6. Public Health & Safety Element

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Chapter 6. Public Health & Safety Element

INTRODUCTION

Protecting the life, health, and property of the community from natural and man-made hazards is a fundamental role of the City of Highland. The occurrence of natural disasters, such as flooding, earthquakes, and fires in Southern California, has made effective public safety programs increasingly important. The Public Health and Safety Element of the General Plan assesses the natural and man-made hazards present in the community and includes goals and policies to address those hazards.

Purpose and Function

The Public Health and Safety Element identifies areas in the City where public and private decisions on land use need to be sensitive to hazardous conditions that pose a potential threat to public health and safety. This element addresses hazards related to geologic and seismic activity, slope instability, flooding, hazardous materials, fire hazards, emergency preparedness, airport land use compatibility and safety, and air quality. This element provides background information related to each hazard, identifies hazard locations in the City, and provides policies for decision-makers in their review of projects. Policies address ways to minimize any social, economic, and environmental disruption, and accelerate the City's recovery following a disaster.

Related Plans and Programs

Critical relationships exist between the Public Health and Safety Element and other General Plan Elements, especially the Land Use, Circulation, and Public Services and Facilities Elements. The types and locations of land uses identified in the Land Use Element are influenced and regulated by the locations of natural and man-made hazards, while emergency evacuation routes and locations of critical facilities can be influenced by the goals and policies identified in the Circulation Element. Additionally, land use changes can influence circulation and traffic in the City, thereby influencing air quality. This element addresses goals and policies to help reduce air quality problems in the City. The Public Services and Facilities Element identifies safety services available to the

City, such as police and fire, to aid in the response to potential disasters identified in this element.

Federal, state, and local regulations, such as the California Environmental Quality Act (CEQA), the California Government Code, and the Highland Municipal Code regulate and/or influence land use and development in the City. Not only do these regulations help protect the health, safety, and welfare of Highland residents, visitors, and businesses by ensuring the proper analyses are conducted, sound construction practices are implemented, and uses are appropriately sited within the City, they can also help minimize the recovery time experienced after the occurrence of a disaster.

GOALS AND POLICIES

This section contains the goals and policies related to public health and safety in the City of Highland.

Geology, Seismicity and Liquefaction

Like most areas throughout Southern California, Highland is susceptible to seismic hazards. With the San Andreas fault zone running through the northern part of the City and the San Jacinto fault not far away, Highland understands the need to guide future development to ensure the health and safety of residents, businesses and visitors. This section describes the geologic setting of Highland, identifies the potential hazards associated with seismic events, and provides policies to address these hazards. In addition to these General Plan policies, the State regulates development in California through a variety of tools that reduce risk or mitigate potential hazards from earthquakes and other geologic hazards. The California Building Code (CBC), the Unreinforced Masonry Law, the Alquist-Priolo Earthquake Fault Zoning Act, the State of California Seismic Hazards Mapping Act and related maps and regulations govern development in potentially seismically active areas.

Geology

Highland and surrounding areas are part of a gently sloping alluvial plain bordered on the north by the San Bernardino Mountains, a traverse range that runs from east to west. The plain is predominantly composed of alluvium deposited by rivers and creeks that drain from the nearby mountains. The Santa Ana River and Mill Creek produced the major coalescing alluvial fans, while East Twin and City Creek created smaller fans. Figure 6.1 shows the generalized geology of Highland.

Older alluvial deposits extend down from the foothills and cover approximately half of the City. The older alluvium consists of terrace deposits in major stream canyons, older conglomerates of alluvial fans

downstream from canyon mouths, and deposits under mesas. Younger alluvium including river channel deposits consisting of unconsolidated gravel, sand, and silt underlies much of the City. These materials appear near the surface of the Santa Ana River course in the eastern portion of Highland. The younger alluvium is highly permeable and conducive to groundwater recharge, particularly in streambeds.

Seismicity

The seismic setting of Highland and surrounding areas is dominated by the San Andreas Fault. Several "active" and "potentially active" faults of the San Andreas Fault are present within and nearby Highland.

North and south branches of the San Andreas Fault run through Highland. The last major earthquake along the south branch of the San Andreas was the 1857 Fort Tejon earthquake, estimated at a Richter magnitude of 8.0 plus. The San Andreas Fault is capable of generating an earthquake magnitude of up to 8.3 on the Richter scale. Located approximately 4.5 miles southwest of Highland, the San Jacinto Fault Zone has a maximum credible earthquake Richter magnitude of 8.5 and has the potential for significant ground shaking within the region.

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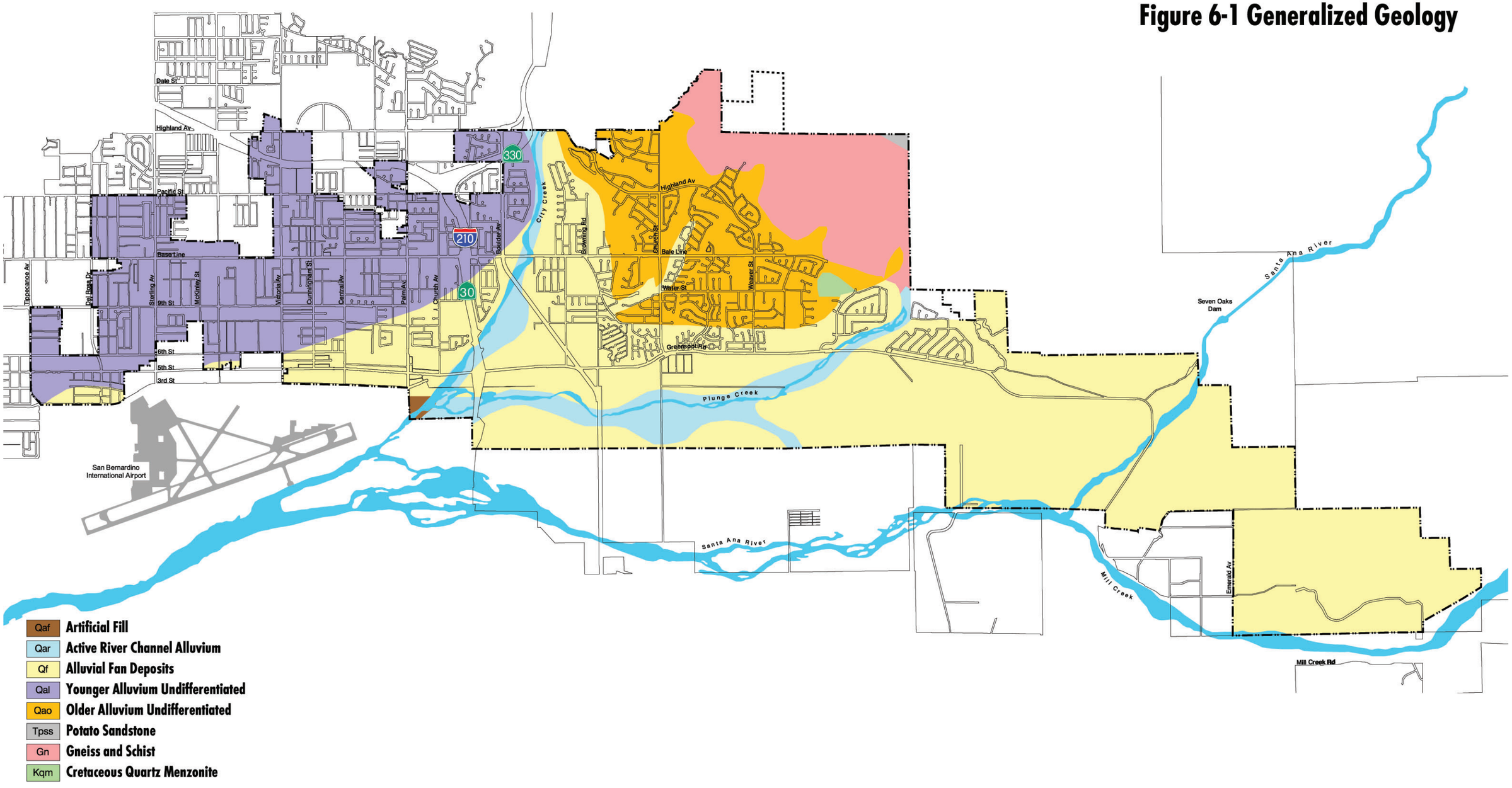
Figure 6-1 Generalized Geology



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To protect residents from hazards associated with seismic activity, areas of the San Andreas Fault have been designated as Earthquake Fault Zones (formerly Special Studies Zones), as required by the **Alquist-Priolo Earthquake Fault Zoning Act**. Under this act, the State Geologist has established and mapped Earthquake Fault Zones, or regulatory zones around the **surface traces** of active faults. The portion of the Alquist-Priolo Earthquake Fault Zone that runs through the eastern portion of Highland is depicted in Figure 6.2.

Prior to the approval of structures within the zone, a geologic study must be undertaken to determine the precise location and necessary setbacks from identified faults. The designation of the San Andreas Fault as part of the Alquist-Priolo Earthquake Fault Zone prohibits the construction of most types of habitable structures within 50 feet of the fault. In addition to this statewide standard, Highland encourages more restrictive policies for special use buildings and activities such as schools, hospitals, and emergency services.

Primary and secondary hazards related to potential seismic activity within the San Andreas fault zone remain as a significant concern to all in Highland. Primary hazards include **ground shaking**, **ground failure**, and ground or **surface rupture**. In general, ground shaking and associated structural failure contribute to the greatest number of earthquake-related damage and deaths. Secondary hazards related to earthquakes include liquefaction, rock falls, ground subsidence, dam overtopping and failure, and seiches.

Highland has a high potential for surface rupturing and is susceptible to ground shaking. Ground shaking is a particular risk in the hills to the north of Highland. While a high potential exists for surface rupturing, the threat of surface rupturing diminishes as development is distanced from the San Andreas Fault Zone. Liquefaction and earthquake-related landslides are also potential threats to the health, safety and welfare of Highland residents.

In the event of a major earthquake, evacuation routes to and from Highland may be severely disrupted due to potential physical road damage, flooding from failure of the Seven Oaks Dam, and the subsidence of the roadbed.

Some structures in Highland, depending on the year of construction, may not withstand a seismic event of the predicted maximum intensity earthquake. A study has been completed to identify these structures and an **Unreinforced Masonry** Building Mitigation Plan is under preparation. Plans for reinforcement or removal of such structures are, at present, uncertain.

Alquist-Priolo Earthquake Fault Zoning Act

The main purpose of the Alquist-Priolo Earthquake Fault Zoning Act is to prevent the construction of buildings used for human occupancy on the surface trace of active faults. The Act focuses on the hazards associated with surface fault rupture and does not address other earthquake hazards.

Surface Trace

Commonly referred to as a "fault line," a surface trace is the intersection of a fault plane with the surface of the Earth. It is sometimes, but not always, visible at the surface because of geomorphic evidence such as ridges, valleys, etc.

Ground shaking is the movement of the earth in response to a seismic event.

Ground failure is the inability of the earth to maintain strength. This hazard typically occurs because of ground shaking and is manifested as liquefaction and tilting or uneven land surfaces.

Surface rupture occurs when movement on a fault deep within the earth breaks through to the surface.

Unreinforced Masonry Law

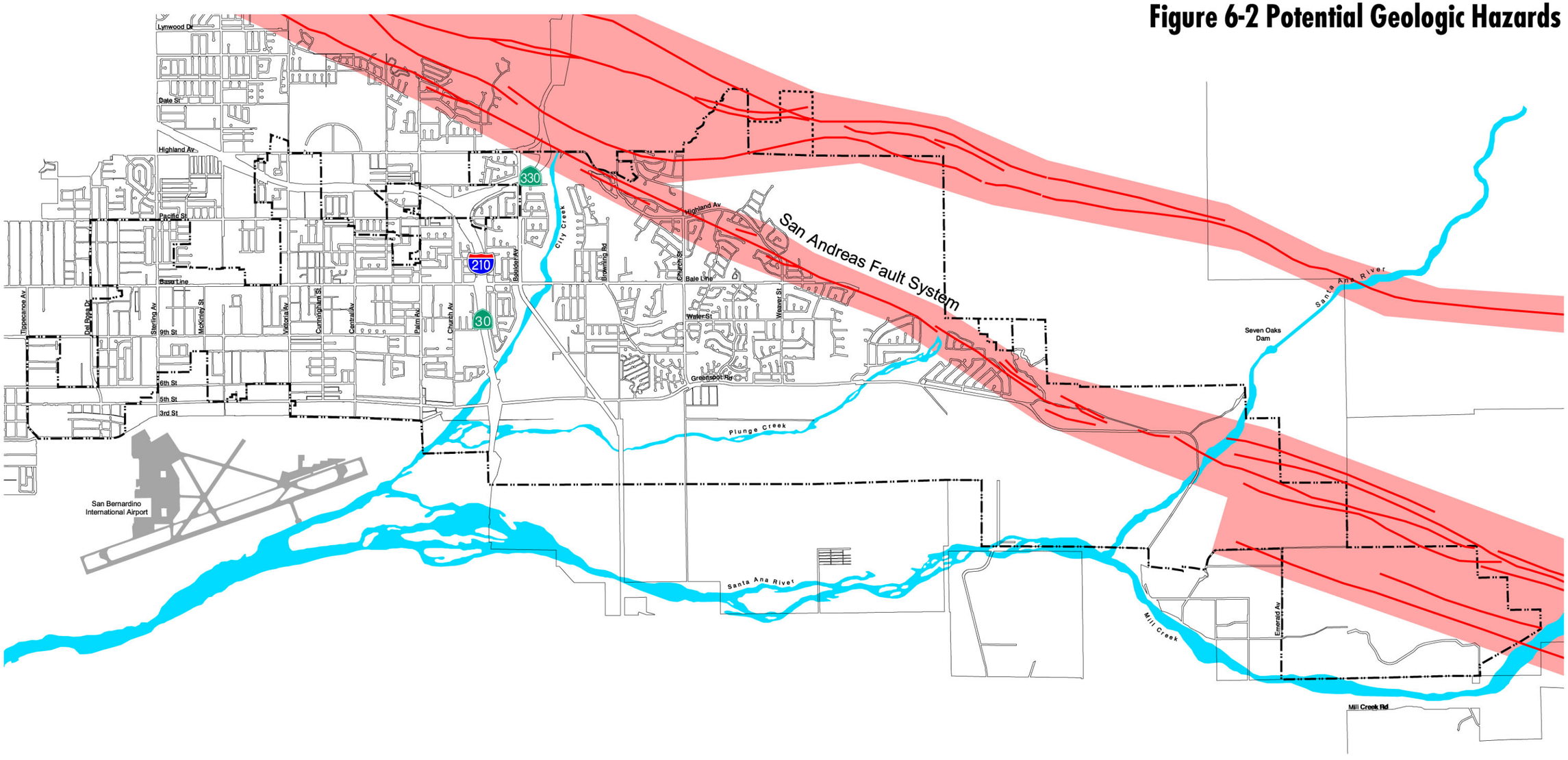
The Unreinforced Masonry Law requires cities and counties within Seismic Zone 4 to identify hazardous unreinforced masonry buildings and consider local regulations to abate potentially dangerous buildings through retrofitting or demolition as outlined in the State Office of Planning Research Guidelines.

Liquefaction

Liquefaction is a seismically induced form of ground failure, which has been a major cause of earthquake damage to roads, utility pipelines, buildings and other structures during past earthquakes in Southern California. Research and historical data indicate that loose, granular materials at depths of less than 50 feet with silt and clay contents of less than 30 percent saturated by relatively shallow groundwater table are most susceptible to liquefaction. These geological conditions are typical in parts of Southern California including Highland, and in valley regions and alluviated floodplains.

The potential threat of liquefaction in Highland is a concern and should be considered in approvals for development on susceptible soils within the City. Liquefaction takes place when granular materials that are saturated by water lose strength and transform from a solid to a liquid state. In general, liquefaction occurs during significant earthquake activity. Structures located on soils such as silt or sand may experience significant damage during an earthquake due to the instability of structural foundations and the moving earth. Areas susceptible to high liquefaction are shown in Figure 6.3.

Figure 6-2 Potential Geologic Hazards



Approximate Fault Location

Alquist-Priolo Earthquake Fault Zone

City Boundary

Sphere of Influence

Source: California Division of Mines and Geology (CDMG), 2000. Digital Images of Official Maps of Alquist-Priolo Earthquake Fault Zones of California, Southern Region, CD 2000-2003.

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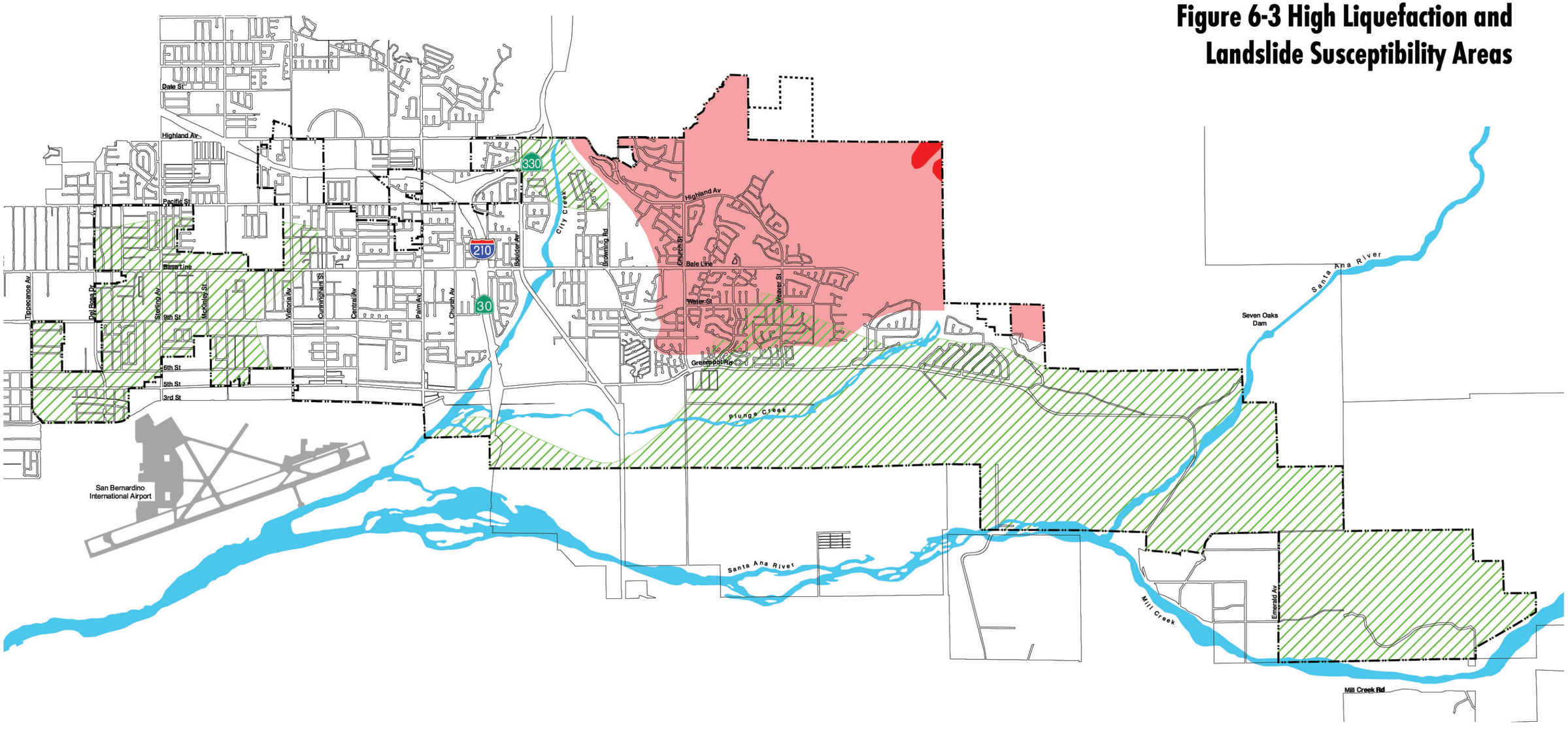
Figure 6-3 High Liquefaction and Landslide Susceptibility Areas



High Liquefaction Susceptibility Area

Low to Moderate Landslide Susceptibility Area

Mapped Existing Landslide

City Boundary

Sphere of Influence

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GOAL 6.1

Minimize the risk to public health and safety and disruption to social, economic, and environmental welfare resulting from seismic and geologic activities.

Policies

1) Ensure that all new development, including facilities required for the provision of emergency services following a seismic or geologic event, adhere to proper construction design criteria.

2) Enforce the requirements of the Alquist-Priolo Earthquake Fault Zoning Act and require the preparation of reports pursuant to the Act as part of the development review process for all new projects.

3) Continue efforts to upgrade seismically hazardous (unreinforced masonry) buildings within the City, including compliance with the Unreinforced Masonry Building Mitigation Plan.

4) Continue to evaluate all new development within the Alquist-Priolo Earthquake Fault Zone.

5) Continue to evaluate the compatibility of critical, essential, high occupancy, and normal to low risk uses in areas of potential liquefaction during the review of all discretionary and ministerial actions.

6) Continue to review building and zoning codes to determine the need for specific standards for siting and seismic design criteria, especially for critical, essential, high occupancy and normal to low risk structures.

7) Review existing critical and emergency structures for any significant siting, design, or construction problems that would make them vulnerable in an earthquake, and incorporate findings of the review into emergency operations plans and long-term programs for upgrading or relocating vulnerable facilities.

8) Continue to monitor new building materials used for earthquake stability and fire resistance and incorporate such materials into plan checks when applicable.

9) Continue to enforce as part of the development review process site-specific analysis of soils and other conditions related to the onsite impact of maximum credible seismic and geologic events.

Critical

Critical uses in potential liquefaction zones that should be *restricted* or considered *generally unsuitable* include nuclear related systems; major dams; explosives or hazardous materials manufacturing, handling, or storage; and hospitals and other emergency medical facilities.

Essential

Essential uses in potential liquefaction zones that should be *restricted* or considered *generally unsuitable* include police, fire and communications systems; Emergency Operations Centers (EOCs); electric power inter-tie systems; power plants; small dams; utility substations; sewage treatment plants; water-works; local gas and electric distribution lines; aqueducts; major pipelines; major highways, bridges, and tunnels; ambulance services; public assembly sites with 300 or more capacity; and schools.

High Occupancy

High occupancy uses in potential liquefaction zones that should be *restricted*, or considered *generally unsuitable*, or provisionally *suitable* include multi-family residential of 20 units or more; major commercial development including large shopping centers; office buildings; large hotels; health care clinics and convalescent homes; heavy industry; and gas stations.

Normal to Low Risk

Normal to low risk uses in potential liquefaction zones that should be *restricted*, or considered *generally unsuitable*, or *provisionally suitable* include single-family and two-family residential; multi-family of less than 20 units; small scale commercial; small hotels or motels; light industry; and warehousing.

Notes:

1 *Restricted* uses are prohibited unless a site investigation demonstrates hazards will be adequately mitigated and that alternative sites are not available or feasible.

2 *Generally suitable* uses are prohibited unless a site investigation demonstrates that a site is suitable or that hazards will be adequately mitigated.

3 *Provisionally suitable* uses require a site investigation to confirm suitability and may require some modification of location or facility design.

Slope Instability

General slope stability is determined by a number of factors such as the angle of the slope, vegetative cover, wildland fire, bedrock, soil, seismic activity, precipitation, groundwater, erosion, and human alterations to land such as hillside grading activities. Slopes may be in temporary equilibrium until one of the aforementioned factors is modified by natural or human activity resulting in an unstable condition and potential slope failure.

Highland's topography ranges in steepness from 0 percent slope (flat) to more than 15 percent slope. The majority of the City (71 percent) falling has a relatively flat category. Foothill slopes of the San Bernardino Mountains exist as a major feature in the eastern portion of Highland and its sphere of influence. These slopes have been subject to erosion, seismic and non-seismic-related landslides, mudslides, and slope collapse in the past. In addition, slopes left from mineral extraction activities exist in Highland. Without reclamation of mining activities, such slopes can become serious hazards.

Landslides

Landslides are fast, downward movement of earth and rock materials. Some landslides are caused by the infiltration of water into unstable material. Other landslides are earthquake-induced landslides consisting of rock falls and debris flow. Areas with the potential for earthquake-induced landslides generally occur in areas of previous landslide movement, or where topographic, geological, geotechnical, and subsurface water conditions indicate a potential for permanent ground displacement. Areas of landslide susceptibility are shown in Figure 6.3.

Foothills crossed by drainage channels created from local mountain runoff to the north characterize areas in the northeastern portion of Highland. Drainage from the north has cut deep into the surrounding landform creating steep walls susceptible to landslides. Traces of the San Andreas Fault zone add to the threat of landslides due to ground shaking. High fire danger in the local mountain area further adds to the risk of landslide and mudslide. Slopes devoid of suitable vegetation after a natural fire event may not be able to maintain topsoil in times of heavy precipitation.

GOAL 6.2

Protect people and property from hazards related to slope instability.

Policies

1) Continue to enforce hillside development guidelines for proposed development within or nearby slope instability areas of the City.

2) Require appropriate structural design measures for proposed development within hillside or steep slope areas.

Flooding

According to the Federal Emergency Management Agency (FEMA), floods are the most common and widespread of all natural disasters, except fires. The potential for flooding is a safety concern in Highland, especially flooding from the failure of the Seven Oaks Dam caused by a severe earthquake.

Flooding is both a local and regional matter. Flooding in areas adjacent to Highland may contribute to potential flood hazards in Highland if appropriate local and regional flood control measures are not properly planned and implemented. The San Bernardino County Flood Control District Comprehensive Storm Drain Plan outlines the necessary drainage improvements.

The City of Highland is responsible for ensuring that new development is protected from 100-year floods due to storm flows in accordance with FEMA's National Flood Insurance Program (NFIP). In January 1976, the San Bernardino County Flood Control District authorized the development of plans for a comprehensive system of storm drains that encompass approximately 42 square miles of area including the City of Highland. In addition, the District's local Zone Advisory Committee reviews and determines the establishment of local flood control improvement priorities.

Drainage Areas

Highland receives a considerable amount of runoff from watershed areas in the San Bernardino Mountains. This runoff flows along several improved, semi-improved, and unimproved flood control channels and creeks to the Santa Ana River and eventually to the sea. Eight major tributaries traverse Highland from east to west including Oak Creek, Plunge Creek, Elder Creek, Bledsoe Creek, Cook Creek, City Creek, Sand Creek, and Upper Warm Creek. Sand Creek, Small Canyon Creek and Bald Ridge Creek flow into Upper Warm Creek. The Santa Ana River is located along the southern boundary of Highland east of the

San Bernardino International Airport. Figure 6.4 shows the location of the Santa Ana River and major tributaries in Highland.

City Creek and Plunge Creek act as major natural drainage facilities for Highland. The Plunge Creek watershed is generally located along Greenspot Road and includes the tributaries of Little Mill Creek and Fredalba Creek. The City Creek watershed is located along Highway 330 north of Highland north of the intersection of Highway 330 and Highland Avenue. According to the East Valley Water District, flows along the City Creek fluctuate from year to year between wet and dry periods. An increase in the amount of paved or impervious surfaces can exacerbate flooding by increasing the amount of storm water and runoff conveyed through the City's drainage system.

100-Year and 500-Year Floodplains

100-Year Floodplain

Land that is subject to flooding by a 100-year flood or the flood elevation that has a one percent chance of being equaled or exceeded each year.

500-Year Floodplain

Land that has the potential to be flooded in a storm that has a 0.2 percent chance of occurring every year.

According to FEMA, parts of Highland fall within the 100-Year Floodplain and 500-year Floodplain. Figure 6.5 depicts flood hazard areas within City boundaries, including the 100-Year and 500-Year Floodplains. The 100-Year Floodplain is an area of land subject to potential inundation by a storm whose intensity occurs on the average of once every 100 years. Communities subject to flooding can participate in FEMA's NFIP. The NFIP offers flood insurance to property owners in flood prone areas. In return for the coverage, the participating community is required to regulate new development in hazardous areas. As a member of the NFIP, the City of Highland has adopted standards for flood protection in relationship to minimum building elevation, flood proofing, and anchoring.

Dam Inundation

Dam Inundation

The release of flood waters to downstream areas caused by failure of a dam.

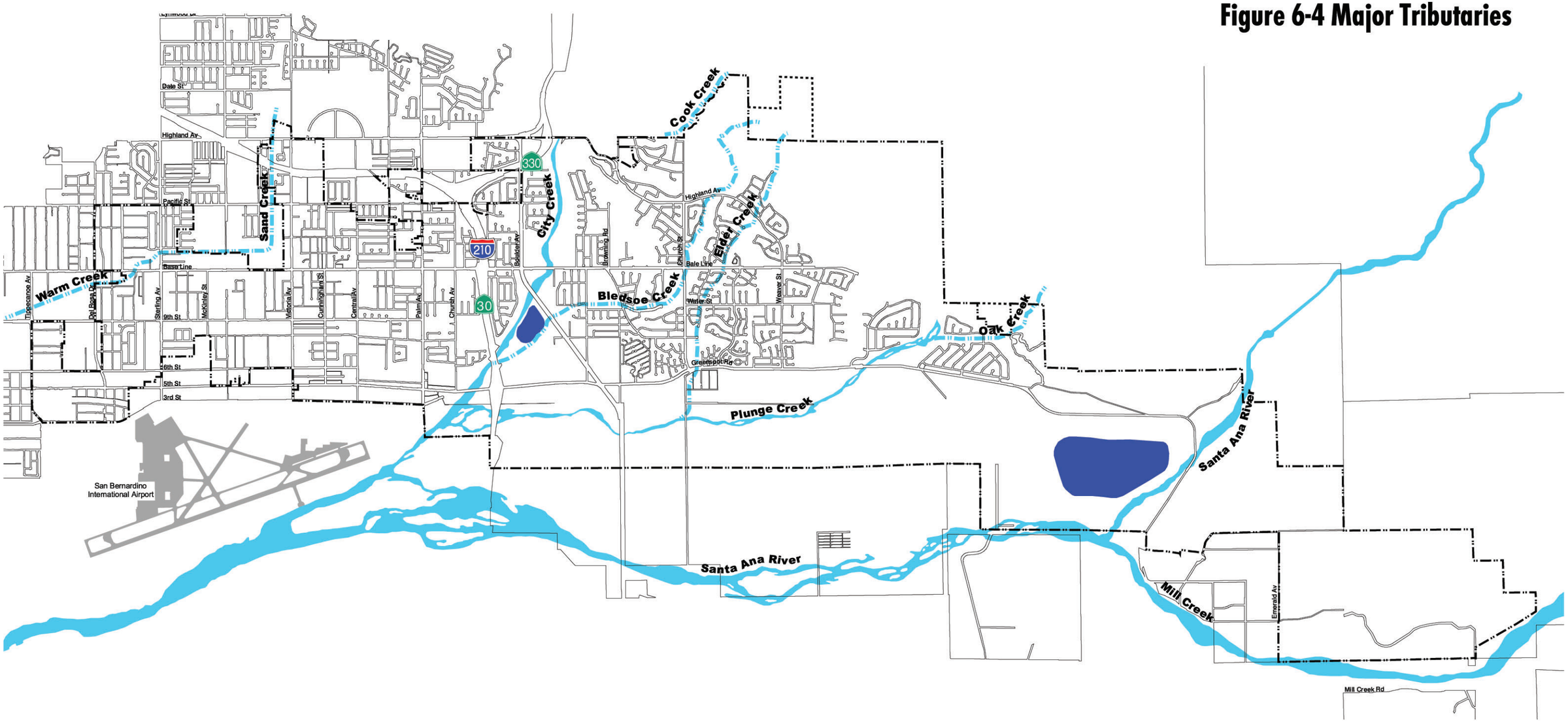
Highland is within the Seven Oaks Dam inundation area. Dam failure at full capacity is a potential hazard for most of Highland. Figure 6.5 shows the limits of flooded areas with failure of the Seven Oaks Dam. In such a case, water could extend as far north as Pacific Street in some locations. All southern exits from Highland could be impassable during a major inundation event.

The Seven Oaks Dam, seen in the right portion of the picture above, is a potential flood inundation hazard for the City of Highland.

Seven Oaks Dam is a single purpose flood control project located just outside Highland's northeast boundary in an unincorporated area of San Bernardino County. The dam is a major feature of the Santa Ana River Mainstem Project designed to protect Orange, Riverside, and San Bernardino Counties from flood. The dam is able to resist an earthquake measuring 8.0 on the Richter scale with any point able to sustain a displacement of four feet without causing any overall structural damage.

In the event of dam failure, the Big Bear Dam has the potential to flood eastern portions of Highland. The Big Bear Dam is a water conservation reservoir owned by the Big Bear Municipal Water District.

Figure 6-4 Major Tributaries



Major Tributary
River/Creek
Percolation Basins
City Boundary
Sphere of Influence

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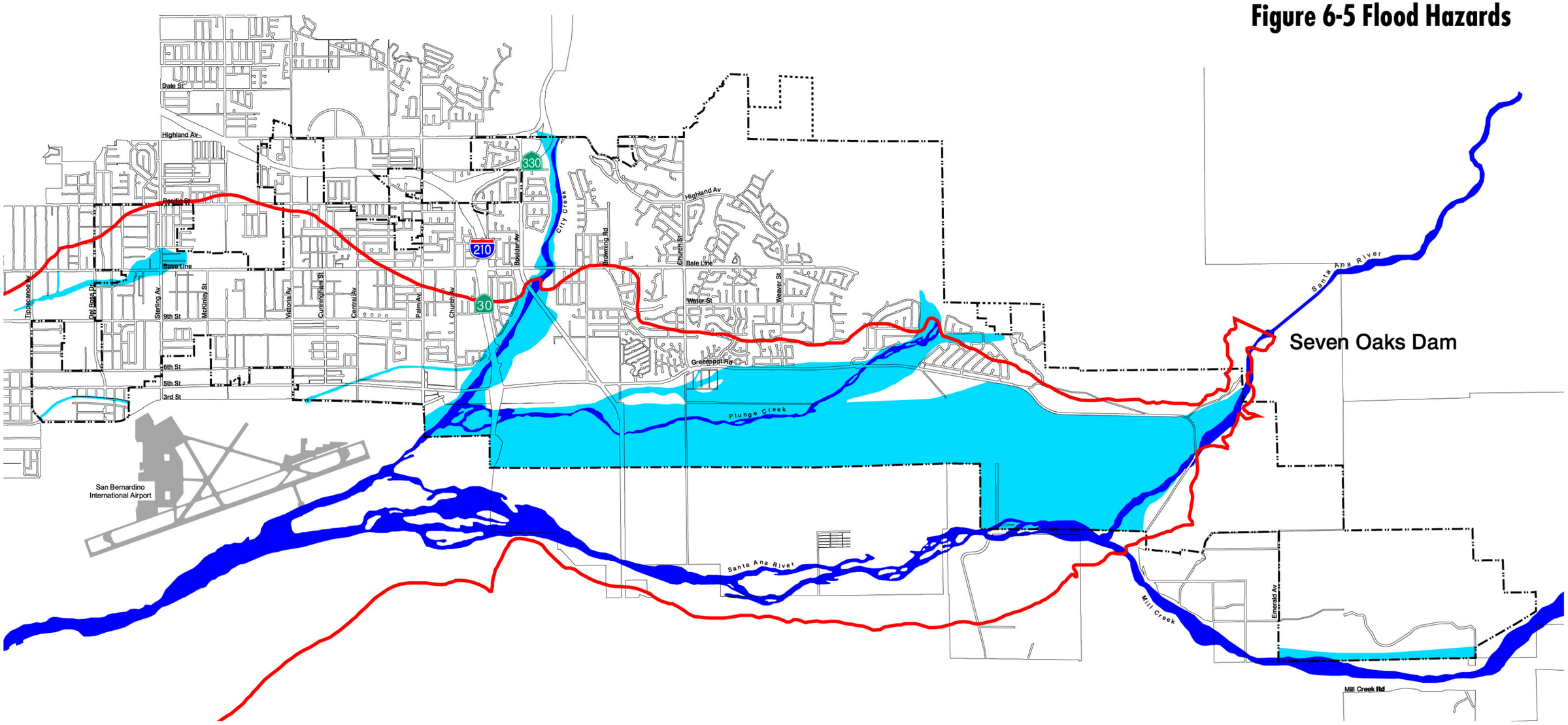
Figure 6-5 Flood Hazards



Limit of Flooded Area with Dam Failure/ 500-Year Flood Boundary

Special Flood Hazard Areas Inundated by 100-Year Flood

City Boundary

Sphere of Influence

Dam Inundation Source: U.S. Army Corps of Engineers
Note: The inundated areas shown on this map reflect events of an extremely remote nature. These results are not in any way intended to reflect upon the integrity of the Seven Oaks Dam. Flooded areas shown are based on dam failure at full pool elevation 2,580 feet, NGVD.
Flood Source: FEMA Flood Insurance Rate Maps, 1996.

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Other facilities located near the San Andreas Earthquake Fault Zone have the potential for damage and/or flooding during a seismic event. These include the East Highlands Reservoir, a smaller reservoir located within Bledsoe Gulch; the North Fork Canal; and the San Bernardino Valley Municipal Water District (SBVMWD) transmission line.

GOAL 6.3

Reduce the risk to life and minimize physical injury, property damage, and public health hazards from the effects of a 100-year storm or 500-year storm and associated flooding.

Policies

1) Review all proposed development to ensure that structures designed for human occupancy are accessible in the event of a 100-year storm and are protected from the 100-year storm to a point one foot above the floodplain.

2) Continue to evaluate the compatibility of critical, essential, high occupancy, and normal to low risk uses in areas within the 100-year floodplain during the review of all discretionary and ministerial actions.

3) Require a drainage study be completed by a qualified engineer prior to all proposed development to certify that the proposed development will be adequately protected and that implementation of the development will not create new downstream flood hazards.

4) Require all development in the City and its sphere of influence comply with discharge permit requirements established by the Regional Water Quality Control Board.

5) Encourage proposed development to balance or enhance the natural landscape features of a site in order to reduce the amount of impervious surfaces built within the City.

6) Continue to work with the San Bernardino County Flood Control District and the United States Army Corps of Engineers to receive and implement updated flood control measures and information.

Critical

Critical uses in the 100-year floodplain that should be *restricted* include nuclear related systems; major dams; explosives or hazardous materials manufacturing, handling, or storage; and hospitals and other emergency medical facilities.

Essential

Essential uses in 100-year floodplain that should be *restricted* include police, fire and communications systems; Emergency Operations Centers (EOCs); electric power inter-tie systems; power plants; small dams; utility substations; sewage treatment plants; water-works; local gas and electric distribution lines; aqueducts; major pipelines; major highways, bridges, and tunnels; ambulance services; public assembly sites with 300 or more capacity; and schools.

High Occupancy

High occupancy uses in 100-year floodplain that should be considered *generally incompatible* include multi-family residential of 20 units or more; major commercial development including large shopping centers; office buildings; large hotels; health care clinics and convalescent homes; heavy industry; and gas stations.

Normal to Low Risk

Normal to low risk uses in 100-year floodplain that should be considered *generally incompatible* include single-family and two-family residential; multi-family of less than 20 units; small scale commercial; small hotels or motels; light industry; and warehousing.

Notes:

1 *Restricted* refers to uses restricted unless alternative sites are not available or feasible and a site investigation demonstrates hazards will be adequately mitigated.

2 *Generally incompatible* refers to uses restricted unless a site investigation demonstrates that a site is suitable or hazards will be adequately mitigated.

7) Utilize flood control methods that are consistent with Regional Water Quality Control Board Policies and **Best Management Practices** (BMPs).

> **Best Management Practice (BMP)**
>
> A practice that has been defined or adopted as the most effective, practical, economical, and technologically sophisticated means to better manage wastes and prevent or reduce contamination of groundwater.
>
> For additional information on BMPs, please refer to the Water Resources section of the Conservation and Open Space Element.

Hazardous Materials

Highland has many businesses that manufacture, transport, store, use and dispose of hazardous materials and waste. The unauthorized handling of such materials is an issue of concern. The unhealthful effects of certain chemicals and substances have led to extensive regulation of hazardous materials. Nevertheless, there is still the potential for hazardous materials to be released into the environment, whether as a result of an accident, carelessness, or intentionally.

Regulations and responsible agencies

Many regulations at the local, state, and federal level govern the management of hazardous materials and waste. Since these regulations are constantly changing, individuals and businesses that use or transport hazardous materials in the City should obtain information and applicable permits from the appropriate jurisdictions. The U.S. Environmental Protection Agency (EPA) and the County of San Bernardino manage the inspection, regulation, and permitting of hazardous materials storage, use, and transportation.

Several other jurisdictions are also involved in regulating the transportation of hazardous waste and materials on roads and highways. The U.S. Department of Transportation (DOT), in cooperation with the U.S. EPA, establishes and enforces regulations for transportation of hazardous materials and wastes such as containment and marking hazardous materials. At the state level, the Department of Health Services (DHS) tracks shipments of hazardous wastes, and the California Highway Patrol (CHP) enforces transportation-related regulations by periodic inspection of vehicles on the road and annual inspection of transport vehicles to issue certification as required by the DHS.

The City of Highland may restrict or prohibit the transportation of hazardous materials and waste on local roads by City ordinance, if the ordinance meets certain conditions. The City may also establish notification requirements or restrict hours of transport by imposing curfews. Other actions the City may take to protect the public from the risk of accident during the transport of hazardous materials include maintaining road systems and improved information to hazardous waste generators so they may contract with reputable transportation companies. The local Fire Department is responsible for inspecting and permitting the use, storage, and handling of hazardous materials.

The City of Highland recognizes its responsibility to provide information and develop guidelines for the management of hazardous waste within City limits. However, not all necessary facilities for processing, transportation, and disposing of hazardous materials may be physically located within City boundaries. The City recognizes its role as a participant in the regional management of hazardous wastes, their generation, transportation and disposal.

San Bernardino County has a County Hazardous Waste Management Plan (HWMP). As further required by the State, all cities within the County must also adopt a City Hazardous Waste Management Plan. Ordinance No. 171, in accordance with state law and the HWMP, regulates hazardous materials management in the City and requires businesses that use hazardous materials or generate hazardous waste to include an inventory of amounts and types of hazardous materials, practices for management and reductions, and emergency response procedures.

GOAL 6.4

Protect life and property from the potential short- and long-term risks of transporting, storing, treating, and disposing of hazardous materials and wastes in the City.

Policies

1) Ensure compliance with current federal, state, and local regulations governing hazardous materials transport, storage, treatment, and disposal by working with appropriate agencies.

2) Require that new facilities involved in the production, use, storage, transport or disposal of hazardous materials locate a safe distance from land uses that may be adversely impacted by such activities. Conversely, do not allow new sensitive facilities, such as schools, child-care centers, and senior centers, to be located near existing sites that use, store or generate hazardous materials.

3) Identify City roadways along which hazardous materials are routinely transported. If essential facilities, such as schools, hospitals, child care centers or other facilities with special evacuation needs are located along these routes, identify emergency response plans that these facilities can implement in the event of an unauthorized release of hazardous materials in their area.

4) Provide information to the public on regulations that address the transport, storage, treatment, and disposal of hazardous materials and wastes.

5) Maintain a variety of effective citywide programs for household hazardous waste collection.

Fire Hazards

Wildland and Urban Fires

Fire hazards threaten lives, property, and natural resources, and also present a considerable risk to vegetation and wildlife habitat. Fires occur in wildland, urban, and wildland-urban interface areas.

Urban fires usually result from sources within structures themselves and are generally related to specific sites and structures. The availability of fire fighting services is essential to minimizing loss. Effective fire protection in urban areas is based upon several factors, such as the age of structures, efficiency of circulation routes that ultimately affect response times, and availability of water resources to combat fires. More urbanized, developed areas of Highland generate general fire service needs. Typical calls for service in these urban areas include structure, vehicle, trash, and vacant lot field fires, as well as emergency medical assistance and response to traffic accidents.

Wildland-urban interface area in north Highland.

Wildland fires occur in large undeveloped areas and result from ignition of grass, brush, and other flammable vegetative materials. Wildland fires can burn large areas destroying vegetation leading to increased susceptibility to land or mudslides, and cause a great deal of damage to both structures and valuable open space land. As indicated in Figure 6.6, the northeastern and eastern portions of the City, especially hillside areas, are most susceptible to wildfires due to the location of fire-prone vegetation, limited access for fire fighting equipment, steep topography, and seasonal conditions that exacerbate fire hazard conditions. Conditions contributing to the severity of wildland fires are primarily related to weather, including temperature, humidity, and wind. Winds commonly referred to as "Santa Ana" winds typically occur during the fall months and pose a particularly significant hazard.

Wildland-urban interface fires occur in areas where urbanized development meets wildland areas. Wind-driven wildland-urban interface fires pose a significant threat to lives and have increased potential to cause significant damage to structures.

In wildland and wildland-urban interface areas, taking the proper precautions, such as the use of fire resistant building materials, implementing fuel modification zones, and maintaining vegetation clearance around structures can help protect developed lands from fires, thereby reducing the potential loss of life and property. New development in wildland and wildland-urban interface areas must be consistent with the provisions of the municipal code.

The California Department of Forestry and Fire Protection (CDF) provides fire protection and emergency medical services to the City of Highland through a cooperative agreement. The CDF also provides wildland fire protection to the unincorporated state responsibility area immediately adjacent to the eastern edge of the City. Additional wildland fire protection services are provided by the U.S. Forest Service on National Forest Lands adjacent to the City.

In October 2003, the worst fires in at least a decade, as described by FEMA, raged across Southern California causing widespread devastation and prompting the declaration of five counties, including San Bernardino County, as federal disaster areas. The City of Highland remained relatively unharmed by this disaster, primarily as the result of aggressive firefighting, and pre-fire preparation and planning. For example, flood control channels and easements at the eastern portion of the City acted as buffers between the fire and homes.

Peak Water Demand and Supply

The availability of water is critical to effective fire protection. The East Valley Water District (EVWD) provides water services to the majority of Highland. Other water districts serving Highland include the Arroyo Verde Mutual Water District and the Eastwood Farms Community Water Users Association. According to the CDF, the Insurance Services Office (ISO) rated the fire protection system of Highland in July 2002 and gave the EVWD a rating of Class I for their water delivery system. A Class I rating is the ISO's best possible classification.

☞ See the Public Services and Facilities Element for additional information on fire and water services.

The CDF has general water flow requirements of 1,500 gallons per minute (gpm) for new residential development and 3,000 gpm for new commercial development. Table 6-1 is a list of water flow requirements by land use for fire protection.

Table 6-1: Water Flow Requirements for Fire Protection

Land Use	*Fire Flow*
Agricultural/Open Space	1,000 gpm for 2 hours
Single-Family Residential	1,500 gpm for 2 hours
Multi-Family Residential/High Density	2,500 gpm for 2 hours
Commercial/Industrial	3,000 gpm for 3 hours

Source: California Department of Forestry and Fire Protection, June 2004.

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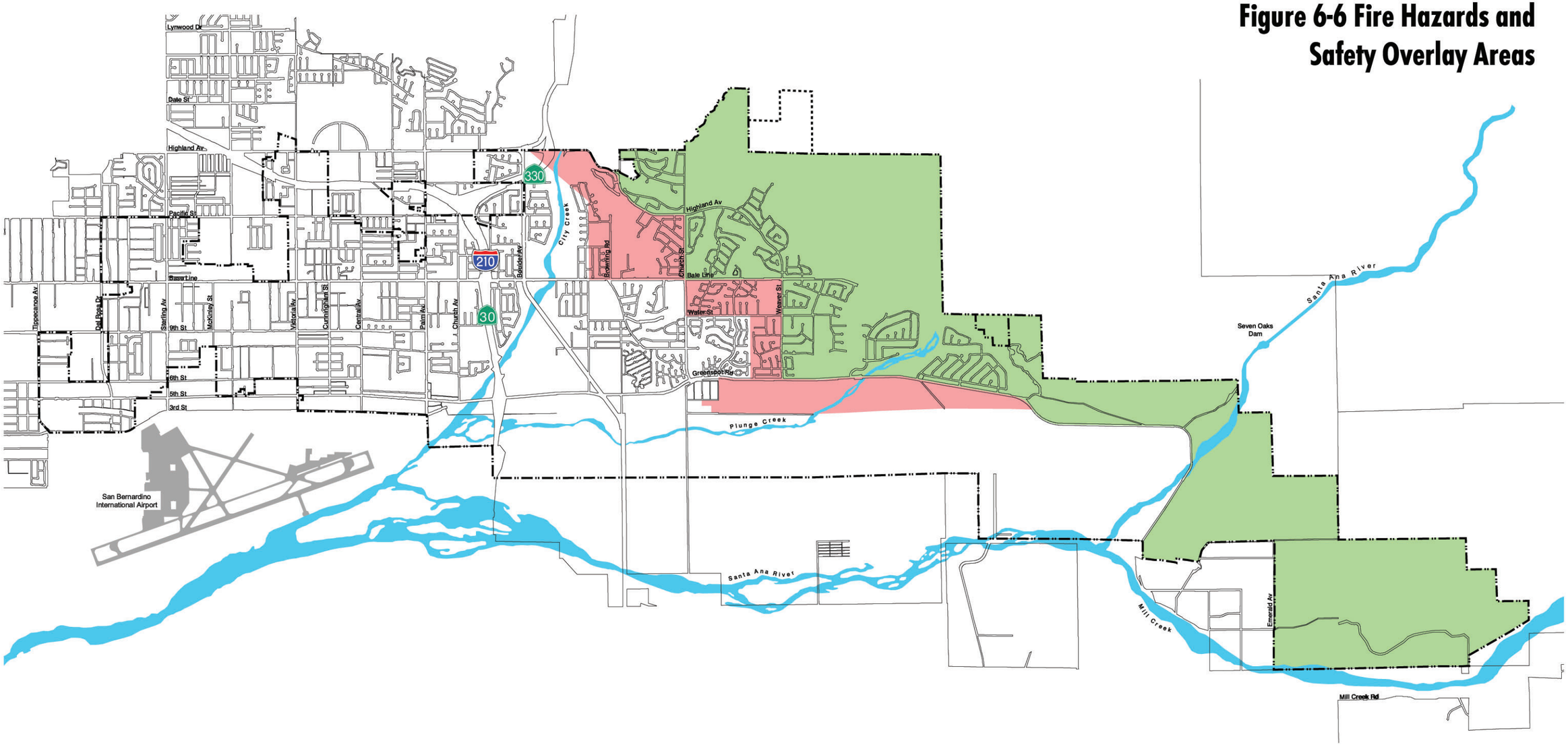
Figure 6-6 Fire Hazards and Safety Overlay Areas



Fire Severity Zone I

Fire Severity Zone II

City Boundary

Sphere of Influence

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GOAL 6.5

Protect life and property from wildland–urban interface fires.

Policies

1) Review the vulnerability of new development in areas with the potential for wildland-urban interface fires and incorporate appropriate mitigation measures in the conditions of approval.

2) Ensure the adequate protection of proposed and existing development in areas subject to wildland-urban interface fires and balance the need for fire prevention measures with the need to preserve significant biological resources.

3) In areas designated as Fire Hazard Zone I and Fire Hazard Zone II, and as set forth in the Municipal Code, continue to incorporate additional fire safety standards, such as:

   - Secondary or alternative access for all new development in a fire safety review area;
   - Increased setbacks from fuel modification areas and fire hazard areas;
   - Perimeter roads adjacent to development; or
   - Maintained fuel modification zones.

4) Prepare, develop, and distribute public information on the prevention of urban and wildland fires.

5) Continue to update the fire department five-year plan to identify fire hazards and risks, and ensure present and future fire protection needs.

6) Continue efforts to develop and maintain public fire prevention education and hazard abatement, in cooperation with other appropriate agencies.

7) Enforce the Fire Sprinkler ordinance for all newly constructed buildings.

8) Require all development to meet the emergency water service standards established by the East Valley Water District.

9) Encourage the use of fire proof construction materials.

Emergency Preparedness

The purpose of emergency preparedness is to protect the health, safety, and welfare of the general public during and after natural and human emergencies. These emergencies include flooding, high winds, earthquakes and other geologic hazards, hazardous material accidents, and wildfire. The City has adopted the City of Highland Emergency Plan. As discussed under Fire Hazards, the City also has a five-year plan that outlines fire hazards and risks, and present and future fire protection needs.

The City participates in the Statewide Master Mutual Aid Agreement; Mutual Aid Agreements with the City of San Bernardino and the San Bernardino County Sheriff's Department; and automatic aid agreements with the cites of Redlands and Yucaipa, the CDF, and the U.S. Forest Service. The American Red Cross also provides a wide range of emergency response support services to Highland ranging from single residential fire to community-wide disaster relief. The Red Cross has an area disaster action team coordinator who will respond to emergencies within an hour of notification to estimate the damage and the need for further relief. The Red Cross works closely with the CDF and the school districts to provide damage assessment, shelter for families left homeless by a disaster and referral services to affected households that need further assistance from state and federal agencies or the Red Cross. Red Cross personnel also assist with evacuations, identifying missing persons, and reuniting displaced families.

Evacuation Routes

The current San Bernardino County General Plan identifies potential evacuation routes in and around Highland. Major evacuation routes within the San Bernardino Valley include, but are not limited to, Interstate 10, 15 and 215; State Highway 30, 31, 60, 66, and 71; and numerous major and secondary highways. Since earthquakes, floods, fires, or other disasters may render some or portions of these routes impassible, specific evacuation routes may need to be designated during an emergency depending on the nature and location of the particular disaster.

GOAL 6.6

Maintain effective emergency preparedness and response programs and coordinate with appropriate public agencies and neighboring jurisdictions to develop a regional system to respond to daily emergencies and major catastrophes.

Policies

1) Maintain the City's emergency plan including inventory of all local emergency resources.

2) Continue to support area wide mutual aid agreements and communication links with San Bernardino County authorities and other participating jurisdictions.

3) Evaluate the adequacy of access routes to and from hazard areas relative to the degree of development or use (e.g., road width, road type, length of dead-end roads, etc.).

4) Establish a working relationship with local amateur radio clubs and secure their voluntary participation in disaster recovery efforts.

5) Ensure adequate provision of public information to residents and businesses on actions to minimize damage and facilitate recovery from a natural disaster.

Airport Land Use Compatibility and Safety

The importance of air transportation has grown over the years due to the timesaving it provides in the movement of people and freight. It has opened up many areas that were not economically feasible when served by other modes of transportation and provides businesses better access to labor supply, natural resources, and product market. In addition to the increased demand for air transportation by businesses, the rapid population increase expected for the Inland Empire will also likely require the expansion of existing aviation facilities and the addition of new facilities.

The closest airports to Highland are the Rialto Municipal Airport, Redlands Municipal Airport, and the San Bernardino International Airport. The Rialto Municipal Airport to the west of the City and the Redlands Municipal Airport to the southeast of the City are general aviation airports. The San Bernardino International Airport, located just outside the City's southern boundary, has the capacity to provide regional air traffic for domestic and international service, both commercial and cargo, along with the necessary support facilities

For additional Airport Land Use Compatibility policies, please see the Airport Element.

For additional Noise policies, please refer to the Noise Element.

The San Bernardino International Airport lies south of the City of Highland.

for major and smaller airlines. In addition, the Ontario International Airport, located approximately 30 miles west of Highland, serves as the nearest commercial airport providing air carrier and air cargo operations.

Evolving air transportation services in the City of San Bernardino can potentially complement economic growth in Highland and create competitive advantages for its businesses. However, the nature of airport operations and their accompanying noise and safety hazards require careful land use planning on adjacent lands to ensure the safety of residents and passengers alike, and to protect Highland businesses and property owners to the greatest extent possible from the potential hazards that could be created by operations from the San Bernardino International Airport, especially by arriving and departing flights that fly over the southern portion of Highland. Figure 6.7 shows the Airport Influence Area of the San Bernardino International Airport. Additionally, a small portion of Highland lies within an area designated as an Area of Special Compatibility Concern on the Redlands Municipal Airport Land Use Compatibility Plan (1997).

GOAL 6.7

Reduce risk to people and property by limiting the type and intensity of development within identified aircraft potential zones and ensure adequate public notification of aircraft activities to residents in overflight areas.

Policies

1) Require the review of all new development in proximity to the San Bernardino International Airport for compliance with Federal Aviation Administration (FAA) requirements and the California Airport Land Use Planning Handbook with adopted plans.

2) Evaluate the compatibility of airport uses, activities, and operations with all new development in proximity to the San Bernardino International Airport prior to approval and protect sensitive uses, such as residences, schools, hospitals, and libraries from overflight areas.

3) Require letters of advisement incorporating information in Conditions, Covenants and Restrictions (CCRs) or Real Estate Disclosures, which report where projects occur within the projected 65 Community Noise Equivalent (CNEL) and established Airport Influence Areas (AIA).

4) Encourage notification requirements and establishment of a buyer awareness program for areas of Highland within established Areas of Special Compatibility Concern.

5) Actively participate in San Bernardino International Airport planning efforts to: encourage economic advantages for the City; discourage intensification of negative impacts on Highland; ensure adequate mitigation of impacts and preservation of land values; and encourage aircraft arrivals and departures southwest of the Airport.

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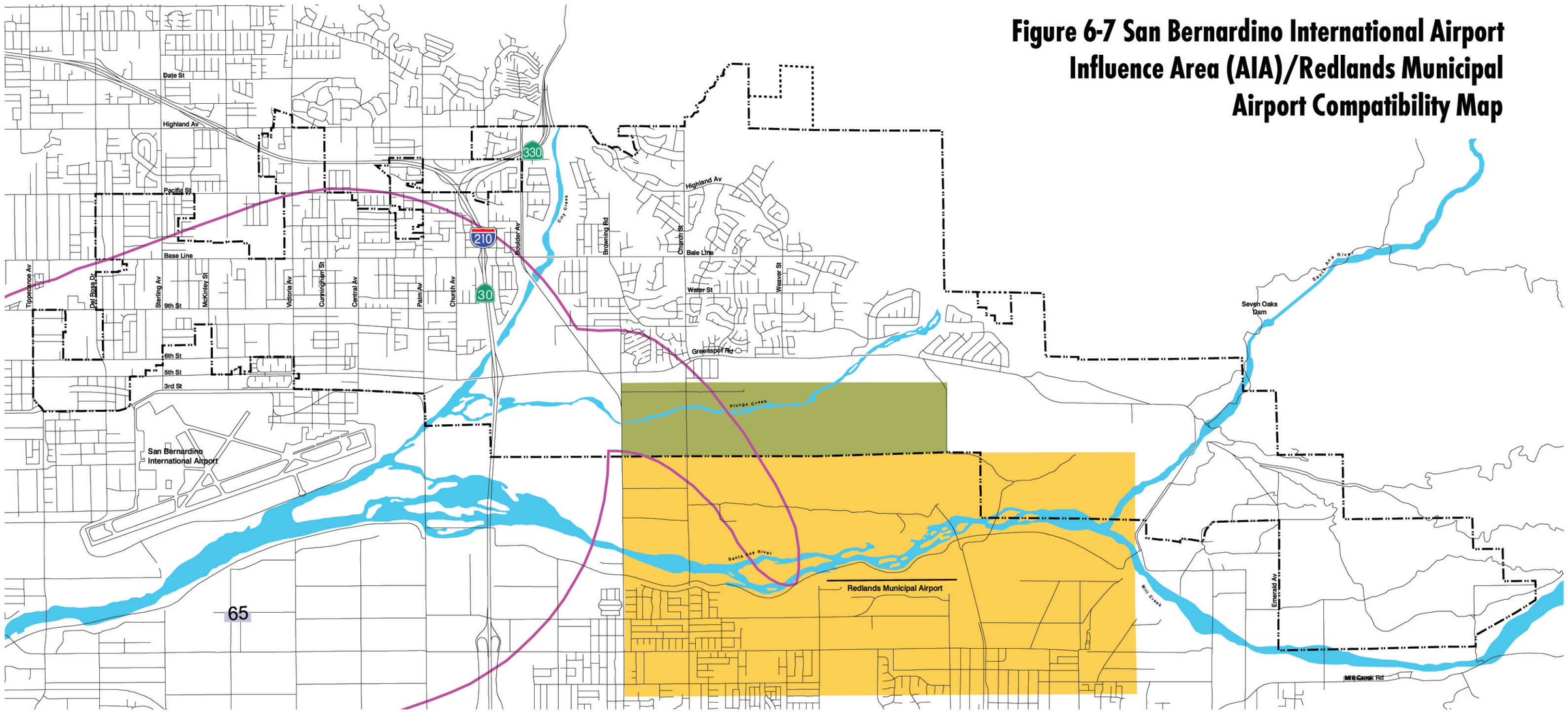
Figure 6-7 San Bernardino International Airport Influence Area (AIA)/Redlands Municipal Airport Compatibility Map



San Bernardino International Airport

- Airport Influence Area

Redlands Municipal Airport

- Redlands Municipal Airport Influence Area
- Area of Special Compatibility Concern
- City Boundary
- Sphere of Influence

Note: As of the writing of this General Plan, the Airport Master Plan for the San Bernardino International Airport was in the process of being prepared. As a consequence, the noise contours and safety zones were not available to include in this plan. Upon adoption of the Airport Master Plan, the new noise contours and safety zones will be incorporated into this figure.

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Air Quality

Although air quality in Southern California continues to improve, Southern California still experiences the worst air quality in the nation, requiring continued diligence to meet air quality standards. Continuing the progress toward clean air is a challenging task, not only to recognize and understand complex interactions between emissions and resulting air quality, but also to pursue the best possible set of strategies to improve air quality while maintaining a healthy economy.

South Coast Air Basin

The City of Highland is located within the South Coast Air Basin. The Basin is a coastal plain with connecting broad valleys and low hills that extend across Los Angeles and Orange Counties as well as the western portions of Riverside and San Bernardino Counties. The Pacific Ocean forms the southwestern border and high mountains surround the rest of the Basin.

Climate and the amount of pollutants emitted into the air are the two primary factors influencing Highland's air quality. Air quality in the Highland area is the product of several factors including climate, location, topography, and emissions from automobile and truck traffic. Additionally, particulate emissions from building, mining and industrial activity also influence air quality. The production of ozone, the main constituent of photochemical smog, is Highland's chief air quality problem. Motor vehicle emissions accumulated throughout the Basin and transported to the Highland area are the main source of ozone.

The South Coast Air Quality Management District (SCAQMD) is the air pollution control agency that provides direction regarding the management of air quality within the region, which includes Orange County and the urban portions of Los Angeles, Riverside, and San Bernardino County. SCAQMD is responsible for controlling air pollution mainly from stationary sources, such as large power plants, refineries, the corner gas station, and some consumer products. SCAQMD develops and adopts an Air Quality Management Plan in compliance with federal and state clean air standards.

Climate

The climate of the Highland area is typical of Southern California's Mediterranean climate with hot, dry summers and mild, moist winters. This pattern is influenced by the semi-permanent high-pressure zone of the eastern Pacific, which is responsible for deflecting storms away from the Basin and allowing for the mild climate of the region. This climatological pattern is rarely interrupted, although some periods of

extremely hot weather, winter storms, or Santa Ana wind conditions occur.

Winds are an important climatic feature of air quality. The SCAQMD notes that the low average wind speeds of the Basin have limited effectiveness in dispersing accumulated air pollutants. Instead, vertical wind currents induced by heating of the mountain slopes carry much of the pollution through mountain passes or upward and over Basin mountains during the spring and early summer months. From late summer through winter, however, winds originating in the mountains occur too late in the day to fully disperse pollutants, thereby allowing them to accumulate within the Basin for one or more days.

Nighttime winds emanating from the southeast are generally mild and cool. Daytime winds originate off-coast and carry with them significant amounts of industrial and automobile air pollutants from the densely urbanized western portion of the Basin to the eastern portion of the Basin.

Inversions are a critical climatic factor that can significantly impede the vertical dispersion of air pollutants. Inversion layers can create an effective "lid" over the Basin, whereby temperature increases with altitude and obstruct vertical air movement. Air pollutants can no longer rise through the inversion, thereby concentrating within the Basin. Inversion layers generally dissipate during the day, once the ground temperature warms up to the air temperature.

Air Quality Plan

Highland has participated in the preparation of a Regional Air Quality Plan for San Bernardino County and its cities within the South Coast Air Basin. The plan includes an Air Quality Element with goals and policies that would become part of each jurisdiction general plan as agreed upon by the participants through consensus. The plan also has a menu of actions that can be evaluated by each jurisdiction, tailored to its specific needs, and incorporated into its own implementation plan. The portions of the Regional Air Quality Plan applicable to Highland's General Plan have been integrated into the goals and policies of this element.

GOAL 6.8

Reduce mobile and stationary source air pollutant emissions through cooperation and endorsement of the San Bernardino Regional Air Quality Plan and support of feasible techniques, incentives, and regulatory measures to achieve significant air quality improvements and any necessary air quality related lifestyle and economic changes while sustaining continued economic growth.

Policies

1) Ensure consistency of Federal, State, and County legislation with Highland's Air Quality goal and policies.

2) Participate in formulating regional policies and solutions to air quality problems established by the San Bernardino County Regional Air Quality Plan.

3) Create and integrate innovative local emissions reducing pilot programs into city plans for future government facilities and equipment.

4) Support the development and use of alternative fuel sources for transportation-related activities to reduce local government energy demand.

5) Participate in the establishment of public private partnerships for the provision of innovative public and private transportation services and systems where the enhancement of the local and regional air quality is a major goal.

6) Cooperate with regional transit agencies in the continued development of diverse and efficiently operated transportation systems that generate the minimum feasible pollutants.

7) Support current incentive programs that recognize and reward developments using new and innovative emission reduction techniques such as innovative efficient window glazing, wall insulation, and ventilation systems; efficient air conditioning, heating, and appliances; use of passive solar design, and solar heating systems; use of energy cogeneration and/or use of waste energy; and landscape techniques that reduce water consumption and provide passive solar benefits.

See the Open Space and Conservation Element for additional policies on Air Quality.

8) Develop transportation demand management programs and incentives to reduce home to work vehicle trips. Examples of programs and incentives include:

   - Employee ride share and transit incentives in public agencies.
   - Employee ride share and transit incentives for employers with more than 25 employees at a single location.
   - Working with private agencies in the implementation of teleconferencing and telecommuting for employers with more than 25 employees at a single location.
   - Working with SANBAG to develop a public/private telecommunications center in San Bernardino County.

9) Reduce work trips in the City and peak period auto travel by enforcing the City's Transportation Demand Ordinance; supporting current staggered, flexible, and compressed work schedules in public agencies; working with private agencies to encourage work schedule flexibility programs for employers with more than 25 employees in a single location; educating City residents on the advantages of ride sharing and public transit; and encouraging the development of job-intensive uses within designated employment centers for local residents.

10) Reduce vehicle emissions by supporting the design and implementation of the Citywide system of bikeways and pedestrian trails as a non-polluting circulation alternative by requiring as part of the development review process the installation of planned bicycle routes, paths, and lanes where designated; and the construction of necessary bicycle parking and storage areas within convenient commercial, employment and recreation activity areas.

11) Reduce the number of vehicles driven to work by requiring as part of the development review process that preferential parking be included in parking lot designs to high occupancy vehicles, vanpools, and shuttle services, if applicable.

12) Continue to encourage the integration of air quality planning with land use and transportation planning in the design, review, and development processes by:

   - Ensuring that site designs facilitate rather than discourage pedestrian movement between commercial development and residential or office uses (e.g., locate buildings adjacent to the street with parking behind such that pedestrians need not walk through parking lots to reach their destination; provide clear pedestrian paths and connections, etc.).

- Supporting the mixed use overlay in the zoning ordinance as a means to enhance pedestrian movement throughout the City.
- Providing for increased intensity of development in designated locations along existing and proposed transit corridors.
- Supporting location and operational standards in the development code for ancillary employee services, including but not limited to child care, restaurants, banking facilities, convenience markets, at major employment centers for the purpose of reducing midday vehicle trips.
- Continuing to develop interconnected traffic signal control system in all new projects, roadway improvements. Move forward with programs to retrofit existing signals on all streets where traffic volume and delay time is significant.
- Enforcing parking lot design guidelines that encourage reciprocal parking designs and/or agreements between adjacent developments, provide for the consolidation of driveways along major commercial corridors such as Base Line, and require parking areas be efficiently designed so as to minimize internal circulation conflicts.
- Integrating, where appropriate and feasible, traffic improvements (e.g., dedicated turn lanes and pockets, bus turnouts and shelters, restripe traffic lands for optimal traffic flow) into capital improvement projects that improve the efficiency of transportation systems.
- Continuing to ensure that all new development applications include an air quality improvement summary per SCAQMD and SCAG Air Quality Handbook Guidelines, which describe the general methods used in development design to reduce air emissions.

13) Regulate the location and design of sensitive receptors (schools, day care facilities, hospitals and the like) from excessive and hazardous emissions to air pollution, and continue to support site plans that separate and/or buffer residential and sensitive receptors from freeways, arterials, point sources, and hazardous material locations.

14) Reduce particulate emissions from construction sites, grading activities, temporary roads and parking lots, and agricultural operations by enforcing requirements that minimize fugitive dust.

15) Enforce compliance of new development with the Tree Preservation Ordinance.

16) Reduce particulate and stationary emissions attributed to the removal, transportation and processing of mineral resources by enforcing required permits and physical barrier requirements that minimize the effects of dust from day-to-day operations of mineral extraction, transportation, and processing facilities.