

Relationship with Other Documents

The purpose of the Safety Element is to include safety considerations in the planning and decision-making process by establishing policies related to future development that will minimize the risk of personal injury, loss of life, property damage, and environmental damage associated with natural and human-caused hazards. As such, there are several policies contained in the Safety Element that are interrelated with other mandatory elements of the General Plan, which are hereby incorporated by reference. For instance, the policies of the General Plan's Land Use, Housing, Open Space and Environmental Justice Elements are internally consistent with the policies of the Safety Element in that they seek to minimize future development in hazardous areas, reduce barriers to placement of developments (including affordable housing) in areas less prone to hazards, minimize risks posed from fire and other hazards, ensure adequate secondary access during an emergency, etc. However, it is important to note that the policies in the Safety Element are tailored to address safety-related issues, and referenced policies in other elements should also be reviewed to determine environmental or other types of policies associated with similar locations or similar types of development.

The policies of the Safety Element are also closely interrelated to various plans that specifically address hazard mitigation planning and disaster preparedness, such as the following:

- ◆ Riverside County Emergency Operations Plan
- ◆ City of Moreno Valley Emergency Operations Plan (EOP)
- ◆ City of Moreno Valley Local Hazard Mitigation Plan (LHMP)
- ◆ City of Moreno Valley Climate Action Plan (CAP)

The aforementioned plans provide implementation measures that are not only consistent with the Safety Element, but also aid in the City's successful response to hazards and emergencies within the City. For example, the City's EOP provides a framework for large-scale emergency response and provides function-specific Standardized Operating Procedures for emergency management. The EOP also provides resources for departments and agencies to effectively respond to emergencies. The EOP, in conjunction with the LHMP, provides a comprehensive overview of emergency mitigation and response.

The 2023 LHMP was crafted in accordance with the federal Disaster Mitigation Act of 2000 and follows the Federal Emergency Management Agency's (FEMA) 2011 Local Hazard Mitigation Plan guidance. The LHMP incorporates a process where hazards are identified and profiled, the people and facilities at risk are analyzed, and mitigation actions are developed to reduce or eliminate hazard risk. The implementation of these mitigation actions, which include both short- and long-term strategies, involves planning, policy changes, programs, projects, and other activities. LHMP integration is required by law as well as for California Department of Forestry and Fire Protection (CAL FIRE) review and can be found at: <https://www.moval.org/departments/fire/LHM-Plan.html>.

Seismic and Geologic Hazards

SEISMICITY

Like much of California, Moreno Valley is located in a seismically active region. As shown in Map S-1, the San Jacinto Fault Zone traverses the northeastern boundary of the city. One of the most seismically active structures in southern California, the San Jacinto fault zone has produced 10 historical earthquakes with a magnitude greater than 6 and has been categorized as an Alquist-Priolo Earthquake Fault Zone by the State of California. Alquist-Priolo Zones identify surface traces of known active faults that pose seismic hazards and buffers around the known traces. New housing construction within these zones is prohibited unless a comprehensive geologic investigation shows that the fault does not pose a hazard to the proposed structure.

The San Jacinto Fault Zone is composed of several parallel faults that together constitute the zone. There are three branches of the San Jacinto Fault in the southeast corner of the study area. The western branch is sometimes referred to as the Casa Loma Fault, which is identified on maps primarily southeasterly of the City limits; the eastern branch, the Claremont Fault. The Farm Road Fault was identified in 1992 in the southeastern portion of the study area. The Casa Loma fault within the City limits is not identified as an Alquist-Priolo Earthquake Fault Zone as insufficient information is available to determine if the fault is active.

Given the extent of known faults in the planning area, the potential for seismic hazard is high. These hazards may be addressed through adherence with existing building codes including the requirements of California Building Code Chapter 18, and state and local regulations, though exposure to seismic risks cannot be completely eliminated.

GROUND SHAKING AND SURFACE RUPTURE

Ground shaking is the effect of surface motion generated by an earthquake that results in the vast majority of damage during seismic events. Several factors control how ground motion interacts with structures, making the hazard of ground shaking difficult to predict. Seismic waves propagating through the Earth's crust are responsible for the ground vibrations normally felt during an earthquake. Structures within the city could be affected by ground shaking during a seismic event associated with the San Jacinto Fault Zone. Additionally, seismic events associated with the active San Andreas Fault located approximately 15 miles northeast and the active Elsinore Fault located approximately 17 miles southwest could also generate ground shaking within the city.

LIQUEFACTION

Liquefaction is a seismic phenomenon in which loose, saturated, granular soils behave similarly to a fluid when subject to high-intensity ground shaking. Liquefaction occurs when three general conditions exist: shallow groundwater; low-density non-cohesive (granular) soils; and high-intensity ground motion. Liquefaction is typified by a buildup of pore-water pressure in the affected soil layer to a point where a total loss of shear strength occurs, causing the soil to behave as a liquid. Studies indicate that saturated, loose to medium dense, near surface cohesionless soils exhibit the highest liquefaction potential, while dry, dense, cohesionless soils and cohesive soils exhibit low to negligible liquefaction potential.

According to the U.S. Geological Survey (USGS), the City is predominantly underlain coarse (Hanford) or (Cienega), sandy loam (Ramona, Greenfield), and rock-land. Areas with high to very high liquefaction typically consist of silt loam properties.

As shown in Map S-2, the majority of the city is classified as having low or moderate potential for liquefaction. Small amounts of land within the western and southern portion of the City are classified as having high potential for liquefaction, and a small amount of land along the southern border is classified as having a very high potential for liquefaction.

LANDSLIDES

Landslides occur when masses of rock, earth, or debris move down a slope, including rock falls, deep failure of slopes, and shallow debris flows. Landslides are influenced by human activities such as grading and other construction activities, irrigation of slopes, mining activity, and by natural factors such as precipitation, geology/soil types, surface/subsurface flow of water, and topography. Landslides can be initiated in slopes already on the verge of movement by rainfall, snowmelt, changes in water level, stream erosion, earthquakes, changes in groundwater, earthquakes, fire, volcanic activity, disturbance by human activities, or any combination of these factors.

Regarding fire, post-fire landslides have become more common place and are increasingly relevant for Moreno Valley. Wildfires alter the way water interacts with the landscape, causing flash floods and debris flows even after modest rainstorms. Burned areas remain especially susceptible to landslides due to altered soil properties from removed vegetation, decreasing the ground's rainfall absorption. These rapid flows of debris can happen during the first few minutes of the first storm after a wildfire event. In accordance with USGS empirical models beginning in 2016, there appear to be no known post-fire debris flow assessments for Moreno Valley. Maps provided by USGS regarding post-fire debris flow assessments indicate both likelihood and potential volume of debris flows exiting the mountain front in response

to storms of 15-minute peak rainfall intensity of 24 mm/h. Higher rainfall intensities as well as longer storm durations may increase probability and potential of post-fire debris flows in the future.

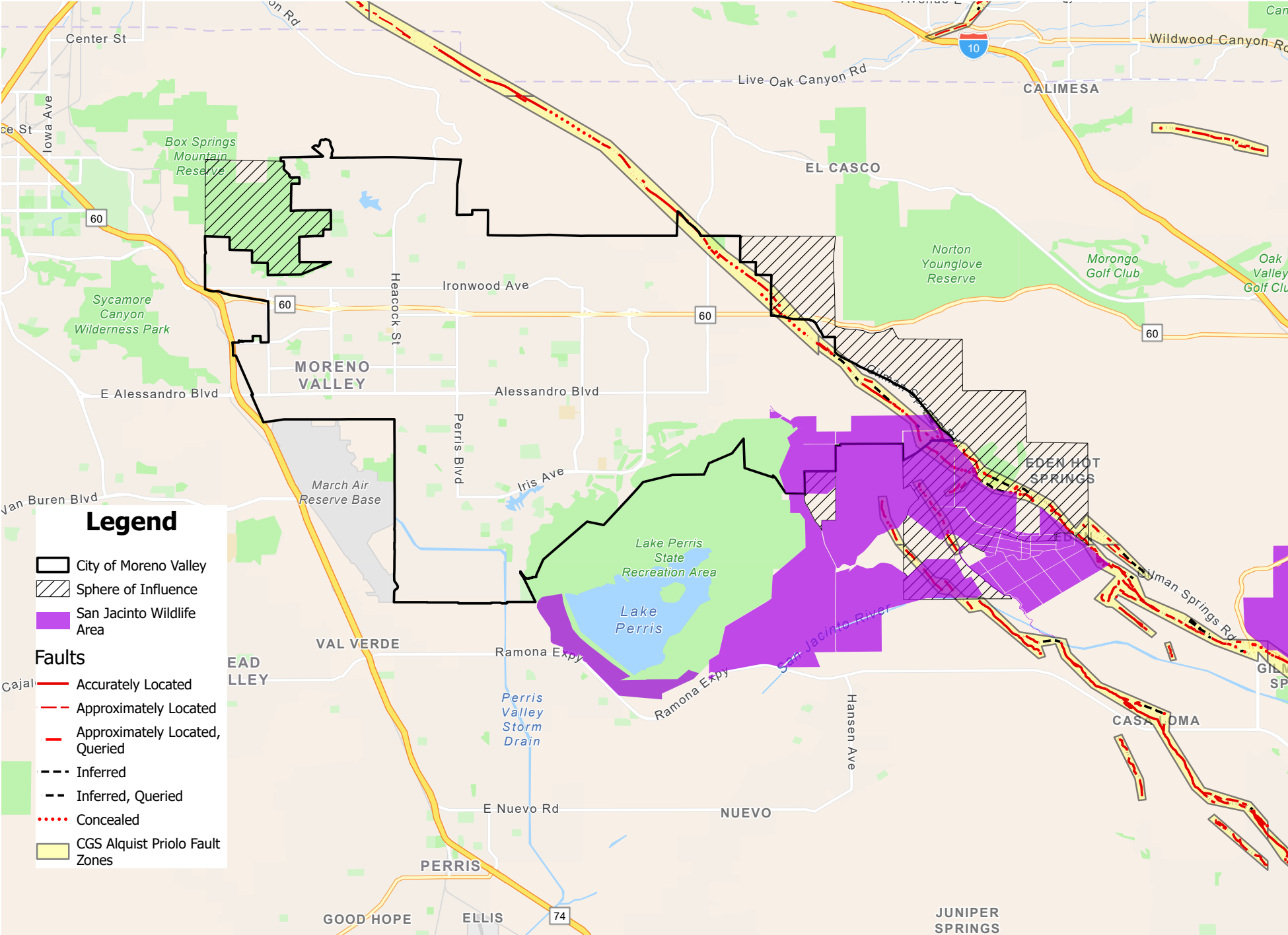
According to Moreno Valley's LHMP, landslides and slope failures occur on average every five years in the mountain foothills of the City. According to the City's LHMP, the probability rating for future landslide events in Moreno Valley is a 2, meaning there is between a 1% and 10% chance that this event will occur within the next year. Landslide susceptibility is defined as the likelihood of a landslide occurring in an area on the basis of local terrain conditions.

As shown in Map S-3, the majority of the City is relatively flat and has been assigned a landslide susceptibility class of 0 (No Risk) by the California Geological Survey (Map S-3). However, some areas within the northern, northeastern and southeastern portions of the City and within the Sphere of Influence have been assigned landslide susceptibility classes ranging from V (Moderate Risk) to X (High Risk). Some areas within the central portion of the City have also been assigned landslide susceptibility classes ranging from V (Moderate Risk) to X (High Risk).



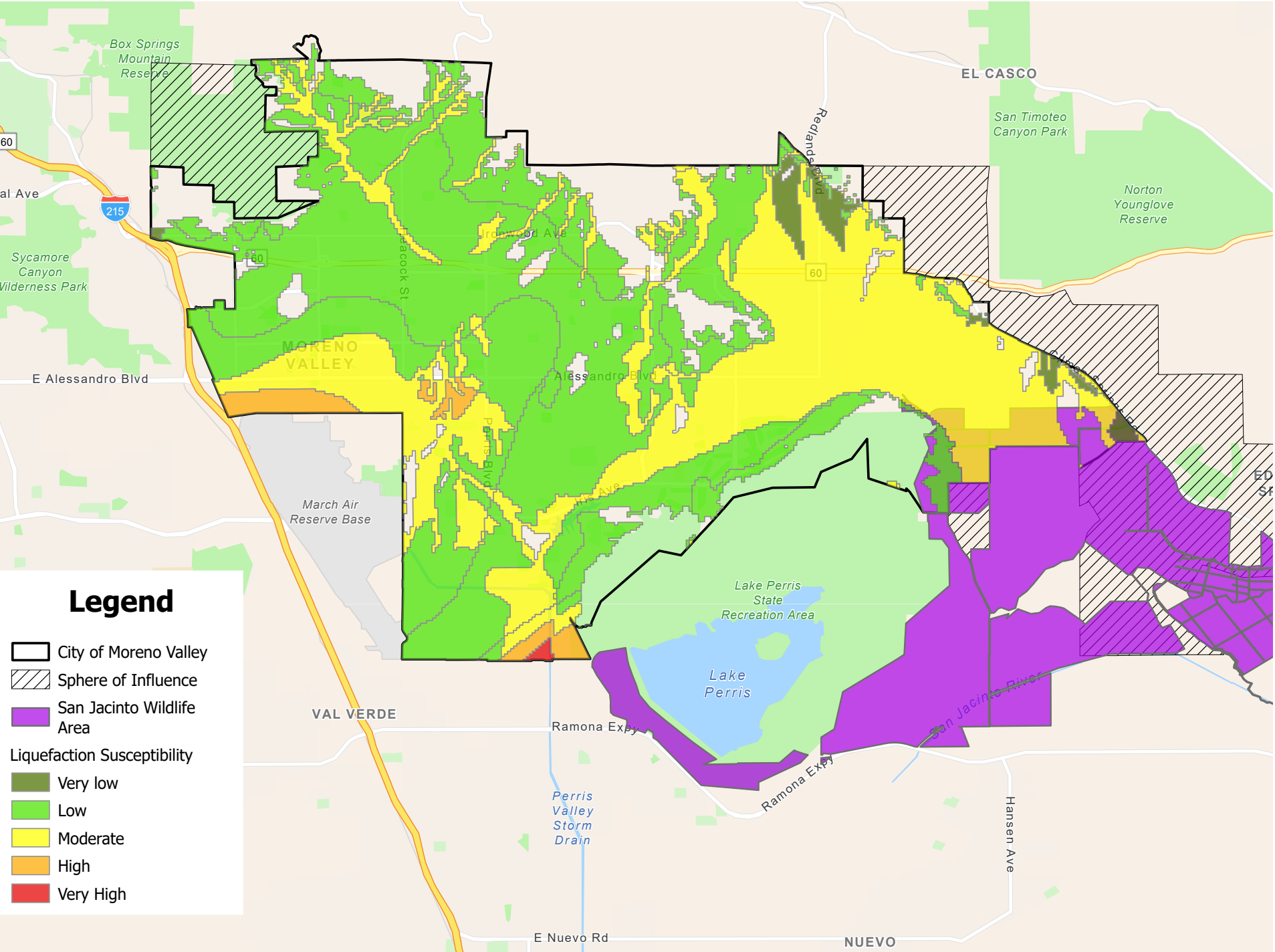
The San Jacinto Fault Zone traverses the northeastern border of the city, putting the area at higher risk for seismic activity.

Map S-1: Fault Zones



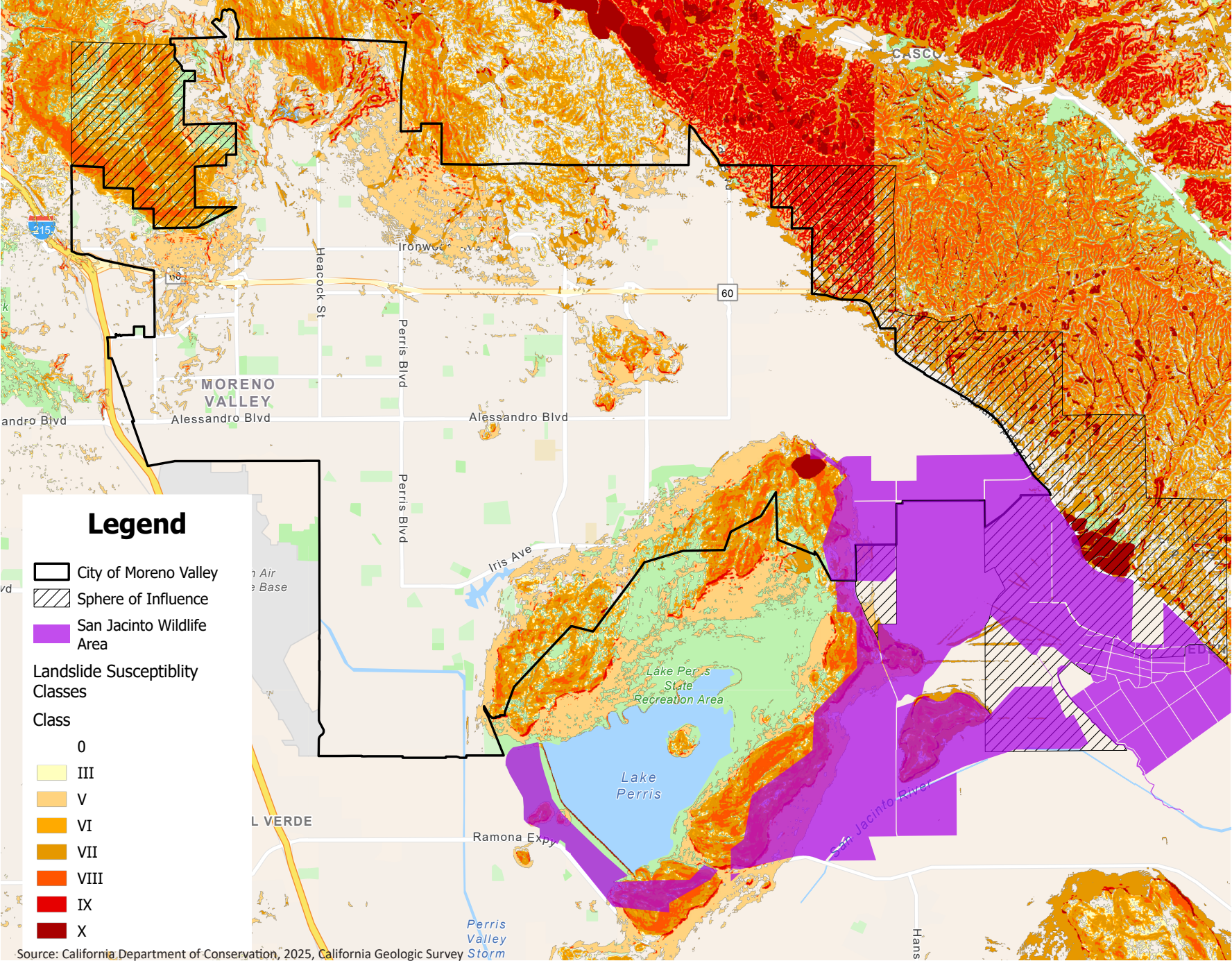
Source: California Department of Conservation, 2025, California Geologic Survey

Map S-2: Liquefaction Hazard



Source: Riverside County, 2019, GIS

Map S-3: Landslide Hazards



Flood Hazards

DRAINAGE

Moreno Valley is situated in a drainage basin whose river systems generally drain from the San Jacinto Mountain range in the north wards lower basin rivers and lakes in the south, San Jacinto River, Canyon Lake, and ultimately to Lake Elsinore. The San Jacinto River waterway converges with the San Ana River and eventually flows into the Pacific Ocean. Precipitation is conveyed via three major City maintained open storm drain channels via three major storm drain channels: the Sunnymead storm drain, the Kitching storm drain, and the Perris Valley storm drain.

- ◆ The Sunnymead storm drain is a concrete-lined channel that extends from SR 60 and crosses the Planning Area in a southwesterly direction. The Channel accepts storm water runoff from the Box Springs Mountains and areas south of the mountains. The runoff flows into the Sycamore Canyon Watershed. This storm water runoff eventually flows into the Santa Ana Watershed.
- ◆ The Kitching storm drain is an open channel that averages a 12-foot bottom, 7-foot deep trapezoidal channel. Kitching Channel and its storm drains system constitutes the backbone of the eastern half of the Sunnymead Master Drainage Plan. The Channel drains in a southerly direction approximately from SR-60 through the central portion of Moreno Valley and into the Perris Valley Storm drain and ultimately into the San Jacinto River Watershed.
- ◆ The Perris Valley storm drain is an open channel. Lateral A runs west to east between Krameria Avenue and Nandina Avenue. Lateral A enters the main channel west of Lasselle Street. Eventually, the storm drain empties into the San Jacinto River Watershed.

FLOODING

Like many communities in the region, Moreno Valley has a history of flooding, primarily in areas that are not fully developed and where the storm drain system is not yet built out. Between 2005 and 2015, six major storm events resulted in flood damage to residential and commercial structures as well as transportation and utility infrastructure totaling over \$59 million. Since 2005, the City has invested over \$25M in new and updated storm drain infrastructure to mitigate flooding issues.

Storms can result in flooding of drainage channels and areas immediately adjacent floodplains, while sheet flows can occur if the capacities of defined watercourses are exceeded. Ponding may also occur if water flow is obstructed due to humanmade obstacles such as the embankments of SR-60 and other roadways. FEMA issues Flood Insurance Rate Maps (FIRM) identifying areas prone to flooding and characterizing flood hazard risk. As shown on Map S-4, a large portion of the eastern part of the city is located within the 500-year flood plain, meaning that properties have a one-in-500 (or 0.2%) chance of flooding in a given year. The 2022 LHMP describes mitigation strategies for development in flood zones including enforcement of the floodplain ordinance, building standards, and stormwater drainage programs to manage urban flooding. Smaller areas, primarily in the southern part of the City are located in the 100-year flood plain, which have a 1% chance of flooding. According to FEMA flood maps, the extent of 100-year flood zones has decreased, particularly near Celebration Park, while the flood zones along channels (such as Heacock Channel, Sunnymead, and Pigeon Pass), catchment basins, and soft-bottom riverbanks throughout the City have remained relatively unchanged since 2019.

The City's LHMP describes historic flooding in

Moreno Valley occurring every two years on average near Heacock Channel, foothill neighborhoods north of Lake Perris, and interior residential neighborhoods such as residential areas of Hubbard Street and Dunlavy Court, Kitching Street-Ivy Lane Neighborhood, Lawless Road – Pigeon Pass Street, and Camino Del Coronado Street-Sunnymead Ranch. This indicates that flooding occurs from insufficient stormwater drainage capacity following winter rainstorms. Due to climate change, precipitation during a 24-hour storm is anticipated to increase in magnitude while annual precipitation decreases. While conditions are becoming drier, rain events during winter storms are anticipated to become heavier and more intense, thus increasing the risk of temporary flooding.

It is important that drainage systems throughout the City be capable of supporting increased streamflow volumes due to climate change to help mitigate flood risks. In correlation with the Parks and Public Spaces Element, the City also incorporates Low Impact Development (LID) techniques and Best Management Practices (BMPs) for all developments within the City.

The Riverside County Flood Control and Water Conservation District (RCFCWCD) is the agency responsible for the regional flood control system. RCFCWCD has prepared three Master Drainage Plans (Sunnymead Area, West End, and Moreno), each of which covers a different portion of the City. RCFCWCD currently owns and maintains a number of regional flood control facilities, while the City controls a number of local facilities. The City's Public Works Department is responsible for maintaining Citywide storm drain systems and regularly updates storm drainpipes and inlets/outlets as identified in the City's Capital Improvement Plan (CIP).

New developments are required to build master drainage plan facilities and/or pay fees that are used to build the facilities.

Any, new development is also required to obtain a National Pollutant Discharge Elimination System (NPDES) permit or comply with NPDES requirements outlined in the Water Quality Management Plan (WQMP) checklist. This includes implementing stormwater Best Management Practices (BMPs) per the Santa Ana Regional Water Quality Control Board (WQCB) (Order No. R8-2010-0033) that can help reduce flooding impact of a storm event and maintain high water quality standards. To ensure compliance, the City makes the Low Impact Design BMP Design Handbook and Checklist from the Santa Ana Regional WQMP available to project applicants at <https://moval.gov/departments/public-works/services-stormwater.html>.

DAM INUNDATION

There are two dams in the City: Pigeon Pass and Sunnymead Ranch, as shown on Map S-5. Dam inundation is also a potential flood hazard in portions of Planning Area. Dam failure can result from causes such as earthquakes, erosion, improper siting, rapidly rising floodwaters, or structural/design flaws, and can result in severe flooding in downstream areas.

Pigeon Pass Dam is an earthen dam built in 1958 and is owned by the RCFCWCD. Failure of the Pigeon Pass Dam (Poorman's Reservoir) in the north western part of the City could result in extensive flooding along the downstream watercourse; impacting residences, commercial centers, roadways, and a portion of the March Air Reserve Base however, the reservoir does not retain water

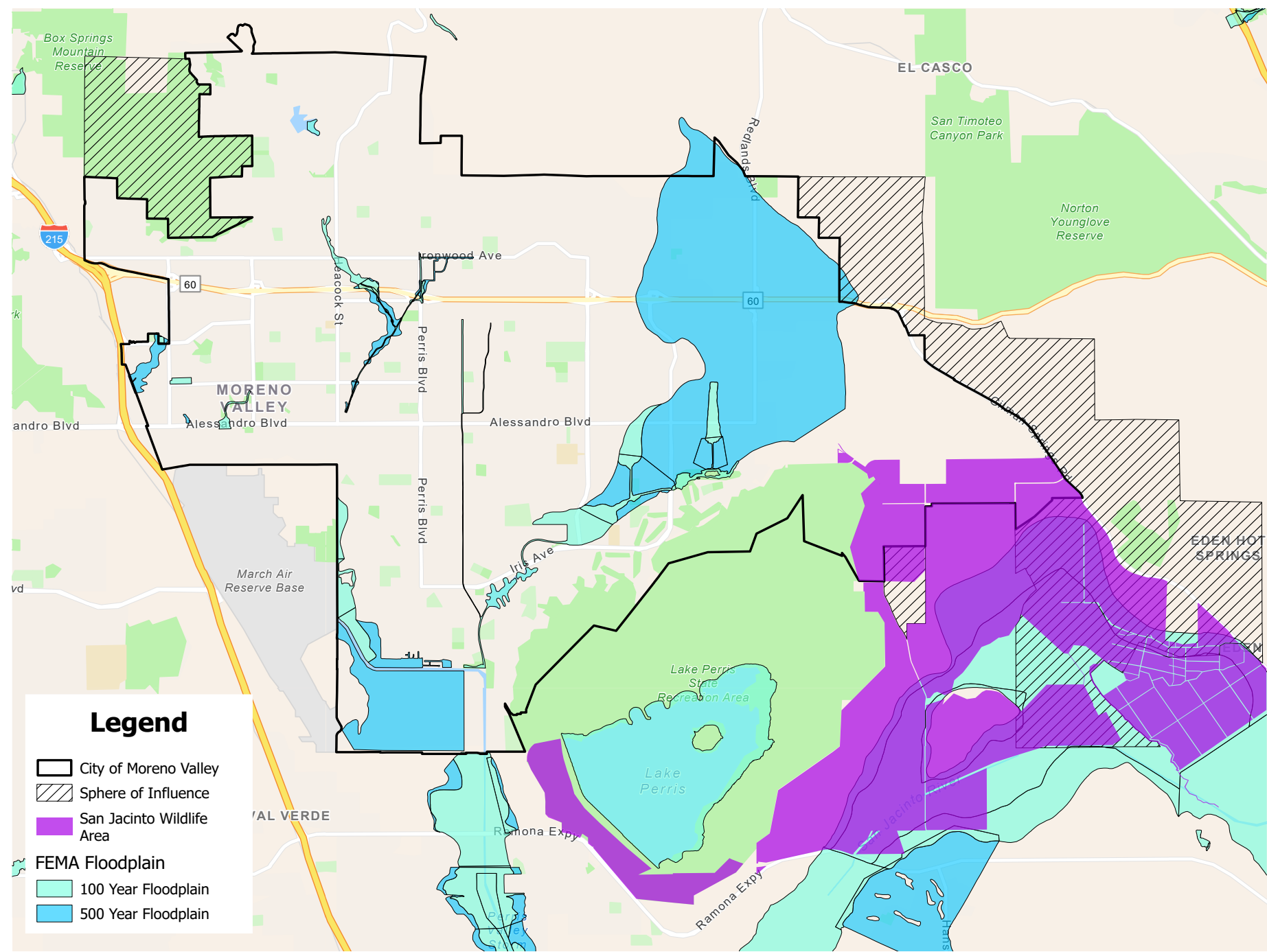
throughout the year and the risk of flooding due to failure is limited to the period during and immediately after major storms. In addition, according to the California Department of Water Resources, the dam is rated as satisfactory, meaning that the dam is able to withstand additional loads or pressures.

Upstream of Pigeon Pass Dam is the Sunnymead Ranch Lake and Dam which collects rainwater from the Shadow Mountain area. Sunnymead Dam is an earthen dam built in 1985 and is owned and managed by the Sunnymead Ranch Planned Community Association. Failure of the dam could result in flooding along Breezy Meadow Drive, potentially inundating residences and impacting nearby school facilities. The dam failure maps are sourced from hydraulic models and show potential flooding scenarios of nearby development. Although there have been no recorded dam failures in the past, measures are described in subsequent sections to safeguard development in the event of a dam failure. In addition, Perris Dam is not located within the City; however, failure of the dam would affect small area south of Nandina Avenue along the Perris Valley Storm Drain and the Mystic Lake area in the southeast corner of Moreno Valley.



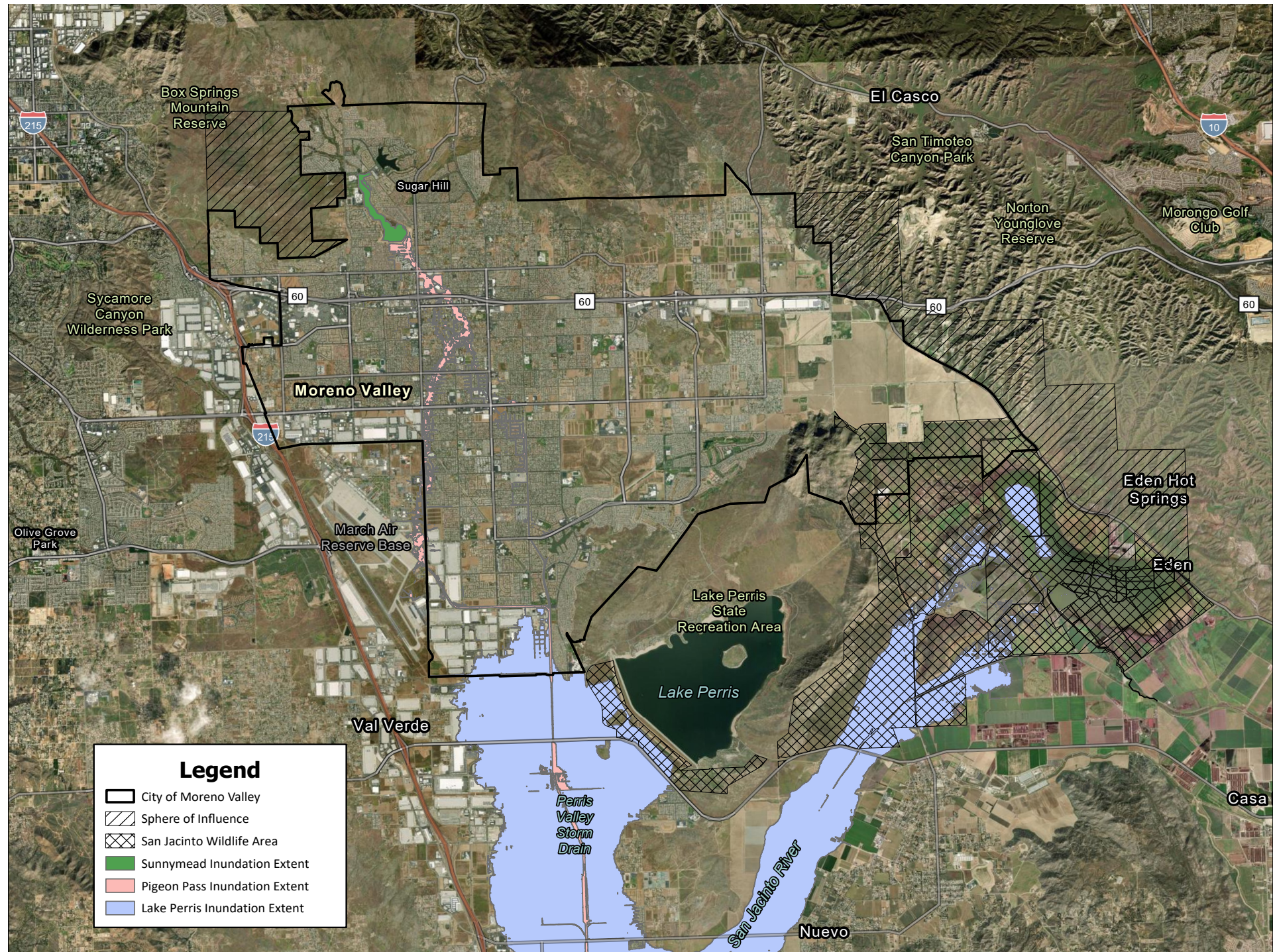
The RCFCWCD manages flood control projects such as the construction of the Nason Basin, above. In 2003, the District completed the construction of the 16-acre basin, which reduces the 100-year flows by more than 70%.
Photo credit: RCFCWCD, rcflood.org

Map S-4: Flood Hazard Areas



Source: Riverside County, 2019, GIS

Map S-5: Dam Inundation Map



Wildfire Hazards

SETTING AND RISK

CAL FIRE has designated Fire Hazard Severity Zones (FHSZs) throughout the state based on factors such as fuel, slope, and weather to indicate varying degrees of fire hazard (i.e., moderate, high, and very high). FHSZ maps evaluate physical conditions that create a likelihood that an area will burn over a 30- to 50-year period. As an urbanized community, wildfire hazard is minimal in most of Moreno Valley; however, given the relatively low annual precipitation and high prevailing temperatures in the region, the annual grasses and sage brush that cover the rolling hills surrounding the City and areas with similar coverage within the City limit are highly prone to fire.

According to 2025 fire hazard maps, the City contains designated Very High Fire Hazard Severity Zones (VHFHSZs) within the Local Responsibility Area (LRA). This indicates that properties and infrastructure within the City are exposed to significant burn risk due to wildfires and would be responsible for responding to wildfire events. There are significant VHFHSZs within the City's jurisdiction, as shown on Map S-5, and are further described below:

- ◆ Areas along the entire northern perimeter of the City i.e., Sunnymead Ranch, Serrano Heights, Moonlight Rim.
- ◆ Areas along the northwestern portion of the City i.e., neighborhoods along Hidden Springs, Box springs mountain foothills;
- ◆ Areas at the southeastern area of the City i.e., Bernasconi Hills, Prince's Peak, Ridge Crest;
- ◆ and areas located southwest of Gilman Springs Road and north of San Jacinto Wildlife area.

Prolonged droughts coupled with high winds and dry vegetation create the highest fire risk in these areas, particularly in autumn and winter, when the Santa Ana winds typically blow and wildfire risk increases significantly. More to the interior of the City, a 75-acre area of rocky, vegetated terrain flanking Moreno Beach Drive south of SR 60 known as Moreno Peak is also designated a VHFHSZ. Wildfire risk at this location is from wind-driven fires and human factors, including sparks from vehicles on adjacent roadways, fireworks, or campfires.

Left uncontrolled, wildfires have the potential to damage or destroy structures, roadways, and utility systems, disrupt the economy, and impact the City's ability to respond to emergencies. Without vegetation, recently burned areas may also be at greater risk from mud and debris flow, further compounding risk. In addition to the direct physical threat to life and property, smoke released during an event can have a detrimental effect on air quality and lead to health risks from smoke inhalation. Smoke can cause or exacerbate respiratory problems for sensitive individuals, and the fine particles in smoke can damage machinery or ground airplanes. People without access to medical care or those that have pre-existing conditions that make it difficult to evacuate or cope with increased smoke conditions are highly vulnerable to wildfires.

As identified in the LHMP, between 2011 and 2022, there were 10 wildland fires ranging from 3 to 1,206 acres and mainly occurring in uphill grassland areas, including 8 that were over 50 acres in size with an estimated total incident cost of over \$1.2 million. The LHMP and the Riverside County Multi-Jurisdictional Hazard Mitigation Plan (MJHMP) both identify wildfire as one of the natural hazards with the highest probability of occurring, and the hazard with the third highest severity. According to the California Fourth Climate Change Assessment, overall burned area may increase by as much as 60 percent during Santa

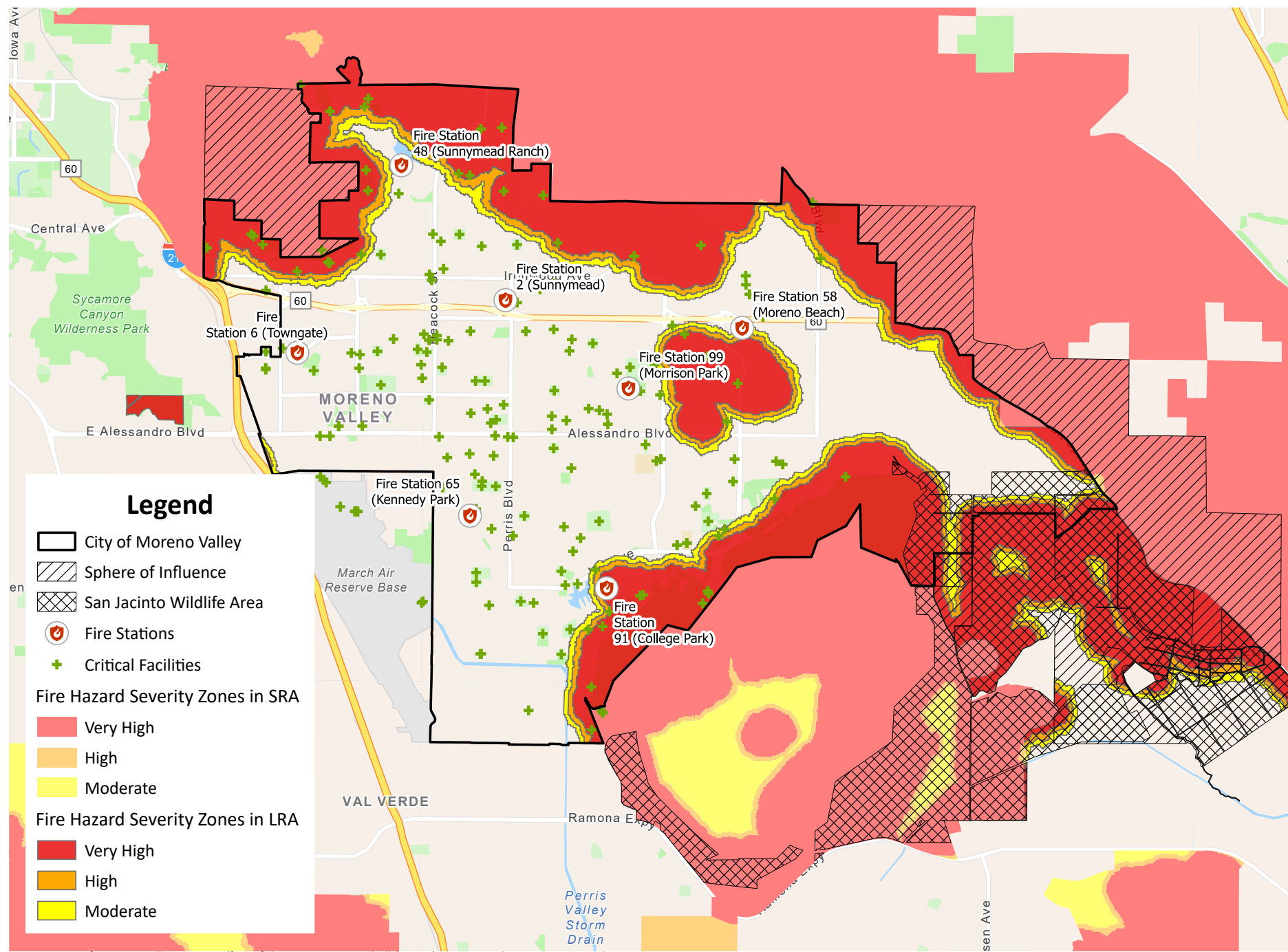
Ana Wind events (typically October to March), and 75 percent during periods without Santa Ana Winds (typically April to September). Models also suggest that the region will see a 13.4 percent increase in average annual acres burned above historic levels by mid-century. By the end of the century, this increase is projected to decrease to 2.3 percent above historic levels due to wildfire fuel reductions associated with increased drought and extreme heat conditions.

WILDLAND URBAN INTERFACE AREAS

To address this risk, the City cooperates with CAL FIRE and the Riverside County Fire Department through cooperative fire protection agreements. Portions of the Planning Area within the City's Sphere of Influence (SOI) are designated State Responsibility Areas (SRA), where the State of California is financially responsible for the prevention and suppression of wildfires, while the Moreno Valley Fire Department (MVFD) has primary responsibility for Local Responsibility Areas (LRA) within the City limit. In California, most wildfire damage occurs in wildland urban interface areas, where homes and woodland vegetation are directly adjacent. Wildland urban interface areas exist on the north, east, and south edges of the Planning Area, including Box Springs Mountain and San Timoteo Canyon to the north, the "Badlands" to the east, and Lake Perris State Park to the south. Portions of these areas within the City limit are partially developed with low density single-family housing, while portions in the SOI are largely undeveloped.

Within the City limit, large tracts of land in wildland urban interface areas are designated Parks/Open Space on the General Plan land use map, which does not permit residential development and existing development includes low density single-family homes. There are no critical police or fire facilities in wildland urban interface areas; however, a portion

Map S-6: Fire Hazard Severity Zones and Critical Facilities



Source: City of Moreno Valley, 2025, Office of the State Fire Marshall (OSFM), Fire Hazard Severity Zones, Phase 4 Data

of the Moreno Valley College Campus is located within a VHFHSZ in the south of the City and major roadways including Redlands Boulevard, Pigeon Pass Road, and World Logistics Parkway also run through VHFHSZs. Undeveloped lands in wildland urban interface areas within the City limit are designated Hillside Residential or Rural Residential, which permit only very low density residential development in these areas.

Essential facilities located within designated VHFHSZs include:

- ◆ Parkside Drive reservoirs located at the Lake Perris foothills,
- ◆ Kaiser Permanente Hospital on Iris Ave,
- ◆ Public Work's MWD Inland Feeder facility at Gilman Springs Road,
- ◆ Kalmia Ave reservoir, Pico Vista Way reservoir, Climbing Rose Drive reservoirs, and
- ◆ Canyon Springs High School.

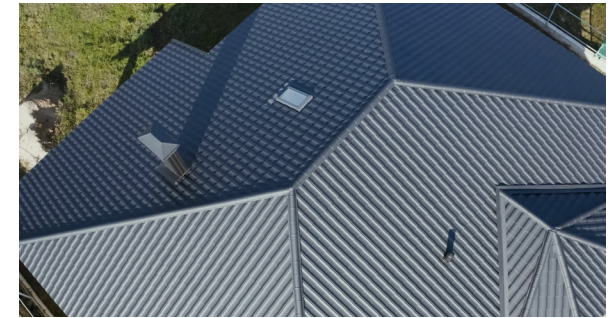
From 2010 to 2024, the fire department experienced an 3.9% increase in call volumes. As the likelihood of wildfires increase in intensity, severity, and frequency due to climate change, the MVFD may experience added stress on personnel and resources as firefighters respond to increasing call volumes. The MVFD'S 2022 strategic plan outlines a methodology for siting future fire stations and maintaining operations. In addition, all new construction in VHFHSZs is required to prepare a fuel modification plan before approval of tentative maps and grading permits. Moreno Valley has also established a hazard abatement program, which is overseen by the MVFD. This program is designed to create defensible space, or a buffer between a building and the flammable vegetation that surrounds it, in order to stop or slow the spread of wildfire and protect property. A legal non-conforming structure is allowed to be redeveloped

or retrofitted following a wildfire event in accordance with § 9.02.180 of the Moreno Valley Municipal Code.

With adoption of the 2040 General Plan, the City will also require preparation of a fire protection plan (FPP) approved by the Fire Code Official prior to approving new development in VHFHSZs. FPPs must include mitigation measures designed to address the unique problems resulting from the location, topography, geology, flammable vegetation, and climate of the proposed site. They must also consider water supply, access, building ignition and fire resistance, fire protection systems and equipment, defensible space, and vegetation management, and must be consistent with the requirements of California Building Code Chapter 7A, the International Wildland-Urban Interface Code, and the Moreno Valley Municipal Code. In alignment with the Parks and Public Spaces Element and urban greening initiatives and redevelopment, projects—whether focused on neighborhoods, streetscapes, or public spaces—have indicated incorporation of fire-resistant tree species to enhance climate resilience and reduce wildfire risk. Within the Moreno Valley LHMP and General Plan, Policy S.1-14 requires new development within Very High Fire Hazard Severity Zones (VHFHSZ) to use fire-resistant landscaping to minimize risk of fire events.

WATER SUPPLY

The City requires a minimum flow required for fire protection in accordance with the adopted amended 2019 California Fire Code and the International Organization for Standardization standards. Any new development in VHFHSZs must meet this standard or be able to mitigate this through other fire protection requirements. The City is served by two water service providers—Eastern Municipal Water District, serving the bulk of the City and Box Springs Mutual Water Company, serving the Edgemont area. The providers have varying capacity to deliver water flows for fire



Metal roofs can be a safer decision in wildfire prone areas than other roofing materials.

suppression purposes. New development in hillside areas of the City will also be required to meet applicable standards for minimum fire flow.

FIRE ACCESS STANDARDS

Clear emergency vehicle access to buildings is critical for public safety. Such access is regulated by the adopted and amended California Fire Code (CFC) and Moreno Valley City Standard Engineering Plans. Under the current Fire Code, all portions of a building shall be within 150 feet of a serviceable fire access road. The City has adopted the CFC with amendments to address local fire hazard concerns. Specific requirements for fire access include:

- ◆ *Roadway Design.* Access roads and public and private streets shall not exceed a 12 percent grade, shall be capable of supporting 75,000 pounds, and shall be built with all-weather driving capabilities.
- ◆ *Subdivision Access.* Subdivisions shall have a minimum of two points of vehicular ingress and egress, as determined by the Fire Code Official and City Traffic Engineer.
- ◆ *Road Widths.* Road widths shall be consistent with City standards and allow for two-way traffic.
- ◆ *Bridge Design.* Per the CFC access bridges shall meet

nationally recognized design standards, including a capability of supporting 75,000 pounds.

- ◆ *Project Perimeter.* Projects shall provide adequate vehicular access for firefighting vehicles to the perimeter of a project that is adjacent to a fuel modified area or fire hazard area.

BUILDING SIGNAGE STANDARDS AND REGULATIONS

Moreno Valley has adopted the latest edition of the CFC, with all appendices, and amended it to address local concerns. The MVFD reviews plans for structures and buildings citywide, including fire-prone areas. Checklists are used to address fire code requirements, including but not limited to street and building signage, water supply, water infrastructure, fire sprinkler requirements, building requirements (fire sprinklers, smoke detectors, roofing, etc.), access roads, and vegetation management, among others.

The City enforces uniform building address and street sign letters as found in the CFC and Uniform Building Code, which establishes requirements for the design and display of approved address numbers, building numbers, or approved building identification on new and existing buildings to ensure legibility and visibility from the street or road fronting the property.

Map S-6 illustrates the City's critical facilities overlaid with Fire Hazard Severity Zones. Several essential facilities—particularly in the northern portion of Moreno Valley—are located within areas designated as Very High Fire Hazard Severity Zones (VHFHSZs). Notably, three of the City's seven fire stations fall within these high-risk zones which could potentially limit emergency response capacity during wildfire events. To address this vulnerability, the City will evaluate facility hardening needs, implement vegetation management buffers, and consider long-term strategies such as relocating or reinforcing

critical infrastructure to ensure operational continuity during extreme fire conditions. Actions to reduce fire hazard exposure and increase building resilience will be incorporated into capital improvement plans and emergency preparedness protocols.

VEGETATION MANAGEMENT AND CLEARANCE STANDARDS

The Moreno Valley Municipal Code requires the preparation and implementation of fuel modification plans for all new development in areas containing combustible vegetation. The Code requires that these plans be consistent with the Riverside County Fire Department Fuel Modification Technical Policy, that they be approved by the Fire Code Official prior to issuance of a grading permit, and that they be updated as needed to address changing conditions. The Code also establishes minimum distances for fuel breaks on agricultural properties and clearances from combustible materials, heavy vegetation, and mature tree trunks on hillside residential properties. Additionally, the MVFD maintains a Hazardous Vegetation and Rubbish Abatement Program to ensure proactive vegetation management through enforcement of actions applicable to all vacant and unimproved parcels on a year-round basis and requires inspection for clearance of tumbleweeds annually each Fall.

Hazardous Materials

The Riverside County Department of Environmental Health Hazardous Materials Branch serves as the Certified Unified Public Agency (CUPA) and is responsible for overseeing the six hazardous materials programs in the County. The Branch is responsible for inspecting facilities that handle hazardous materials, generate hazardous waste, treat hazardous waste, own/operate underground storage tanks, own/operate aboveground petroleum storage tanks, or handle

other materials subject to the California Accidental Release Program. In addition, Riverside County maintains a hazardous materials emergency response team that responds to hazardous materials and other environmental health emergencies 24 hours a day, 7 days a week. All MVFD Firefighters are mandated to maintain certification as Hazardous Materials First Responder-Operational.

Hazardous materials are used in Moreno Valley for a variety of purposes including manufacturing, service industries, various small businesses, agriculture, medical uses, schools, and households. Hazardous materials are also used at the March Air Reserve Base adjacent to the City, and may be transported to and from the Base on City roadways. Accidents can occur in the production, use, transport and disposal of these hazardous materials. The probability of accidental spills is accentuated by the fact that the region is susceptible to earthquakes. The City and surrounding area have a history of pipeline ruptures, spillage and vandalism to natural gas and sewer lines. A gas line explosion could cause significant damage to buildings and infrastructure, and a mainline event could disrupt gas delivery. Pipeline incidents could cause cascading hazards such as flooding, transportation and hazardous materials incidents.

According to Envirostor (<https://www.envirostor.dtsc.ca.gov/public/>) and GeoTracker (<https://geotracker.waterboards.ca.gov/>) databases, there are active clean up sites, primarily from past and current dry-cleaning uses, that are located in the western part of the City. The sites are currently being monitored for potential contaminants and remediated as necessary by the property owner.

Wind Hazards

Throughout the region and in Moreno Valley, high winds can pose a risk to public safety, particularly between October and March when the Santa Ana winds can blow up to 100 miles per hour. These winds, which typically occur several times per year, have been known to topple power lines, trees, and streetlights. They can also spread uncontrolled wildfire and hinder access for firefighters. Residents should exercise caution during major windstorms, and the City can work to minimize risk by educating the public about wind hazard preparedness and site design strategies that minimize harmful impacts.



High winds in Moreno Valley, January 2021.
Photo credit: Francisco de Santiago, Youtube.

Goal S-1: Protect life and property from natural and humanmade hazards.

Geologic and Seismic Hazards

POLICIES

S.1-1: Continue to restrict the development of habitable structures within Alquist-Priolo Earthquake Fault Zones consistent with State law.

S.1-2: In areas of high liquefaction risk (see Map S-2), require that project proponents submit geotechnical investigation reports and demonstrate that the project will satisfy all recommended mitigation measures prior to City approval.

S.1-3: Require geotechnical studies for new development in areas where sewers are not available to ensure that the surrounding soil can support alternative wastewater disposal systems.

S.1-4: Structures intended for human occupancy shall be designed and constructed to retain their structural integrity when subjected to seismic activity, in accordance with the California Building Code.

S.1-5: Continue to regulate development on hillsides where the average slope is greater than 10 percent and limit the removal of natural vegetation in hillside areas when retaining natural habitat does not pose threats to public safety.

ACTIONS

S.1-A: Implement the seismic upgrade projects identified in the LHMP for overcrossing bridges at SR-60/Moreno Beach, SR-60/Redlands Avenue, and SR-60/World Logistics Parkway to ensure the seismic safety of critical



Seismic retrofit of the Perris Dam. Photo credit: California Department of Water Resources, 2019.

transportation infrastructure in the City.

S.1-B: Use the building inspection program to inventory and evaluate earthquake hazards in existing buildings, especially buildings with unreinforced masonry (URM), using the most current seismic design standards and hazard reduction measures. Explore measures to encourage building owners to upgrade and retrofit structures to render them seismically safe.

Flooding Hazards

POLICIES

S.1-6: Coordinate with the Riverside County Flood Control and Water Conservation District to address storm drainage and flood control on a sub-regional basis in order to optimize the use of existing and planned conveyance facilities.

S.1-7: Design, construct and maintain street and storm drain flood control systems to accommodate 10-year and 100-year storm flows respectively, employing “green infrastructure” techniques as feasible and appropriate. The storm drain system shall conform to Riverside County Flood Control and Water Conservation District master drainage plans and the requirements of the Federal Emergency Management Agency.

S.1-8: Permit development in the 100-year

floodplain which represents an acceptable use of the land in relation to the hazards involved and the costs of providing flood control facilities. Locate critical facilities, such as hospitals, fire stations, police stations, public administration buildings, and schools outside of flood hazard areas.

S.1-9: Encourage project designs that minimize drainage concentrations, minimize impervious coverage, utilize pervious paving materials, utilize low impact development (LID) strategies, and utilize best management practices (BMPs) to reduce stormwater runoff and minimize increases in downstream runoff resulting from new development.

S.1-10: Through development agreements and compliance with adopted master drainage plans and existing regulations, require that new development provide necessary storm drainage improvements and ensure that upstream stormwater generators fully address stormwater needs on their property.

S.1-11: Continue participation in the National Flood Insurance Program (NFIP) and the Community Rating System to ensure that the City is incentivized to reduce the risk of damage from flooding, inundation due to dam failure, and improve flood preparedness.

ACTIONS

S.1-C: Work with the Riverside County Flood Control and Water Conservation District to update master drainage plans as needed to accommodate anticipated development.

S.1-D: Seek funding to implement the storm drain

and flood control improvements detailed in master drainage plans including the Moreno, Sunnymead, West End, and Perris Valley Master Drainage Plans and the Local Hazard Mitigation Plan.

S.1-E: In updating the Capital Improvement Plan, consider and incorporate flood control improvements identified in master drainage plans, specifying funding and timing of prioritized improvements. Coordinate the City's Capital Improvement Plan with planned County improvements.

S.1-F: Periodically review the risk of increased flooding hazards due to climate change and develop strategies to adapt to changing flood hazard conditions, including those related to monitoring, emergency preparedness, vegetation management, and development policies, and ensure that the City's hazard information is up to date regarding climate trends.

Wildfire Hazards

POLICIES

S.1-12: Work to prevent wildland fire and to protect lives, property, and watersheds from fire dangers.

S.1-13: Jointly with State, County, local and other agencies, inform property owners of wildfire risks and measures to reduce those risks.

S.1-14: Require new development and redevelopment in VHFHSZs to prepare a Fire Protection Plan that minimizes risks by:

- ◆ Assessing site-specific characteristics such as topography, slope, vegetation type, wind

patterns etc.;

- ◆ Siting and designing development to avoid hazardous locations (e.g., through fuel breaks) to the extent feasible;
- ◆ Incorporating fuel modification and brush clearance techniques in accordance with applicable fire safety requirements and carried out in a manner which reduces impacts to environmentally sensitive habitat to the maximum feasible extent;
- ◆ Using fire-safe building materials and design features, consistent with the adopted Municipal Code and Fire and Building Code standards;
- ◆ Using fire-resistant landscaping; and
- ◆ Complying with established standards and specifications for fuel modification, defensible space, access, and water facilities.

S.1-15: Avoid, where feasible, locating new development in areas subject to high wildfire risk. If avoidance is not feasible, condition such new development on implementation of measures to reduce risks associated with that development.

S.1-16: Require that all new development located in a VHFHSZ or a State Responsibility Area (SRA) be served by adequate infrastructure, including safe access for emergency response vehicles, visible street signs, and water supplies for fire suppression.

S.1-17: Require new development and redevelopment in VHFHSZs to enter into a long-term maintenance agreement for vegetation management in defensible space, fuel breaks, and roadside fuel reduction.

S.1-18: Continue to require proactive weed abatement, brush thinning, and removal services on new and existing development in High and Very High Fire Hazard Severity Areas in order to curb potential fire hazards.

S.1-19: Cooperate with the Riverside County Fire Department and CAL FIRE to ensure that all portions of the Planning Area are served and accessible within an effective response time and to address regional wildfire threats.

S.1-20: Work with responsible agencies and nongovernmental organizations to plan for post-fire recovery in a manner that reduces further losses or damages from future fires.



ACTIONS

S.1-G: Maintain and make publicly available an up-to-date a map of high and very high fire hazard areas, consistent with CAL FIRE designations.

S.1-H: Consider developing alternative fire protection standards suitable for Rural Residential areas not exposed to high wildland fire hazards.

S.1-I: Disseminate information on fire weather watches and fire risks via the City's website and encourage all Moreno Valley residents to engage in risk reduction and fire preparedness activities.

S.1-J: Identify essential service facilities located in VHFHSZs and work with property owners to update emergency plans for operational redundancies and evacuation. .

S.1-K: Identify existing non-conforming roadways and work with City personnel, resource agencies, and adjacent property owners to conform to current fire safe standards.

Wind Hazards

POLICIES

S.1-21: Monitor issues related to damage from windstorms and undertake precautionary measures as needed, such as tree trimming.

S.1-22: Set new schools, housing, and care facilities a minimum of 100 feet back from high voltage power lines or substations.

Humanmade Hazards

POLICIES

S.1-23: Continue to require remediation of hazardous material releases from previous land uses as part of any redevelopment activities.

S.1-24: Regulate development on sites with known contamination of soil or groundwater to ensure that construction workers, future

occupants, adjacent residents, and the environment are adequately protected from hazards associated with contamination.

S.1-25: Consistent with State regulations, require proper storage and disposal of hazardous materials to reduce the likelihood of leakage, explosions, or fire, and to properly contain potential spills from leaving the site.

Emergency Management

With the potential for natural and humanmade hazards in the Planning Area, it is critical that the City plan proactively to provide for the safety of residents in times of disaster. This involves ensuring that all parts of the City are accessible for both evacuation and emergency access, including areas of new development and areas in the north of the City with fewer access points.

The purpose of emergency preparedness is to protect the health, safety and welfare of the general public both during and after natural, technological, or attack-related emergencies. To handle such events effectively requires coordination with a range of public and private sector partners as well as various City Departments such as the Police, Fire, Community Development, Emergency Services, and Public Works Departments. The City recognizes the importance of emergency preparedness through the design and implementation of its Emergency Operations and Local Hazard Mitigation plans. These plans are based on the functions and principles of the Standard Emergency Management System (SEMS) and the National Incident Management System (NIMS).

The California Emergency Services Act requires the City to manage and coordinate the overall emergency and recovery activities within its jurisdictional

boundaries. Under SEMS, the City is responsible at two levels, the field response and the local government level. At the field response level, the City and all other agencies use the Incident Command System (ICS) to aid in a standardized emergency response. At the local government level, a designated Emergency Operations Center (EOC) located within the Moreno Valley Fire Department is used as the central location for gathering and disseminating information and coordinating all jurisdictional emergency operations within the area. During disasters, the City of Moreno Valley is required to coordinate emergency operations with the Riverside County Operational Area and, in some instances, other local governments. Local agencies are a part of broader Emergency Management Systems, overseen by the State of California's Southern Region Emergency Operations Center.

The State of California Multi-Hazard Mitigation Plan, also known as the State Hazard Mitigation Plan (SHMP), was approved by FEMA in 2023. The SHMP represents the State's primary hazard mitigation guidance document and builds upon California's commitment to reduce or eliminate potential risks and impacts of natural and human-caused disasters to help communities with their mitigation and disaster resiliency efforts. The adoption of the SHMP qualifies the State for federal funds in the event of a disaster. Locally, the City of Moreno Valley adopted its Local Hazard Mitigation Plan (LHMP) in 2025. The purpose of the LHMP is to articulate a plan for reducing and/or eliminating risk in the community. The LHMP assesses risks associated with earthquake, wildfire, flooding, drought, landslide, insect infestation, extreme weather, severe wind, dam failure and inundation, hazardous materials accidents, terrorist attack, and other hazards, identifying mitigation goals, objectives, and projects to reduce the risk. Moreno Valley is also a signatory of the Riverside County Unit Strategic Fire Plan, the guiding document for pre-fire mitigation and response management to reduce

wildfire impacts. Primary risk components addressed in the Unit Plan include communications infrastructure, recreational areas, and homes.

TRAINING

The MVFD is committed to developing the knowledge, skills, and abilities of all employees. The Department's Training Plan provides for initial and recertification courses as mandated by policy, law, or technical specialty to ensure quality service to the public. Employees receive training through CAL FIRE's Position Qualification System, which is compliant and aligned with the National Incident Management System (NIMS), ensuring that personnel have at least the minimum education, experience, and evaluation requirements for each ICS position. MVFD employees receive standardized California State Fire Training courses, established, developed, and delivered by the Office of the State Fire Marshall.

EVACUATION ROUTES

Map S-7 shows emergency evacuation routes in the community and Map S-8 shows the emergency routes overlaid by the Fire Hazard Severity Zones since fire hazard is one of the most significant hazard in the City. The evacuation routes include I-215, SR 60 and major roadways through the City. The evacuation network consists of 129 miles of roadway designated as potential evacuation routes in the event of disaster, including 34 bridges and 127 water crossings.

An analysis of existing development patterns and roadway connectivity completed with the use of graphic information systems (GIS) software indicates that some residential areas in northern and southeastern portions of the City have constrained emergency access, including developments in the Sunnymead Ranch, Moreno Valley Ranch, and Hidden Springs developments. These subdivisions pre-date incorporation into the City of Moreno Valley

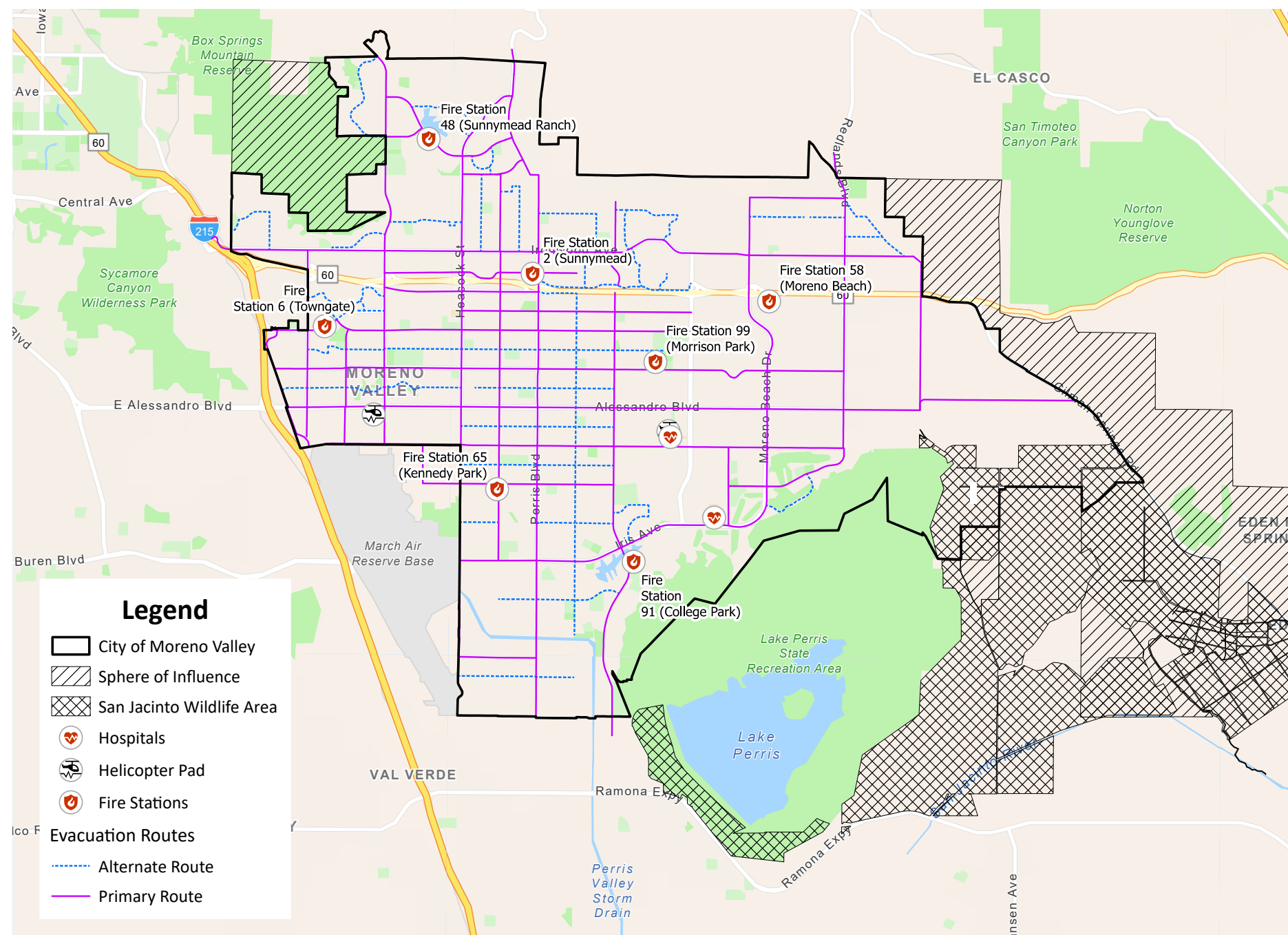


The City of Moreno Valley's Emergency Alert and Warning Notification System is utilized to rapidly send notifications to all residents and businesses in an affected area in the event of an emergency or disaster.

and where homes were constructed on cul-de-sacs with a single point of connection to the municipal roadway network. Approval of new development in these areas is conditioned on review by the MVFD and the Moreno Valley Department of Public Works to ensure adequate emergency access. . The City has also reviewed emergency evacuation preparedness consistent with Assembly Bill 747 (AB 747) (2019) and Senate Bill 99 (SB 99) (2019) requirements. This draft assessment, found in Appendix A, is intended to provide the City with a broad "planning level" assessment of the capacity of the transportation system during an evacuation scenario. Additionally Alert MoVal is the City's early warning notification system to proactively alert residents of areas with constrained access in the event of a disaster requiring emergency evacuation. The City can also receive notifications from Alert RivCo for residents and businesses within Riverside County.

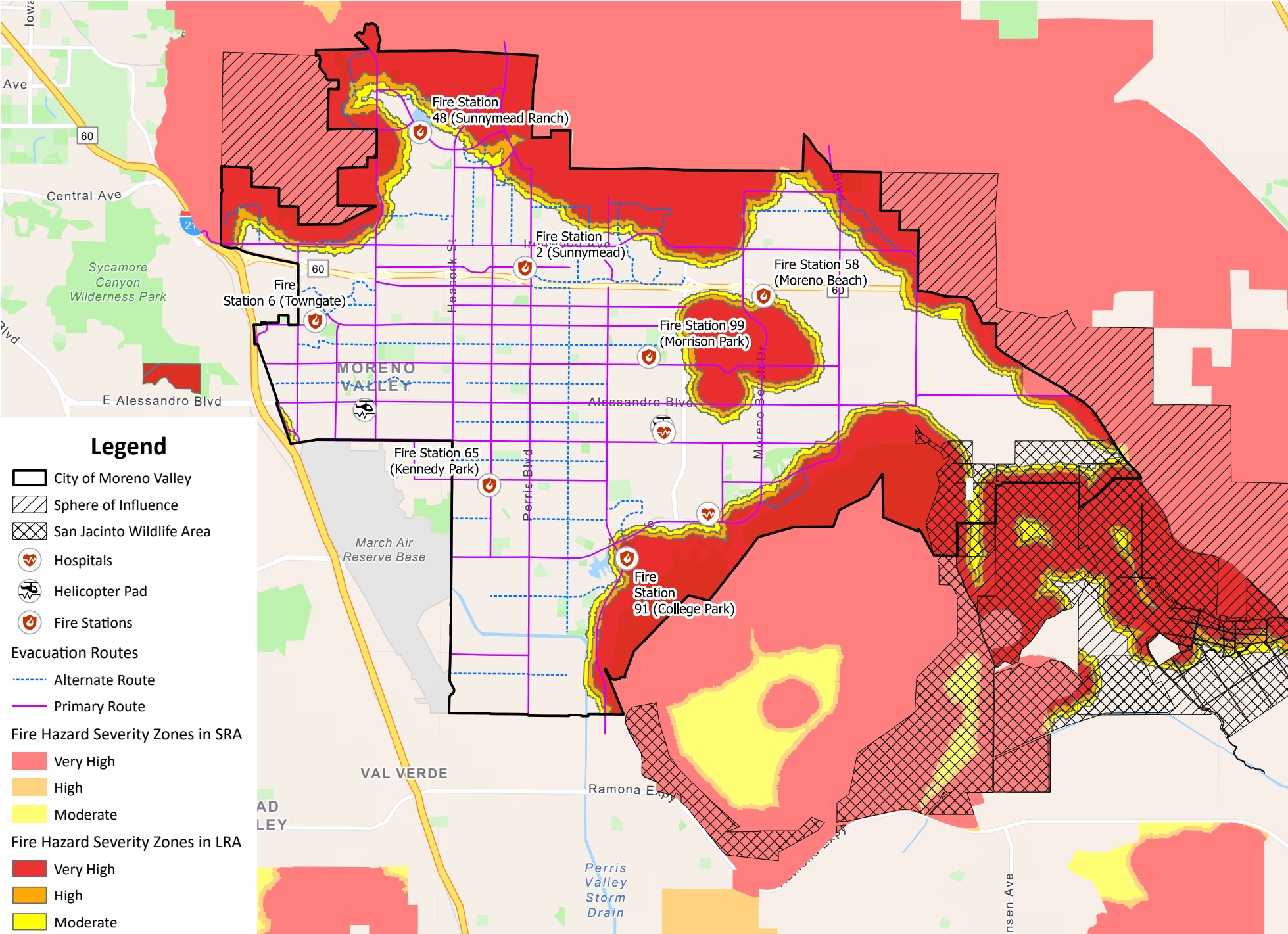
Areas at greatest risk from fault rupture, flooding, and wildfire are generally concentrated in the north, northeastern, and eastern portions of the City.

Map S-7 Emergency Evacuation Routes



Source: City of Moreno Valley, 2025

Map S-8 Evacuation Routes and Fire Hazard Severity Zones



Source: City of Moreno Valley, 2025

Under emergency evacuation scenarios involving one or more of these events, access via Reche Canyon Road, Redlands Boulevard, SR 60, and Gilman Springs Road is most likely to be impacted. An analysis of multiple factors, including household access to vehicles, network constraints, distance to available exit gateway, and traffic signal timing indicates that roadway capacity will allow for evacuation of the northwestern area of the City to be completed in approximately 2.5 hours and evacuation of the northwestern area to be completed in approximately 1.5 hours.

Evacuation times could be improved with the implementation of technological and design strategies. For example, the use of painted medians instead of raised medians on roadways in areas of highest risk shown on Map S-6 would effectively allow for reversible lanes that create additional outbound capacity. Application of this strategy would approximately double evacuation capacity in the northwestern portion of the City. Further, remote control of signal timing from the City's Traffic Management Center (TMC) allows for real-time modifications to signal timing that can speed evacuation in the event of emergency. Approximately half of the traffic signals in the City are currently connected to the TMC and Moreno Valley General Plan policy provides for the implementation of this technology in vulnerable areas as a priority going forward. Moreno Valley General Plan policy also provides for exploration of additional actions to facilitate emergency evacuation, including the study of improved roadway connections, including Morton Road/Gernert Road in unincorporated Riverside County to the west of Moreno Valley.

In 2018, the City began the LISTOS public education program to help raise awareness of emergency and disaster preparedness measures in the community. Staff takes information out to the community and offers an 8-hour "Alertar y Preparar" training course for individuals and families. After participating in LISTOS discussions, community members are encouraged to engage in other opportunities such as CERT.



ACES/RACES (top) and CERT (below) volunteers.

DISASTER RESPONSE VOLUNTEERS

The City of Moreno Valley also relies on emergency volunteer programs, including the following:

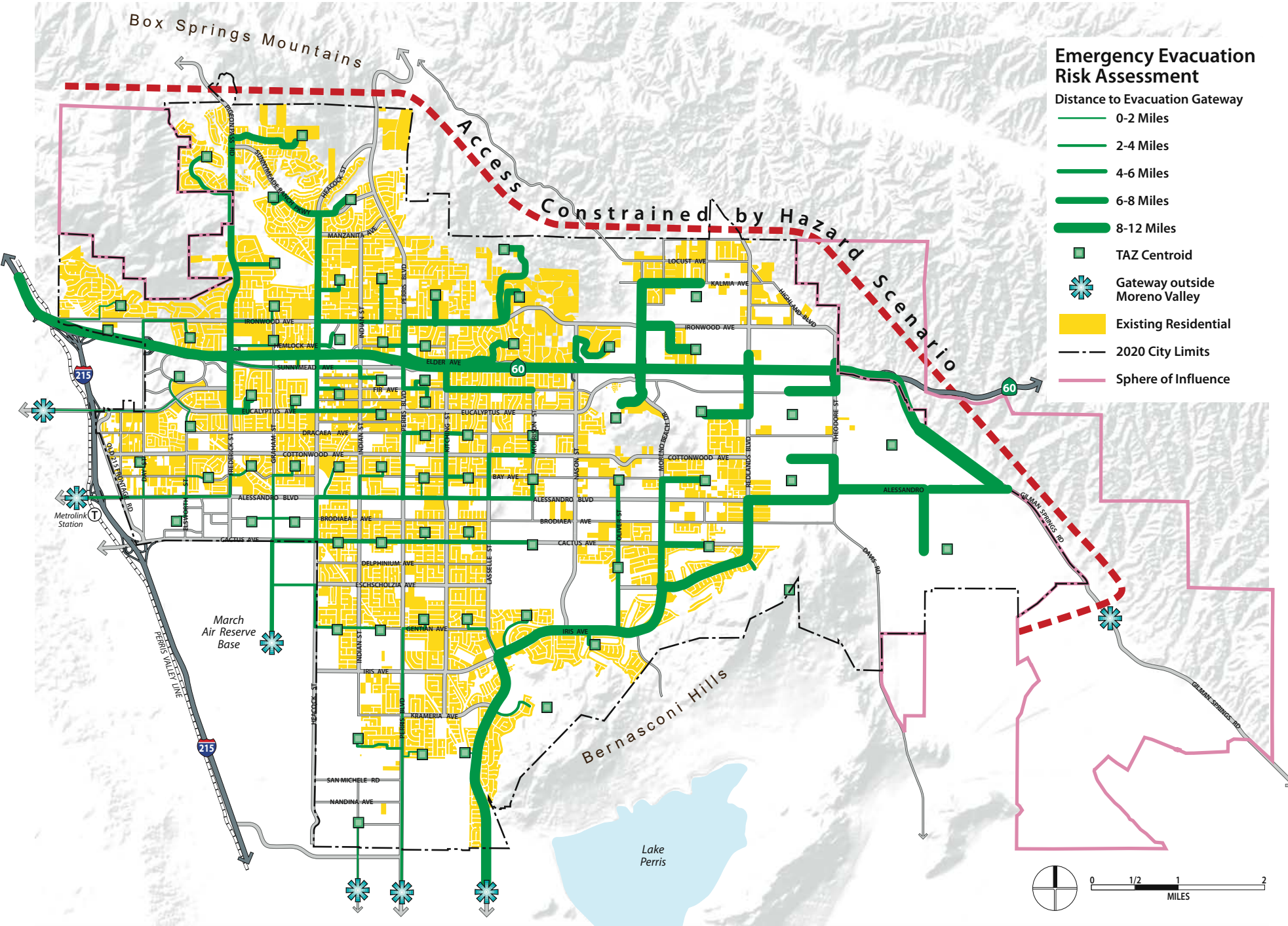
- ◆ *Emergency Response Force (ERF)* – The ERF consists of professionally trained, multi-level volunteer emergency personnel. The ERF assists during emergency and disaster situations, often reporting directly to the incident commander. ERF members also provide first aid during large public events and gatherings such as the 4th of July festivities. Members receive a wide array of emergency and

disaster training including Care and Shelter Operations, Damage Assessment, Medical and Triage, Emergency Response to Terrorism, Automated External Defibrillator (AED), CPR/First Aid, Traffic Control, Search and Rescue, and Evacuation techniques.

- ◆ *Community Emergency Response Team (CERT)* – CERT volunteers must attend the 21-hour FEMA course to participate on the volunteer team. Graduates are trained to help themselves, their families and their neighborhoods during a disaster and are also trained to work effectively with emergency responders. Examples of training provided in the 21-hour FEMA course are: disaster preparedness, triage and rapid treatment techniques, damage assessment, rescuer safety, search and rescue techniques, cribbing and leveraging, terrorism awareness, and disaster fire suppression. Cribbing and leveraging are terms often used by FEMA in tandem, and they refer to lifting an object slightly with a lever (leveraging) in order to stabilize and support the object beneath with cribbing materials (cribbing).
- ◆ *Moreno Valley Amateur Communications Emergency Services/Radio Amateur Civil Emergency Services (MV ACES/RACES)* – In an emergency, amateur radio (ham radio) operators who belong to our Moreno Valley ACES/RACES group, provide emergency communication for the City. Using special equipment, these volunteers, are also capable of sending live pictures from the incident site to the City's Emergency Operations Center via ham radio.

Public education and awareness programs are given priority before any emergency occurs and are crucial to all emergency management phases. In 2018, the City began providing public education programs such as Community Emergency Response Team (CERT) and 'Listos' to help raise awareness of emergency and disaster preparedness action in the community. Listos

Map S-9: Emergency Evacuation Risk Assessment



California is a resource for local agencies to bridge the gap between emergency preparedness or response and language barriers. In addition, a free 8-hour CERT training course is provided in English and Spanish for individuals and families that are held at public institutions in the City.

Pre-disaster awareness and education programs are viewed as equal in importance to all other preparations for emergencies and receive an adequate level of planning.

Goal S-2: Provide effective response to disasters and emergencies

POLICIES

- S.2-1:** Use the LHMP and Emergency Operations Plan to guide actions and investments for emergency preparedness and response.
- S.2-2:** Maintain area-wide mutual aid agreements and communication links with partner agencies and other participating jurisdictions.
- S.2-3:** Locate critical facilities, such as hospitals and health care facilities, emergency shelters, fire stations, police stations, emergency command centers, and other emergency service facilities and utilities so as to minimize exposure to flooding, seismic, geologic, wildfire, and other hazards.
- S.2-4:** Maintain and periodically update the LHMP and Emergency Operations Plan to effectively prepare for, respond to, recover from, and mitigate the effects of natural or human caused disasters that require the planned, coordinated response of multiple agencies or jurisdictions.

S.2-5: Partner with Caltrans and neighboring jurisdictions on measures to protect critical evacuation routes such as SR-60 and I-215 and work with local agencies to develop contingency plans for operations when these and other roads are inoperable due to flooding or wildfire.

S.2-6: Continue to engage the Police and Fire Departments in the development review process to ensure that projects are designed and operated in a manner that minimizes the potential for criminal activity and fire hazards and maximizes the potential for responsive police and fire services.

S.2-7: Where possible, avoid the installation of raised and planted medians while balancing the need to increase tree canopy in areas shown on Map S-6 unless installation is required pursuant to City Standard Plans. The use of painted medians in these areas will allow for reversible lanes that create additional outbound capacity to facilitate emergency evacuation.

S.2-8: Promote a greater community awareness and understanding of natural and humanmade hazards and steps that can be taken to reduce personal risk by:

- ◆ Continuing Community Emergency Response Team Training to educate volunteers about disaster preparedness and train them in basic disaster response skills, such as fire safety, light search and rescue, team organization, and disaster medical operations.
- ◆ Providing emergency preparedness presentations to service clubs, homeowner's

associations and other organizations to enhance preparedness.

S.2-9: Minimize risk and threat of infection or disease by encouraging and promoting participation in annual/seasonal immunization efforts.

ACTIONS

- S.2-A:** Collaborate and coordinate with the Riverside County Public Health Department to promote community awareness regarding prevention and protections from communicable disease and/or pandemic flu, including the provision of information to the public in English and Spanish.
- S.2-B:** Provide information on major evacuation routes and notification systems used for emergency alerts to residents and businesses in Moreno Valley.
- S.2-C:** Use the early warning notification system to notify residents by phone, text, or email of the need to evacuate in the event of emergency and the location of evacuation centers, particularly residents of vulnerable areas and neighborhoods with constrained emergency access.
- S.2-D:** Prioritize the connection of traffic signals in areas shown on Map S-6 to the City's Traffic Management Center to allow for real-time modifications to signal timing that can speed evacuation in the event of emergency.
- S.2-E:** Work with Riverside County, railroad operators, and other emergency response agencies to address disconnected routes

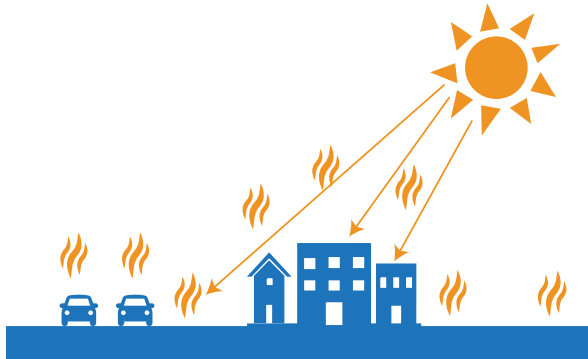
and explore roadway improvements that can provide better emergency access under emergency evacuation scenarios.

S.2-F: Evaluate options for ensuring emergency power at critical and community facilities, including microgrids, solar capture and storage, distributed energy, and back-up generators. Consider the ability to reduce utility costs and carbon emissions in the assessment.

S.2-G: Consider creating neighborhood level plans to improve initial emergency response, subsequent recovery, and ongoing self-sufficiency within the City.

S.2-H: Work with property owners and Home Owners Associations in Very High Fire Hazard Severity Zones to explore options for improving emergency access in areas where existing roadways may not be fully compliant with current standards.

Community Resilience to Climate Hazards

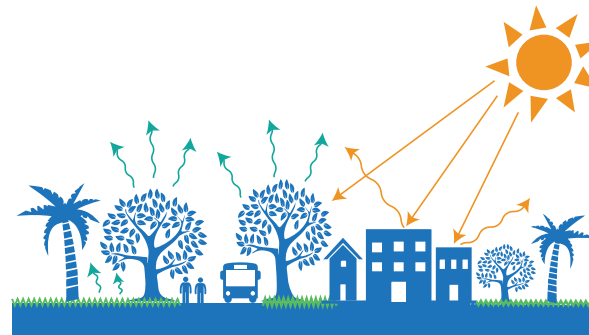


Urban heat island effect, demonstrated in the diagram above, is a condition in which man-made materials like asphalt, concrete, and brick absorb and retain more of the sun's heat than natural elements. Planting more trees and using UV-reflective materials and coatings on buildings can help reflect and absorb that heat through evaporation, transpiration, and albedo.

According to Cal Adapt, a tool providing peer-reviewed climate change data at local levels throughout California, Moreno Valley is predicted to experience a range of climate-related impacts, including extreme heat, wildfire, extreme precipitation, and flooding. The climate hazards described below provide a range of projections under Representative Concentration Pathway (RCP) 4.5 and RCP8.5 scenarios. RCP4.5 represents a moderate greenhouse gas (GHG) emissions scenario in which GHG emissions are somewhat curbed based on human intervention, whereas RCP8.5 represents a high emissions scenario where no intervention is taken. RCPs are developed by the Intergovernmental Panel on Climate Change (IPCC) and are often used by decision-makers to plan for GHG resiliency and mitigation measures.

EXTREME HEAT

As global temperatures rise, Moreno Valley is predicted to experience a range of climate-related impacts, including extreme heat, wildfire, extreme precipitation, and flooding. Under medium and high emissions scenarios, the average annual maximum temperature in Moreno Valley is projected to increase by 5°F to 6°F by 2050. The increase in temperature will likely result in more frequent and longer heat waves, causing stress on people, infrastructure, and



services. These changes pose a risk to human health where individuals with preexisting health conditions such as respiratory disease, individuals with mobility difficulties, or those working outdoors are more susceptible to heat stress that may increase the rate of hospitalizations. Extreme heat and temperatures can also increase the likelihood of drought, wildfire risk, and diminished air quality, resulting in more frequent power shut-offs.

Urban heat islands can also exacerbate extreme heat impacts in developed areas. The “heat island effect” is an urban condition that occurs because man-made materials, like asphalt, concrete, and brick, absorb and retain more of the sun’s heat than natural elements like trees, fields, and bodies of water, making outdoor gathering places uncomfortable or even unhealthy. Urban heat islands can exacerbate already dangerous summer temperatures and put more strain on the electricity grid through higher air conditioning use. Landscape developments are required to reduce heat and humidity by utilizing tree plantings to create shaded microclimates and increase resiliency (Moreno Valley Municipal Code § 9.17.010). The Parks and Public Spaces Element discusses the need to increase tree canopy and its role in reducing heat island effect. Utilizing building materials such as cool roofs, reflective coatings, light-colored pavements, and high-performance insulation and site design techniques such as building orientation, strategic placement of landscaping and windows, and use of courtyards and breezeways can provide passive cooling and reduce energy demand are also required (Moreno Valley Municipal Code § 9.17.080).

As the number of extreme heat days increases due to climate change, the need to expand access to cooling centers and thermally comfortable public spaces has become a pressing public health and climate

resilience priority. In response to acute symptoms of heat stress, the City has designated cooling centers for City residents to be used when temperatures are at 97°F or above for more than two days. These include the Moreno Valley Public Library (Main Branch), Iris Plaza Conference Center, Moreno Valley Senior Center, and the Conference and Recreation Center on Frederick Street. To increase community resilience to extreme heat, the City has identified additional public and private facilities that could serve as cooling centers, including school multipurpose rooms, community faith centers, and libraries in outlying areas under Policy S.3-5. Upgrades such as improved signage, ADA-compliant access, backup power, and multilingual outreach materials can make these facilities more accessible and reliable during emergencies.

WILDFIRE

Wildfire risk is anticipated to increase with wildfire season starting earlier, running longer, and increasing in severity. Since 2019, the extent of VHFHSZs within local responsibility areas has increased and includes fire stations and other critical facilities located in HFHSZs or VHFHSZs. Additional resources would be needed to support the MVFD in responding to wild and urban fires, among other responsibilities. The MVFD implements standards for vegetation and clearance, building signage, fire access, fire flow, and development within wildland urban interface zones to increase wildfire resiliency. Additional information regarding Fire Protection is provided in the Parks and Public Service Element.

EXTREME PRECIPITATION & FLOODING

Extreme precipitation can also place a disproportionate burden on sensitive populations, where intense rainstorms can cause hazardous road conditions and

power outages that may isolate households. According to Cal-Adapt, under medium and high GHG emission scenarios, annual precipitation is projected to decrease but maximum rainfall during a 24-hour storm is projected to increase by 0.075 to 0.090 inches. This indicates that precipitation events are likely to be more intense and within a shorter wet season. Historic records show that flooding events typically occur in urbanized residential areas, indicating that precipitation is occurring faster than it is draining. As new drainage features are installed, it is important to consider increased flow volumes and incorporating LID techniques and BMPs since climate change is anticipated to exacerbate urban flooding.

Looking to the future, Moreno Valley will continue to collaborate with other public agencies, organizations, and institutions in the region in developing and implementing programs that are environmentally, economically, and socially beneficial. Raising public awareness of climate-related impacts and measures that community members can take to protect themselves is also a critical part of the approach. The overarching goal is to prepare residents for a changing climate and build resilience among all segments of the population, particularly those at greatest risk from climate hazards.

SOCIAL VULNERABILITY

The federal Center for Disease Control's Agency for Toxic Substances and Disease Registry describes social vulnerability as a community's ability to prevent human suffering and financial loss in the event of a disaster such as disease, flooding, or other hazards. Climate change can exacerbate socio-economic disparities, resulting in an unequal burden on households who may need more resources to respond to hazard events thus increasing social vulnerability. The City contains a number of census tracts identified as disadvantaged, in which the western portion of the City

contains the most vulnerable households. This portion of the City contains a mix of high-density residential development, industrial development, and a major highway: CA-60. Census tracts located in these areas are generally exposed to higher levels of pollution, higher rates of poverty, lower rates of vehicle access, and have crowded households, among other things. Although there are many influences and factors that impact social vulnerability, the Environmental Justice Element and Climate Action Plan identify measures to reduce burdens on disadvantaged communities in the City. The measures take into account pollution exposure, dignified housing, civic engagement, and climate mitigation measures to increase social resilience against climate-exacerbated hazards.

CRITICAL FACILITIES

Critical facilities in a city are those essential structures, services, and resources that are vital for the wellbeing and functioning of the community, particularly during and after disasters or emergencies. These facilities are considered critical because their disruption or damage can have severe consequences for public safety, health, and the overall recovery of the community. Table S-1 provides the list of various critical facilities as identified by the City's Public Works Department as part of the approved LHMP. Map S-6 shows the location of these critical facilities.

Table S-1- List of Critical Facilities

<i>Critical/Essential Facility Type</i>	<i>Quantity</i>
City Hall	1
Emergency Operations Center	1
Public Safety Building	1
Conference and Recreation Center (EOC Family Care Center)	1

Corporate Yard	1
Animal Shelter	1
Annex #1	1
Fire Stations	7
Electric Utility (MVU)	1
City Library	1
Hospitals/Urgent Care/Dialysis	8
Residential Care Facilities	134
College	1
Schools (5 high schools, 9 middle schools, 28 elementary schools, 10 charter schools)	61
Pharmacies	19
Total	239

Goal S-3: Build community resilience to climate change

POLICIES

S.3-1: Continue to collaborate in regional climate action planning initiatives.

S.3-2: Partner with local utilities, regional agencies, and local jurisdictions to assess the vulnerability of energy infrastructure and identify improvements that increase resilience of local energy infrastructure.

S.3-3: Consider climate impacts, risk, and uncertainty in designing and evaluating the City's Capital Improvement Plan design and adjust infrastructure design standards and project locations to address asset- and site-specific vulnerabilities.

S.3-4: Employ best practices and protocols for outdoor safety on City operations and projects to accommodate City staff and City contractors during high temperature days and heat waves.

S.3-5: Expand access to and awareness of cooling centers and resilience hubs throughout the

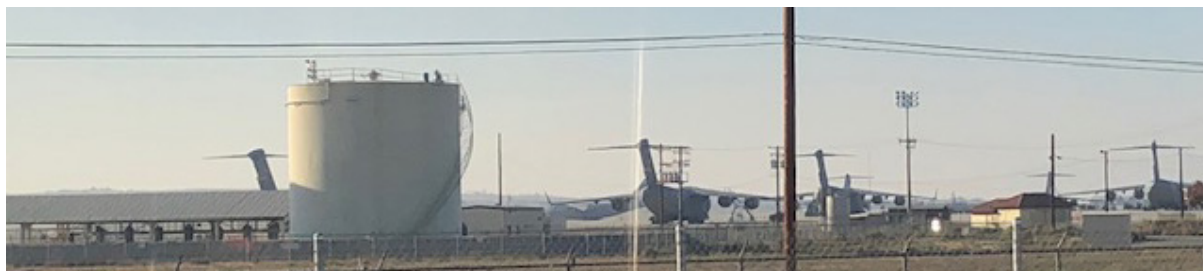
City, especially for outdoor workers, seniors, and the homeless and other vulnerable populations, particularly households located in census tracts identified as a disadvantaged community.

S.3-6: Encourage the use of landscaping, building materials, and site design techniques that provide passive cooling and reduce energy demand. In particular, promote the use of voluntary measures identified in the California Green Building Code (Title 24, Part 11 of the California Code of Regulations) to minimize heat island effects, including hardscape and roof materials with beneficial solar reflectance and thermal emittance values and measures for exterior wall shading.

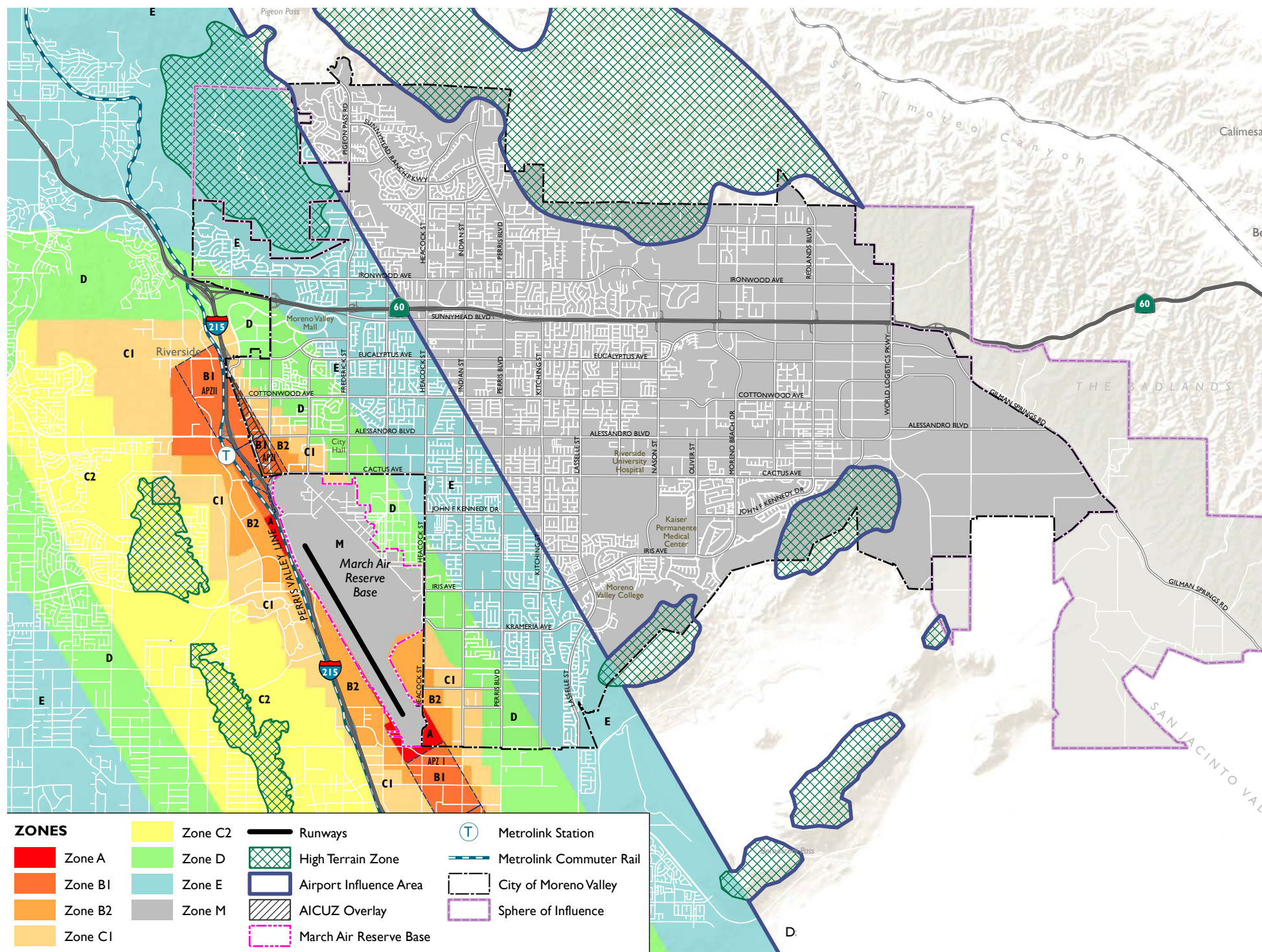
S.3-7: Require new development to provide and maintain shade trees suitable to local climatic conditions. A climate-appropriate strategy may involve planting mostly drought-tolerant native trees that may have less foliage, interspersed with leafier trees at points where people gather.

S.3-8: Assess the feasibility of implementing urban heat island mitigation technologies in public gathering places, including UV-reflective materials and coatings, porous pavement, evaporative cooling towers, or other technologies that can reduce surface and air temperature and mitigate for the effects of extreme heat.

S.3-9: Use the Alert MoVal system to notify residents by phone, text, or email of extreme weather conditions such as heat waves, and the availability of shelters, cooling centers, and resilience hubs.



Map S-10: Airport Land Use Compatibility Zones



S.3-10: Encourage maintenance or removal of overgrown or dead trees that may pose a falling hazard in windy conditions.

ACTIONS

S.3-A: Identify additional locations for cooling centers and resilience hubs in Moreno Valley and ensure the locations develop backup power sources in the event of a power outage.

S.3-B: Prepare a Landscape Manual or enhance landscape standards in the Municipal Code to mitigate urban heat island effects. In addition to identifying a climate-appropriate planting palette and recommended plant mix, targets for street tree canopy, shade structure coverage, and asphalt paving coverage should be identified and the reflectance of stone and rock ground cover in heat generation should be considered.

S.3-C: Explore establishing a tree planting and maintenance program in partnership with local community groups or non-profit organizations.

S.3-D: Work with the Riverside Transit Agency (RTA) to study the feasibility of bus shelter design that offers protection and relief from heat, including the incorporation of drinking fountains and shade trees with drip irrigation.

Airport/Aviation Safety

Airport operations pose risks to people and property located nearby and those to the safety of people on board aircraft. In the General Plan, safety impacts are mitigated primarily through land use policies that specify the types of land uses near the airport, thus

limiting the number of people exposed to the risk of an accident and protecting airspace from land uses that can create hazards to flight. Other strategies to address risk include reducing the potential for bird strikes and electromagnetic interference that can disrupt airport operations systems.

The March Air Reserve Base (MARB) and the March Inland Port (MIP) is located along the southwest border of Moreno Valley. MARB/MIP is a joint-use airport, used for both military and civilian purposes. Originally a March Air Base, the MARB/MIP was established by a joint use agreement between the Department of Defense and March Joint Powers Authority (JPA) in 1997. The JPA is the recognized local reuse agency charged with planning for the economic redevelopment of surplus properties at the Base. Under the agreement, the public and military entities share essential aviation facilities such as the control towers and runways, as well as maintenance of facilities, under this joint use arrangement. The March Inland Port Airport Authority (MIPAA), established by the JPA, is responsible for the development and operations of the public use airport.

The Riverside County Airport Land Use Commission adopted an update to the Airport Land Use Compatibility Plan (ALUCP) for the MARB/MIP in 2014. The ALUCP is primarily based upon the U.S. Air Force's Air Installation Compatibility Use Zones Study for the March Air Reserve Base (AICUZ). The ALUCP incorporates noise and safety protection measures equivalent to or greater than recommended in the AICUZ. While no modifications to the existing airport runways or approaches are anticipated, the ALUCP studied potential future military and civilian aircraft activity to inform the development of unique Airport Compatibility Zones each with its own land use restrictions in consideration of projected future use by both military and civilian aircraft. The compatibility zones (shown on Map S-10) and their associated

restrictions account for noise and overflight factors as well as safety and airspace protection factors. Within the City limit, there is a special zoning overlay for the AICUZ that limits public exposure to aircraft accidents and noise and encourages future development that is compatible with the continued operation of March Air Force Base. Ongoing coordination with the March Air Reserve Base, the March Joint Powers Authority, and the March Inland Port Airport Authority will help to reduce the exposure of people and property to hazards from any flight accidents, as well as reduce the risk of an accident involving aircraft in flight over the City.

Goal S-4: Minimize airport safety hazards and promote compatibility with airport operations.

POLICIES

S.4-1: Minimize airport hazards in Moreno Valley through consistency with the March Air Reserve Base/Inland Port Airport Land Use Compatibility Plan (March ALUC Plan).

S.4-2: Review all projects within the March Air Reserve Base/Inland Port Airport Influence Area for conformance with the compatibility criteria outlined in the March ALUC Plan.

S.4-3: Minimize the potential for development adjacent to the March Air Reserve Base/Inland Port Airport to adversely affect airport operations such as by reducing the potential for bird strikes, and electromagnetic interference, and glare.

S.4-4: Coordinate with the March Air Reserve Base, the March Joint Powers Authority, and

the March Inland Port Airport Authority to ensure that roadways are designed to safely accommodate airport vehicles and that airport-related traffic is routed to minimize hazards to or conflicts with Moreno Valley residents and businesses.

S.4-5: Use education and practical ways of reducing exposure to electromagnetic fields (EMFs) near transmission lines and other sources.

ACTIONS

S.4-A: Update applicable site development standards in the Zoning Code to incorporate measures for landscape design and maintenance on properties immediately adjacent to the MARB so as to reduce the potential for bird strikes. Standards should address planting palette, water features and maintenance practices.



March Air Reserve Base seen from above, 2015

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