12. Safety

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Introduction

San Bernardino has seen more than its fair share of disasters over several decades—from wildfire and urban fires to flooding to earthquakes and debris flows. Reducing exposure to these threats and protecting the health, safety, and welfare of the City is a fundamental role of City government. It is increasingly important that the City of San Bernardino maintain programs that provide an effective response to both natural and human-caused hazards.

To that end, the Safety Element assesses natural and human-caused hazards in the City and provides goals, policies, and programs to help the City prepare for, respond to, and recover from those hazards. The Safety Element serves the following functions:

- Facilitates the identification and mitigation of hazards, thus strengthening codes, project review, and permitting processes.
- Strengthens hazard preparedness planning and post-disaster reconstruction policies.
- Identifies how hazards are likely to increase in frequency and intensity due to climate change.
- Presents policies and programs that are directed at identifying and reducing hazards and improving community resiliency.

Regulatory Framework

The regulatory framework for safety planning within a general plan is in California Government Code § 65302 and supporting statutes. This law requires that each city prepare and adopt a safety element for the protection of the community from any unreasonable risks associated with natural and manmade hazards. This element is state-mandated and serves as a strategy for the identification of hazards and responsive goals and policies to mitigate hazards.

Organization Framework

The Safety Element outlines the City's long-term strategy for identifying and addressing safety hazards in the community. Broadly speaking, the element addresses:

- Emergency Planning, including how the City prepares, respond, and recover from emergencies and disasters.
- Natural Hazards, including seismic and geology, flooding, wildland fire, severe weather, and climate change.
- Human-Caused Hazards, including hazardous materials, and aviation hazards that are caused by human activities.

Relationship with other Elements and Plans

The Safety Element provides policy direction and designs safety improvements that complement other General Plan elements. Hazards identified in the Safety element determine, in part, the type and location of different land in the Land Use Element and evacuation routes in the Circulation Element. The identified safety hazards also affect, in part, the type, magnitude, and location of police and fire services that are dedicated to responding to hazards in this element. The Safety Element also affects the type of regulations for housing.

Two local plans affect the implementation of the Safety Element. The San Bernardino's Local Hazard Mitigation Plan profiles hazard conditions, analyzes risks to people and facilities, and develops actions to reduce hazard risks. The City's Emergency Operations Plan provides City procedures to improve readiness, mobilization, and contingency planning that ensures the uninterrupted delivery of essential City functions and services during disasters.

Achieving the Vision

San Bernardino's location, geographic size, and complexity of its economy inevitably expose people, buildings, and facilities to natural and human-generated hazards. Reducing the risks associated with such hazards improves real and perceived senses of safety, provides the community with a higher quality of life, and spurs continuous investment and improvement of San Bernardino's economy, business, and neighborhoods.

The 2050 General Plan is intended to help create an environment of opportunity for residents, business, and all who seek to invest in the future of San Bernardino. Residents and businesses will make investments when there are significant opportunities to enhance their wellbeing. A community that is safe from natural and human-generated hazards will attract new businesses and residents and provide the security needed for making investments.

The Safety Element is responsive to the City's Vision because it:

- Establishes the infrastructure and facilities to protect the health, safety, and welfare of business, visitors, and residents.
- Enhances the City's image and improves its reputation by providing a safe place to live, work, and recreate.
- Effectively creates a framework for proactively responding to natural and man-made hazards and disasters.
- Minimizes any economic disruption and accelerates the City's recovery following a disaster.

While hazards and emergencies arise in all communities, the General Plan Safety Element provides, particularly in combination with its Local Hazard Mitigation Plan and Emergency Operations Plan, offers the City the tools for effectively responding to contingencies.

Planning Context

The following presents the context for planning for San Bernardino to be a safe and resilient community to both natural and human-caused hazards. Topics are presented first, followed by goals and policies that are designed to achieve the City's vision.

Emergency Preparedness and Response

Advance preparation for potential disasters can prevent severe loss of life and property from catastrophic events. The proper preparations improve the City's ability to respond to emergency situations created by these occurrences. Preparation, however, is only the first step in the management of hazards and disasters. Once a disaster has occurred, the capability of the City to respond to the situation affects how quickly the City can recover from impacts.

Emergency Operations Plan (EOP)

San Bernardino's EOP details the responsibilities and interactions of the federal, State, and local governmental agencies and private organizations in the event of natural and/or human-related disasters. The EOP describes potential hazards, recommended mitigations post-disaster aid, reconstruction, and financial assistance. The EOP aims to save lives, prevent property damage, protect and assist the public with emergencies, and facilitate recovery after a disaster. The City is prepared to maintain its core level of service during emergency situations through implementation of the EOP.

Local Hazard Mitigation Plan (LHMP)

The Disaster Mitigation Act (DMA) of 2000 requires that local governments, as a condition of receiving federal disaster mitigation funds, adopt a mitigation plan that describes the process for identifying hazards, risks, and vulnerabilities; identifies and prioritizes mitigation actions; encourages local mitigation; and provides technical support for those efforts. In response, the City prepared the LHMP and FEMA has certified the City's LHMP. The City's 2025 LHMP is incorporated into this Safety Element by reference and is found at https://sbcity.org/460/Local-Hazard-Mitigation-Plan.

Mutual Aid

The City participates in the Standardized Emergency Management System (SEMS), a State-mandated system for agencies to request emergency resources and equipment from other agencies. As part of SEMS, the City participates in the California Master Mutual-Aid Agreement to ensure that adequate resources, facilities, and other support are provided to jurisdictions whenever their own resources are insufficient to cope with a given emergency. Automatic aid pacts with the County Office of Emergency Services and local fire departments provide additional response services to San Bernardino.

Community Emergency Response Training

The Police Department participates in FEMA's Community Emergency Response Training (CERT) program, which includes classes that train residents how to respond in dangerous situations if emergency services are delayed. The CERT program teaches how to manage utilities and put out small fires, perform CPR, provide basic medical aid and treatment, search for and rescue victims safely, organize themselves and volunteers to be effective, and collect disaster intelligence to support first-responder efforts. Additional educational resources are provided to the public via presentations and flyers.

Emergency Alerts and Evacuation

SBCTA has prepared an Emergency Evacuation Network Resiliency Study in 2025 to comply with Government Code Section 65302.15. This study identifies neighborhoods where evacuation network redundancy is lacking. Three evacuation scenarios were evaluated–a major earthquake, wildfire, and failure of the Seven Oaks Dam to determine roadway capacity during each of these potential events. San Bernardino uses a mass notification system to alert cities by telephone, cell phone, and email. San Bernardino County offers a weather and incident warnings system that alerts residents about emergency situations that are foreseen or active.

Figure S-1, Evacuation Routes, shows the primary evacuation routes in the City. All routes face potential disruption that may block or damage roadways, or collapse overpasses. **Figure S-2**, Evacuation-Constrained Residential Parcels, shows parcels that have only one evacuation route. These include parcels in northern San Bernardino which may be subject to wildfires and landslides, and parcels in the southern and western areas which could be subject to flooding.

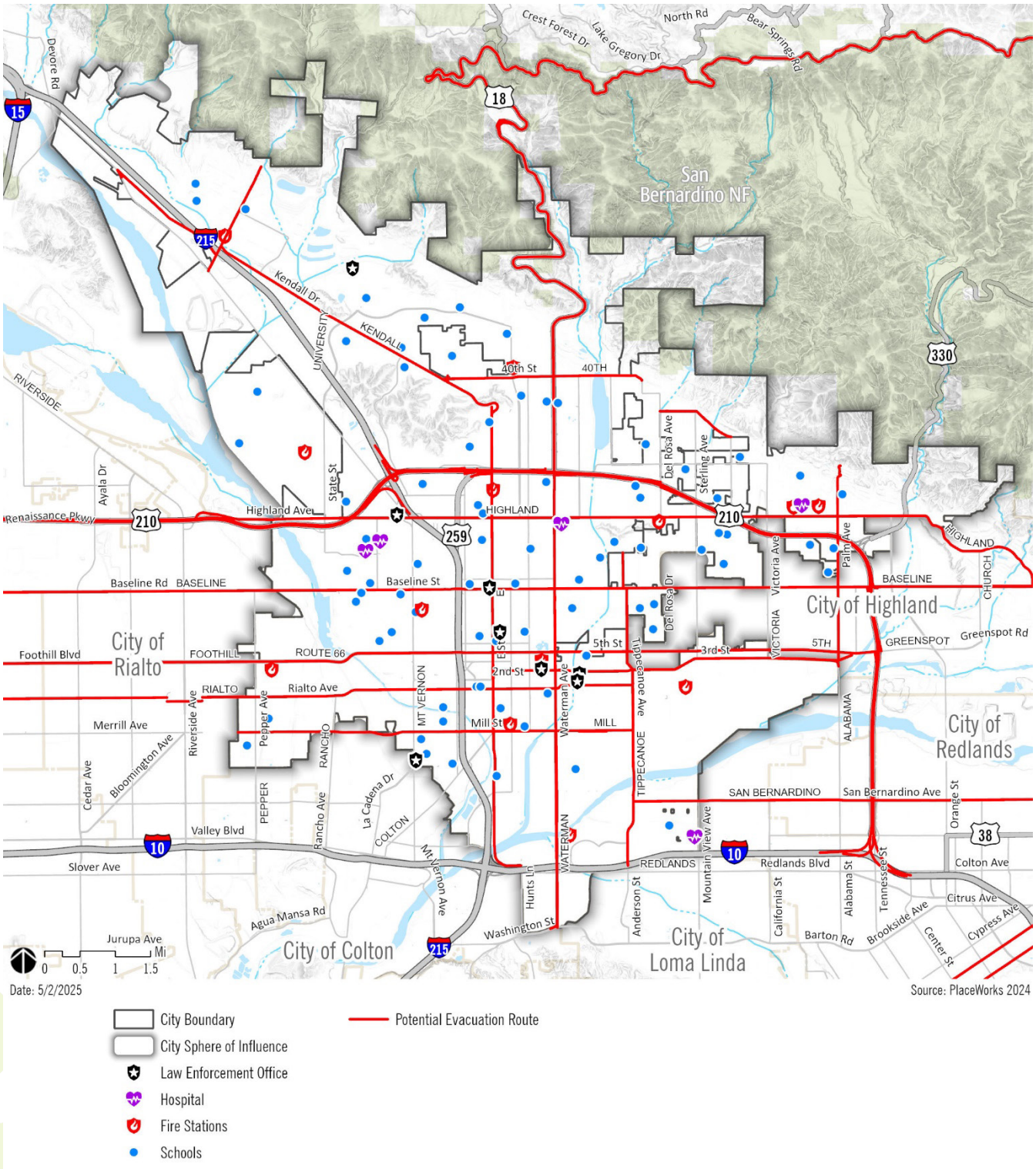


Figure S-1 Evacuation Routes

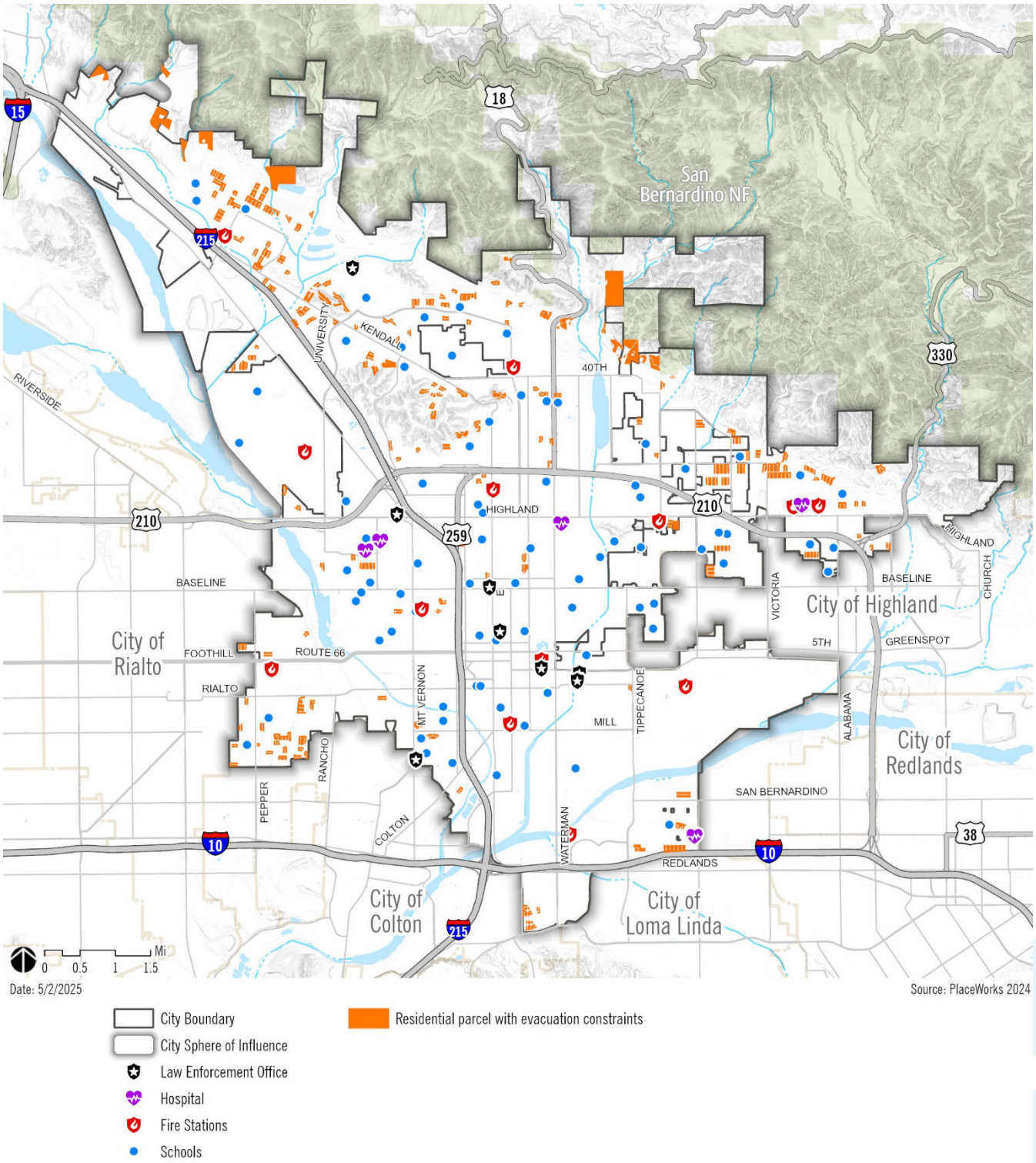


Figure S-2 Evacuation-Constrained Residential Areas

Goal S-1 Emergency Preparedness and Response

A framework for effectively preparing for, responding to, and recovering from natural and human-caused emergencies.

Policies

S-1.1 **Emergency operations plan.** Maintain a functional City Emergency Operations Plan that addresses all hazards, including climate change hazards and lays out a plan for how to respond to each hazard in an effective manner.

S-1.2 **Local hazard mitigation plan incorporation.** Incorporate the most recent version of the City of San Bernardino Local Hazard Mitigation Plan, certified by FEMA, into this Safety Element by reference, as permitted by California Government Code 65302.6.

S-1.3 **Hazard and evacuation route awareness.** Promote hazard preparedness and awareness of evacuation routes to all residents, ensuring resources are available in multiple languages and formats for people with different or limited access and functional needs.

S-1.4 **Mutual aid agreements.** Maintain and expand, where needed, mutual aid agreements with neighboring cities and the County of San Bernardino and develop partnerships with other emergency relief organizations.

S-1.5 **Access to critical facilities**. Ensure that critical, high-occupancy, and essential facilities have adequate access for emergency personnel to access the facility in the event of an emergency or disaster.

S-1.6 **Post-disaster redevelopment**. Require that buildings, structures, and infrastructure redeveloped after a disaster meet current local, state, and federal code requirements to reduce future vulnerabilities to hazards.

S-1.7 **Siting critical and essential facilities**. Locate new critical and essential facilities outside of Fire Hazard Severity Zones, designated floodplains, moderate to high landslide susceptibility areas, and Alquist-Priolo Zones—to ensure operability during hazard events.

S-1.8 **Interjurisdictional coordination**. Coordinate with San Bernardino County, neighboring local governments,

state and federal agencies, and non-governmental partners as well to effectively prepare for and respond to multiple natural and human-caused disasters.

S-1.9 **Community emergency response team.** Expand the capabilities of the City's Community Emergency Response Team to provide more community members with the information and tools to respond to disasters and emergency situations.

S-1.10 **Adequate police and fire services**. Require new development to have adequate police and fire protection services that are sufficient to keep the community safe, respond to emergencies in a timely manner, and allow for timely evacuation prior to project approval.

S-1.11 **Evacuation access**. Require new development in a Fire Hazard Severity Zone or the Wildland-Urban Interface, as shown in the most current CAL FIRE map, to identify at least two points of access for day-to-day access and evacuation purposes and make improvements to ensure adequate capacity of evacuation routes.

S-1.12 **Emergency evacuation routes**. Ensure emergency evacuation routes are built and maintained to remain open during and after disasters. Reassess evacuation routes and develop a multi-hazard evacuation plan to ensure routes are functional.

S-1.13 **Evacuation constrained parcels.** Explore secondary means of ingress and egress in areas with evacuation constraints, as shown in **Figure S-2**, Evacuation Constrained Residential Parcels, for existing subdivisions or developments of 10 units or more.

S-1.14 **Warning and notification**. Work with SBCFD to provide early-warning and notification of emergencies and disasters that will convey information in multiple languages and formats to ensure it is widely accessible, including to people with access and functional needs.

S-1.15 **Resilience hubs.** Establish resilience hubs, in easily accessible locations for all residents, which are situated outside of areas at risk from hazard impacts to the extent possible, offer refuge from extreme heat and poor air quality, and are equipped with backup power.

Hazardous Materials and Waste

San Bernardino has many businesses that use or transport hazardous materials. These materials, because of quantity, concentration, physical or chemical characteristics, are hazardous to humans and/or the environment. Hazardous materials may be toxic, corrosive, reactive, or explosive. The following describes how such materials are regulated in the City of San Bernardino.

Hazardous Waste Operations

The California Department of Toxic Substances Control (DTSC) requires permits for the use, storage, or disposal of hazardous waste. The permit categories range from the use of solvents and flammable material in the ordinary repair of automobiles to the treatment or handling of hazardous waste in large quantities. Operations that involve the treatment of hazardous waste or storage over long periods of time require a special permit by DTSC. San Bernadino has approximately two dozen businesses that generate, manage, ship, or receive hazardous materials. Most of these are small generators.

Hazardous Waste Transport

San Bernardino County's highways (SR-215, I-10, and I-15), railroads, and pipelines are frequently used to transport hazardous materials such as gasoline, chemicals, crude oil, and hazardous liquid products. These modes present potentially hazardous conditions to people, property, and the environment should an accident occur in the loading, unloading, or transport of materials. Each of these carriers is responsible for securing permits prior to operation. The California Highway Patrol and Caltrans are responsible for enforcing federal and state regulations affecting hazardous waste haulers and responding to hazmat transportation emergencies on public roads.

Household Hazardous Waste

Many common household items are considered hazardous, including medications, paint, motor oil, antifreeze, auto batteries, pest control products, drain cleaners, pool care products, and household cleaners. These materials need to be used, stored, and disposed of in a safe manner. When used properly, household hazardous materials are normally not a problem. Improper use can significantly affect human health. For example, some household cleaners may be harmful separately or when combined, such as ammonia and bleach.

Flames caused by mixed household wastes disposed of in curbside trash bins have injured City workers. The City operates a drop-off facility where residents can properly dispose of hazardous household waste at the San Bernardino International Airport.

Hazardous Waste Planning and Response

Hazardous waste and materials are stored, treated, and transported in the City. The San Bernardino County Fire District implements the Hazardous Waste Management Plan for the City. Adopted in the early 1990s and revised in 2005, this plan established regulations at the local level for the creation, storage, and handling of hazardous waste material. City departments also assist in implementing the plan's objectives by identifying hazardous waste generators and advising them of the various permits required prior to approval or operation.

The San Bernardino County Fire District, which is the Certified Unified Program Agency, maintains a Hazardous Materials Response Team that is trained and equipped to handle hazardous materials releases within the City. A material release is spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing of hazardous waste into the environment, unless permitted or authorized by a regulatory agency.

Natural Gas Wells and Pipelines

San Bernardino has several oil and gas wells within its boundaries. Of the five oil wells in the City, three are idle and two are plugged. None of the well facilities have been stimulated or poses hazards from use. Should the wells be activated, state law requires oil and gas operators to offer groundwater and surface water sampling in areas within 3,200 feet of the wellhead if it is in a Health Protection Zone (HPZ). An HPZ is defined as an area within 3,200 feet of a sensitive receptor.

Southern California Gas operates natural gas pipelines in the City. These include a 36-inch pipeline running through Cajon Canyon and a 12-inch pipeline running along the base of the mountains, moving west through Rialto and Fontana. San Bernardino also has several hazardous liquid pipelines; one runs east-west parallel to the railroad in southern San Bernardino and the other runs north from the former Colton Quarry to the BNSF Yard and north until it crosses the I-215.

Goal S-2 Hazardous Materials and Waste

A community which is adequately protected from potential hazards associated with the use, storage, manufacture, transportation, and disposal of hazardous materials in the City.

Policies

S-2.1 **Household hazardous waste education program**. Work with SBCFD to continue educating the community regarding the proper storage, handling, use, and disposal of household hazardous wastes.

S-2.2 **Household hazardous waste program coordination**. Coordinate with the SBCFD to manage the collection, transport, and disposal of hazardous waste, including household hazardous waste and education.

S-2.3 **Hazardous materials plan**. Require business owners to prepare, submit, and update business plans submitted to the SBCFD with measures necessary to minimize hazardous materials accidents due to natural disaster(s).

S-2.4 **Hazardous material spill response**. Coordinate with appropriate federal, regional and state environmental, resource agencies, SBCFPD, and surrounding cities to ensure effective response to hazardous materials spills.

S-2.5 **Hazardous material facility siting**. Prohibit new facilities that use, store, manufacture, transport, or dispose of hazardous materials facilities adjacent to or near schools, residential areas, or other sensitive land uses.

S-2.6 **Hazardous material and waste handling**. Work with appropriate federal, state, and other agencies to ensure enforcement of regulations governing the proper handling, treatment, movement, and disposal of hazardous materials and waste.

S-2.7 **Hazardous material transportation routes**. Avoid, to the maximum extent feasible, hazardous materials transportation routes on roads with a high concentration of people or sensitive facilities, such as downtown, housing, schools, parks, and public services locations.

Flooding Hazards

Historically, flooding hazards have been the most destructive natural disaster within San Bernardino. Seasonal storms and flooding following wildfires have caused the most damage. This section describes the key flooding concerns, including dam inundation.

Flooding

Flooding represents a significant and common hazard in San Bernardino, especially at the base of the mountains and foothills. Twenty (20) flood events have occurred since 2005 from severe storms and heavy rainfall. The City's location at the base of the San Bernardino Mountains and the confluence of the Cajon Creek, Santa Ana River, and multiple streams makes the community vulnerable to significant flooding events.

Areas most susceptible to widespread flooding are designated as the 100-year and 500-year floodplains, as defined by FEMA. As depicted on **Figure S-3**, floodplains generally follow the Cajon Wash and four creeks (Lytle, East Twin, Warm Creek, and City Creeks). To control flooding, the City has a complex series of storm drains, channels, levees, natural drainage courses, dams, and basins to divert flows. **Figure S-3** also shows areas of the City protected by levees.

Federal, state, and county agencies collaborate in preventing local floods. FEMA delineates flood hazard zones for communities and manages the National Flood Insurance Program for communities that participate in the program. The Department of Water Resources ensures the proper maintenance and repair of dams. The County Flood Control District is responsible for the construction and maintenance of flood control facilities. The City also maintains a flood hazard overlay zone to minimize hazards in specific geographic areas.

Despite these measures, flooding will continue to be a local hazard. Although San Bernardino is likely to experience only a slight increase in annual rainfall in the future, the region is expected to see an increase in extreme events due to climate change, resulting in more frequent or widespread flooding. This underscores the importance of San Bernardino maintaining a robust flood hazard program that addresses the role of infrastructure, community education, and response preparedness in reducing the impacts of flooding.

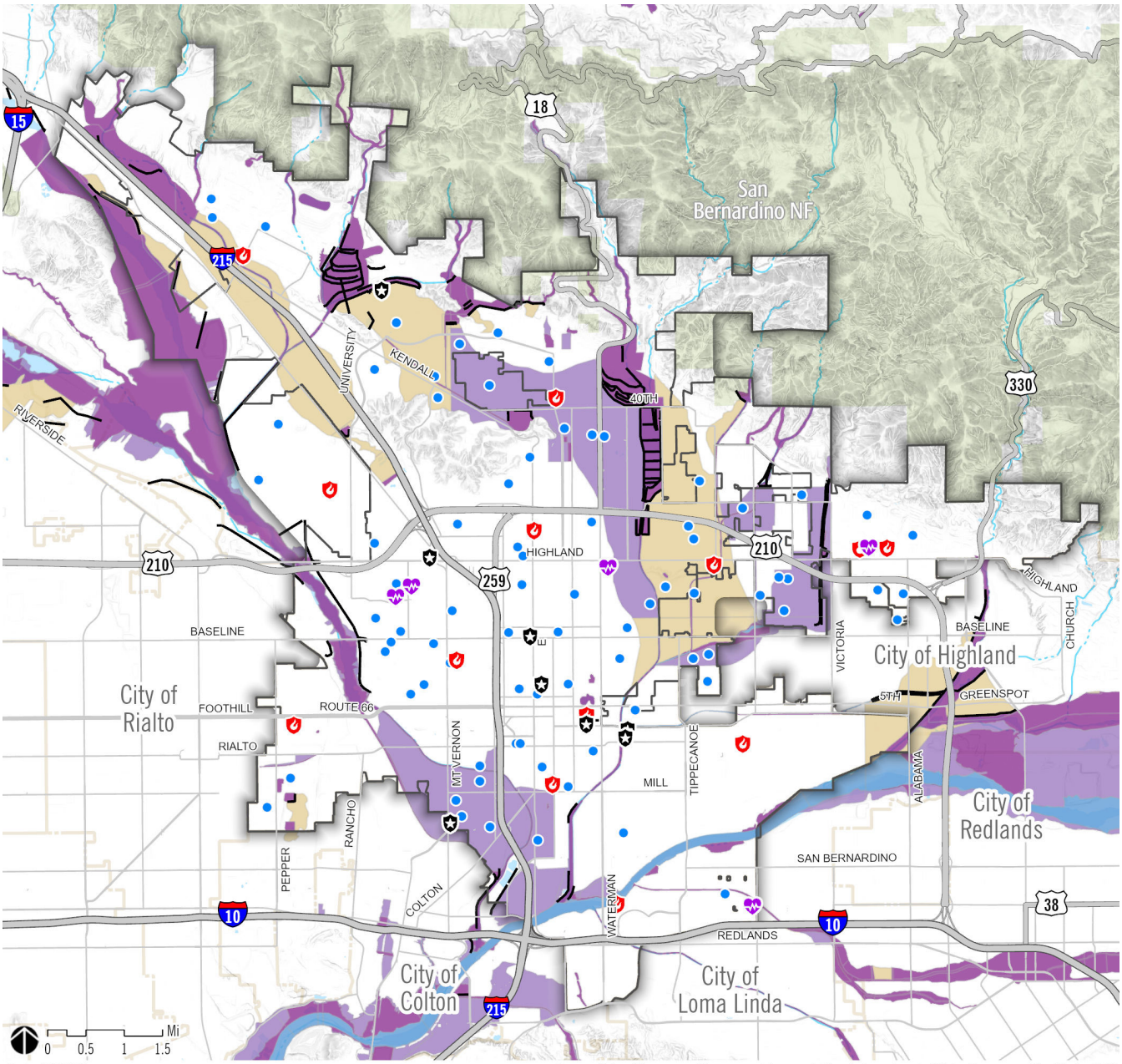


Figure S-3 Flood Hazard Zones

Dam Inundation

Inundation hazards result from a partial or complete failure of a dam. Causes of dam failure include flooding, earthquake, blockage, landslide, improper maintenance or operation, poor construction, vandalism, and terrorism. While the probability of a complete failure of a dam is remote, it is extremely hazardous because it can occur quickly, with little warning. Areas directly below the dam are at the greatest risk. The area downstream of a dam that is potentially at risk for flooding if the dam fails is called the "dam inundation zone."

Dams are assigned hazard ratings. A dam has a "high" hazard potential if it stores more than 1,000 AF of water, is higher than 150 feet, has the potential for downstream property damage and/or evacuation, and would likely cause loss of life if it failed. Dams with a "significant" hazard potential or those where failure would not result in the loss of human life, but could cause economic loss, damage the environmental, disrupt lifeline facilities, and so forth. Dams with a low hazard rating present a minimal hazard.

Table S-1, Reservoir Inundation Hazards, lists each dam and its potential for causing damage in San Bernardino.

Table S-1 Reservoir Inundation Hazard

Dam/ Reservoir	Year Build	Storage Capacity	Hazard Rating	Condition of Dam
Seven Oaks	1999	145,600 af	High	Satisfactory
Devil Canyon	1995	980	High	Satisfactory
Little Mountain	1958	150	High	Satisfactory
Devils Canyon #1	1934	79	High	Satisfactory
Perris Hill Reservoir	1962	31	High	Satisfactory
Mineral Hot Springs	1967	37	High	Satisfactory
Small Canyon	1957	20	High	Satisfactory

Source: Department of Water Resources, 2017.

Figure S-4, Dam Inundation, shows inundation zones in the City. Failure of the Seven Oaks Dam is the primary hazard and would cause severe flooding along the Santa Ana River. Should the dam fail, inundation is 30 minutes to San Bernardino City limits and 80 minutes to the Auto Plaza. However, since the dam is a flood control feature, it is usually dry and rarely approaches a third of the total capacity.

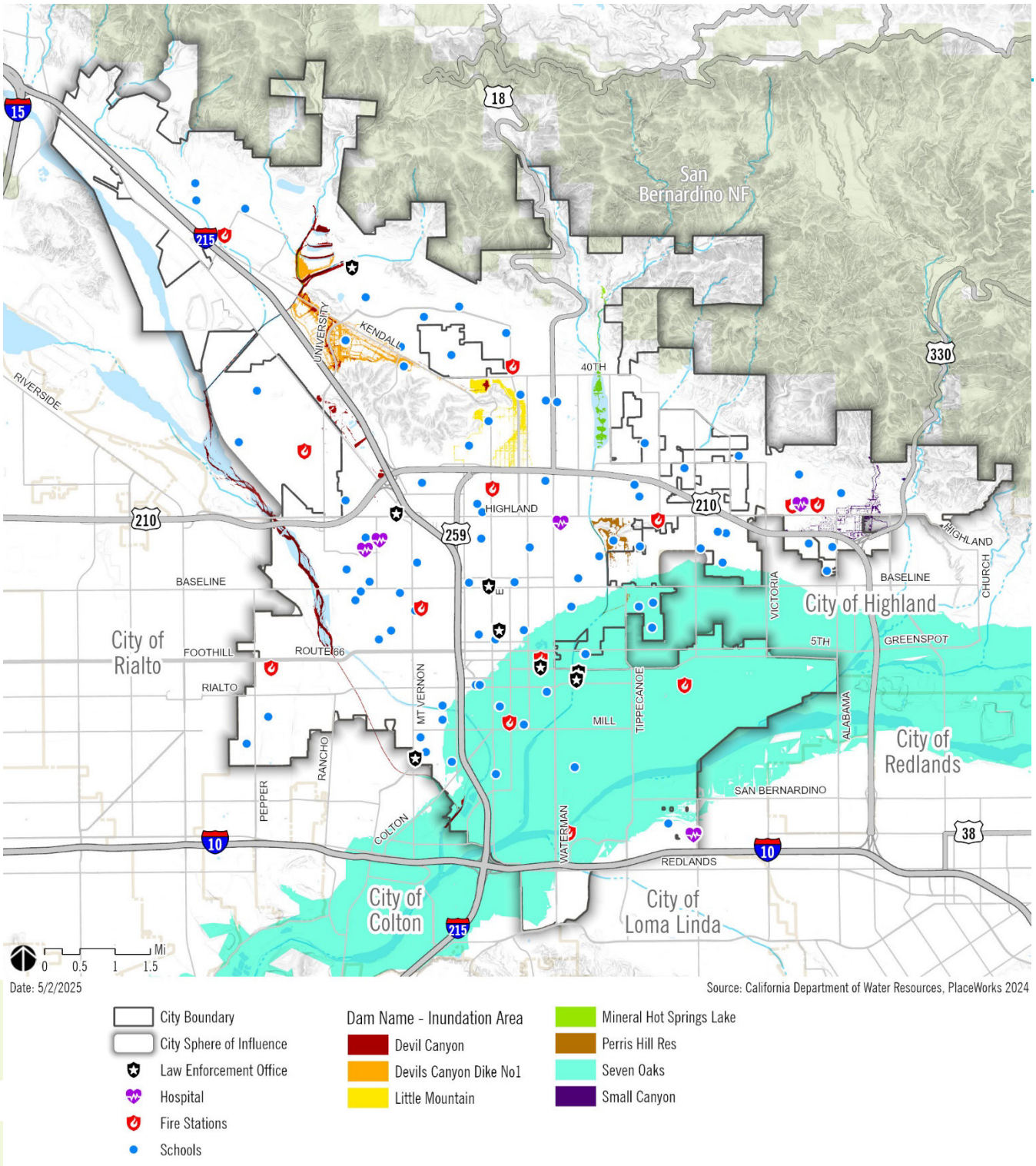


Figure S-4 Dam Inundation Areas

Geologic and Seismic Hazards

San Bernardino lies within the Bunker Hill-San Timoteo Basin, bounded by the active San Andreas Fault on the northeast and San Jacinto Fault on the southwest. The developed portion of the City lies mostly on a broad, gently sloping lowland that is underlain by alluvial sediments, particularly along the Cajon Creek and Santa Ana River basins. These physical features have also contributed to a high-water table throughout the lower elevations. Taken together, the City is subject to significant geological and seismic hazards.

Earthquakes and Fault Zones

San Bernardino is located between several active fault zones—the San Andreas, San Jacinto, Glen Helen, and the Loma Linda Faults. Each of these faults is classified as Alquist Priolo Special Study Zones, as shown on **Figure S-5**. These zones are parallel to designated faults and from 200 to 500 feet on either side. Site-specific geologic reports are required for development within these zones to determine their precise location and any required setbacks from active faults. Human occupancy structures are prohibited within 50 feet of an active fault.

The City of San Bernardino, due to its proximity of the San Andreas Fault Zone, has been regionally designated as a high earthquake severity zone, where major probable damage due to maximum intensity IX or X, as defined by the Mercalli Intensity Scale, is possible. Earthquakes of this intensity would be expected to cause significant damage in San Bernardino. General structural damage includes serious damage or destruction of masonry buildings, unreinforced buildings, older tilt up warehouses, and even wood-frame structures.

Several of the major Southern California faults have a high probability of experiencing an earthquake of 6.7M or greater in the next 30 years. The Southern San Andreas Fault has a 19 percent chance of an earthquake of this magnitude, the San Jacinto Fault has a 5 percent chance, and the Elsinore Fault has a 3.8 percent chance. The probability of an earthquake of magnitude 6.7 or greater occurring anywhere in Southern California within the next 30 years is 93 percent. An earthquake of this magnitude could result in significant damage, economic loss, loss of life, and injury in San Bernardino.

Liquefaction

Liquefaction is a process whereby strong earthquake shaking causes sediment layers saturated with groundwater to lose strength and "liquify." This subsurface process can lead to ground failure that, in turn, can result in property damage and structural failure. Groundwater depth shallower than 10 feet from the surface is considered to have the highest liquefaction susceptibility. Groundwater 10 to 30 feet below the surface is considered to have a moderately high to moderate susceptibility. Groundwater 30 to 50 feet deep can create a moderate to low susceptibility to liquefaction.

As shown in **Figure S-6**, Liquefaction Areas, areas of high and moderate potential for liquefaction are in the southern portion of the City. High potential areas are concentrated adjacent to the San Andreas Fault Zone north and northeast of the City and in the old artesian area between the San Andreas and San Jacinto Faults in the central and southern part of the City. The City will continue to be susceptible to liquefaction, particularly if droughts cause the water table level of Bunker Hill-San Timoteo Basin to rise. The old artesian area will continue to experience the greatest groundwater fluctuations, making it highly susceptible to liquefaction.

Ground shaking, fault rupture, or liquefaction pose threats to the community during an earthquake. Buildings that house people or buildings providing essential functions and services can be damaged or destroyed. While advances in engineering design and building code standards reduce the potential for collapse of new buildings in an earthquake, older structures built before many earthquake design standards were incorporated are more susceptible to damage. This includes unreinforced masonry or pre-cast concrete buildings, soft-story structures, and other buildings in need of seismic retrofits.

Geology and Soils

San Bernardino lies on a sloping lowland that flanks the southwest margin of the San Bernardino Mountains. The lowland is underlain by alluvial sediments eroded from bedrock in the adjacent mountains and washed by rivers into the valley where they have accumulated in layers of gravel, sand, silt, and clay. Hazards created by geologic processes include subsidence, landslides, and soil erosion.

Subsidence

Subsidence can be caused by geologic processes or by human activity such as subsurface mining or pumping of groundwater. Historic and potential ground subsidence areas within San Bernardino are depicted in **Figure S-7**, Subsidence Areas. The City's historic subsidence area was located within the thick, poorly consolidated alluvial and marsh deposits of the area north of Loma Linda. Since 1972, SBWMD has maintained groundwater levels that filter back into the alluvial deposits. Ground subsidence has not been identified since the groundwater recharge program began.

Landslides and Debris Flows

San Bernardino's topography, soil composition, and vegetation increase the potential for slope failure and landslide. Historically, debris flows and landslides have occurred during and after severe rainstorms, fires, or floods in 1983, 1993, 1995, 2003, 2005, 2007, 2010, and 2011, 2014, 2016, and 2023. Mudflows frequently flow into the Cajon Wash and have blocked Sierra Way, Waterman Avenue, and 40th Street. As shown in **Figure S-8**, Landslide Susceptibility Areas, susceptible slopes are primarily in northern San Bernardino. Potential slope failures could be hazardous to buildings, reservoirs, roads, and utilities. Seismic shaking may also cause slope failure.

Soil Erosion

Alluvial fans are highly susceptible to both wind and water erosion. Soil erosion has historically coincided with major storms, high winds, floods, and fires. In San Bernardino County, much of the damage to landfill and disposal sites during the December 2010 winter storm event was caused by erosion. Major erosion events occurred in 1954 and 1993, coinciding with floods and fires. With climate change, the combination of increasing wildfire likelihood, decrease in soil moisture due to extreme heat and drought, and persistent severe winds may increase the prevalence of soil erosion.

Figures S-5, S-6, S-7, and **S-8** illustrate the location of areas within San Bernardino that are directly affected by earthquake faults, liquefaction, subsidence, and landslides.

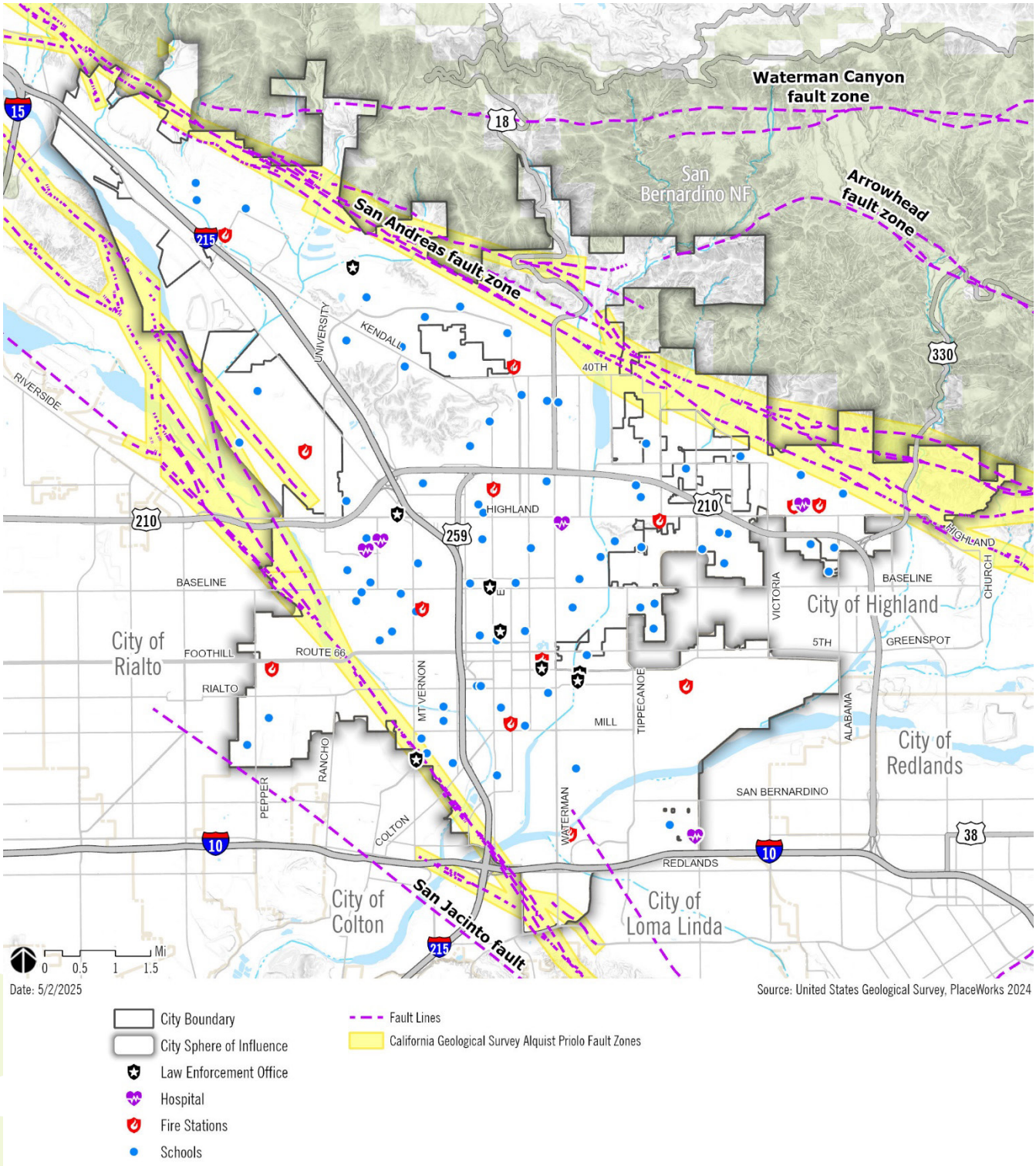


Figure S-5 Earthquake Fault Zone

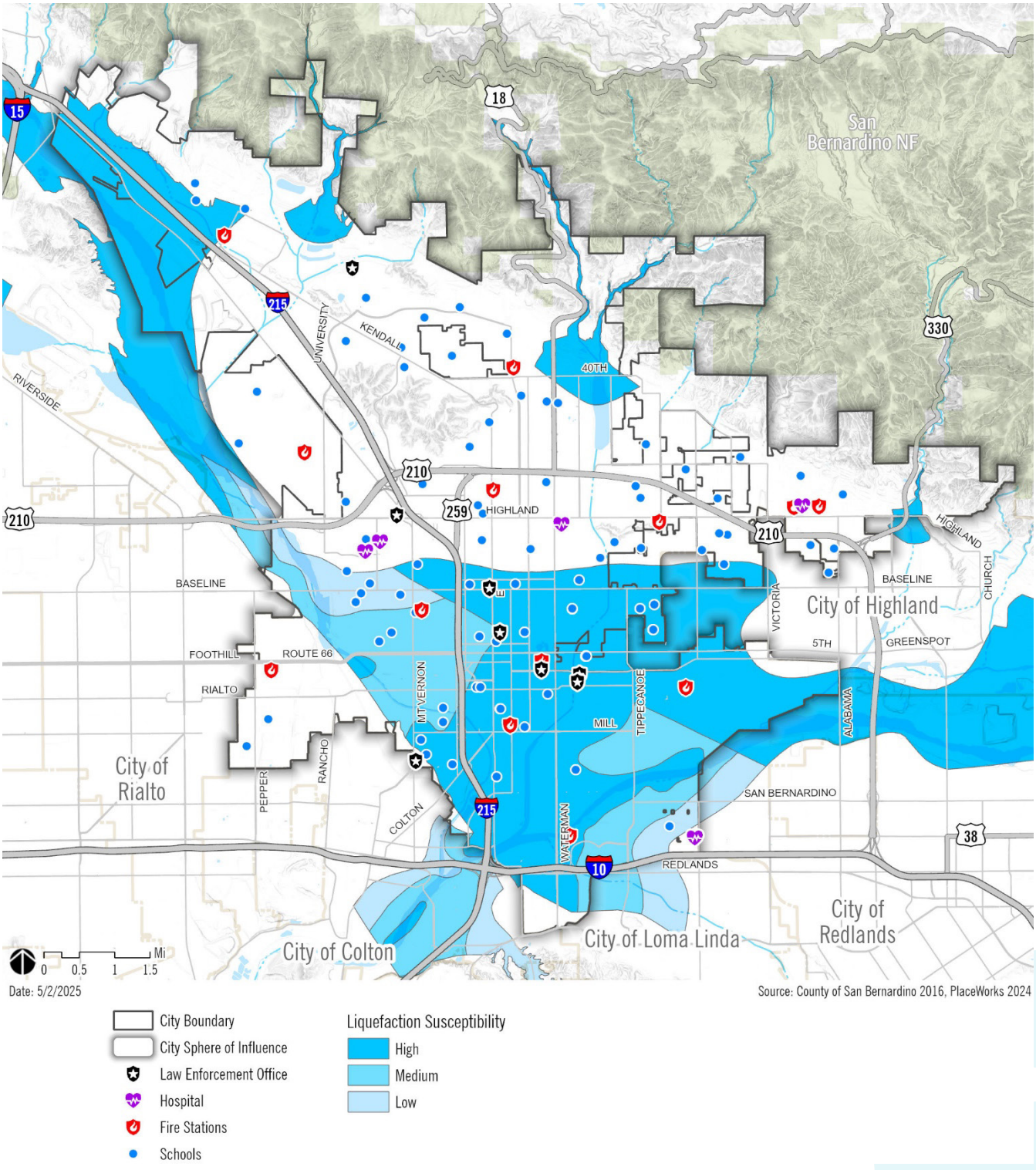


Figure S-6 Liquefaction Areas

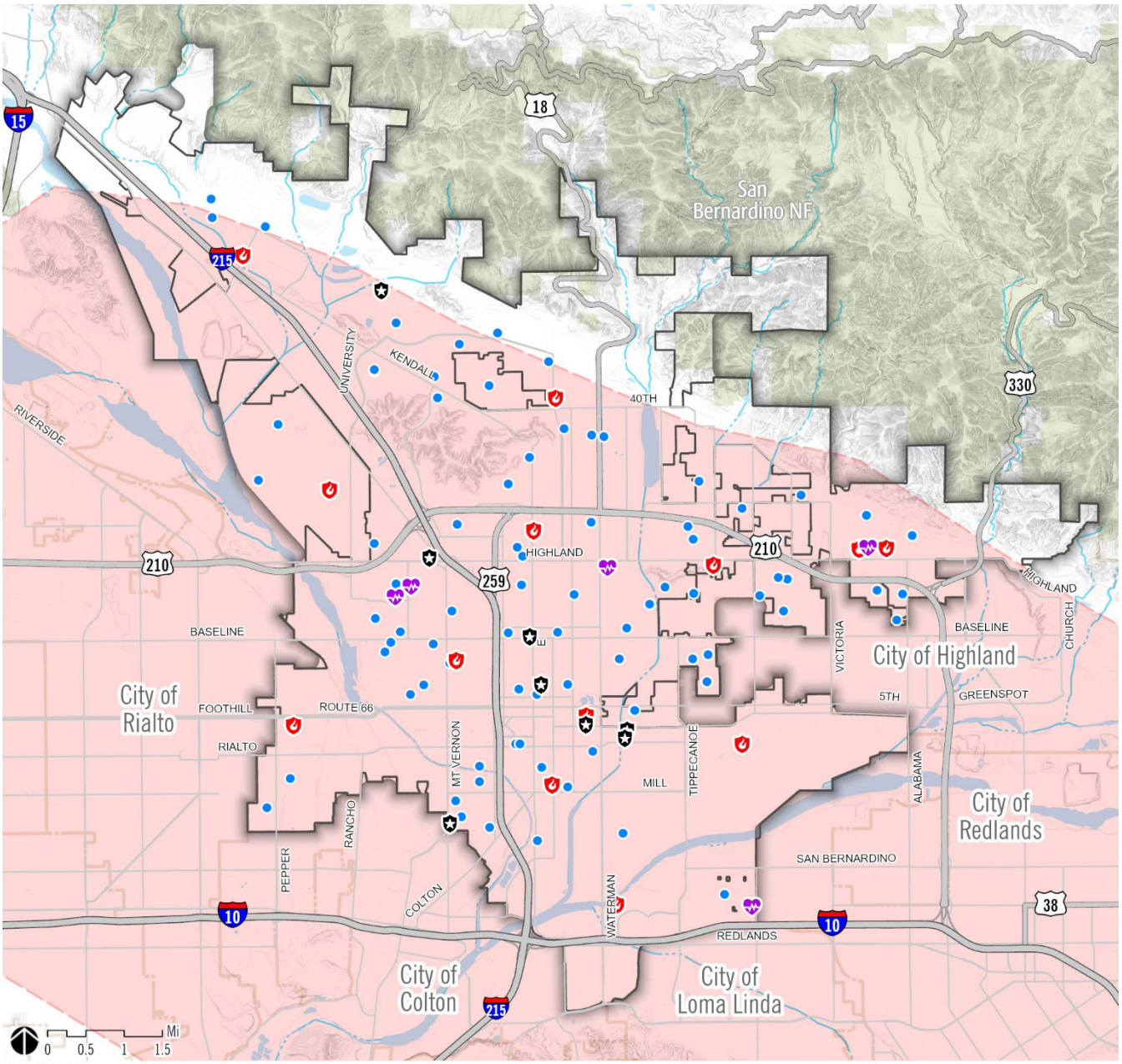


Figure S-7 Subsidence Areas

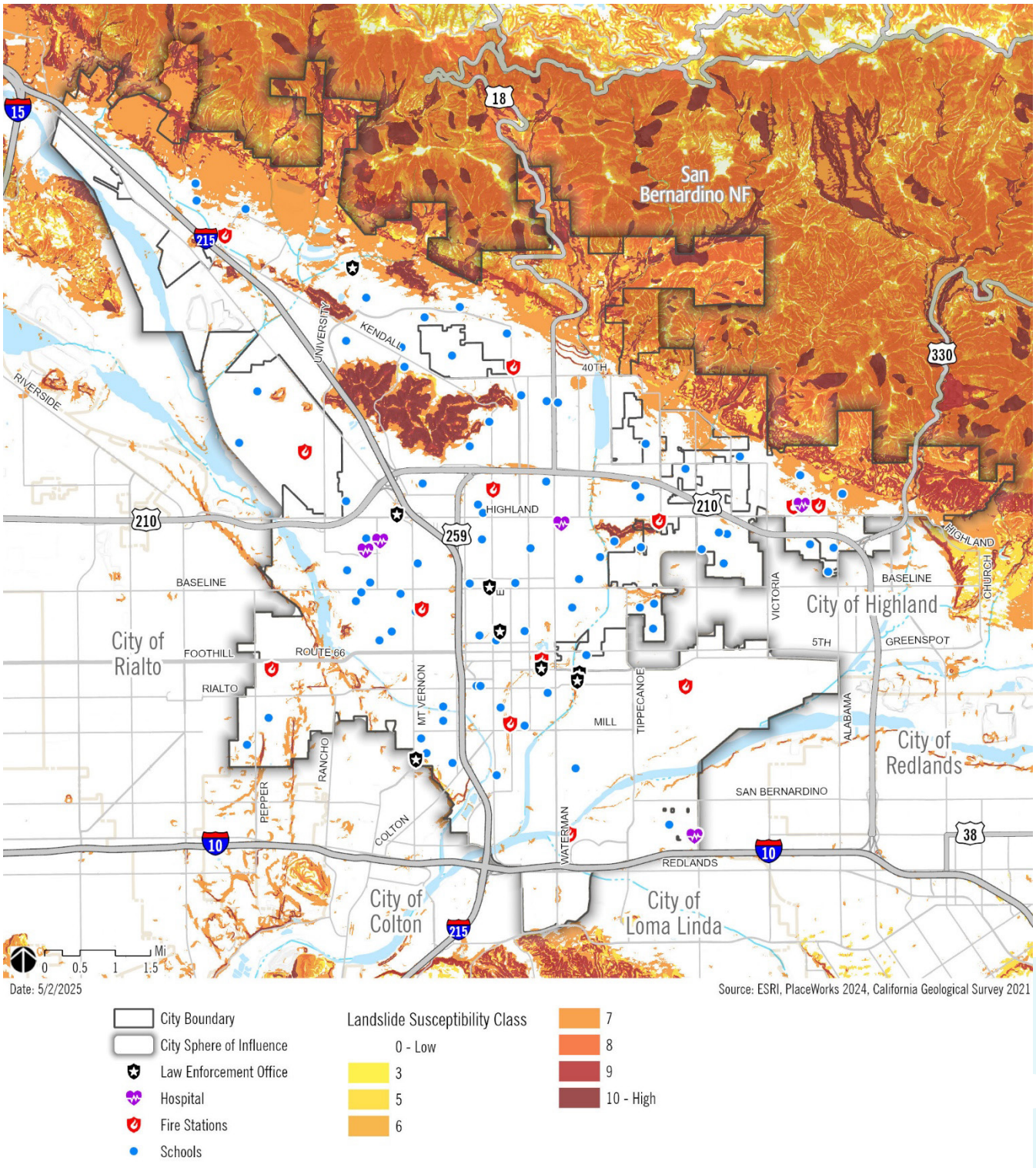


Figure S-8 Landslide Susceptibility Areas

Goal S-4 Geologic and Seismic Hazards

A built environment that minimizes the risk of loss of life, injuries, and economic disruptions resulting from seismic and geologic hazards.

Policies

S-4.1 **Geologic investigations.** Require geologic and geotechnical studies for new development as part of the project and environmental review process; require mitigations identified through those investigations.

S-4.2 **Seismic standards.** Enforce requirements of the California Seismic Hazards Mapping Act, Alquist-Priolo Acts, and California Building Code seismic standards when siting, evaluating, and constructing new projects.

S-4.3 **Liquefaction hazards.** Require liquefaction assessment for qualifying projects, in areas shown in **Figure S-6**, Liquefaction Areas, as being susceptible to liquefaction. Provide specific measures to mitigate liquefaction risk.

S-4.4 **Critical facility retrofits.** Retrofit critical facilities and lifeline utilities to prevent damage from geologic and seismic hazards and ensure these facilities are functional during and after a disaster.

S-4.5 **Seismically vulnerable buildings.** Require existing unreinforced masonry buildings to be seismically retrofitted, based on an engineering evaluation, if deemed unsafe by a building official.

S-4.6 **Landslide hazards.** Require that new construction and significant alterations to structures in landslide hazard areas identified in **Figure S-8**, be evaluated for site stability and provide specific mitigation prior to approval.

S-4.7 **Hillside hazards.** Require slope stability analyses for new development in hillsides or in landslide risk areas shown in **Figure S-8**, and in compliance with regulations in the City Hillside Management Overlay Zone.

S-4.8 **Subsidence risk.** Coordinate with San Bernardino County Public Works Department and the San Bernardino Municipal Water District to participate in regional measures that reduce risk of subsidence.

Wind Hazards

The City is subject to extremely high winds due to the proximity to the San Bernardino Mountains and Cajon Pass. At their highest speeds, high winds can damage buildings and public utility structures. Nearly all major fires in the San Bernardino Mountains have coincided with high winds, which exacerbate wildfire conditions. Other hazards associated with high winds include downed trees and power lines, property damage, and potentially hazardous conditions for aircraft.

The Santa Ana winds are a reversal of the prevailing southwesterly winds and are usually region wide from October to April, with peak wind speeds in December and January. Santa Ana winds are dry, warm winds that flow from the higher desert elevations in the north through the mountain passes and canyons. As they funnel through the canyons, their velocities increase. Consequently, peak velocities, which can reach 90 to 100 mph, are highest at the mouths of the canyons and dissipate as they spread across the valley floor.

Wildfires due to power lines comprise half of the most destructive fires in California history. Utilities may proactively cut power to electrical lines (an event called a Public Safety Power Shutoff or PSPS) to prevent arcing in high wind events and reduce the likelihood that their infrastructure could cause or contribute to wildfire. Edison has declared PSPS in San Bernardino many times in recent years. Though reducing the risk of wildfire, a PSPS can leave communities and essential facilities without power, which brings its own risks and hardships, particularly for vulnerable communities and individuals.

Northern San Bernardino adjacent to the mountains is classified by the City as a “high wind area” (see **Figure S-9**, Wind Hazard Areas). In this area, stringent conditions apply to the construction of buildings and public facilities. Due to the topography, wind velocities vary throughout the City; though building standards remain constant. The California Fourth Climate Change Assessment indicates that the frequency of Santa Ana events over the 21st century may slightly diminish, but the strongest winds may become drier than normal.

Goal 10.5 Wind Hazards

A community that is adequately prepared and protected from the disruptions caused by severe wind hazards.

Policies

S-5.1 **Building code standards**. Require development in the High Wind Hazard Area, as designated on **Figure S-9**, be designed and constructed according to the California Building Code and California Fire Code to withstand extreme wind speeds.

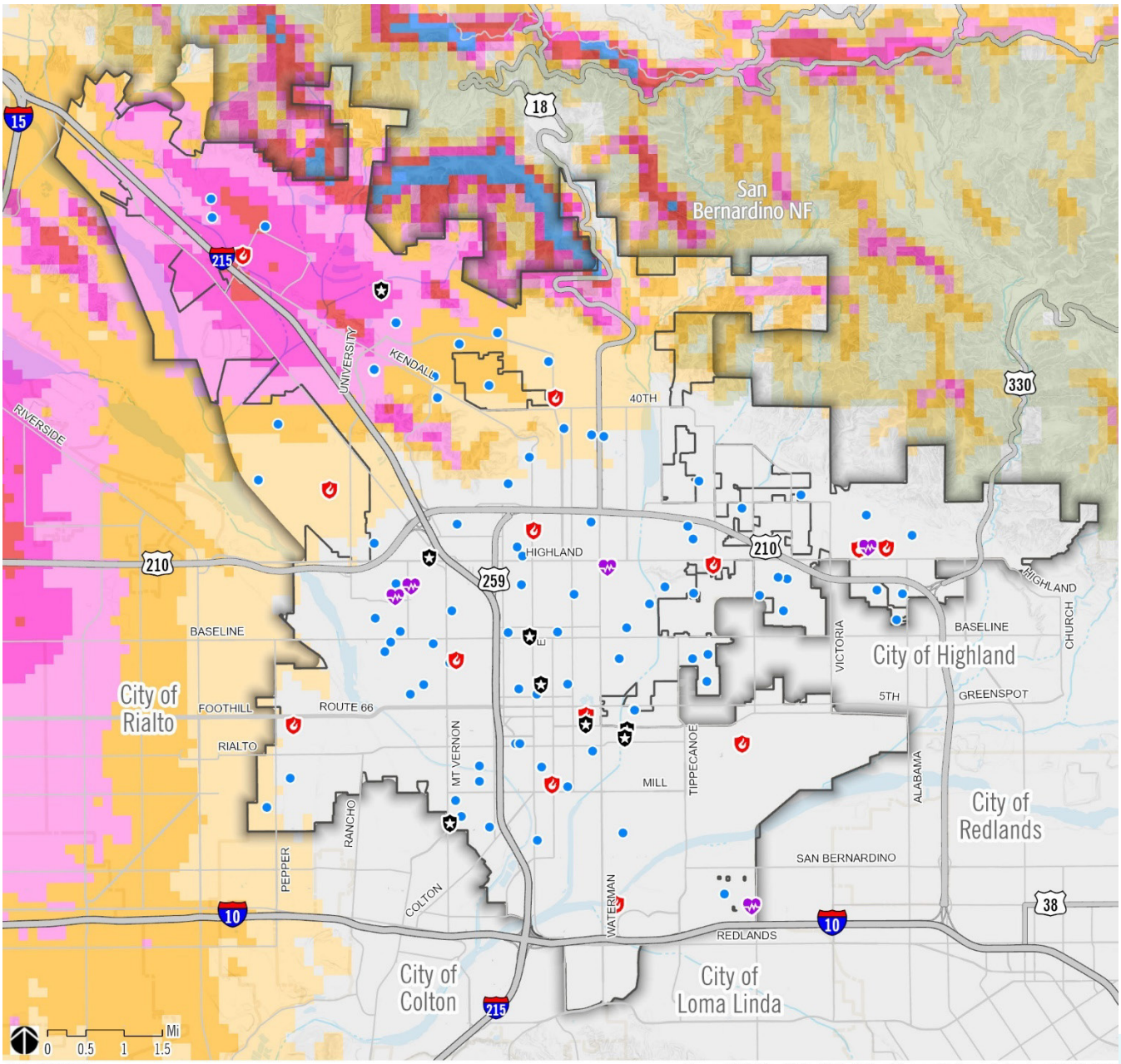
S-5.2 **Project siting**. Require new and redeveloped structures be situated in a manner that prevents adverse funneling of wind on-site and on adjacent properties, around their base, and in passageways, to reduce the probability and risk of spreading of fire.

S-5.3 **Public infrastructure design**. Construct public infrastructure (including but not limited to: street lighting, traffic signaling, signage, and so forth) in susceptible areas of the community to withstand extreme wind velocities in High Wind Hazard areas.

S-5.4 **Undergrounding utilities**. Coordinate with SoCal Edison to underground electrical transmission infrastructure, prioritizing high voltage transmission lines and areas within Fire Hazard Severity Zones, the Wildland Urban Interface, and High Wind Hazard Areas.

S-5.5 **Backup energy during power outages**. Collaborate with SoCal Edison and organizations such as the Service Center for Independent Life to ensure that those who depend on electricity for medical devices and refrigerated medication have backup energy supplies during extreme heat and wind events.

S-5.6 **Emergency alert notification**. Coordinate with San Bernardino County Fire Protection District and SoCal Edison to provide emergency alerts about upcoming extreme wind events and how to prepare for them.



Date: 5/2/2025

Source: ESRI, PlaceWorks 2024, National Renewable Energy Laboratory (NREL) 2009

City Boundary
City Sphere of Influence
Law Enforcement Office
Hospital
Fire Stations
Schools

Wind Power Density (W/m2)
Wind power class 1 (0 - 200 W/m2)
Wind power class 2 (200 - 300)
Wind power class 3 (300 - 400)
Wind power class 4 (400 - 500)
Wind power class 5 (500 - 600)
Wind power class 6 (600 - 800)
Wind power class 7 (800 - 2000)

Figure S-9 Wind Hazard Areas

Wildfire Hazards

Wildfire refers to uncontrolled fire on undeveloped land. Grassland, brush, and woodland habitats in the San Bernardino Mountains provide highly flammable fuel that is conducive to wildfires. These ecosystems are typically capable of regeneration after a fire, making periodic wildfires a natural part of the ecology of these areas. However, frequent wildfires that burn at high temperatures can prevent regeneration. A Mediterranean climate with hot, dry summers and cool, wet winters create fuels that dry out during the summer and fall months, exacerbating wildfire hazards.

In San Bernardino, wildfire season historically peaks in the fall, with dry, gusty downslope Santa Ana winds after long dry summers. Wildfire is of most concern in the areas of the City with natural vegetation, such as undeveloped areas and larger lots with expansive unirrigated vegetation. Many of these areas are covered in grasslands, brush or woodlands, which are easily ignited, especially in the summer months. If grass and brush fires can be reached by fire equipment, they are relatively easy to control. However, fast and hot burning wildfires can destroy vegetation cover, leading to flooding and debris flows when precipitation does return.

Wildfires can also create a secondary hazard of wildfire smoke, which degrades air quality and exacerbates respiratory illnesses. Wildfire smoke consists of a mix of gases and fine particulate matter from burning vegetation and materials, the most concerning of which is fine particulate matter (PM2.5). PM2.5 from wildfire smoke can seep deep into lung tissue and affect the heart and circulatory system. Although wildfire smoke is a health risk to all, sensitive groups (e.g., children, older adults, people with chronic respiratory or cardiovascular disease, etc.) may experience more acute and chronic symptoms from exposure to wildfire smoke,

Figure S-10, Historic Wildfire Perimeters, shows wildfires that have burned within or near San Bernardino since the 1920s. The 2003 Old Waterman Canyon Fire destroyed 330 homes and burned 91,000 acres, and the 2024 Line Fire burned 44,000 acres. Areas in northern San Bernardino are most susceptible to wildfires. These areas include unincorporated San Bernardino County, the San Bernardino National Forest, and mountain areas along the I-15 pass.

Wildfire will continue to be a high-risk hazard for personal safety and property damage in San Bernardino, and smoke impacts from local and regional wildfires are likely to continue to be problematic. Climate change will likely exacerbate these risks, as warmer temperatures worsen drought conditions, drying out vegetation and creating more fuel for wildfires. Increased winds may result in more erratic fire behavior, making fires harder to contain. Warmer temperatures are also expected during more of the year, extending the wildfire season, which is likely to begin earlier in the year and extend later than it has historically. Wildfires later or earlier in the year are more likely during Santa Ana wind events, which can cause wildfires to move more quickly and increase the likelihood of burning in the developed areas. Because wildfire burns trees and vegetation that help stabilize hillsides and absorb water, more areas burned by fire may also lead to an increase in landslides and debris flows.

Wildland-Urban Interface

Wildfires can spread into the wildland-urban interface (WUI), which is an area where buildings and infrastructure (e.g., cell towers, public facilities, homes) mix with flammable wildland vegetation. The WUI is composed of the interface, intermix, and influence communities. Intermix WUI refers to areas where housing and wildland vegetation intermingle, and interface WUI refers to areas where housing is near a large area of dense wildland vegetation. The influence WUI refers to an area of -susceptible vegetation up to 1.5 miles from the WUI.

As illustrated in **Figure S-11**, Wildland Urban Interface, the WUI is primarily in the northern and northeastern area of the City. This is the same area where the severe wind hazards are most predominant within the community. The influence zone abuts the forested areas of the San Bernardino Mountains, and the interface area includes developed areas along the rolling hillsides of the City. The intermix zones are scattered more broadly throughout the community.

In the WUI, efforts to prevent and limit wildfires hinge on hardening structures and creating defensible space through a multi-faceted approach of engineering, enforcement, education, emergency response, and economic incentive. However, even with these strategies, fires in the WUI are likely to increase in the future due to development being located near wildland vegetation areas. Climate change could increase the potential for a WUI fire due to drier fuels.

Urban Fires

Urban fires occur in built-up environments, destroying buildings and other structures in their wake. Urban fires are often caused by faulty wiring or mechanical equipment, combustible construction materials, misuse of appliances and electricity for cooking and heating, smoking, and arson. To minimize fire damage and loss, the City has adopted the building and fire codes of the San Bernardino County Fire Protection District. It requires the provision of adequate water supply for firefighting, defensible space, fire-retardant construction, and minimum street widths, among other things.

Fire Hazard Severity Zones

CAL FIRE establishes Fire Hazard Severity Zones (FHSZ) based on vegetation type, topography, wind pattern, and several other factors. As shown on **Figure S 12**, Fire Hazard Severity Zones, Very High FHSZs are in northern and northeastern San Bernardino along the base and slope of the San Bernardino Mountains. As shown on **Figure S-13**, Land Uses in Very High Fire Hazard Severity Zones, 11 schools, a police station, a fire station, and several parks are in Very High FHSZs. Some of these high-risk areas are also difficult to access due to single-access roadways or winding roads bordering undeveloped hillsides. Though large wildfires do not occur every year, wildfires driven by extreme weather are more likely to burn in VHFSZ areas.

Fire Protection Services

The San Bernardino County Fire Protection District provides fire protection services to San Bernardino. SBCFPD responds to hazards that include floods, fires, earthquakes, and train derailments. The Office of Emergency Services coordinates the provision of emergency services within the county. The service area of the City of San Bernardino is in SBCFPD Division 2, with 9 fire stations throughout the community. The City of San Bernardino is served by 2 battalion chiefs, and a total of 40 personnel are on duty per shift.

The Office of the Fire Marshal provides emergency preparedness and response to fire incidents and prevents emergencies through education and enforcement of health and safety laws.

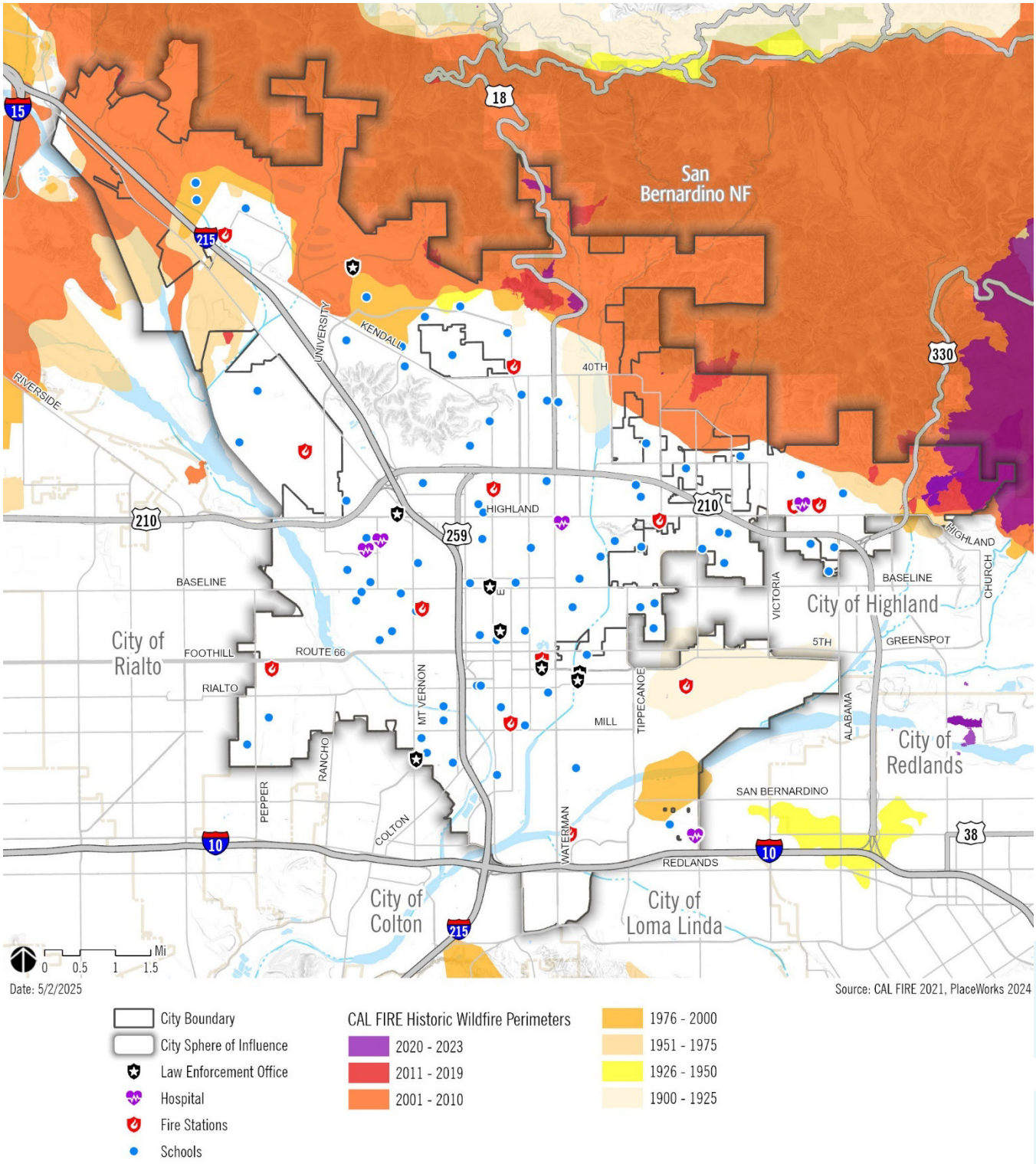


Figure S-10 Historic Wildfire Perimeters

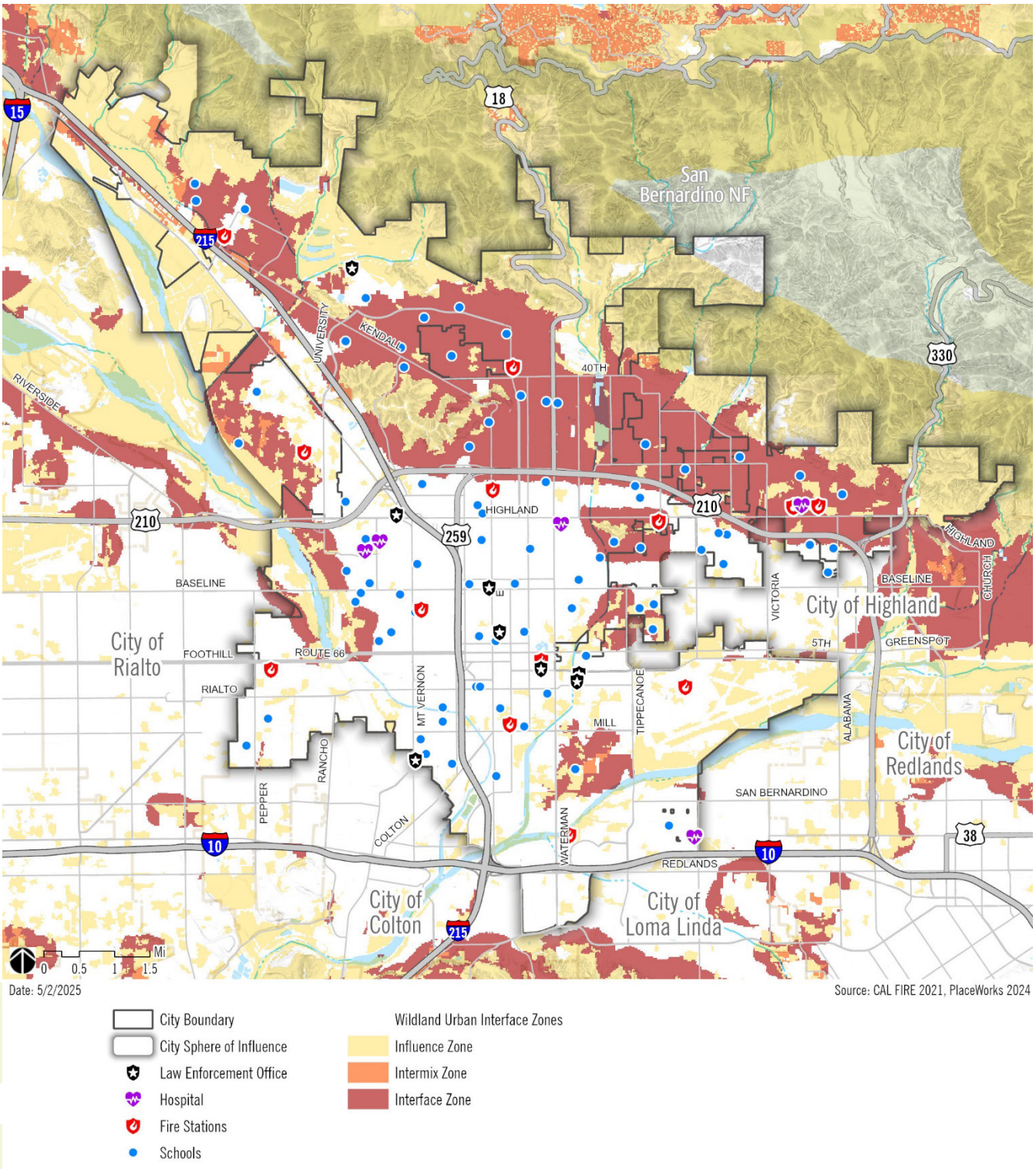


Figure S-11 Wildland-Urban Interface

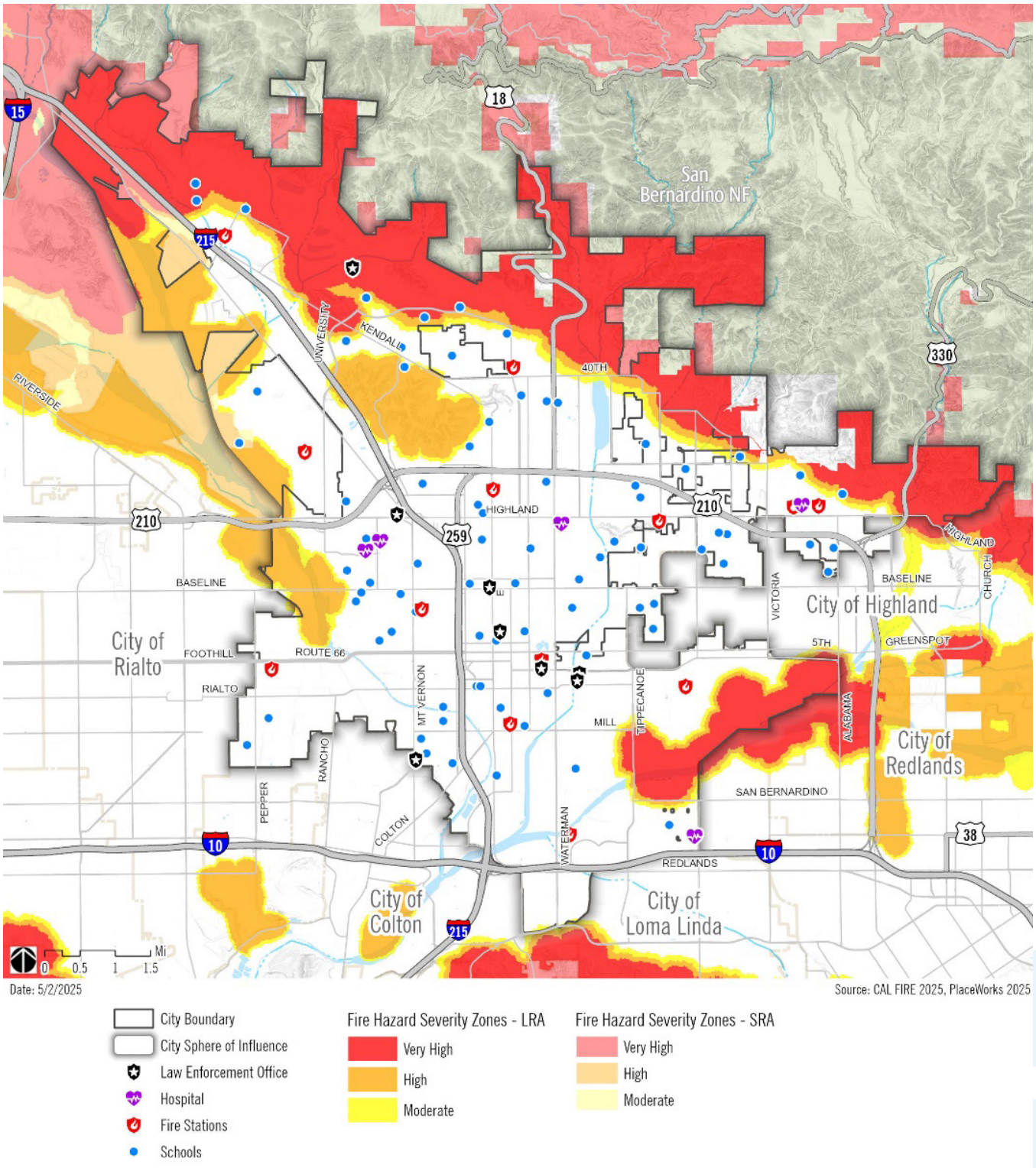


Figure S-12 Fire Hazard Severity Zones

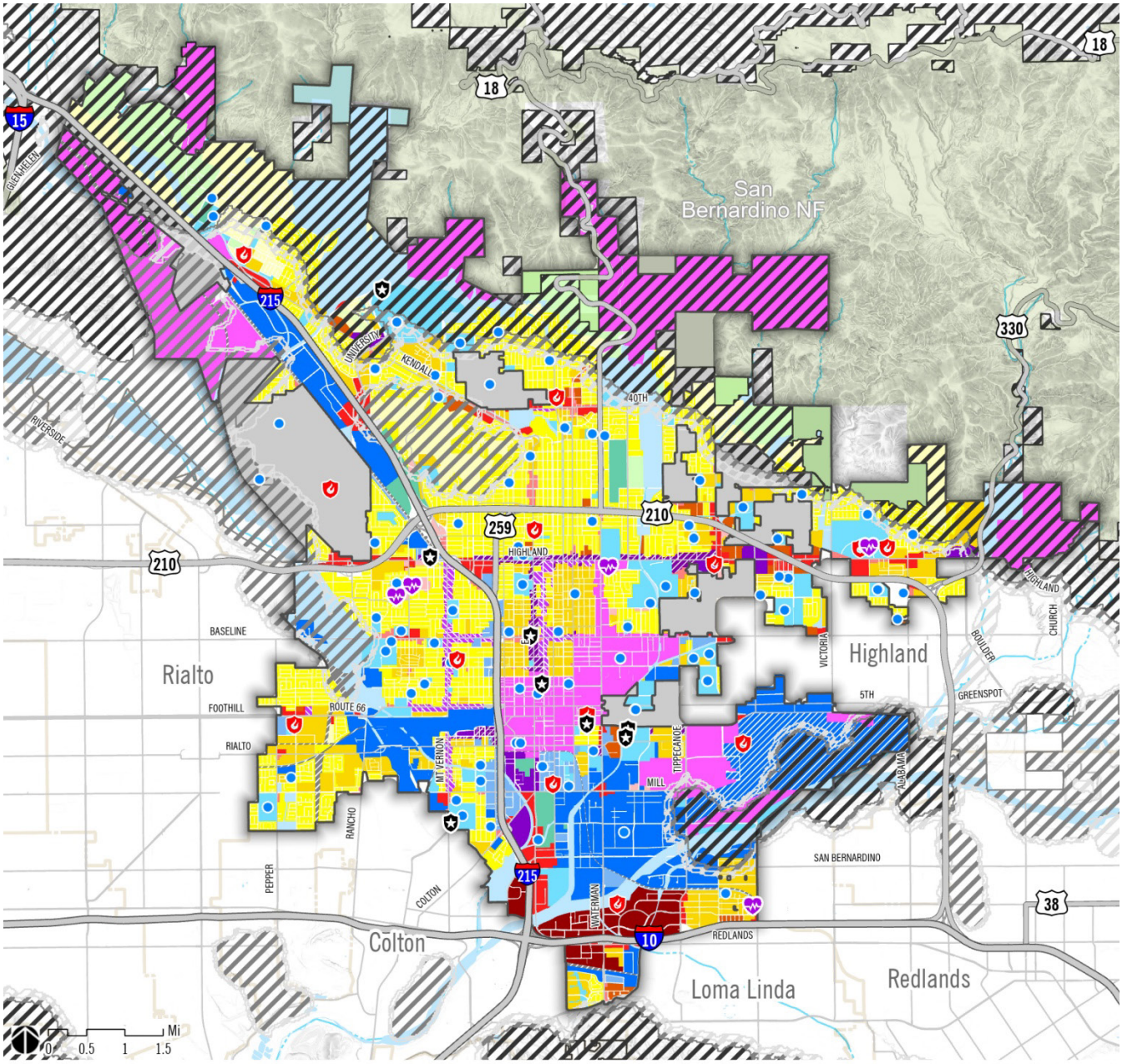


Figure S-13 Land Uses in Fire Hazard Severity Zones

Goal S-6 Wildfire Hazards

Minimize injury, loss of life, and damage to property from wildfire and structural fires.

Policies

S-6.1 **Coordination with USFS**. Work with the USFS and private landowners to ensure that sites are developed, buildings are constructed, and that vegetation and natural areas are appropriately managed to minimize the risk of wildfire in the foothills.

S-6.2 **Local code compliance**. Require that development in the Very High FHSZ and Wildland-Urban Interface, shown on **Figures S-11** and **S-12**, are subject to provisions of the Hillside Management Overlay District and the Foothill Fire Zones Overlay.

S-6.3 **Fire retardant roofing**. Continue to require that all new construction projects as well as rehabilitation projects that include the replacement of roofs of existing structures use fire retardant materials. (LU-1 and S-3)

S-6.4 **Residential development in very high FHSZs**. Avoid new residential development in Very High FHSZs. Where infeasible, residential development shall:

- Adhere to the California Building Code, California Fire Code, and Fire Safe Standards requirements.
- Provide adequate water conveyance infrastructure to meet daily and fire-flow requirements.
- Install fire-resistant native landscaping and fuel breaks, which shall be required in residential areas.
- Identify at least two points of access for day-to-day and evacuation purposes, make improvements, and maintain routes to ensure adequate capacity.
- Install visible home numbering and street signs that identify evacuation routes.

S-6.5 **Fire safety plans**. Require new development in the Very High FHSZs or the Wildland Urban Interface to have a fire safety plan, in consultation with and approval by SBCFPD, prior to the issuance of building permits.

S-6.6 **Fire safe regulations**. Require property owners of development in Local Responsibility Area and Wildland-Urban Interface, shown on **Figures S-11** and **S-12**, to comply with building, defensible space, and fuel break standards in the Public Resources Code (PRC 4291) and Very High FHSZ Fire Safe Regulations.

S-6.7 **Building code compliance**. Adopt and enforce the most recent version of the California Building Code and Fire Code, including local amendments, as well as the California Very High FHSZ Regulations for new and existing development.

S-6.8 **Fire hazard reduction projects**. Continue to work with the SBCFPD to implement fire hazard reduction policies and projects, in accordance with the City's Local Hazard Mitigation Plan, the General Plan, and the Capital Improvement Program.

S-6.9 **Brush removal and weed abatement**. Support brush removal and weed abatement in developed areas within the City to minimize fire risk, and coordinate with the SBCFPD, CALFIRE, and the USFS for brush removal in areas outside of City limits.

S-6.10 **Fuel modification zones**. Developers of property on or abutting hillsides shall implement, with consultation and approval from the SBCFPD, a fuel-modification zone, between natural open space and planned development to lessen the fire hazard potential in interface areas.

S-6.11 **CAL FIRE unit fire plan**. The current version of the San Bernardino CAL FIRE Unit Fire Plan is hereby incorporated into this Safety Element, by reference, to ensure that non-conforming development reduces fire hazards by implementing Very High FHSZ Fire Safe Regulations for roads and vegetation.

S-6.12 **Fire suppression water supply**. Ensure that public and private water distribution and supply facilities have adequate capacity and reliability to supply both daily and emergency firefighting needs consistent with the standards and requirements promulgated by the SBCFD.

S-6.13 **Water supply and infrastructure for wildfire.** Ensure that existing and future development within the City has sufficient water supplies, appropriate water delivery infrastructure, and appropriate water pressure nearby for fire-fighting purposes consistent with the standards and requirements promulgated by the SBCFD.

S-6.14 **Fire hazard public education**. Work with the SBCFPD to conduct public education, in languages and formats appropriate for people with different access, lingual, and functional needs, to inform residents and business owners of fire hazards and measures to minimize damage caused by fires.

S-6.15 **Post-fire redevelopment**. Require redevelopment after wildfires to meet current California Building Code, California Fire Code, and California Very High FHSZ Fire Safe Regulation to reduce future vulnerabilities through site preparation, layout design, fire-resistant landscaping, and fire-retarding design and materials.

S-6.16 **Post fire slope stabilization**. Coordinate with local, state, and federal agencies as appropriate to stabilize burned slopes after a wildfire to prevent debris flows during winter months and to encourage the regrowth of native plants that help (re)stabilize burned slopes.

Climate Change Hazards

Climate change is expected to affect future occurrences of natural hazards in and around San Bernardino. Many of these hazards will likely become more frequent and intense. In some cases, these trends have begun, such as droughts, extreme heat, and wildfires. According to California's Fourth Climate Change Assessment, San Bernardino can expect various changes to climate change hazards.

The Safety Element includes a vulnerability assessment (VA) that looks at how people, buildings, infrastructure, and other community assets may be affected by climate change. San Bernardino's VA, prepared in accordance with the California Adaptation Planning Guide, assesses how eight climate-related hazards—air quality, drought, extreme heat and warm nights, flooding, health hazards, landslides, severe weather, and wildfire—may affect 65 population groups and community assets. In short, San Bernardino populations and assets are most vulnerable to flooding and wildfire. The results of the VA are integrated into the hazard and other safety sections.

Air Quality

The predominant sources of local air pollution are ozone from vehicle exhaust, fine particulate and diesel particulate matter from vehicles and stationary sources, and smoke from wildfires. According to the California Office of Health Hazard Assessment ozone levels in San Bernardino are among the highest statewide; and levels of fine particulate matter exceeded 50 percent of census tracts in California. Higher future temperatures will likely increase ground-level ozone, especially in valley cities like San Bernardino. Ground-level ozone is associated with reduced lung function, pneumonia, asthma, cardiovascular diseases, and premature death. Wildfire smoke also increases air pollution and can pose a significant health risk.

Drought

Drought occurs when conditions are drier than normal for an extended period, making less water available for people and ecosystems. Droughts are a regular occurrence in California and in the Inland Empire. According to the California Fourth Climate Change Assessment, climate change will lead to more frequent and more intense droughts, which could potentially strain water supplies.

The San Bernardino Municipal Water District (SBMWD) receives its water supply from the Bunker Hill Groundwater Basin. Management of this basin is coordinated through the San Bernardino Valley Municipal Water District (SBVMWD), a regional water wholesaler. The City is a signatory to the San Bernardino Valley Regional Urban Water Management Plan (UWMP). According to the UWMP, the SBMWD anticipates adequate water supplies within its service territory under normal, single dry and multiple dry year conditions.

Extreme Heat and Warm Nights

Extreme heat occurs when temperatures rise significantly above normal levels, which is 101.2°F in San Bernardino, or when the temperature does not fall below 68.1°F during the nighttime. Extreme heat days in San Bernardino are projected to increase from an annual average (1961–1990) of 4 days/year to 31 days/year by mid-century (2035–2064) and 50 days/year by end of century (2070–2099). The number of warm nights is projected to increase from a historic annual average (1961–1990) of 5 nights/year to an annual average of 43 nights/year by mid-century and 78 nights/year by end of century.

Extreme heat can cause heat-related illnesses, such as heat cramps, heat exhaustion, and heat stroke, in addition to exacerbating respiratory and cardiovascular conditions. Many residents live in homes which lack air conditioning, and as a result, are more susceptible to heat and resulting harm from extreme heat events. If homes have air conditioning, the increased use may be cost prohibitive, particularly for older less efficient homes. Some types of infrastructure, including power lines and roadways, face greater stresses during high temperatures that make failure more likely.

Human Health Hazards

Several diseases, such as hantavirus pulmonary syndrome, Lyme disease, West Nile virus, and influenza, are linked to climate change. Pests such as mice, rats, ticks, and mosquitoes carry these diseases. Climate change can increase the rates of infections because many of the animals that carry diseases are more active during warmer weather and may expand in population size due to higher levels of rainfall and stagnant water after flooding. Some diseases and illnesses have the potential to become epidemics or pandemics if spread within communities, regions, or over multiple countries.

Epidemics and pandemics, such as COVID-19, can worsen health conditions and cause economic disruptions in the City and region.

Severe Weather

Severe weather includes high winds, hail, and lightning, often caused by intense storm systems. Santa Ana winds can destroy buildings, knock over trees, damage power lines and electrical equipment, and fan small sparks into large wildfires in the region. Severe weather can also include heavy rainfall, which can cause flash floods and ponding in areas not protected by a levee in the City. While less common in the City, hail and lightning can damage the buildings and infrastructure supporting economic sectors and key services in the community. As described from the California Fourth Climate Change Assessment, the connection between climate change and severe weather is not as well established, but evidence suggests that these forms of severe weather may occur more often than in the past.

Goal S-7 Climate Change Hazards

A resilient community able to adapt to climate change hazards.

Policies

S-7.1 **Extreme heat hazard priority**. Elevate extreme heat as an important hazard of concern in the City of San Bernardino to adequately prepare and respond to extreme temperatures.

S-7.2 **Resiliency of City-owned structures**. Increase resiliency of City-owned structures to severe weather and support homeowners and business owners to improve the resilience of their homes and businesses through retrofits, weatherization, and so forth.

S-7.3 **Alternative transit routes**. Coordinate with Omnitrans to identify alternative routes and stops if normal route infrastructure is damaged or closed due to severe weather.

S-7.4 **Expand use of green infrastructure**. Promote and expand the use of drought-tolerant green infrastructure, including street trees and landscaped areas, as a cooling strategy in public and private spaces.

S-7.5 **Water policy to address drought**. Prepare for more frequent and severe droughts by working with water providers to implement conservation measures and ensure sustainable water supply.

S-7.6 **Use of regenerative features**. Encourage new developments and existing property owners to incorporate sustainable, energy-efficient, and environmentally regenerative features into their facilities, landscapes, and structures to reduce energy demands and improve on-site resilience.

S-7.7 **Use of natural or ecosystem processes**. Encourage the use or restoration of natural features and ecosystem processes, when considering options for the conservation, preservation, or management of open space. Examples include aquatic or terrestrial vegetated open space, systems and practices that use or mimic natural processes, and other engineered systems to provide clean water, conserve ecosystem values and functions, and provide benefits to people and wildlife.

S-7.8 **Public health sector coordination**. Coordinate with the County Department of Public Health to ensure emergency and public health services can meet the needs of the population during extreme heat, poor air quality, and human health hazards events.

S-7.9 **Outdoor industries**. Encourage businesses that have outdoor workers to allow for shifting work hours to earlier in the day from May through September to reduce heat-related illnesses on extreme heat days.

S-7.10 **Medical sector collaboration**. Collaborate with the County Department of Public Health and healthcare providers to prepare for health emergencies and disaster that can disrupt medical services and facilities.

S-7.11 **Warehouse air conditioning**. Encourage warehouses and logistic centers to be climate controlled to ensure workers and drivers have access to air conditioning to reduce the high working temperatures.

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