associated with a project and/or to protect a project and adjacent properties from storm water related hazards associated with the project. This has resulted in a systematic construction of drainage facilities in association with new development projects.

Drainage facilities are built to design specifications determined by the City's Bureau of Engineering. The Bureau in the 1920s established a hydrologic testing laboratory, later called the Hydraulic Research Laboratory. Using mathematical models and dynamic

physical models, the lab developed and refined drainage system design and design standards. For specific projects its models were designed to take into account particular site specific factors such as degree of slope, susceptibility to flooding, anticipated velocity of water. The lab also designed associated equipment, including an efficient grate configuration for catch basin grates so grates would not be hazardous to bicyclists, and developed engineering aids such as hydraulic tables, charts and graphs. In the 1980s and 1990s the lab focused on designing wastewater related hydraulic structures. The laboratory incorporated computer technology to assist in hydraulic analysis. The lab's design innovations and standards have been used not only in development of the Los Angeles storm water and waste water systems and by the City's engineers but have been used by other jurisdictions and private engineers.

**Land use planning.** Land use planning is important in protecting the public from storm water related hazards. The State Subdivision Map Act allows local jurisdictions to disapprove permits for construction of structures in flood hazard or inundation areas if the hazards cannot be mitigated adequately. The Flood Control Act of 1960 authorized the Army Corps to provide flood maps and information to local jurisdictions to assist them in land use planning. Subsequent federal and State (Cobey-Alquist Flood Plain Management Act, Water Code Section 8401c) legislation encouraged local land use planning, regulations and enforcement in flood prone areas by linking insurance rates and flood management funding to the adequacy of local regulations.

Flood hazard areas, or flood plains which are subject to 100-year floods, comprise approximately 30 square miles of the City. These areas were mapped by the Federal Emergency Management Agency (FEMA), which deemed that approximately 15 square miles of the hazard areas were buildable. The LHMP includes maps that detail FEMA flood zones and estimates of structures currently located within flood zones. To comply with the Flood Disaster Protection Act of 1973, which increased the insurance rates set forth in the National Flood Insurance Act of 1968 and required local floodplain regulations to have enforcement provisions, the City of Los Angeles first adopted the Flood Hazard Management Ordinance in 1980 (amended in 1988 by Ordinance 163,913; amended in 1998 by Ordinance 172,081 and then again in 2021 by Ordinance 182,952). The ordinance establishes annexation procedures and permit review and mitigation procedures for issuance of development permits in areas prone to flooding, mud flow or coastal inundation. It also specifies the responsibilities of City agencies which process the permits. Mitigation measures include relocation of structures within a property, increased base elevation, additional structural reinforcement, anchoring, and installation of protective barriers. A permit can be denied if mitigation is deemed insufficient to protect human life. Compliance with the National Flood Insurance Act makes the City eligible for FEMA funds and reduced federal flood insurance rates. Flood inundation areas generally are classified in the lowest density zoning categories.

**Ecological systems.** Environmental considerations are an important part of flood control systems. As the Los Angeles flood control system neared completion and public

demand for water supplies, recreation and beautification increased, Congress provided for multiple use of facilities. By the 1960s watershed protection, electrical power, recreation, agriculture and water storage were integral secondary uses of flood control systems and considerations in flood control systems planning. Paving of the Los Angeles River bottom, and City in general, reduced groundwater recharge. To compensate for the loss, water spreading grounds were established to replenish underground aquifers. Three sections of the Los Angeles River have unpaved bottoms partially due to the existence of natural springs. These sections and dam basins provide natural habitats for wild animals and birds. The dam basins also provide land for recreation and agricultural uses. Sand bars, trees and heavy marsh growth provide protected habitats for water birds. Fish live in the river channel. Until 1984, the Los Angeles River channel, except for the unpaved sections, virtually was dry except during the rainy season. Upon completion of the San Fernando Valley Donald C. Tillman Wastewater Reclamation Plant (1984) a continuous flow of reclaimed water was sent down the channel creating a year round stream which has regenerated plant and animal life along the entire channel. Some hiking, equine and bicycle trails exist and are planned for expansion along the edges of some flood control channels.

In recent years, the City has explored ways to better use ecological processes to prevent flooding, treat runoff, and recharge ground water supplies. This approach has been articulated primarily through the LA Sanitation One Water LA 2040 Plan. The Plan identifies projects, programs and policies that will yield sustainable, long-term water supplies for Los Angeles and will provide greater resiliency to drought conditions and climate change. Under this direction the City has started to explore more resilient solutions to localized flooding, such as bioswales and improved onsite storage of rainwater. The Los Angeles River is the project that most vividly illustrates this shift in thinking. For decades the River was used primarily as flood control infrastructure. Today, the River is undergoing a transformative shift to offer additional public benefits including open space and recreation, ecological habitat, sustainable development along river frontages and bicycle and pedestrian connectivity. More information on the Los Angeles River is available in the LA River Master Plan, managed by Los Angeles County.

**Water quality.** Water quality relative to drainage was an early consideration of the City. Public funds began to be expended in the late 1880s for construction of public works, including streets with gutters and associated drains. The sewage and water drainage systems were separated so as to keep storm and drainage water from entering the sewage system and to enable large quantities of rain water to be carried rapidly to the ocean without necessity of treatment. In the 1920s sewer maintenance hole covers near gutters were sealed to keep out storm water and an inspection unit was established to identify and cite property owners for illegal connections from roofs, yards, wash racks and the like into the sewer system. In recent years pollution of drainage water has become an increasing concern.

Prior to 1958 the primary concern relative to water pollution related to pollution of

ocean and beaches due to oil tanker spills. Such spills were regulated by federal agencies. Beginning with the Water Pollution Control Act of 1956, the federal government began to address the problem of pollution discharge into navigable waters, such as the Pacific Ocean. Initially, this resulted in regulations of discharge of waste water (sewage). More recently, federal regulations have focused on storm water, urban runoff and dumping of pollutants into storm drainage systems. Daily runoff in dry or wet periods washes residues from the land, including deposits from vehicles, pet waste, pesticides and street litter. Illegal dumping of waste into the storm drainage system adds to the run-off stream. The first rains of the season wash accumulated pollutants from streets, vegetation and roof tops into the drainage system. Even natural seepage, such as from the La Brea tar pit area or other oil and gas deposits which underlay large sections of the City, or from microorganisms in the soil, contribute pollutants. Pollutants also are washed from the air onto the land and into the run-off stream. Air quality aspects of pollution are addressed in the General Plan Air Quality Element. Increasingly, cities are looking to the expanded use of ecological infrastructure to treat stormwater through organic processes to address this threat.

Storms result in inflow and infiltration into sewage systems and have caused release into the ocean of partially treated sewage. Sometimes discharge washed into the ocean during storms has resulted in temporary beach closure due to potential health hazards associated with harmful bacteria from human and animal waste and decomposed plant material which is washed from land surfaces into the ocean by storms or which results from leak incidents. There also is concern that storm related residues may contribute damage to the ecology of the local bays, estuaries and natural water supported habitats.

To address potential hazards of discharge and run-off, the Federal Clean Water Act (i.e., Water Pollution Control Act) was amended in 1972 making it unlawful to discharge water borne pollutants into navigable waters of the United States from any point source, except as allowed by a National Pollutant Discharge Elimination System (NPDES) permit. A "point source" being an identifiable source of discharge such as from a ship, pipe, fissure, or container, as opposed to non-point sources, such as water borne run-off containing pollutants from sources which are not readily identifiable. In 1973 the Federal Environmental Protection Agency (EPA) issued regulations to implement the Act and specifically exempted urban runoff that was not contaminated by industrial or commercial sources. The State Water Resources Control Board and its regional boards were charged with enforcing the regulations and issuing the permits. In Los Angeles, the regulations were interpreted to apply to City sewage and industrial waste water discharges into the Pacific Ocean and not to storm water or urban runoff.

To more clearly address the issue of storm water and urban runoff, the Clean Water Act was amended in 1987 to require NPDES permits for any discharge into navigable waters of the United States. The intent of the amendment was to address non-point sources and general urban and storm water runoff, especially residues from routine industrial



and commercial activity. Such residues are washed by storm water from surfaces and the land and are carried via the drainage systems to the ocean. There was recognition in broadening the regulations that it was difficult to assess non-point source pollution and that further data and evaluation of run-off was needed.

In 1988-90 the EPA issued storm water discharge regulations to implement the 1987 amendments. The 1987 amendment to the Clean Water Act required that the Environmental Protection Agency (EPA) issue National Pollutant Discharge Elimination System (NPDES) Municipal Stormwater permits for discharges from large Municipal Separate Storm Sewer Systems (MS4s), which are systems serving a population of 250,000 or more.

An NPDES permit allows clean stormwater discharges into rivers, lakes or the ocean. The California State Water Resources Control Board (Los Angeles Region) issues NPDES permits in the Los Angeles area with the permit requiring a decrease in pollutants in stormwater and urban runoff. The City of Los Angeles is in compliance with the requirements of the NPDES Municipal permit. More information on the City of Los Angeles's NPDES permit can be found on the Los Angeles Water Resource Control Board website.

## Slope Failure and Subsidence

Los Angeles is a part of the Pacific Coastal Region, a huge geologic region which stretches from Alaska to the tip of South America. The region consists of young geologic areas in which the mountains still are in the process of growing and shaping the California landform. Los Angeles is one of the few major cities in the world with a mountain range (the Santa Monica Mountains) bisecting its land area. In addition, it is bounded by the Santa Susana and Verdugo Mountains and the Palos Verdes Hills. The Beverly Hills and Baldwin Hills bound or cross other sections of the City. The Pacific Ocean interacts with the coastal boundaries of these ranges to create seaside cliffs and beaches. Under natural conditions, slopes often give way, resulting in landslides. As City development spread from the flat lands of what is now the Central City and the San Fernando Valley into the hillsides and along the bases of slopes, unstable soil and erosion sometimes contributed to landslides and mud and debris flows which impacted development, especially following rain storms. Landslides can be triggered by natural causes such as earthquakes, ocean wave action or saturation by storm, or can be induced by the undercutting of slopes during construction, improper artificial compaction or saturation from sprinkler systems or broken pipes.

The principal tools for mitigation of geologic hazards is the City's Municipal Code, including the Building and Zoning Codes. In 1929 the Building and Safety Department began to compile and correlate data on soil conditions for distribution to realtors, builders and prospective property buyers. In 1952 hillside grading provisions were added to the Building Code. Los Angeles was the first city in the nation to have such

provisions. Storms of 1957- 58 caused extensive damage in hillside areas and led to adoption of the 1963 Grading Code. It was the first such legislation in the nation and served as a model for other jurisdictions. A unique feature of the Code was a requirement that professional geologists supervise hillside grading. Under the Code the Department of Building and Safety has the authority to withhold building permit issuance if a project cannot mitigate potential hazards to the project or which are associated with the project. A property owner may be required to install pilings to anchor a structure to bedrock, to construct retaining walls, build drainage systems or implement other mitigation measures. If, after a project is constructed, potential slope stability hazards are identified, the City can require implementation of stabilization measures.

For more than half a century, Los Angeles has issued and revised ordinances attempting to control the development of this sensitive hillside region, focusing on issues such as lot sizes, grading, density, street access, and the preservation of the natural terrain. The motivating force behind this legislative activity has been the belief that the City's hills and mountains are a valuable asset for those that live in them, and for those that view them from below, and should be preserved for the public.

In the late 1950s, demand to subdivide tracts in the city's mountainous areas grew as most of the flat land was already nearly completely subdivided. However, many of these hillside areas were zoned as R1, which allowed for lot sizes as small as 5,000 square feet. In response, the City passed an urgency ordinance to protect the hills in 1960, designating certain areas as "H" Hillside or Mountainous Areas. This appears to be the first time a hillside regulation was placed in the Zoning Code. At the time, the "H" designation mandated the minimum size for lots in future subdivisions to be 15,000 square feet. This resulted in lower density, as it reduced the number of dwelling lots permitted in the mountains. However, some lots were allowed to be as small as 9,000 square feet if the average size for all lots in a tract was 15,000. (For more information on this action see Ordinance No. 17,155) In 1964, the "H" designation was permitted to be added to RA and RE zones in addition to R1. However, problems arose as the Advisory Agency approved reduced lot areas. This allowance was made because in certain circumstances, smaller lot sizes could help maintain natural terrain and minimize grading by clustering the dwelling units into a smaller area of development. In reality, the ordinance was interpreted as a means of attaining the maximum number of lots mathematically possible in a subdivision. In 1967, the City reduced flexibility regarding lot averaging: below average lots could only be no more than 20% of the total, and only if the reduced size resulted in less grading, improved lot design, or other environmental benefits. Limits were put in place to encourage higher quality development and reduce density.

In 1968, residents of the Benedict Canyon area objected to the extensive trucking of earth and other materials as a result of a subdivision occurring in their neighborhood. In



response, regulations on the export and import of earth materials were created for hillside areas to protect public health and safety.

In 1970, it was decided that these regulations should apply city-wide, not just in hillside areas. Now known as the Haul Route Approval process, grading plans had to be submitted for review, and if the difference between export and import quantities was greater than 1,000 cubic yards, applicants had to submit other information as well, such as the proposed haul route, total weight, and disposal site. Applications could then be approved, disapproved, or required to abide by conditions of approval designed to mitigate negative effects of the haul routes. Conditions could include limits on truck length, weight, or speed, as well as limits on the time of day trucks could access roads so as to minimize conflicts with peak-hour traffic and children walking to and from school.

In the early 1970s, the Mayor's Ad Hoc Landslide Committee issued recommendations to increase safety-related grading requirements for subdivisions in hillside areas. In addition to ensuring that individual sites can be graded safely, this ordinance also required that geologic and soils engineer reports be submitted that listed all relevant geologic data and solutions to possible hazards. If any parcel contained existing or potential geologic hazards without effective solutions, the preliminary Tract or Parcel Map could be disapproved.

The City passed its first Slope Density Ordinance in mid-1970s, with the intent to limit construction where slopes were steepest. This action established a relationship between density, slope and a variety of factors, including grading, erosion, flooding, added cost of public services, stability of land, inadequate access, and the aesthetic impact of development. Initially, the ordinance only applied to areas designated "Minimum Density" Housing on an adopted Community Plan. Developers filed two unsuccessful lawsuits against the City, hoping the courts would declare slope density invalid. In 1986, the ordinance was expanded and made applicable city-wide.

In 1989, the City Planning Commission instructed staff to prepare an ordinance to regulate development on substandard lots, specifically those located in the hillside areas of the City. In response, the City Planning Department formed an in-house hillside committee to identify common problems and recommend solutions to these concerns. After these were presented to the Commission in 1990, it was determined that a more comprehensive measure, covering standard lots in addition to substandard lots, was necessary to better address the problems of inappropriate development in hillside areas. The current hillside regulations (LAMC Section 12.21 A.17, enabled by the Baseline Hillside Ordinance) were passed in 1992 and most recently updated in 2017. That action focused primarily on tailoring development more appropriately for hillside areas with narrow streets and established more restrictive development standards, as well as addressed fire and safety problems for properties fronting onto these streets.

The citywide Baseline Hillside Ordinance replaced many individual Interim Control Ordinances that temporarily regulated development in various specific hillside communities until the official ordinance passed. The ICOs were a temporary solution to the problems that resulted from out-of-scale development on “infill” lots. Such lots became a problem as technology advanced and allowed construction to occur in particularly steep areas that were originally deemed unbuildable and left undeveloped at the time the land was subdivided. The previous Hillside Ordinance established regulations for height, front and side yards, lot coverage, parking, fire protection, street access, sewer connection and grading related to required parking. Uniform setbacks were established in order to provide a necessary visual safety zone for incoming emergency equipment, as well as improving access to light and air for new development sites and adjacent properties. Maximum lot coverage was determined in order to minimize excessive grading and allow for more usable open space. Heights limits were established to protect the views provided by ridgelines and vistas. Sewer connection became a requirement for new construction to provide uniform methods of waste disposal, and help to protect and help preserve the water table from possible contamination by antiquated disposal systems.

**State Requirements and Mapping.** CA Government Code Section 65302[g][1] requires municipalities to address slope instability leading to mudslides and landslides. The City’s Baseline Hillside Ordinance (BHO) limits the quantity of grading or the amount of earth one can import or export from a property that result in major alterations of the City’s natural terrain, the loss of natural on-site drainage courses, increased drainage impacts to the community, off-site impacts, and increased loads on under-improved hillside streets during construction, except where needed to remediate unsafe conditions. While still allowing for reasonable construction and grading activity, the Baseline Hillside Ordinance caps the amount of grading allowed on a property based on the size of the lot and restricts the volume of earth allowed to be imported and exported from a property. More information on the City’s grading requirements for developments in the hillsides can be found in LAMC Section 12.21.

The goals, objectives and policies in Chapter 3 broadly consider prevention, response and recovery as it pertains to all disaster events, including slope instability. The LHMP details Maps of Landslide Hazard Areas by Area Planning Commission, included as figures 11-6 through 11-12. Chapter 11 of the LHMP details different types of landslide events, their causes, secondary impacts, and an analysis of buildings and population in moderate, high and very high landslide risk areas, including a valuation of potential property damage. This analysis demonstrates that the vast majority of parcels in Landslide Hazard Areas are designated as open space or single family residential, resulting in less development when compared to the rest of the city. The chapter also evaluates critical facilities and infrastructure in a landslide risk area.

## Seismic Events

The programs associated with this Safety Element emphasize seismic safety issues because seismic events present a significant threat of devastation to life and property. With an earthquake, there is no containment of potential damage, as is possible with a fire or flood. Unlike a fire or flood whose path often can be generally measured and predicted, quake damage and related hazard events may be widespread and, at present, are unpredictable. Related hazard events could occur anywhere in the quake area including inundations from damaged reservoirs or release of hazardous materials, such as gas, which in turn could lead to fires or form toxic clouds.

The greater Los Angeles area has experienced a number of moderate seismic events which have resulted in considerable disruption of the infrastructure, impact on social and economic life, loss of lives and extensive property damage within the City, the greater metropolitan area and the adjacent region. The most recent of these was the 6.7 magnitude 1994 Northridge earthquake which was centered in the northwest part of the City, in the general vicinity of the 1971 San Fernando (aka Sylmar) quake.

The U.S. Geological Survey has estimated the probability of a ten to thirty percent potential for a 7.5 or more magnitude quake along the southern portion of the San Andreas fault within the next five to thirty years. The Alquist-Priolo Act requires the State Geologist to map active earthquake fault zones. Those faults in the Los Angeles area typically are visible, above ground faults, e.g., the San Andreas fault. However, it is the quakes along the unmapped faults, such as the blind thrust fault associated with the Northridge earthquake, that increasingly are becoming the focus of study and concern.

Seismic mitigation is relatively new, compared to flood and fire mitigation. Every major seismic event in the United States and abroad has provided valuable data for evaluating existing standards and techniques and improving hazard mitigation. The 6.3 magnitude Long Beach earthquake of 1933 killed 115 people and caused approximately \$48 million in property damage. It demonstrated the vulnerability of unreinforced masonry structures and the hazards of parapets and unanchored facade decorations. In response, the State legislature adopted the Field Act of 1934 which set seismic building standards. Locally the reinforcement and parapet standards were adopted for new construction. The nature of damage to Seattle, Washington, due to the 1949 earthquake, persuaded Los Angeles to require removal of parapets and decorative appendages so as to prevent unreinforced masonry and concrete from falling onto streets and sidewalks during a quake. The ordinance was applicable to some 30,000 pre-1933 buildings which were located predominantly in the Central City area. The 1985 Mexico City earthquake prompted the City to upgrade and expand its urban search and rescue program (see Fire Section). Following the 1971 San Fernando quake, the City required improved anchoring of new tilt-up (concrete walls poured and tilted-up on the site) structures and retroactive reinforcement of unreinforced masonry structures. A seismic retrofit tilt-up ordinance was developed and made retroactive two weeks after the 1994

Northridge earthquake. Subsequently, the City adopted a series of ordinances which required retrofitting of certain existing structures (e.g., foundation anchoring of hillside dwellings) and for new construction, as well as an ordinance which required evaluation of structures by a structural engineer during the construction process. The Northridge quake underscored the need for thorough, on-going building inspections to assure construction of buildings according to Code.

Although the Northridge earthquake was listed by seismologists as a moderate quake, it was the most costly seismic event in the United States since the 1906 San Francisco earthquake. Within the City and surrounding region, approximately 72 people died as a result of the quake (including by heart attack associated with the quake experience), thousands were physically injured, and the direct and indirect psychological toll was incalculable. Property damage was in the billions of dollars. An estimated 3,000 (as of June 1996) buildings were damaged in the City, some requiring demolition. Approximately 5,800 buildings had to be partially or totally vacated, including approximately 25,640 mostly multiple-residential dwelling units. By the autumn following the quake, some 27,000 units were deemed in danger of being lost because owners had difficulty financing repair costs.

In addition, the infrastructure of the metropolitan area was severely disrupted. Freeways collapsed, the power systems for the City and linked communities as far away as Oregon were temporarily “blackout” and communications were disrupted. Due to abatement measures, planning, training and interagency and inter-jurisdictional coordination, response was much more efficient than in 1971 following the San Fernando quake. Stronger building codes and required retrofitting following the San Fernando quake contributed to a reduction in damage to structures and buildings and resulted in better containment of hazardous materials. Coordinated response resulted in more rapid identification of damage sites, extinguishing of fires, addressing of fire hazards, administering, often from battle-field like temporary facilities, to the injured and displaced and initiation of work to restore the disrupted cities and region. Closure of businesses, disruption of services and dislocation of people had a significant domino effect on the economy of the region, State and nation. The economic impact would have been greater had the quake been more severe or had disruption of the infrastructure continued for a longer period of time.

The fact that the Northridge event occurred at 4:31 a.m. January 17, 1994 on the Martin Luther King Jr. national holiday may have been the primary reason for so little loss of life and human injury. A low number of commuters were traveling on the freeways and streets and few people were in offices, industrial, commercial buildings, public garages and shopping centers, many of which suffered severe structural and non-structural damage. Many emergency and seismic experts believe that had the quake occurred at midday, instead of during the predawn, the loss of life and injury figures would have been substantially higher. Nevertheless, emergency forces were severely challenged by the event.

The Northridge quake was one of the most measured earthquakes in history due to extensive seismic instrumentation in buildings and on the ground throughout the region. Information from seismological instruments, damage reports and other data provided a wealth of information for experts to analyze. Traditional theories about land use siting and existing building code provisions were called into question. It is known that the complex Los Angeles fault system interacts with the alluvial soils and other geologic conditions in the hills and basins. This interaction appears to pose a potential seismic threat for every part of the City, regardless of the underlying geologic and soils conditions. Structural damage does not occur due to any one factor. The duration and intensity of the shaking, distance from the epicenter, composition of the soil and type of construction, all are factors in determining the extent of damage which may occur. Alluvial and artificially uncompacted soils tend to amplify the shaking. Shallow ground water, combined with uncompacted soils can result in liquefaction (quicksand effect) during a strong quake. Therefore, it is difficult to escape the impacts of a quake. During the Northridge quake, damage appeared to have a more direct relationship to building construction than did proximity to the epicenter. Largely as a result of the Northridge earthquake, the national Uniform Building Code was amended in 1994 to require that new development projects provide geotechnical reports which assess potential consequences of liquefaction and soil strength loss and propose appropriate mitigation measures, e.g., walls supported by continuous footings, steel reinforcement of floor slabs, etc. These provisions were incorporated into the Los Angeles City Building Code, effective January 1996.

These are important findings for Los Angeles because Los Angeles is a built city. Few large tracts of land remain which have not already been developed with some use. Many key facilities, such as freeways, already follow fault lines through mountain passes. Buildings already are built on uncompacted and alluvial soils. Part of the downtown center, including its many high rise buildings, is built near the Elysian Park blind thrust fault which many seismologists believe could be the source of a major seismic event in the not so distant future. Physical expansion and change in the City will occur primarily through rehabilitation of existing structures and infill development of existing neighborhoods. The City's biggest challenge is how to protect an existing city and its inhabitants from future damage. Many believe this should be accomplished through improved building design instead of prohibition of construction. Over the past several decades the City has retrofitted critical facilities, such as City Hall and some Port of Los Angeles facilities with base isolators to make the structures less prone to failure during strong ground shaking. Most recently, the City has embarked on an ambitious soft story retrofit program, which requires all vulnerable multi-family properties to undertake mandatory retrofitting to ensure safety during and after a seismic event. These types of retrofitting are a step in addressing the strengthening of built structures.

Pre-seismic event land use planning with a view to reconfiguring the devastated areas though post-event changes in land use, intensity of development, etc. generally are not

included as programs of this Safety Element. It has been the City's experience that the unpredictability of seismic events, both as to location and damage, renders such planning impractical. Devastation, while widespread, generally does not completely destroy entire blocks, neighborhoods or large geographic areas. Therefore, rebuilding tends to be more of an infill activity than an urban clearance and reconstruction enterprise. However, redevelopment programs are included in the optional tools available for reconstruction of severely damaged areas and are being used to rebuild neighborhoods devastated by the Northridge quake. Today, there is a much stronger emphasis on mitigating the effects of displacement after a disaster and protecting individuals who might have social and economic vulnerabilities that are exacerbated by a disaster event. Expanding on this commitment will drive many of the Safety Element work programs over the next several decades.

More information on the local history and context of seismic events in Los Angeles can be found in Chapter 9 of the Local Hazard Mitigation Plan: *Earthquake*, including a detailed write up on historic events. Information on specific response procedures to an earthquake event can be found in the Earthquake Annex of the Emergency Operations Plan.

**State Requirements and Mapping.** The State Public Resources Code Section 2699 requires that a safety element "take into account" available seismic hazard maps prepared by the State Geologist pursuant to the Alquist-Priolo Earthquake Fault Zoning Act of 1972. The Alquist-Priolo Act was established as a direct result of the 1971 San Fernando earthquake. It requires that the State Geologist map active faults and seismic hazard areas throughout the State. Today, the provisions of CA Government Code section 65302(g)(1) require cities to address seismically-induced surface rupture, ground shaking, ground failure, tsunami, seiche and dam failure (all covered under Flood and Water Hazards), subsidence (covered in Slope Failure and Subsidence) and other seismic hazards.

A map of major fault locations is included in the LHMP as Figure 9-2. The LHMP includes maps of peak ground acceleration on the Newport-Inglewood Fault (Figure 9-3), Palos Verdes Fault (Figure 9-4), Puente Hills Fault (Figure 9-5), the San Andreas Fault (Figure 9-6), and the Santa Monica Fault (Figure 9-7). The LHMP also includes a description of soil classifications and their ability to maintain ground shaking, according to the National Earthquake Hazard Reduction Program (NEHRP). These soil classifications are mapped by Area Planning Commission (APC) in Figures 9-8 through 9-14. Additionally, the LHMP Maps Liquefaction Zones by APC in Figures 9-15 through 9-21. Collectively these maps satisfy the requirements of Government Code Section 65302(g)(1). The LHMP also includes information on critical facilities, including the likelihood of significant damage and estimated timetables to reestablish function, in Tables 9-17 through 9-26.

The Hazard Mapping Act requires the State Geologist to map areas subject to amplified



ground shaking (or conditions which have potential for amplified ground shaking), liquefaction and landslide hazard areas. Following the 1994 Northridge earthquake, the hazard mapping program was revised and accelerated. Today these maps are available through the California Department of Conservation website. Policy 1.1.6, which focuses on consistency with State and Federal regulations, ensures that the City of Los Angeles will continue to reference and integrate these State mapping efforts. In addition to the hazard mapping provisions, the State requires that property sellers or agents disclose to potential property buyers geotechnical reports and their contents.

## Hazardous Materials

Hazardous materials have been a concern since 1900 when the City experienced its first major oil industry fire. Extraction of oil and gas deposits began in 1896 when Edward Doheny discovered oil at Second Street and Glendale Boulevard (Westlake community). By 1900 he had erected over 600 wooden oil rigs and installed hundreds of storage tanks and related facilities. In that year a family bonfire ignited the oil field at Bixel Street. An estimated 10,000 gallons of blazing oil spilled down the hills but was diverted and suppressed before it reached the densely built Central City. The saving of the downtown from a potential disaster prompted the City to purchase more fire suppression equipment and to expand the number of fire stations and personnel. Subsequent oil field fires in the Doheny and other fields throughout the City resulted in regulations to assure containment of oil fires in oil fields, refineries and oil and gas storage facilities.

**Oil and Natural Gas.** Much of the area south of the Santa Monica Mountains is underlain by gas and oil deposits. Natural gas, crude oil and hydrogen sulfide can work their way to the surface or infiltrate structures, causing potential fire and health hazards. To regulate the extraction, production, and storage of oil and natural gas, the City established Oil Drilling District procedures in 1948 that amend the zoning designations of specific areas in the City with an "O" suffix. The procedures are codified in Chapter 13, Section 1 of the Los Angeles Municipal Code. That specific chapter remains in the jurisdiction of the Office of Zoning Administration of the City's Planning Department. LAMC 13.01 chapter outlines operating and safety requirements and compliance measures for oil and gas activities. These provisions are intended for both stand-alone oil wells and for controlled drill sites whose operations may encompass the refining and processing of oil or gas for production purposes. The conditions also address land use impacts such as hours of operation, noise, and traffic. On September 19, 2016, the Chief Zoning Administrator issued Zoning Administration Memorandum No. 133, which outlines specific instructions and requirements for proposed projects that involve drilling, re-drilling, or maintenance of an oil well. These procedures also require an environmental assessment of each project to determine the type of CEQA clearance. The Office of Zoning Administration works closely with the Office of Petroleum and Natural Gas Administration and Safety in the Public Works Department to address compliance measures with City and State requirements. In addition, landfills are sources

of methane gas. The existence of underground gas and hazardous materials deposits requires monitoring of excavations and known seepage areas. A major incident occurred in 1971 during the tunneling for the Feather River Project when a methane explosion killed 18 workers. Incidents relating to the gas seepage caused temporary safety shutdowns of the Metro Rail subway tunneling in 1993-95.

The Fire Department works cooperatively with the United States Coast Guard, the State and Los Angeles County in responding to off-shore emergency incidents including responding to, containing and cleaning-up off-shore oil spills. The City's authority is to protect the shoreline (on-shore). In accordance with a mutual aid agreement with the U.S. Coast Guard, the Fire Department provides the initial response to any spill in the harbor or off-shore. Its responsibility is to contain the initial spill and keep the situation from getting worse. The County is responsible for coordinating clean-up efforts.

The previous Safety Element included a map of Oil Field and Oil Drilling Areas. Today, the most current information on oil extraction is available from the State, specifically the California Department of Conservation Geologic Energy Management Division (CalGEM).

**Other Hazardous Materials.** In the 1920s the use of chemicals and hazardous materials in the City's expanding manufacturing and commercial sectors increased the hazards for both workers and the general populace. A series of movie studio back lot fires and film processing laboratory fires occurred in the late 1920s. These incidents led to the enactment of City regulations to protect workers and the public from fires and fumes associated with highly flammable film and chemicals used in film processing as well as from hazards associated with flammable movie sets.

Today hazardous materials are used in commercial, industrial, institutional and agricultural enterprises as well as households throughout the City. Los Angeles operates both a major international airport and a major harbor within its boundaries and operates other airport facilities within and outside its boundaries. Hazardous and highly flammable materials are shipped through, stored and used (especially fuels) at these facilities. They also are transported along freeways and highways and are stored in facilities throughout the City. Many hazardous materials, if released by accident or catastrophic event, could cause severe damage to human life and health and to the facilities and could disrupt activities within a radius of several miles around the release site.

Currently, the Port of Los Angeles proactively conducts due diligence evaluations, site investigations, environmental oversight and audits, remedial design plans. As part of the overall cleanup process, the Port of Los Angeles performs and coordinates health and environmental risk assessments, conducts regulatory reviews, and negotiates restoration levels for contaminated sites with local, State, and federal agencies, including the U.S. Coast Guard, U.S. Environmental Protection Agency (EPA), California

Department of Fish and Wildlife, California Department of Toxic Substances Control, California Regional Water Quality Control Board, County of Los Angeles Fire Department, City of Los Angeles Fire Department, and Los Angeles Port Police. The Port also oversees emergency response and waste management programs by responding to emergency and non-emergency chemical spills, releases of hazardous materials, and abandoned waste in Los Angeles Harbor. More information on POLA emergency response programs can be found in the POLA Master Plan.

During the 1994 Northridge earthquake, over 100 incidents of quake related release of hazardous materials were reported. Of these, 23 involved release of natural gas, 10 involved release of gases and liquid chemicals at educational institutions and 8 involved release of hazardous materials at medical facilities. Gas leaks or chemical reactions triggered fires which destroyed or damaged nine university science laboratories. Rupture of a high pressure natural gas line under Balboa Boulevard in Granada Hills resulted in a fire which damaged utility lines and adjacent homes. Petroleum pipeline leaks released 4,000 barrels of crude oil into the Santa Clara River north of Los Angeles and caused fires in the Mission Hills section of the City. Most recently, in 2015 and 2016, a natural gas leak in the Aliso Canyon storage facility triggered a State declared State of Emergency that threatened nearby residents of the Porter Ranch community. More information on past hazardous materials incidents is available in LHMP Chapter 17: *Hazardous Material, Transportation and Radiological Incidents*.

Fires can damage labeling and warning signs which are posted on chemical and fuel containers and on structures to identify presence of hazardous materials. Identification of hazardous materials, storage and handling sites and information about containment facilities and/or procedures are important to protect emergency personnel as well as employees and the adjacent community during a spill incident and incident clean-up.

Hazardous materials management is regulated by federal and State codes. Within the City, the Fire Department is designated as the enforcement agency for the City, State and federal hazardous materials regulations. City regulations include spill mitigation and containment and securing of hazardous materials containers to prevent spills. In addition, the State Fire Marshall enforces oil and gas pipeline safety regulations and the federal government enforces hazardous materials transport pursuant to its interstate commerce regulation authority. More information regarding the oversight of hazardous materials, including their transport, is available in the LHMP Chapter 17.

As noted above, this Safety Element primarily addresses hazardous materials relative to other potential natural hazards. Landfill monitoring is addressed separately within the General Plan and by the City's Solid Waste Integrated Resources Plan, more commonly known as the City's Zero Waste Plan, in keeping with citywide sustainability goals.

In recent years the City has dedicated more resources to environmental justice, working to minimize land use conflicts that bring vulnerable populations into contact with

hazardous materials. In 2013 the City adopted the Clean Up, Green Up pilot, which works to address the cumulative health impacts of industrial land uses adjacent to homes, schools, parks and other sensitive areas. The program is currently active in portions of Boyle Heights, Pacoima, and Wilmington. In 2015 the City released the Plan for a Healthy LA, an Element of the General Plan focused on health and wellness that meets the requirements of SB 1000 (Environmental Justice). Brownfield remediation is a citywide priority, but the need still exceeds the available funding. Additional guidance on the regulation of hazardous materials is also often found in Community Plans, especially in geographic areas with compounding concerns regarding hazardous materials. For example, recently adopted Community Plans for the West Adams - Baldwin Hills - Leimert Park, South Los Angeles, and Southeast Los Angeles areas include additional guidance on oil drilling and processing, as much of the area is located over an active oil field.

**State Requirements and Mapping.** The State lists hazardous materials as a topic that can be included in the Safety Element at the discretion of a local jurisdiction. Therefore, there are no specific requirements set by the State. Because hazardous materials are a critical concern locally they are discussed at length in Chapter 17 of the LHMP, which focuses on *Hazardous Materials, Transportation and Radiological Incidents*.

## Climate Change

Since the Safety Element was last updated in 1996, Climate Change has emerged as a paramount challenge for the City of Los Angeles. As a result of climate change Los Angeles can expect to see several of the hazards above increase in severity and frequency. This is especially true of wildfires, flooding, drought, extreme heat and sea-level rise.

In addition to increased frequency and severity of existing hazards, the City must grapple with some emerging hazards. As discussed in the fire section, large scale fires can have regional air quality impacts, requiring municipalities to provide temporary shelter to residents without access to good air filtration. While the Los Angeles climate used to be relatively temperate, we can now expect to see many more days of extreme heat. More information on extreme heat can be found in the Adverse Weather Annex of the Emergency Operations Plan and in Chapter 6: *Adverse Weather* of the LHMP. While flooding presents an acute hazard, the lack of availability of water is also a chronic threat to the Los Angeles region as a result of climate change. Information on how Los Angeles monitors and responds to a drought emergency is available in Chapter 8: *Drought* of the LHMP. Efforts to plan and manage water supply to ensure continued access to water are addressed through planning efforts including the One Water LA 2040 Plan (produced by LA Sanitation) and Urban Water Management Plan (produced by LA Department of Water and Power).

Two plans produced by Mayor Garcetti's administration, Resilient Los Angeles and the Green New Deal (Sustainability pLAn), recognize climate change as a real threat and have prioritized the need to build the capacity of individual families and businesses to prepare for and recover from emergency events and build long-term financial security. Long-term response networks and recovery strategies are key to keeping local communities safe. There is a need to modernize aging infrastructure for the future, and develop ways to provide more safe and affordable housing to improve the economic security of Angelenos. The most recent strategies involve further empowering and engaging neighborhoods and organizations to foster local resilience and social cohesion. More information on how the City is building resilience can be found in the Resilient LA and Green New Deal Plans.

These local networks also play a critical role in climate adaptation for our most vulnerable communities as the City takes action to reduce local health and wellness disparities while increasing economic security for all Angelenos. As part of the preparation and response to disasters and climate change, the Mayor's Resilient Los Angeles Plan sets measurable goals to build city leadership in resilience, integrates tools and technology to prioritize the most vulnerable population in decision-making, and is focused on fostering faster and more efficient disaster preparedness and recovery.

**State Requirements and Mapping.** CA Government Code section 65302[g][4] requires municipalities to address climate change adaptation and resilience strategies by using the process in the California Adaptation Planning Guide and reflected in reference tools like Cal-Adapt. These tools were referenced in the development of the Green New Deal, which is consistent with the protocols of the Paris Climate Agreement. Language from the Green New Deal has been integrated into the Safety Element Goals, Objectives and Policies, specifically through the addition of Objective 1.2. These policy revisions additionally satisfy the requirements of CA Government Code section 65302(g)(4)(B), which directs cities to create a set of adaptation goals, policies and objectives.

CA Government Code Section 65302[g][4](A) requires municipalities to create a vulnerability assessment that identifies risks that climate change poses to the local jurisdiction and the geographic areas at risk from climate change impacts, including but not limited to flooding and wildfire hazards. The risk assessment and various mapping components of the LHMP serve as the current LA City vulnerability assessment. In addition there are several other documents that detail vulnerability in Los Angeles, including: The 2020 Floodplain Management Plan, Port of Los Angeles Sea Level Rise Adaptation Strategy, Metro Climate Action Plan (CAAP), and One Water LA 2040. The LHMP vulnerability assessment will be updated and expanded during the next LHMP update.

Finally, CA Government Code section 65302[g][4][C] requires municipalities to create a

set of feasible implementation measures designed to carry out the goals, policies and objectives that relate to climate change. This Element has been updated to include a chapter on implementation programs, most of which were developed through related planning efforts. The program list in Chapter 4 details the City's approach to building on the existing mitigation measures discussed above to better address climate change.

## Other Hazards

This chapter has focused primarily on the hazards that are most cited in California State Laws pertaining to the Safety Element of the General Plan. There are several additional hazards of local concern that are discussed in other long range plans, primarily the LHMP. Readers are encouraged to reference the LHMP for more detailed information. While these hazards are not discussed in this chapter, they are considered in the breadth of hazards covered by the Goals, Objectives and Policies.

Hazards not discussed above but included in the LHMP include:

- Cyber Attack and Space Weather (LHMP Chapter 16)
- Public Health Hazards, including Pandemics (LHMP Chapter 18, also covered in the Pandemic Annex and 2019 and Mass Care Health Medical Annex of the Emergency Operations Plan)
- Terrorism and Weapons of Mass Destruction, Civil Unrest (LHMP Chapter 19, also covered in the Terrorism Prevention and Protection Annex and Civil Disturbance Annex)



# Chapter 3: Goals, Objectives and Policies

The Safety Element goals, objectives, policies and programs are broadly stated to reflect the comprehensive scope of citywide emergency planning and disaster response. In most instances the goals, objectives and policies are not specific to a particular disaster. Rather, they aim to address the City's approach to any number of disaster events, including but not limited to: adverse weather, climate change and sea level rise, dam failure, drought, earthquake, flood, landslide, tsunami, wildland fire, technology impacted hazards, hazardous material incidents, public health hazards, and terrorism. Details on each of these disaster categories can be found in the Local Hazard Mitigation Plan.

Because City codes and regulations contain standards for water, streets, etc. the Safety Element goals, objectives, policies and programs generally do not contain specific standards.

Goals, objectives, policies and programs are intended to be carried out to the greatest extent feasible and within the resources available. Implementation of these goals, objectives and policies is accomplished through the work programs of the various city departments, the most safety specific of those are included as implementation programs in Chapter 4.

## Goal 1: Hazard Mitigations

A city where potential injury, loss of life, property damage and disruption of the social and economic life of the City due to hazards is minimized.

### Objective 1.1

Implement comprehensive hazard mitigation plans and programs that are integrated with each other and with the City's comprehensive emergency response and recovery plans and programs.

### Policies

**1.1.1 Coordination.** Coordinate information gathering, program formulation and program implementation between City agencies, other jurisdictions and appropriate public and private entities to achieve the maximum mutual benefit with the greatest efficiency of funds and staff.

**1.1.2 Disruption Reduction.** Reduce potential disruption due to disaster, with an emphasis on critical facilities, governmental functions, infrastructure and information resources.

**1.1.3 Facility/Systems Maintenance.** Provide redundancy (back-up) systems and strategies for continuation of adequate critical infrastructure systems and services so as to assure adequate circulation, communications, power, transportation, water and other services for emergency response in the event of disaster related systems disruptions and the growing climate emergency.

**1.1.4 Health/Environmental Protection.** Protect the public and workers from the release of hazardous materials and protect City water supplies and resources from contamination resulting from accidental release or intrusion resulting from a disaster event, including protection of the environment and public from potential health and safety hazards associated with program implementation.

**1.1.5 Risk Reduction.** Reduce potential risk hazards due to disaster with a focus on protecting the most vulnerable people, places and systems.

**1.1.6 State and Federal Regulations.** Assure compliance with applicable state and federal planning and development regulations.

**1.1.7 Building Community Capacity.** Build social cohesion and increase local resilience through community collaboration and education.

## Objective 1.2

Confront the global climate emergency by setting measurable targets for carbon reduction that are consistent with the best available methods and data, center equity and environmental justice, secure fossil free jobs, and foster broader environmental sustainability and resiliency.

## Policies

**1.2.1 Environmental Justice.** In keeping with the Plan for a Healthy LA, build a fair, just and prosperous city where everyone experiences the benefits of a sustainable future by correcting the long running disproportionate impact of environmental burdens faced by low income families and communities of color.

**1.2.2 Renewable Energy.** Aggressively pursue renewable energy sources, transitioning away from fossil based sources of energy and toward 100% renewable energy sources.

**1.2.3 Local Water.** Continue to lead in water conservation and smart water policy through improvements to per capita water use, watershed management, and wastewater and stormwater recycling.

**1.2.4 Clean and Healthy Buildings.** Design, build and rebuild buildings using passive energy principals, advanced efficiency measures, and on-site renewable energy.

**1.2.5 Housing and Development.** In keeping with the Housing Element, put affordable housing within reach of every family and a roof over the head of every Angeleno by developing housing that is affordable, efficient and connected to transportation options.

**1.2.6 Mobility.** In keeping with the Mobility Plan, build a comprehensive and integrated transportation network that changes how Angelenos get around and reduces car dependency.

**1.2.7 Zero Emissions Vehicles.** In keeping with the Mobility Plan, work toward zero emissions transportation and goods movement and increases zero emissions infrastructure including charging.

**1.2.8 Industrial Emissions and Air Quality Monitoring.** In keeping with the Air Quality Element, ensure that every Angeleno can breathe clean, healthy air by addressing air pollution from all sources, with a particular emphasis on prioritizing the health and wellbeing of overburdened families and delivering environmental justice.

**1.2.9 Waste and Resource Recovery.** Harvest waste as a resource, stimulate economic innovation, and create green jobs by improving and expanding existing systems of trash and recycling.

**1.2.10 Food Systems.** In keeping with the Plan for a Healthy LA, ensure access to healthy, sustainable food in a changing climate, especially in communities already facing food access disparities.

**1.2.11 Urban Ecosystem and Resilience.** In keeping with the Conservation and Open Space Elements, create a more temperate biodiverse city with more green space for people and habitat.

**1.2.12 Prosperity and Green Jobs.** Leverage investments in green infrastructure and systems to create inclusive economic opportunities for the city's workforce.

**1.2.13 Lead by Example.** Leverage government owned properties and publicly-driven investments to realize broader climate change goals.

## Goal 2: Emergency Response

A city that responds with the maximum feasible speed and efficiency to disaster events so as to minimize injury, loss of life, property damage and disruption of the social and economic life of the City and its immediate environs.

### Objective 2.1

Develop and implement comprehensive emergency response plans and programs that are integrated with each other and with the City's comprehensive hazard mitigation and recovery plans and programs.

## Policies

**2.1.1 Coordination.** Coordinate program formulation and implementation between City agencies, adjacent jurisdictions and appropriate private and public entities so as to achieve the maximum mutual benefit with the greatest efficiency of funds and staff.

**2.1.2 Health and environmental protection.** Develop and implement procedures to protect the environment, sensitive species and public from potential health and safety hazards associated with hazard mitigation and disaster recovery efforts.

**2.1.3 Information.** Develop and implement training programs and informational materials designed to assist the general public in handling disaster situations in lieu of or until emergency personnel can provide assistance, with an emphasis on reaching vulnerable communities.

**2.1.4 Interim procedures.** Develop and implement pre-disaster plans for interim evacuation, sheltering and public aid for disaster victims displaced from homes and for disrupted businesses. Plans should include provisions to assist businesses which provide significant services to the public, plans for reestablishment of the financial viability of the City and assistance for residents to remain in the city.

**2.1.5 Response.** Develop, implement and continue to improve the City's ability to respond to emergency events.

**2.1.6 Standards/Fire.** Continue to maintain, enforce and upgrade requirements, procedures and standards to facilitate more effective fire suppression, including enforcement of peak water supply requirements and minimum roadway widths and clearances.

**2.1.7 Building Community Capacity.** Develop and implement strategies for involving volunteers, community groups, and civic organizations in emergency response activities.

## Goal 3: Disaster Recovery

A city where private and public systems, services, activities, physical condition and environment are reestablished as quickly as feasible to a level equal to or better than that which existed prior to the disaster.

### Objective 3.1

Develop and implement comprehensive disaster recovery plans which are integrated with each other and with the City's comprehensive hazard mitigation and emergency response plans and programs.

## Policies

**3.1.1 Coordination.** Coordinate with each other, with other jurisdictions and with appropriate private and public entities prior to a disaster to plan and establish disaster recovery programs and procedures which will enable cooperative ventures, reduce potential conflicts, minimize duplication and maximize the available funds and resources to the greatest mutual benefit following a disaster.

**3.1.2 Health/safety/environment.** Develop and establish procedures for identification and abatement of physical and health hazards which may result from a disaster. Provisions shall include measures for protecting workers, the public and the environment from contamination or other health and safety hazards associated with abatement, repair and reconstruction programs.

**3.1.3 Historic/Cultural.** Develop procedures which will encourage the protection and preservation of historic and cultural resources during disaster recovery.

**3.1.4 Interim Services/Systems.** Develop and establish procedures prior to a disaster for immediate reestablishment and maintenance of damaged or interrupted essential infrastructure systems and services so as to provide communications, circulation, power, transportation, water and other necessities for movement of goods, provision of services and restoration of the economic and social life of the City and its environs pending permanent restoration of the damaged systems.

**3.1.5 Restoration.** Look to the future and rebuild based on the lessons of the past. Prior to a disaster, develop and establish procedures for securing assistance and expediting inspection and permitting activities to facilitate the rapid repair and rebuilding of those parts of the private and public sectors which were damaged or disrupted as a result of the disaster with an added consideration of future safety. Develop and establish procedures to enhance the resilience of buildings and infrastructure that are rebuilt following a disaster. Develop tools to ensure that vulnerable residents and business owners are included in community rebuilding efforts.

## Chapter 4: Programs

The following table of Programs reflects the implementation of Safety Element Goals, Objectives, and Policies by various departments of the City government. The list synthesizes hundreds of programs and projects described in existing long-range and safety specific planning documents including: the 1996 Safety Element, the 2018 Local Hazard Mitigation Plan, the 2020 Floodplain Management Plan, Resilient Los Angeles, LA's Green New Deal, and hazard-specific and operational Annexes maintained by city departments and the Emergency Management Department.

The Programs are organized to align with the Goals of Hazard Mitigation, Emergency Response, and Disaster Recovery. Some are currently implemented by the entities indicated in the table while others are aspirational, representing safety and resilience best practices to be achieved or put in place on an ongoing, short, medium, or long timeline. The Programs are synthesized and generalized from among many specific department or agency actions in order to holistically and comprehensively address all aspects of safety and disaster response by the City; as such each Program is assigned at least one, but in some cases many agencies and departments that are responsible for its implementation.

Generally short term goals are targeted for 0-5 years, medium term goals are 5-10 years, and long term goals are expected to take 15+ years to implement. A listing of department abbreviations is available in appendix A.

#	Program Description	Policies	Time Frame	Responsible Department (s)
1	<b>Emergency Operations Master Plan.</b> Maintain and implement the City's Emergency Operations Master Plan and procedures, including staff training and exercises for emergency procedures. Implement citywide data integration systems to support first responders and City departments in identifying the most urgent and highest need situations. Provide resources for people with disabilities that include preparing emergency preparedness manual, assessment of disability needs, and disaster preparedness online planning tool. Expand and maintain communication outreach, including outreach to identified vulnerable populations, for hazards such as tsunamis, wildfires, and earthquakes.	2.2.2	Ongoing	EMD, DOD



2	<b>Implement and Maintain Local Hazard Mitigation Plan (LHMP).</b> Maintain, update and implement the Local Hazard Mitigation Plan (next update scheduled for 2022) and incorporate the most up-to-date, available risk and vulnerability assessment information for all climate hazards and actions and projects designed to mitigate or reduce the impacts of identified hazards (including for planned development) and increase community resilience. Maintain and update modeling, as necessary, and develop and share updated hazards mapping, leveraging future climate data such as from Cal-Adapt to support Local Hazard Mitigation Plan updates and other appropriate uses. Develop an urban heat vulnerability index and mitigation plan to prepare vulnerable assets, resources and communities for higher temperatures and more frequent extreme heat.	1.1.4	Short, Ongoing	EMD, DPW, ITA, LACP
3	<b>Expand Homeless Services.</b> Expand mobile City services for vulnerable populations. Expand access to City services for homeless, marginalized, and vulnerable communities such as homelessness programs within the Housing Element and a comprehensive homelessness strategy. Coordinate a homeless housing service provider preparedness program to fortify systems and services to withstand future natural disaster related or climate related challenges. Connect people experiencing homelessness near the LA River and in other hazard areas, such as VHFHSZs, with better access to services and housing. Ensure that there are provisions to locate and evacuate homeless individuals in hazard areas during a disaster event. Expand access to temporary shelter, particularly during climate events including extreme heat and poor air quality days.	1.2.1, 1.2.5	Medium	LAHSA, CAO, EMD, LAFD, RAP, DPW, LAPD
4	<b>Los Angeles River.</b> Actively pursue grant funding to build out the bicycle network, greenway trail system, and other improvements identified in the 2007 LA City Council adopted Los Angeles River Revitalization Master Plan (LARRMP), and support campaigns, such as Greenway 2020, that pledge to help fund and raise awareness for this effort which will increase opportunities for access to nature, multigenerational community gathering spaces, physical activity, and psychological respite. Use the LA River as a case study to advance other greening projects around riverways that also serve as stormwater infrastructure, such as the Pacoima Wash, Arroyo Secco, and the Ballona Creek. Continue the use of signage, demonstration projects, and public art to use the LA River as a space to educate visitors about sustainability and resilience best practices.	1.2.11	Medium	LA County, BOE, USACE, LACP, RAP, Metro
5	<b>Drinking Water Quality and Access.</b> Identify funding, prioritization, and approach to improving water delivery facilities in order to improve the quality of drinking water. Test and provide ongoing assurance about the quality of drinking water. Identify and retrofit/install priority	1.1.4	Medium	LADWP, LASAN, GSD, RAP

	permanent hydration stations to ensure access across Council Districts. Prioritize large municipal buildings, public properties, and LADWP customer service centers.			
6	<p><b>Identify, Analyze, and Mitigate Local Oil and Gas Risks.</b> Collaborate with the South Coast Air Quality Management District on air quality monitoring at L.A.'s refineries and oil and gas extraction sites. Support leak detection and repair initiatives and explore new emissions capture technology at refineries. Update all pipeline franchise agreements to require leak detection, abatement best practices, and strong environmental and health and safety protections. Improve tracking for flaring emissions and create a transparent database of air quality impacts. Prioritize areas with vulnerable populations that are disproportionately impacted by refinery emissions. Eliminate leaks within the natural gas supply chain by ensuring a pathway to closure is established for the Aliso Canyon storage facility. Support the evaluation and testing of methane detection monitors as part of the South Coast AQMD's AQ-SPEC program.</p> <p>Facilitate broader community engagement in oil and gas entitlement review under the provisions of ZA memo 133. Evaluate the feasibility of a no drill health and safety buffer zone between oil and gas production facilities and residential areas. Explore the feasibility of phasing out oil uses within City limits over time.</p>	1.2.8	Medium	DPW, LACP, Mayor, AQMD, LA County, LA SAN, LADBS, LADOT, CAO
7	<p><b>Floodplain and Watershed Management.</b> Maintain, update, and implement the Floodplain Management Plan. Provide information annually to the Flood Hazard Mitigation Coordinator for the preparation of the Annual Floodplain Management Plan Evaluation Report that includes mitigation action progress, compliance actions taken during reporting period, and number of permits approved in designated flood hazard areas and granted waivers. Maintain current list of City-owned or City-leased properties located in FEMA-designated flood zones and evaluate floodplain management alternatives. Maintain and enhance the City's classification under the Community Rating System (CRS) to mitigate impacts from flood insurance reform. Coordinate floodplain management program with the Enhanced Watershed Management Plan and One Water LA 2040 Integrated Water Management Plan. Provide education programming to maintain a healthy watershed and keep Angelenos safe. Update hillside area maps as needed to identify urban flooding hot spots for maintenance and future stormwater management projects in order to improve watershed health and slope stability, limiting land disturbance and maintaining vegetation. Incorporate floodplain management information into the Zoning Information and Map Access System (ZIMAS).</p>	1.1.5	Ongoing	DPW, LACFCD, LADBS, LACP, HCIDLA, LAUSD, RAP

8	<b>Evaluate and Improve Reservoirs.</b> Evaluate reservoirs and dams for earthquake safety and make improvements, as needed. Dispatch reservoir inspection and damage teams following natural disasters to inspect and report condition of facilities. Collect and analyze water volumes and pumping capability to ensure facilities are functioning properly to reduce potential hazards and routinely monitor structural conditions.	1.1.2	Long, Ongoing	DPW
9	<b>National Flood Insurance Program.</b> Maintain, comply with, and meet the requirements of the National Flood Insurance Program to protect property owners and recover more quickly after a flood. Conduct trainings for City staff related to hazard prevention topics such as compliance with the National Flood Insurance Program. Conduct outreach to property owners about the benefits of compliance with the National Flood Insurance Program.	1.1.6	Short, Ongoing	BOE, DBS, EMD
10	<b>Increase Stormwater Capture.</b> Expand stormwater capture throughout the city using green infrastructure to combat climate change and drought. Construction of new or retrofitting existing stormwater facilities should prioritize areas with vulnerable populations that are disproportionately impacted by climate change. Encourage stormwater capture on public and private properties, including projects not subject to the LID ordinance and in open spaces areas, to install permeable pavement, green roofs, trees, bioswales, and rainwater catchment systems. Maintain and implement the One Water LA 2040 Integrated Water Management Plan to facilitate a transition to a more ecological, systems-based approach to stormwater and flood management.	1.1.5	Medium	LADWP, DPW, LADOT
11	<b>Flood Risk Reduction.</b> Develop and maintain a citywide list of priority maintenance-related flood problem sites, conduct necessary inspections and prioritize maintenance to address problems prior to wet season and after significant storms. Maintain a list of critical facilities in the city as identified in the City's Local Hazard Mitigation Plan, provide information to operators of critical facilities in FEMA-designated flood zones and encourage flood protection measures at those facilities, prioritizing natural infrastructure, where feasible. Ensure new essential public facilities will be located outside of at-risk flood areas when possible.	1.1.2	Ongoing	BOE, LASAN, EMD
12	<b>Local Water Supply Resilience.</b> Reduce LADWP purchases of imported water by 50%. Expand and protect water sources to reduce dependence on imported water and strengthen the city's local water supply. Leverage flood mitigation infrastructure to enhance local water availability. Update and report on the Water Integrated Resources Plan	1.2.3	Medium	LADWP, MWD, LASAN, LA County, BOE

	every five years to set and evaluate water supply resilience goals. Continue to explore expanding the remediation and use of groundwater.			
13	<b>Expand Recycled Water for Beneficial Reuse.</b> Expand the reuse of non-potable recycled water. Expand the use of purple piping and greywater systems in public and private developments. Pilot membrane reactor technology to help clean recycled water. Recycle water at Hyperion Water Reclamation Plant (WRP) for beneficial reuse at local facilities such as LAWA. Recycle water at Donald C. Tillman WRP to recharge into groundwater basins.	1.2.3	Medium	LADWP, LASAN, LA County, LADOT, Streets LA, BOE, MWD
14	<b>Water Conservation:</b> Expand existing programs and develop targeted campaigns to increase awareness on L.A.'s water policy goals. Expand low water use/drought tolerant native landscaping and Low Impact Development (LID) programs. Expand municipal and proprietary buildings retrofits. Support the use of water efficient appliances in residential units through appliance rebate programs.	1.2.3	Short	LADWP, LASAN, RAP, GSD, LADBS, BOE, DPW, CAO, LAWA, POLA
15	<b>Land Use Regulations in Hazard Areas.</b> Use hazard information to shape zoning decisions during the Community Plan update process and include feasible methods to avoid or minimize climate change impacts associated with land use change. Evaluate ordinances such as the baseline hillside ordinance, hillside construction ordinance, floodplain management ordinance, wildlife protection ordinance, ridgeline ordinance, and conduct updates to enhance safety and improve resilience based on updated risk and vulnerability information to protect people, property, water quality, and native habitat. Expand the use of land use tools established through the Clean Up Green Up ordinance to apply citywide. Explore the provision of additional building code requirements in areas that are likely to be more severely impacted by climate change, for example requiring cooling features and additional open space in residential developments subject to extreme heat, or requiring elevated building height in areas subject to sea level rise. Develop and integrate sustainable grading standards in building and land use regulations to reduce potential for surface erosion, soil instability or landslides by limiting disturbance on steep slopes. Regularly convene a hillside task force with representatives from relevant departments to address the unique land use challenges of hillside communities, including the egress requirements of P47.	1.1.5	Long, Ongoing	LACP, LADBS, LASAN, BOE
16	<b>Resilience in Wildfire Safety.</b> Continue to implement wildfire safety programs including brush clearance, fire road and utility corridor maintenance, red flag parking restrictions, wildland operation planning, and defensible space landscaping restrictions. Explore integrating more sustainable practices into existing fire prevention strategies that	1.1.5	Short, Ongoing	LAFD, LADBS, LADWP, LACP,

	minimize fire hazard, such as prohibiting planting of invasive and fire hazardous vegetation, promoting native landscaping and biodiversity and retaining native trees and native vegetation to support habitat preservation, biodiversity, wildlife connectivity, stormwater infiltration, landscape succession, and carbon sequestration. Revise and enhance plans and programs as risk scenarios change due to climate change.			LASAN, LADOT
17	<b>Urban Forest.</b> Continue the City Plants initiative to develop an Urban Forest Healthy Environment Strategic Plan that will target increased tree plantings to reduce air pollution, with a priority for vulnerable communities near truck routes, manufacturing, warehousing, distribution, refineries, chemical plants, and the Port. Prioritize communities with the highest heat island vulnerabilities and insufficient tree canopy based on “Los Angeles 1 Million Tree Canopy Cover Assessment” prepared by the Forest Service of the U.S. Department of Agriculture. The Urban Forest Healthy Environment Strategic Plan should target tree plantings in public spaces such as public rights of way, parks, and similar locations. Continue to implement tree planting requirements and replacements, such as the Protected Trees Ordinance, to retain mature and native trees, throughout the city and in particular, in ecologically sensitive areas to promote climate adaptation, provide shade and cool temperatures on extreme heat days and to reduce urban heat island effect, air pollution, noise pollution, and electricity consumption.	1.2.11	Medium	LASAN, Mayor, LADWP, LA County, RAP, Streets LA, LADOT, LACP, BSS
18	<b>Cool Neighborhoods.</b> Reduce the urban heat island effect by installing cooling features such as innovative shade design, water features, and cooling centers at parks. Identify opportunities to implement cool corridors and other interventions to improve pedestrian comfort on routes to high-volume transit stops and cooling spaces. Install cool pavement material on city streets. Pilot cool neighborhoods in vulnerable communities with severe heat island effects. Explore climate-adapted urban design principles particularly for high heat areas, such as cross-ventilation, enhanced open space, use of cool material, green roofing, and requirements for both heating and cooling of buildings.	1.2.1, 1.2.11	Medium	LADOT, LADBS, Mayor, LACP, BOE, LASAN, Streets LA, Metro, LA County
19	<b>Retrofit, Acquisition, or Relocation of Structures.</b> Support retrofitting, purchase, or relocation of structures in hazard-prone (high risk) areas to prevent future structure damage, giving priorities to properties with exposure to repetitive losses and areas with greatest economic need. Identify best practices and building code amendments to retrofit existing buildings to withstand specific disasters. Track and implement State legislation related to building retrofit in hazard areas.	1.1.5	Long	LADBS, HCID, HACLA, Mayor, LACP, GSD

20	<b>Seismic Retrofits.</b> Retrofit all structures to mitigate seismic hazards such those identified by the LADBS soft-story retrofit program. Identify financing strategies and retrofit residential and non-residential structures, including public facilities, and also mitigate non-structural seismic hazards. Conduct outreach to property owners and tenants to connect them with resources to identify financial support for seismic retrofits.	1.1.5	Medium, Ongoing	LADBS, HCID, HACLA, GSD
21	<b>Zero Waste in City Government.</b> Transition to paperless personnel files. Ensure all City facilities are equipped with appropriate recycling, including recycling for machining material and organics collection. Adopt and implement a sustainable technology policy across all City departments.	1.2.13	Short	Mayor, GSD, Personnel, ITA
22	<b>Decarbonize Buildings.</b> Design and implement policies to decarbonize existing buildings. Complete building electrification study and develop supporting programs for building electrification. Implement net zero energy projects at City facilities. Implement GHG performance standards for material procurement for purchasing by City Departments.	1.2.2	Short	LADBS, Mayor, GSD, HCID, HACLA
23	<b>Advance Planning for Disaster Response.</b> Implement regulations allowing flexible reuse of privately owned property following a disaster and explore the use of transfer of development rights away from vulnerable areas. Incorporate resilience in land use planning in community plans to improve the ability to recover following disasters, and adapt to climate change and economic shifts, using available data on risk exposure and vulnerability to guide community plan updates. Develop programs and tools to ensure that vulnerable communities are given additional support during and immediately following a disaster, including tenant protections. Expand provisions for vulnerable populations in the next update of the Emergency Operations Plan (EOP) Recovery Annex. Pre-establish procedures to expedite bureaucratic processes and programs (such as building inspections and permits, tenant protections including eviction moratoriums, and financial assistance) immediately following a disaster. Evaluate insurance regulations that will apply immediately following a disaster and incorporate likely scenarios into disaster recovery plans.	2.1.5	Ongoing	EMD, LACP, LADBS, HCID, HACLA, LAFD, DOD, DOA
24	<b>Citywide Economic Resilience:</b> Establish a capital project pipeline that creates living-wage jobs for Los Angeles' most disadvantaged populations. Collaborate with anchor institutions to target investment from diverse sectors of employment. Increase access to free wi-fi to help reduce technology disparities. Update the Citywide Growth Strategy to leverage land use as a tool to better connect accessible housing and employment opportunities. Explore tax incentives and other financing tools to create interconnected districts with housing and	1.2.12	Medium	GSD, LADOT, LADWP, LAWA, Metro, LA County,



	employment accessibility (see Housing Element programs for more information on financing tools).			HCID, HACLA
25	<b>Increase Prosperity.</b> Continue to deliver and promote comprehensive financial literacy programs that advance equity to empower people on saving, budgeting, credit, and investment to improve financial skills. Collaborate with local educational institutions to ensure job training and preparedness for positions that offer a living wage and career advancement.	1.2.12	Medium	EWDD, LAPL, RAP, HCID, HACLA
26	<b>Climate Adaptation and Preparedness Plan.</b> Building upon the Green New Deal, complete a Climate Adaptation and Preparedness (CAP) plan. Complete a risk assessment and develop specific reduction measures and monitoring programs. Work with Climate Resolve, the Los Angeles Regional Collaborative for Climate Action and Sustainability and local community partners to inform City efforts to identify and respond to the health impacts of climate change and to develop strategies that incorporate community-driven mitigations with expert-led solutions; targeting implementation in the neighborhoods that are most disproportionately impacted by the effects of climate change.	1.2.1-1.2.14	Medium	LACP, Mayor, LADWP, BPW
27	<b>Implement Resilience and Sustainability Actions with Communities.</b> Create a commission that empowers impacted communities in implementation of sustainability and resilience actions, such as those identified in the Plan for a Healthy Los Angeles, Resilient LA, and the Green New Deal. Convene citywide forums through the Department of Neighborhood Empowerment, inviting participation from Neighborhood Councils on critical sustainability issues. Increase education and training through City science, arts, and cultural programming offered by departments. Expand climate resilience and emergency preparedness throughout the local food system in collaboration with community groups and nonprofit organizations. Develop the next generation of stewards of Los Angeles to be leaders in climate and disaster resilience.	1.1.1	Short	Mayor, DONE, DCA, LAFD, LAPD, EMD, Neighborhood Councils, LAUSD, LAFD, LADWP, BOS, RAP, HCID, HACLA, LACP
28	<b>Increase Renewable Energy Sources.</b> Invest to upgrade power system infrastructure and ensure power system reliability and energy resilience. Identify and prioritize solar and microgrid backup power projects. Streamline permitting and interconnection processes for energy storage projects. Expand combined solar and energy storage pilot projects in vulnerable communities. Require newly built parking structures to have solar and EV charging. Create a standard plan for carport solar. Install solar at the Port and at City facilities.	1.2.2	Short	Mayor, LADWP, GSD, LACP, LADBS, BOE, POLA

29	<b>Increase Access to Renewable Energy:</b> Establish community solar programs that expand access to solar savings to low-income and renter households which include solar rooftops and shared solar programs, as well as the Virtual Net Energy Metering pilot program. Seek opportunities for third-party clean energy service providers to leverage private property for distributed generation. Implement a communication network to enable use of smart meters.	1.2.2	Short	LADWP, Mayor, CAO, LACP, LADBS, BOE, HCID
30	<b>Reduce Port-related GHG Emissions.</b> Transition to zero-emissions technology at the Port. Develop a suite of emissions reduction programs for ocean going vessels at the Port of Los Angeles, such as expanding the use of shore power (AMP) or other emissions capturing technologies. Deploy 100% zero emission on-road drayage trucks. Install 100% zero emission cargo handling equipment. Maintain and implement the Port of Los Angeles Climate Action Plan.	1.2.8.	Short	POLA
31	<b>Increase Waste and Resource Recovery.</b> Require at least 80% recycling of construction and demolition waste. Implement a ban on expanded polystyrene. Increase participation in residential recycling and composting. Establish a residential food scraps collection program, including drop off-locations throughout the city. Establish a food recovery (of discarded edible food) and distribution program. Identify food recovery partners and develop cold storage infrastructure to scale food recovery efforts.	1.2.9	Short	LASAN, Mayor
32	<b>Urban Agriculture.</b> Develop a comprehensive urban agriculture program that removes barriers and supports the development of a local urban agriculture system (including community gardens). More information on specific strategies is available in the Plan for a Healthy LA program 50.	1.2.10, 1.2.11	Medium	LASAN, Mayor, LACP, HCID, LA County, DPW
33	<b>Building Social Cohesion and Increase Local Resilience.</b> Build social connection between neighbors and increase participation to encourage welcoming neighborhoods with efforts such as launching the “neighborly” microgrants program. Continue to offer training programs and provide informational materials designed to assist the general public in handling disaster situations, such as the Ready Your LA Neighborhood Program, as carried out by the EMD, and the Community Emergency Response Team (CERT) program run by LAFD. Ensure all City staff are prepared to assume a disaster assistance role through the Disaster Service Worker (DSW) program.	1.1.7, 2.1.3	Medium	EMD, LAFD, DONE, Neighborhood Councils

34	<b>Leverage Investments for Major Events.</b> Leverage infrastructure investments leading up to major events, such as the Olympic and Paralympic Games, to advance resilience goals, increase health and wellness, and prevent displacement of vulnerable Angelenos.	1.2.13	Medium	Mayor, DPW, LADOT, LAWA, LADWP, POLA, ITA, Metro, RAP, DOA, DCA
35	<b>Resilience in Capital Improvements Planning and Facilities Maintenance.</b> Identify vulnerable critical infrastructure and increase resilience of these facilities. Critical infrastructure is defined in the LHMP and includes potable water systems, wastewater systems, electric power systems, oil refineries, natural gas systems, freeways, streets, bridges, railroads, airports and the harbor, communication systems. Integrate resilience and sustainability principles into City capital improvements planning. Make resilience-building a permanent part of the City of Los Angeles' systems and services. Maintain threat recognition systems or warning systems for critical infrastructure such as the flood threat recognition system and flash flood warning system.	1.1.2	Long, Ongoing	DPW, EMD, GSD, LADWP, DPW, CAO, LAWA, POLA
36	<b>Resilient Flow of Goods and Services.</b> Fortify critical transportation infrastructure and supply chains through continued assessments, coordination, and investment. Partner with key transit agencies to facilitate the exchange of data and information to coordinate and prioritize critical transportation infrastructure and transit investments to develop a robust system, capable of withstanding shocks and stresses. This includes critical transportation infrastructure such as freeways, streets, bridges, railroads, airports, and the harbor.	1.1.2	Long	LADOT, EMD, LADWP, LAWA, POLA, LADOT, BOS, SCAG Metro, Caltrans
37	<b>Pursue Academic Partnerships.</b> Integrate new and emerging science into policy through partnerships with academic, local, state, and federal scientists. Continue to partner with leading scientists, researchers and resilience experts to foster the integration of City policies and programs with current and future science discovery. Launch the Campus Resilience Challenge.	1.2.13	Short	Mayor, Academic Institutions
38	<b>Airport Safety.</b> Leverage airport safety, efficiency, and modernization improvements to increase resilience at L.A airports. Maintain and update the LAX Master Plan to consider an appropriate range of scenarios due to natural disasters and climate change.	1.1.2	Short, Ongoing	LAWA
39	<b>Hazardous Materials Management.</b> Continue to employ staff with special training and equipment for hazardous waste collection, spill prevention, storage and use oversight, and other activities to manage	1.1.4	Short, Ongoing	LASAN, LAPD, DPW, LAFD

	hazardous materials and hazardous waste, consistent with applicable State and federal regulations.			
40	<b>Advance Counter-terrorism Efforts.</b> Continue surveillance and monitoring for terrorism. Continue the terrorist early warning group. Expand and strengthen communities to combat all forms of violent extremism. Continue to maintain technological, chemical, and biological detection devices to address hazardous materials and explosive devices and provide staff training on the use of those devices.	1.1.4.	Short, Ongoing	LAPD
41	<b>Disaster Response for Animal Care and Control.</b> Continue coordination with Emergency Management Department on identification of hazards and risk reduction projects for animal care and control. Maintain the EOP annexes related to the sheltering of small and large animals. Expand provisions for the sheltering of wildlife during a disaster event.	2.1.2	Short, Ongoing	DAS, EMD, LA Zoo
42	<b>Emergency Sheltering.</b> Develop and implement the interim evacuation, sheltering, and public aid for disaster victims displaced from homes. Maintain the EOP annexes related to emergency shelter, which detail provisions for temporary shelter, traditional and non-traditional shelter, and reconstitution.	2.1.4	Ongoing	EMD, RAP, DOD, Red Cross, FEMA, CTD, LAPL, LAUSD, CalOES
43	<b>Response.</b> Grow partnerships between the public, private, and nonprofit sectors to provide critical services to vulnerable Angelenos in times of crisis such as involving volunteers and civic organizations in emergency response activities. Provide Angelenos access to additional trauma resources. Grow partnerships that expand support for animals after a major shock.	2.1.7	Short	EMD, LAFD, CDFW, Mayor, LAFD, LAPD, DMH, DAS, LA Zoo, DOD, DOA
44	<b>Emergency Preparedness Communication.</b> Involve volunteers and civic organizations in emergency preparedness and response activities. Offer training and provide preparedness information to businesses and Angelenos directly, with a focus on ensuring coverage for the most vulnerable communities. Expand workforce preparedness to restore services following a disaster and promote neighborhood preparedness plans. Maintain the City's Emergency Management Department website, and social media sites to provide emergency preparedness information to the general public and media. Ensure effective communications during disaster response such as providing multilingual interpretation, including sign language, with an emphasis on protecting linguistically isolated populations. Launch an earthquake early warning	2.1.5	Short	EMD, LADWP, CalOES, Mayor, LAFD, LAPD, CTD, EWDD, DOD, DOA, LAWA, LAUSD, LAHSA

	system. Develop a system to alert visitors to the city of disaster risk and response.			
45	<b>LAPD Disaster Response Role.</b> Continue LAPD disaster response activities such as providing ingress and egress for emergency response vehicles, providing security at critical infrastructure, promoting safety through timely and reasoned response, and deploying the mobile command response unit and informing it of the risks identified for hazards.	1.1.5	Short, Ongoing	LAPD
46	<b>Backup Power for Critical Facilities.</b> Retrofit critical assets with backup power to maintain operational capacity during all hazard events to prevent the interruption of power supply. Invest to upgrade power system infrastructure and ensure power system reliability.	2.1.4	Short, Ongoing	LADWP, DPW, GSD, POLA
47	<b>Evacuation Plans.</b> Maintain and update evacuation plans for areas potentially affected by hazards as a part of the Emergency Operations Plan, Evacuation Functional Support Annex, including procedures related to residential developments in a very high fire hazard severity zone (VHFHSZ) or other hazard areas that do not have at least two emergency evacuation routes. Utilize Hillside Task Force/working group (which is convened by BOE and includes LACP, LADOT, LADBS and other relevant departments) to study hillside access, develop procedures and advance recommendations to be coordinated with appropriate agencies (police, sheriff, Department of Transportation, LACP, Los Angeles County, etc.).	2.1.4	Ongoing	EMD, LAFD, LAPD, LADOT, LAHSA, BOE
48	<b>Fire Standards and Procedures.</b> Maintain and update, as needed, the City's procedures and standards to facilitate fire prevention, preparedness, response and recovery, including more effective fire suppression. Continue to ensure adequate peak load water supply in all areas. Determine necessary fire suppression infrastructure needs, including the need for special equipment to address conditions within hillside communities and encampments of unhoused individuals.	2.1.6	Ongoing	LAFD
49	<b>Cooling &amp; Smoke Relief Centers.</b> Upgrade cooling and smoke relief (poor air quality relief) centers to better meet the needs of the elderly and persons with disabilities. Expand communications on types of cooling and smoke relief resources and available relief spaces, including through notification of homeless populations, to increase usage and deployment. Increase access to, and communication on the availability of cooling and smoke relief centers on poor air quality days.	2.1.5	Medium	RAP, LAPL, Mayor, City Council, DOD, DOA, LAHSA, LADWP, DPW, LASAN, LACP, EMD

50	<b>Cyberattacks.</b> Enhance protection of critical digital assets from cyberattacks by continuing the Emergency Cyber Incident Response Program. Teach Angelenos how to protect themselves from cyberattacks. Lead development of a cross-sector cybersecurity innovation incubator. Facilitate partnerships with Los Angeles businesses through the cybersecurity platform, LA Cyber Lab.	2.2.2	Short, Ongoing	LAPD, ITA
51	<b>Historic Resources Recovery.</b> Immediately following a disaster, utilize historic preservation tools including Survey LA and formal designations of Historic-Cultural Monuments, Historic Preservation Overlay Zone, and Mills Act properties to carefully consider how best to preserve the cultural legacy of the city in rebuilding and recovery efforts.	3.1.3	Ongoing	LACP, LADBS, HCID, GSD
52	<b>Pre-Disaster Housing Recovery Strategy.</b> Maintain and update, as needed, the City's Pre-Disaster Housing Recovery Strategy to ensure smooth transition from mass care/shelter to housing, and to leverage existing resources, including funding and private insurance, for rehousing and reconstruction. Ensure equitable access to post-disaster housing for the most vulnerable Angelenos. Ensure that displaced residents are given extra support to allow them to return to reconstructed housing.	3.1.5	Short	HCID, EMD, HACLA, LADBS



# Appendix A: Listing of Responsible City Departments

<b>AQMD</b>	Air Quality Management District	<b>LACDPW</b>	LA County Department of Public Works
<b>BOE</b>	Department of Public Works - Bureau of Engineering (BOE)	<b>LACFCD</b>	Los Angeles County Flood Control District
<b>CalOES</b>	California Office of Emergency Services	<b>LADBS</b>	Department of Building and Safety
<b>CAO</b>	Chief Administrative Officer	<b>LADOT</b>	Los Angeles Department of Transportation
<b>CAO</b>	Office of the City Attorney	<b>LADPH</b>	Los Angeles County Department of Public Health
<b>CTD</b>	Department of Convention and Tourism Development	<b>LADWP</b>	Department of Water and Power
<b>DAS</b>	Department of Animal Services	<b>LAFD</b>	Los Angeles Fire Department
<b>DCA</b>	Department of Cultural Affairs	<b>LAHSA</b>	Los Angeles Homeless Service Authority
<b>DCP</b>	Department of City Planning	<b>LAPD</b>	Los Angeles Police Department
<b>DHS</b>	U.S. Department of Homeland Security	<b>LAPL</b>	Los Angeles Public Library
<b>DMH</b>	LA County Department of Mental Health	<b>LASAN</b>	Department of Public Work Bureau of Sanitation and the Environment
<b>DOA</b>	Department of Aging	<b>LAUSD</b>	Los Angeles Unified School District
<b>DOD</b>	Department of Disability	<b>LAWA</b>	Los Angeles World Airports
<b>DONE</b>	Department of Neighborhood Empowerment	<b>Mayor</b>	Office of the Mayor
<b>DPW</b>	Department of Public Works, which includes the following bureaus: Sanitation and the Environment (LASAN), Street Services (StreetsLA), Engineering (BOE), Contract Administration (BCA), Street Lighting (BSL)	<b>Metro</b>	Los Angeles County Metropolitan Transportation Authority
<b>EMD</b>	Emergency Management Department (includes the Emergency Operations Organization (EOO))	<b>MWD</b>	Metropolitan Water District of Southern California
<b>EPA</b>	U.S. Environmental Protection Agency	<b>OEM</b>	Los Angeles County Office of Emergency Management
<b>EWDD</b>	Economic and Workforce Development Department	<b>POLA</b>	Port of Los Angeles
<b>GSD</b>	General Services Department	<b>RAP</b>	Department of Recreation and Parks
<b>HACLA</b>	Housing Authority of the City of Los Angeles	<b>SCAG</b>	Southern California Association of Governments
<b>HCID</b>	Los Angeles Housing and Community Investment Department	<b>SoCal Gas</b>	Southern California Gas Company
<b>ITA</b>	Information Technology Agency	<b>StreetsLA</b>	Department of Public Works - Bureau of Street Services
<b>LA County</b>	Los Angeles County	<b>USACE</b>	U.S. Army Corps of Engineers

# Appendix B: Related Plans and Acronyms

The plans and organizations referenced in this Element are included here for reference. Plans and organizations are subject to frequent update, and are provided here as they were active in 2021.

<b>ACS</b>	American Community Survey	<a href="https://www.census.gov/programs-surveys/acs">https://www.census.gov/programs-surveys/acs</a>
<b>AQ-SPEC</b>	Air Quality Sensor Performance Evaluation Center	<a href="http://www.aqmd.gov/aq-spec">http://www.aqmd.gov/aq-spec</a>
<b>BHO</b>	Baseline Hillside Ordinance	
	Cal -Adapt	<a href="https://cal-adapt.org/">https://cal-adapt.org/</a>
<b>CalGEM</b>	California Department of Conservation Geologic Energy Management Division	<a href="https://www.conservation.ca.gov/calgem">https://www.conservation.ca.gov/calgem</a>
<b>CDTSC</b>	California Department of Toxic Substances Control	<a href="https://dtsc.ca.gov/">https://dtsc.ca.gov/</a>
	Cal EnviroScreen	<a href="https://oehha.ca.gov/calenviroscreen">https://oehha.ca.gov/calenviroscreen</a>
	CalFire	<a href="https://www.fire.ca.gov/">https://www.fire.ca.gov/</a>
<b>CGC</b>	California Government Code	<a href="https://leginfo.ca.gov/faces/codesTOCSelected.xhtml?tocCode=GOV">https://leginfo.ca.gov/faces/codesTOCSelected.xhtml?tocCode=GOV</a>
<b>CGS</b>	California Geologic Survey	<a href="https://www.conservation.ca.gov/cgs">https://www.conservation.ca.gov/cgs</a>
<b>CWRB</b>	California State Water Resources Control Board	<a href="https://www.waterboards.ca.gov/">https://www.waterboards.ca.gov/</a>
<b>CUGU</b>	Clean Up Green Up	
<b>CAAP</b>	Climate Action and Adaptation Plan (Metro)	<a href="https://media.metro.net/projects_studies/sustainability/images/Climate_Action_Plan.pdf">https://media.metro.net/projects_studies/sustainability/images/Climate_Action_Plan.pdf</a>
<b>CERT</b>	Community Emergency Response Team	<a href="https://www.cert-la.com/">https://www.cert-la.com/</a>
<b>DSW</b>	Disaster Service Worker Program	<a href="https://emergency.lacity.org/dsw/disaster-service-worker-program-for-public-employees">https://emergency.lacity.org/dsw/disaster-service-worker-program-for-public-employees</a>
<b>EMC</b>	Emergency Management Committee	<a href="https://emergency.lacity.org/about/emc">https://emergency.lacity.org/about/emc</a>
<b>EMD</b>	Emergency Management Department	<a href="https://emergency.lacity.org/">https://emergency.lacity.org/</a>
<b>EMS</b>	Emergency Medical Services (LAFD)	<a href="https://www.lafd.org/about-ems-bureau">https://www.lafd.org/about-ems-bureau</a>
<b>EOB</b>	Emergency Operations Board	<a href="https://emergency.lacity.org/about/emergency-operations-board">https://emergency.lacity.org/about/emergency-operations-board</a>
<b>EOC</b>	Emergency Operations Center	<a href="https://emergency.lacity.org/about/eoc">https://emergency.lacity.org/about/eoc</a>
<b>EOO</b>	Emergency Operations Organization	<a href="https://emergency.lacity.org/about/eoo">https://emergency.lacity.org/about/eoo</a>
<b>EOP</b>	Emergency Operations Plan	<a href="https://emergency.lacity.org/sites/g/files/wph1791/files/2021-04/comprehensive_emergency_operations_plan_eop-2018.pdf">https://emergency.lacity.org/sites/g/files/wph1791/files/2021-04/comprehensive_emergency_operations_plan_eop-2018.pdf</a>
<b>FIREScope</b>	Fire Resources of Southern California Organized for Potential Emergencies	<a href="https://firescope.caloes.ca.gov/">https://firescope.caloes.ca.gov/</a>
<b>FEMA</b>	Federal Emergency Management Agency	<a href="https://www.fema.gov/">https://www.fema.gov/</a>
<b>FMP</b>	Floodplain Management Plan	<a href="https://eng2.lacity.org/projects/fmp/pdf/2020FMPOct.pdf">https://eng2.lacity.org/projects/fmp/pdf/2020FMPOct.pdf</a>
<b>GND</b>	Green New Deal / Sustainability pLAn	<a href="https://plan.lamayor.org/sites/default/files/pLAn_2019_final.pdf">https://plan.lamayor.org/sites/default/files/pLAn_2019_final.pdf</a>
<b>ICS</b>	Incident Command System	<a href="https://training.fema.gov/emiweb/is/icsresource/">https://training.fema.gov/emiweb/is/icsresource/</a>
<b>LABC</b>	Los Angeles Building Code	<a href="https://up.codes/viewer/los_angeles/lbc-2018">https://up.codes/viewer/los_angeles/lbc-2018</a>
<b>LAMC</b>	Los Angeles Municipal Code	<a href="https://codelibrary.amlegal.com/codes/los_angeles/latest/lamc/0-0-0-107363">https://codelibrary.amlegal.com/codes/los_angeles/latest/lamc/0-0-0-107363</a>

	Los Angeles River Master Plan	<a href="https://www.larivermasterplan.org/">https://www.larivermasterplan.org/</a>
	Los Angeles River Revitalization Master Plan	<a href="https://boe.lacity.org/lariverrmp/CommunityOutreach/masterplan_download.htm">https://boe.lacity.org/lariverrmp/CommunityOutreach/masterplan_download.htm</a>
<b>LHMP</b>	Local Hazard Mitigation Plan	<a href="https://emergency.lacity.org/sites/g/files/wph1791/files/2021-03/2018_LA_HMP_Final_2018-11-30.pdf">https://emergency.lacity.org/sites/g/files/wph1791/files/2021-03/2018_LA_HMP_Final_2018-11-30.pdf</a>
<b>LID</b>	Low Impact Development Ordinance (LASAN)	<a href="https://lacitysan.org/san/faces/home/portal/s-lsh-wwd/s-lsh-wwd-wp/s-lsh-wwd-wp-lj?_afrcSessionid=NOppxPLV7usE5T4OHl8L7qXi8Ai4zkUeJpVsifpQzzmZU4ERyRLW11004035791-1708335573?_afrcLoop=13963498127397057&amp;_afrcWindowMode=0&amp;_afrcWindowId=null&amp;_afrcCtrl-state=omhxt5t0x_1">https://lacitysan.org/san/faces/home/portal/s-lsh-wwd/s-lsh-wwd-wp/s-lsh-wwd-wp-lj?_afrcSessionid=NOppxPLV7usE5T4OHl8L7qXi8Ai4zkUeJpVsifpQzzmZU4ERyRLW11004035791-1708335573?_afrcLoop=13963498127397057&amp;_afrcWindowMode=0&amp;_afrcWindowId=null&amp;_afrcCtrl-state=omhxt5t0x_1</a>
<b>MS4</b>	Municipal Separate Storm Sewer System	<a href="https://www.waterboards.ca.gov/losangeles/water_issues/programs/stormwater/municipal/">https://www.waterboards.ca.gov/losangeles/water_issues/programs/stormwater/municipal/</a>
<b>NIMS</b>	National Incident Management System	<a href="https://www.fema.gov/emergency-managers/nims">https://www.fema.gov/emergency-managers/nims</a>
<b>NPDES</b>	National Pollutant Discharge Elimination System	<a href="https://www.epa.gov/npdes">https://www.epa.gov/npdes</a>
	One Water LA 2040 Plan (LASAN)	<a href="https://www.lacitysan.org/san/faces/home/portal/s-lsh-es/s-lsh-es-owla">https://www.lacitysan.org/san/faces/home/portal/s-lsh-es/s-lsh-es-owla</a>
<b>OASIS</b>	Operational Area Satellite Information System	<a href="https://www.caloes.ca.gov/cal-oes-divisions/public-safety-communications/ca-9-1-1-emergency-communications-branch/tactical-communications/oasis">https://www.caloes.ca.gov/cal-oes-divisions/public-safety-communications/ca-9-1-1-emergency-communications-branch/tactical-communications/oasis</a>
	Plan for a Healthy Los Angeles	<a href="https://planning.lacity.org/plan-healthy-los-angeles">https://planning.lacity.org/plan-healthy-los-angeles</a>
	Port of Los Angeles Sea Level Rise Adaptation Strategy,	<a href="https://ascelibrary.org/doi/10.1061/9780784482629.009#:~:text=The%20Port%20of%20Los%20Angeles,impacts%20of%20sea%20level%20rise,&amp;text=With%20global%20sea%20levels%20projected,magnitude%20of%20coastal%20flood%20events..">https://ascelibrary.org/doi/10.1061/9780784482629.009#:~:text=The%20Port%20of%20Los%20Angeles,impacts%20of%20sea%20level%20rise,&amp;text=With%20global%20sea%20levels%20projected,magnitude%20of%20coastal%20flood%20events..</a>
<b>RACR</b>	Real-Time Analysis and Critical Response	
<b>RYLAN</b>	Ready Your LA Neighborhood	<a href="https://www.readyla.org/">https://www.readyla.org/</a>
	Resilient Los Angeles	<a href="https://resilientcitiesnetwork.org/downloadable_resources/Network/Los-Angeles-Resilience-Strategy-English.pdf">https://resilientcitiesnetwork.org/downloadable_resources/Network/Los-Angeles-Resilience-Strategy-English.pdf</a>
<b>SEMS</b>	Standardized Emergency Management System	<a href="https://www.caloes.ca.gov/cal-oes-divisions/planning-preparedness/standardized-emergency-management-system">https://www.caloes.ca.gov/cal-oes-divisions/planning-preparedness/standardized-emergency-management-system</a>
<b>SWIRP</b>	Solid Waste Integrated Resources Plan	<a href="https://www.lacitysan.org/san/faces/home/portal/s-lsh-wwd/s-lsh-wwd-s/s-lsh-wwd-s-zwswirp?_afrcLoop=14305167157201769&amp;_afrcWindowMode=0&amp;_afrcWindowId=null&amp;_afrcCtrl-state=9p2vq35ur_78#!%40%40%3F_afrcWindowId%3Dnull%26_afrcLoop%3D14305167157201769%26_afrcWindowMode%3D0%26_afrcCtrl-state%3D9p2vq35ur_82">https://www.lacitysan.org/san/faces/home/portal/s-lsh-wwd/s-lsh-wwd-s/s-lsh-wwd-s-zwswirp?_afrcLoop=14305167157201769&amp;_afrcWindowMode=0&amp;_afrcWindowId=null&amp;_afrcCtrl-state=9p2vq35ur_78#!%40%40%3F_afrcWindowId%3Dnull%26_afrcLoop%3D14305167157201769%26_afrcWindowMode%3D0%26_afrcCtrl-state%3D9p2vq35ur_82</a>
<b>UWMP</b>	Urban Water Management Plan (LADWP)	<a href="https://www.ladwp.com/ladwp/faces/ladwp/aboutus/a-water/a-w-sourcesofsupply/a-w-sos-uwmpLn.jsessionid=WpVJgfsYHS42rh6RTqXXvD4zc1Lyq9H12HGh37HfFR7Vh4mbx74!1585827336?_afrcLoop=202610019386704&amp;_afrcWindowMode=0&amp;_afrcWindowId=null#!%40%3F_afrcWindowId%3Dnull%26_afrcLoop%3D202610019386704%26_afrcWindowMode%3D0%26_afrcCtrl-state%3D29352vtyn_4">https://www.ladwp.com/ladwp/faces/ladwp/aboutus/a-water/a-w-sourcesofsupply/a-w-sos-uwmpLn.jsessionid=WpVJgfsYHS42rh6RTqXXvD4zc1Lyq9H12HGh37HfFR7Vh4mbx74!1585827336?_afrcLoop=202610019386704&amp;_afrcWindowMode=0&amp;_afrcWindowId=null#!%40%3F_afrcWindowId%3Dnull%26_afrcLoop%3D202610019386704%26_afrcWindowMode%3D0%26_afrcCtrl-state%3D29352vtyn_4</a>
<b>VHFHSZ</b>	Very High Fire Hazard Severity Zone	<a href="https://www.lafd.org/fire-zone">https://www.lafd.org/fire-zone</a>
<b>VLCP</b>	Venice Local Coastal Program	<a href="https://planning.lacity.org/plans-policies/community-plan-update/venice-local-coastal-program">https://planning.lacity.org/plans-policies/community-plan-update/venice-local-coastal-program</a>