

9

Safety

The Safety Element of the General Plan is to provide information “for the protection of the community from unreasonable risks associated with the effects of seismically induced surface rupture, ground shaking, ground failure, and dam failure; slope instability leading to landslides, subsidence, and other geological hazards; flooding; hazardous material accidents; and wildland and urban fire” (Government Code §65302 [g]). One of the City’s highest priorities is the protection of its residents from geologic and soils hazards, hazardous materials, flooding, and fires.

A new component of the safety element is a discussion of the City’s Emergency Operations Plan. The Emergency Operation Plan premise is to reduce injury and loss of life, property, and natural resources through the effective management of emergency resources.

9.1 SAN RAMON EMERGENCY OPERATIONS PLAN

In 2006, the City of San Ramon City Council adopted its Emergency Operations Plan and a subsequent update to the plan was initiated in 2009. The Emergency Operations Plan identifies the appropriate actions to take when an event occurs due to a major earthquake, hazardous materials incident, flood, national security emergency, wildfire, landslide, and dam failure.

The City’s plan complies with existing state and federal laws. The objectives of the plan are to reduce injury, and loss of life, property, and natural resource through effective management of emergency resources. The Emergency Operations Plan identifies the City’s emergency planning, organizational, and response policies and procedures, while integrating and coordinating these with other governmental levels when required. The Emergency Operations Plan institutes the Incident Command System, the Standardized Emergency Management System, and the National Incident Management System, which provide a common system that is recognized throughout the State of California as a basis for managing large emergency incidents that could involve multiple agencies and jurisdictions.

The City’s response to disasters is based on four phases including: increased readiness, initial response operations, extended response operations, and recovery operations. All individual departmental plans support the Emergency Operations Plan and inform staff of the procedures for recalling departmental personnel, disaster assignments, and departmental resource lists. Response to emergencies follows the Incident Command System, ensuring unified command by all emergency response teams. Depending on the type of incident, the most appropriate agency will become the lead agency and will be supported by the other emergency response teams.

GUIDING POLICIES

9.1-G-1 Maintain the City’s Emergency Operations Plan as the guide for emergency management in San Ramon.

IMPLEMENTING POLICIES

9.1-I-1 Maintain and update the City’s Emergency Operations Plan, as required by State and Federal laws, to minimize the risk to life and property of seismic and geologic hazards, hazardous materials and waste, and fire.

Disseminate information to community and business leaders and residents regarding all aspects of emergency and disaster preparedness, including plans for evacuation and alternate access routes and provisions of Emergency Operation Plan. The City will participate in a coordinated emergency response in the event of any local or regional, natural or man-made disaster.

9.1-I-2 In collaboration with other agencies, maintain and disseminate emergency preparedness information.

The City participates in a Joint Powers Agreement (JPA) Citizen Corps Council program as encouraged by Federal Emergency Management Agency (FEMA) in collaboration with the San Ramon Valley Fire Protection District, San Ramon Valley Unified School District, and Town of Danville. The joint program conducts an annual emergency preparedness community fair, provides a Community Emergency Response Team (CERT) program, and conducts regular trainings and drills with interested residents and businesses. Public education and emergency preparedness information are shared between the agencies for common dissemination to the public, consistent with the “be ready” federal and state campaigns.

9.1-I-3 Coordinate regular exercises and drills with emergency organizations. Provide training opportunities for all City staff to be adequately trained to State and Federal requirements.

The City maintains regular employee training programs to meet the National Incident Management System (NIMS) and California Standardized Emergency Management System (SEMS) requirements.

9.2 GEOLOGIC, SEISMICITY AND SOILS HAZARDS

GEOLOGY

The San Ramon Planning Area is located in the East Bay Hills of the Coast Ranges in the western part of Contra Costa County, California. The East Bay Hills are part of a block of folded and faulted Upper Cretaceous age (about 62 to 98 million years ago) marine sedimentary rocks of the Great Valley Sequence. The local hills are formed from younger rocks, uplifted between the Hayward and Calaveras fault zones. The Planning Area includes a series of northwest-trending ridges and valleys, and is underlain by Tertiary (about 2 to 62 million years ago) marine and non-marine sedimentary rocks.

Safety

SEISMICITY

The major active fault with rupture potential in San Ramon is the Calaveras Fault, which lies parallel to and just west of San Ramon Valley Boulevard. The California Legislature has established an Alquist-Priolo Earthquake Fault Zone along the fault, requiring detailed studies of rupture hazards prior to new construction. Two smaller faults, the Dublin Fault and the Bollinger Fault, also traverse portions of the City and its Sphere of Influence and are not regarded as active. Minor faults, presumed inactive, intersect active or potentially active faults and any movement of the master fault could trigger adjustments (earthquakes) on minor cross faults or adjacent subparallel faults.

In 1990, the State Legislature passed the Seismic Hazards Mapping Act, which became effective on April 1, 1991. The purpose of the Act is to protect public safety from the effects of strong ground shaking, liquefaction, landslides, or other ground failure and hazards caused by earthquakes. The program and actions mandated by the Seismic Hazards Mapping Act closely resemble those of the Alquist-Priolo Earthquake Fault Zoning Act. The Seismic Hazards Mapping Act requires the State Geologist to delineate the various seismic hazard zones and requires cities to regulate certain development projects within the zones. If a project is located in this zone, development permits for a site may not be issued until the geologic and soil conditions of the project site are investigated and appropriate mitigation measures, if any, are incorporated into development plans.

The United States Geological Survey and the State Department of Conservation's California Geologic Survey prepare geologic maps and reports, which should be consulted for locations of additional minor faults. The existence of any fault line, whether it is inside or outside of an earthquake fault zone, should be given serious consideration and thorough evaluation prior to any development decisions.

SOILS

The San Ramon Planning Area is dominated by generally northwest-trending, broad, rounded ridges, and intervening valleys with steep side slopes. Sandstone bedrock crops out locally on ridge crests and underlies upper hill slopes at shallow depths. Northern and eastern portions of the Planning Area are underlain by non-marine conglomerate, sandstone, and mudstone. Alluvial terraces are locally present along major drainages. Soils are thin to non-existent on ridges, crests, and hill slopes, thicken toward the base of hill slopes, and generally are thick in colluvium-filled swales.

Soils within the San Ramon Planning Area frequently contain clays with high shrink-swell potential. Soils in the valley floors generally consist of alluvium and a mixture of sand, silt, and clay. These areas have an elevated risk of experiencing localized liquefaction in the event of strong ground shaking. Figure 9-1 illustrates the geotechnical hazards in San Ramon.

Slopes range from level and gently sloping along the valley floor to slopes exceeding 75 percent in hilly areas where rock outcrops occur. In these areas, there are high to severe erosion hazards on slopes where bare soil is exposed as well as elevated risks of landslides. Much of the Tassajara Valley and Bollinger Canyon Subareas are steeply sloped, with existing and potential for new landslides posing concerns for new development in these areas.

The Bay Area's seismic activity requires that the City be vigilant with regard to safety. Crucial measures may include the avoidance of geologic and seismic hazards in building, and the adequate provision of public information regarding seismic safety.

In the steeper portions of the Planning Area, such as Bollinger Canyon, the Westside, and Tassajara Valley, active landslides (debris flows, earth flows, and slumps) and severe erosion potential represent major constraints to development. Any development in valley floors would require careful siting, grading, and building techniques because these areas have an elevated risk of experiencing localized liquefaction in the event of strong ground shaking.

GUIDING POLICY

- 9.2-G-1 Minimize risks of personal injury and property damage posed by geologic and seismic hazards.

IMPLEMENTING POLICIES

- 9.2-I-1 Review proposed development sites during the planning process to identify and mitigate any potential geologic or seismic hazards.

Following receipt of a development proposal, engineering staff shall review the plans to determine whether a geotechnical review is required.

- 9.2-I-2 Require the preparation of a fault investigation study to identify appropriate setbacks for any proposed structure intended for human occupancy within 50 feet of an active fault trace.

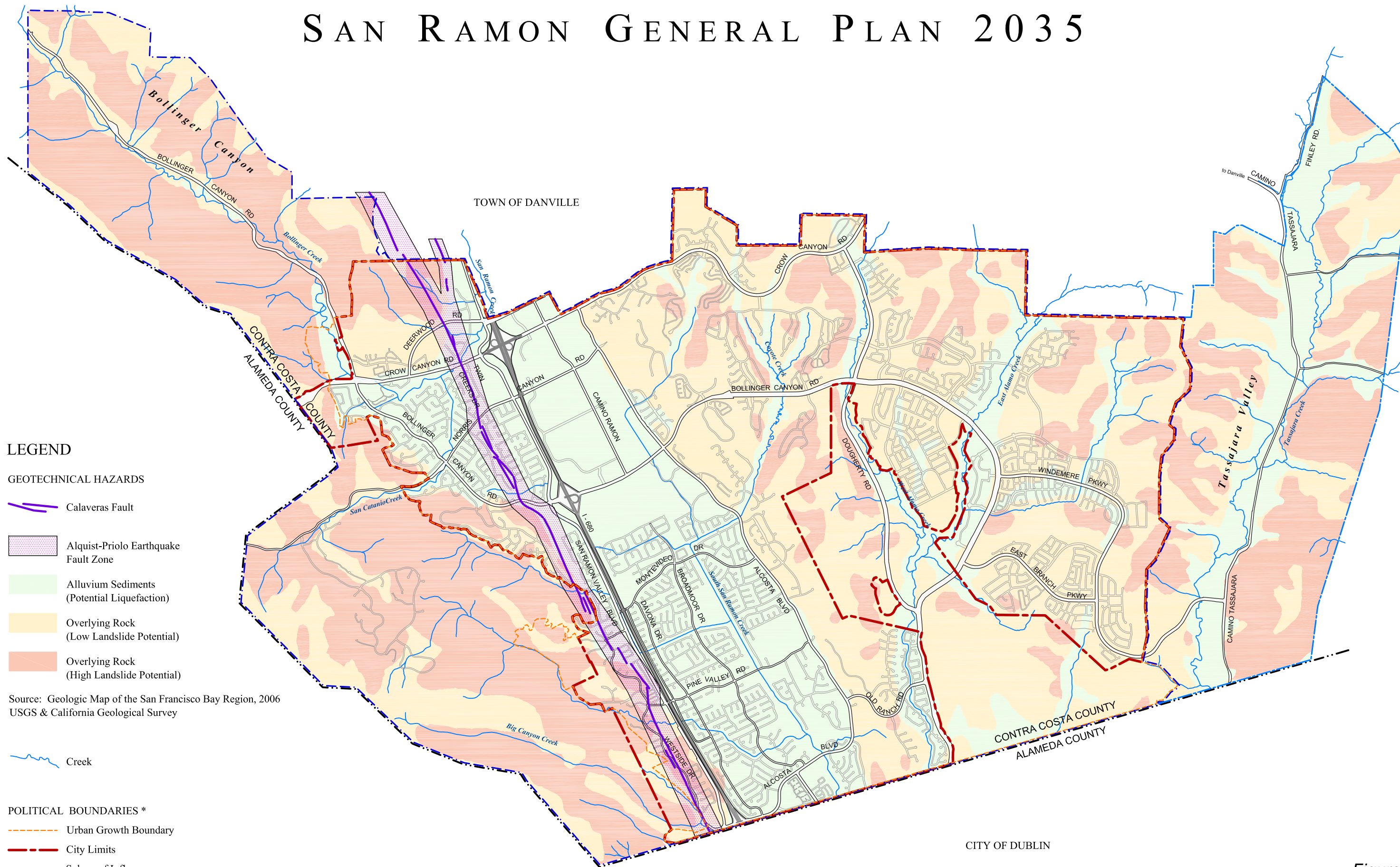
It is also the City's intent to discourage homes, offices, hospitals, public buildings, and other similar structures over the trace of an inactive fault, but to allow non-habitable uses such as landscaping, parking lots, and noncritical storage, within seismic setback areas that could experience displacement without undue risk to people and property. Roads may be built over active faults only where alternatives are impractical and where no utility lines are placed in the right-of-way.

- 9.2-I-3 Where appropriate, require an independent registered engineering geologist or geotechnical engineer to review geotechnical reports submitted by applicants on sites in seismically hazardous areas.

- 9.2-I-4 Require comprehensive geologic and engineering studies of critical structures regardless of location.



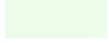


Critical structures are those most needed following a disaster or those that could pose hazards of their own if damaged. They include utility centers and substations, water reservoirs, hospitals, fire stations, police and emergency communications facilities, and bridges and overpasses.

SAN RAMON GENERAL PLAN 2035



LEGEND






GEOTECHNICAL HAZARDS

-  Calaveras Fault
-  Alquist-Priolo Earthquake Fault Zone
-  Alluvium Sediments (Potential Liquefaction)
-  Overlying Rock (Low Landslide Potential)
-  Overlying Rock (High Landslide Potential)

Source: Geologic Map of the San Francisco Bay Region, 2006
USGS & California Geological Survey

 Creek

POLITICAL BOUNDARIES *

-  Urban Growth Boundary
-  City Limits
-  Sphere of Influence
-  Planning Area Boundary
-  County Boundary

* The locations of political boundaries are shown adjacent to each other for ease of identification. Actual political boundaries are coterminous when shown as contiguous, parallel, or overlap.



Figure 9-1
Geotechnical Hazards

(Updated on October 21, 2019)

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- 9.2-I-5 Require geotechnical field review during the construction phase of any new development as determined by the City Engineer.

While proper grading techniques can effectively reduce risks of geologic hazards, it is important that a geotechnical engineer and/or engineering geologist provide onsite field inspection and testing during construction to ensure compliance with geotechnical recommendations.

- 9.2-I-6 Require preparation of a soils report as part of the development review and/or building permit process.

The City is underlain by moderately to highly expansive soils, which must be taken into account during building design to minimize potential cracking and settling of structures. The report, however, would not be necessary when soil characteristics are known, and the City's Building Official determines it is not needed.

- 9.2-I-7 Limit cut-and-fill slopes to 3:1 (33 percent slope) except where an engineering geologist or geotechnical engineer can establish to the satisfaction of the City Engineer that a steeper slope would not pose undue risk to people and property.

This grading standard is applied to new development throughout the City to reduce the appearance of angled contours and to maintain slope stability. The City encourages less steep slopes wherever possible so that the visual impacts of grading are minimized. Encourage the use of 3D modeling to assure visual mitigation. The San Ramon Valley Fire Protection District should also ensure that emergency access to hillside development is maintained.

- 9.2-I-8 Blend cut-and-fill slopes with existing contours to avoid the appearance of artificial slopes.

Grading plans should provide variation in horizontal and vertical contours that mimic the surrounding terrain such that development blends with the existing environment and avoids the visual impacts that result from high cut slopes and steep embankments.

- 9.2-I-9 Provide information and establish incentives for property owners to rehabilitate existing buildings using construction techniques to protect against seismic hazards.

San Ramon requires compliance to the City-adopted California Building Code, which specifies seismic standards for new construction, as well as for additions or expansions to buildings. It is in the community's best interest to do all that is necessary to ensure that all structures meet current seismic standards. Incentives may include free inspections, assistance in obtaining loans, and possibly reduced fees.

- 9.2-I-10 Control erosion of graded areas with revegetation or other acceptable methods.

Plant materials for re-vegetation should not be limited to hydro-seeding and mulching with annual grasses. Trees add structure to the soil and take up moisture while adding color and diversity.

- 9.2-I-11 Require financial protection for public agencies and individuals as a condition of development approval where geologic conditions indicate a potential for high maintenance costs for areas of public benefit.

The formation of Geological Hazard Abatement Districts (GHAD) is one mechanism that can ensure geotechnical mitigation measures are maintained over the long term for areas of public benefit. Financial risks are to be equitably shared among owners and not borne by the City.

- 9.2-I-12 Encourage continued investigation by State agencies of geologic conditions within the City's Planning Area to promote public awareness of potential geologic and seismic hazards.

The City's requirement for independent review of geologic reports shall consider the most recent available information regarding seismic hazards, including the potential for seismic shaking and fault rupture within the Mt. Diablo fold-and-thrust belt.

- 9.2-I-13 Review and update, as appropriate, City Code requirements for excavation, grading and filling to ensure that they conform to currently accepted standards.

9.3 HAZARDOUS MATERIALS

Some topics regarding public safety can be dealt with only at a regional level, or fall within the responsibility of public agencies other than the City of San Ramon. The use and transportation of hazardous substances is one example for which public safety depends in large part on the actions taken by the state and federal governments.

Pursuant to state law, the City has adopted by reference Contra Costa County's Hazardous Waste Management Plan. The Plan establishes a comprehensive approach to management of hazardous wastes in Contra Costa County, including siting criteria for new waste management facilities, educational and enforcement efforts to minimize and control the hazardous waste stream, and policies to maintain a unified database on businesses that generate hazardous waste.

The California Environmental Protection Agency (CEPA) lists all leaking Underground Storage Tank (UST) sites and all solid waste disposal facilities from which there is a migration of hazardous waste. Contaminated sites threaten the quality of the City's groundwater and shall be cleaned through decontamination of soils and filtration of groundwater. Clean-up shall be required in conjunction with development of property or alteration of existing uses.

In San Ramon, waste oil is collected at the curb by the franchised waste hauler, and household hazardous wastes are collected on weekends at various locations throughout the County. Central Contra Costa Sanitary District (Central San) and Mt. View Sanitary District (MVSD) jointly operate Contra Costa County's first permanent Household Hazardous Waste Facility (HHW) located in Martinez. The HHW collection facility collects household cleaners, automotive care products, paint and paint-related products, and garden care and pest control products at no charge for cities in its service area, which includes the City of San Ramon.

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Although San Ramon does have businesses that use hazardous materials, hazardous waste is not generated in large amounts and a waste disposal facility is not likely to be sited in the City. However, a concern exists because of the transportation of hazardous materials along the I-680 corridor and other routes of regional significance that pass through or are in close proximity to San Ramon.

GUIDING POLICY

9.3-G-1 Minimize the risk of property damage and personal injury resulting from the production, use, storage, disposal, or transportation of hazardous materials.

IMPLEMENTING POLICIES

9.3-I-1 Promote the reduction, recycling, and safe disposal of household hazardous wastes through public education and awareness.

9.3-I-2 Continue to investigate options for establishing household hazardous waste drop off locations that are convenient to San Ramon residents

Central Contra Costa Household Hazardous Waste Collection Facility was constructed in Martinez in approximately 1997 for the collection of hazardous waste generated by the residents and businesses of Contra Costa County. The Martinez facility is over 20 miles from San Ramon. In order to accommodate the San Ramon residents, financially viable options and ventures through local businesses and agencies to enhance household hazardous waste collection and disposal programs should be explored.

9.3-I-3 Require the clean-up of sites contaminated with hazardous substances.

The California Environmental Protection Agency publishes the Hazardous Waste and Substances Sites List, which identifies properties in the City that have the potential for hazardous materials contamination. Contaminated sites are threats to the quality of groundwater and shall be cleaned through decontamination of soils and filtration of groundwater. Clean-up shall be required in conjunction with new development, reconstruction, property transfer of ownership, and/or the continued operation after the discovery of contamination. Continual business operation may be permitted during the conduct of clean-up or remediation of the contamination as long as the clean-up proceeds in accordance with an approved clean-up plan.

9.3-I-4 Support and implement policies contained in the Contra Costa County Hazardous Waste Management Plan that encourage and assist the reduction of hazardous waste from businesses and homes in San Ramon.

9.3-I-5 Require businesses generating hazardous waste to pay necessary costs for local implementation of programs specified in the County Hazardous Waste Management Plan, as well as the costs associated with emergency response services for a hazardous materials release.

- 9.3-I-6 Work with the San Ramon Valley Fire Protection District to minimize potentially dangerous conditions from storing, dispensing, using and handling of hazardous materials.

The San Ramon Valley Fire Protection District reviews and approves plans for new and existing businesses with hazardous material, and may require new developments and change of use of existing facilities to conform to the California Fire Code with respect to storing, dispensing, using and/or handling of hazardous materials.

9.4 FLOOD AND STORM DRAINAGE

According to the Federal Emergency Management Agency (FEMA), a majority of Contra Costa County's creeks and shoreline lie within the 100-year floodplain. Drainage facilities in Contra Costa County are provided by the cities, the County, and the Contra Costa County Flood Control and Water Conservation District (FCWCD). The FCWCD collects special assessments to finance drainage improvements in areas with adopted drainage plans.

In the unincorporated parts of the San Ramon Planning Area, lands immediately abutting Alamo Creek in Dougherty Valley and Tassajara Creek in Tassajara Valley are within the 100-year floodplain. Neither Dougherty Valley nor Tassajara Valley is currently in a formal drainage area. The maintenance of Dougherty Valley flood control facilities will be undertaken by County Service Area (CSA) M-29. These facilities will be maintained by the City of San Ramon once they are annexed to the City as provided for in the Dougherty Valley Settlement Agreement.

The City is generally responsible for maintaining the publicly owned elements of the flood control system within the incorporated area, except for the San Ramon Creek downstream of Crow Canyon Road and the Canyon Lakes area, which are the responsibility of the FCWCD.

The 100-year flood is the flood elevation that has a one percent chance of being equaled or exceeded each year. Areas that are within the 100-year flood zone, as determined by FEMA at the time of preparation of this document are indicated on Figure 9-2.

The City's potential vulnerability to flooding makes the maintenance of the creeks system and the location of structures above the 100-year floodplain important considerations. Maintenance tactics, detention of increased runoff, and the grading of land so that buildings remain above the 100-year floodplain should be a priority in areas of new development and re-development.

Maintenance practices for existing creeks and drainage systems should also be re-evaluated and adjusted because of the changes in the awareness of drainage systems and their associated environments, as well as public attitudes and the regulatory climate. Changing the maintenance practices will require considerable resources, and new funding mechanism, should be explored.

Dougherty Valley's development concept maintains major creek channels and places development above the 100-year floodplain. In addition, the FCWCD and the Contra Costa County Public Works Department have employed flood detention basins and channeling systems to control the flows of both Alamo Creek and Tassajara Creek in the Tassajara

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Valley, and the FCWCD has designed storm drainage improvements that are expected to accommodate creek flows at development build-out.

GUIDING POLICY

- 9.4-G-1 Protect the community from risks to lives and property posed by flooding and stormwater runoff.

IMPLEMENTING POLICIES

- 9.4-I-1 Reduce hazards caused by local flooding through improvements and ongoing maintenance to the storm drain system and/or creek corridors.

- 9.4-I-2 Require new development to prepare hydrologic studies to assess storm runoff impacts on the local and subregional storm drainage systems and/or creek corridors. New development shall implement all applicable and feasible recommendations from the studies.

Developers shall provide an assessment of a project's potential impacts on the local and subregional storm drainage systems, so that the City can determine appropriate mitigation to ensure that system capacity and peak flow restrictions are not exceeded.

- 9.4-I-3 Require new development to provide a funding mechanism for ongoing maintenance of drainage facilities and other stormwater control measures. Maintenance may be by the City under contract, or by a private entity.

If wetlands are affected, maintenance of drainage facilities may include mitigation monitoring in compliance with regulatory requirements until these requirements have been met.

- 9.4-I-4 Establish landscape and maintenance guidelines for required detention basins to ensure that such facilities achieve a look and quality that is consistent with the landscape of San Ramon and applicable regulatory requirements.

Detention ponds provide aesthetic as well as safety benefits. Landscape and maintenance guidelines incorporated into a maintenance manual and ongoing monitoring would ensure that ponds in San Ramon are integral to the look and feel of the City landscape.

- 9.4-I-5 Maintain flood insurance rate maps and post for public education.

Encourage all property owners within flood hazard areas to carry flood insurance.

- 9.4-I-6 Explore new funding mechanisms for enhancing the riparian environment and converting, where possible, flood control channels back to a more natural setting while keeping the existing uses and maintaining sufficient carrying capacity of the channels.

- 9.4-I-7 All new developments shall not increase runoff to the 100-year peak flow in the City's flood control channels or to local creeks and shall be substantially equal to pre-development conditions. All new storm water systems shall be in compliance

with the requirements of the City's Stormwater Municipal Regional Permit issued by the San Francisco Regional Water Quality Control Board.

All cities within the Contra Costa County, including the City of San Ramon, are part of the Contra Costa Clean Water Program and are co-permittees of the Municipal Regional Permit issued by the San Francisco Bay Regional Water Quality Control Board. The Permittees are required within their respective jurisdictions to effectively prohibit the discharge of non-stormwater into the storm drain systems and watercourses through the enforcement of the Municipal Permit requirements at the local level.

- 9.4-I-8 New development shall be required to locate buildings above the 100-year floodplain and outside the special flood hazard area to minimize potential flood damages.

9.5 WILDLAND AND URBAN FIRES

The San Ramon Valley Fire Protection District (SRVFPD) provides fire protection services to the incorporated and unincorporated portions of San Ramon.

The risk of both urban and wildland fires exists in the San Ramon Planning Area (Figure 9-3).

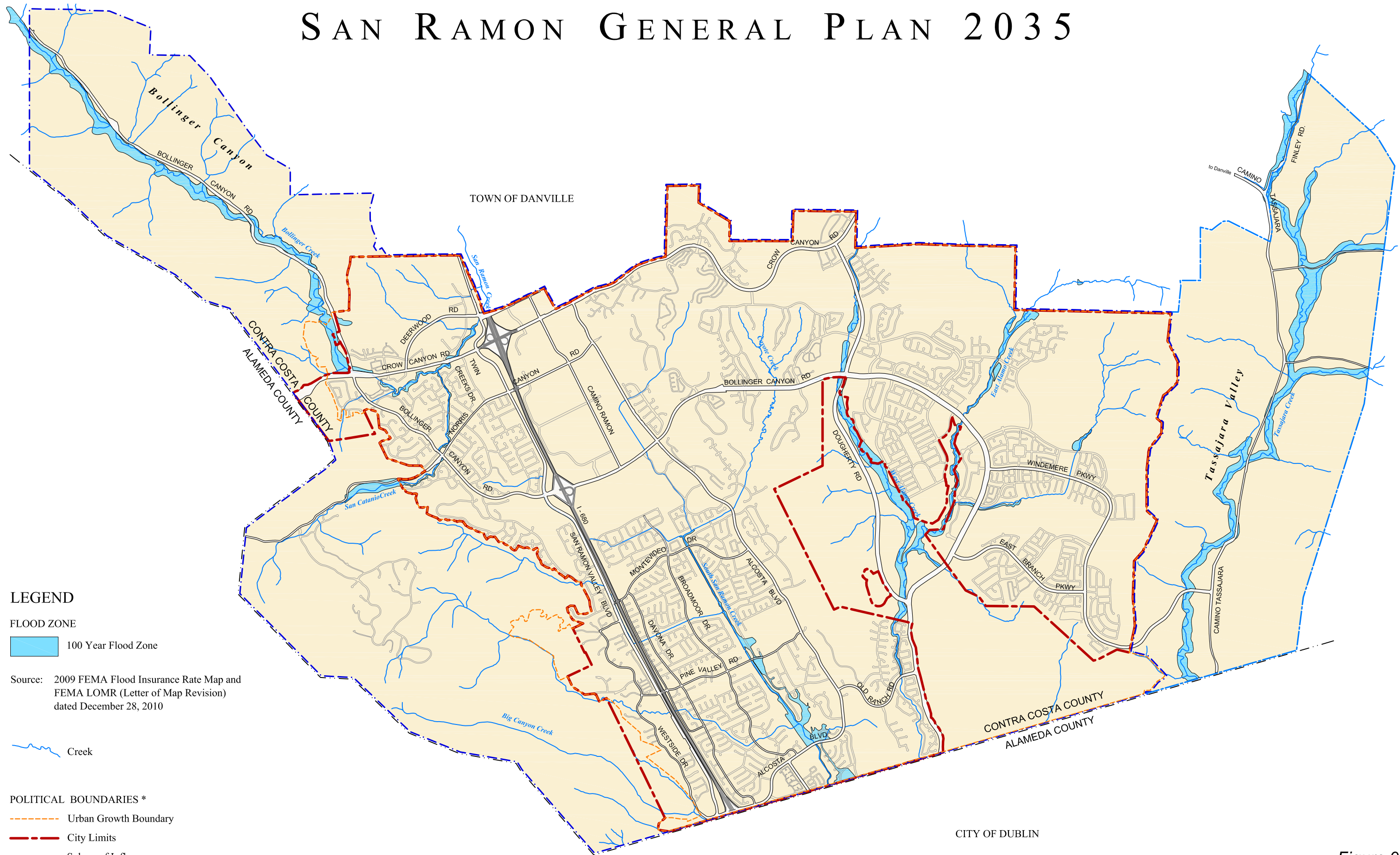
The hazards related to wildland fires are related to a combination of factors including winds, temperatures, humidity levels, fuel moisture content of vegetation and topography. The risk to the community is increased in some areas because of the combustibility of building materials including roofs, adequacy of access roads, water supply duration, and pressure and maintenance of flammable vegetation surrounding structures.

To quantify this potential hazard, the California Department of Forestry and Fire Protection (Cal Fire) has developed a fire modeling and mapping process that utilizes three main criteria in order to evaluate and recommend potential fire hazards in wildland areas. The criteria are type of vegetation, fire weather, and topography. The maps developed by Cal Fire identify areas as Fire Hazard Severity Zones and include three severity classifications: moderate, high, and very high.

Fire hazards in San Ramon are usually created by increases in the number of homes adjoining open space; therefore, much of the threat of wildland fires is due to open grasslands abutting residential developments. Many neighborhoods within the City are located in remote regions and are surrounded by grasslands. As San Ramon continues to expand, more of these wildland urban interface areas are created. This situation creates extreme fire hazards, and San Ramon is committed to planning development, with the help of fire protection agencies, that minimizes the risk of fire to the greatest extent possible.


Because of an extended dry season with low humidity, San Ramon has many days where fire danger is critical. Within the City, fuel loading is light and wildfire hazard is moderate, except in areas adjacent to the City where steep woodland slopes and rolling grassy hills create high to extreme hazards. Areas in San Ramon representing the greatest risk are the Dougherty Valley and Tassajara Valley areas to the east of the City Limit and the wildland areas at the Planning Area's western edge and northwestern corner.

SAN RAMON GENERAL PLAN 2035



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FLOOD ZONE

 100 Year Flood Zone


Source: 2009 FEMA Flood Insurance Rate Map and FEMA LOMR (Letter of Map Revision) dated December 28, 2010


 Creek


POLITICAL BOUNDARIES *

 Urban Growth Boundary

 City Limits

 Sphere of Influence

 Planning Area Boundary

 County Boundary

* The locations of political boundaries are shown adjacent to each other for ease of identification. Actual political boundaries are coterminous when shown as contiguous, parallel, or overlap.



Figure 9-2
Flood Zones

(Updated on October 21, 2019)

SAN RAMON GENERAL PLAN 2035

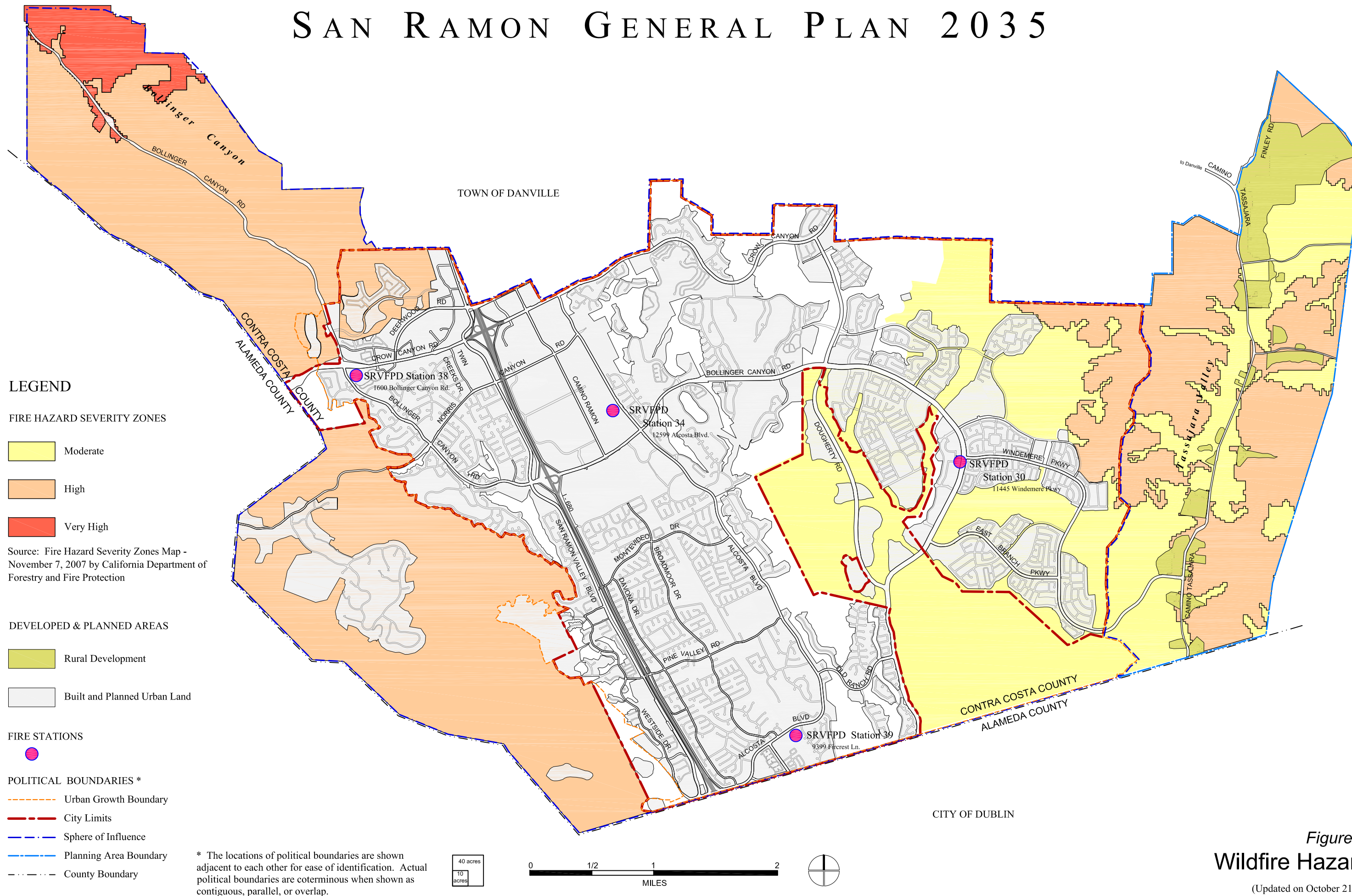


Figure 9-3
Wildfire Hazards

(Updated on October 21, 2019)

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New development will likely create increased fire hazards caused by interactions between open grassland and dense residential development. Therefore, projected development in the City's Planning Area will likely require the construction of fire suppression services facilities for new subareas. The budgeting and timing of such construction should be considered with respect to safety and the pace of new development. Moreover, community design techniques that allow optimal fire services response time should remain a priority.

GUIDING POLICY

9.5-G-1 Minimize the risks to lives, property, and natural environment due to fire hazards.

IMPLEMENTING POLICIES

9.5-I-1 Require site design features, which are based on a wildfire risk assessment, and fire retardant building materials to reduce the risk of fire within the City.

While the City enforces the International Building Code on all development and redevelopment proposals in San Ramon, the San Ramon Valley Fire Protection District may determine, during the initial application review, whether a project is located in a Fire Hazard Area and require developments to utilize best development practices that allow for both the protection of the structure and the preservation of the open space.

9.5-I-2 Require the completion of a Fire Protection Plan for new development adjacent to a Fire Hazard Area in order to determine which mitigation measures are appropriate to minimize fire hazard.

9.5-I-3 Work with the Fire Protection District on planning for a new training facility at an appropriate location where neighborhood impacts would be mitigated.

9.5-I-4 Require sprinklers in new homes located more than 1.5-miles from a fire station.

9.5-I-5 Require sprinklers in all mixed-use development to protect residential uses from non-residential uses, which typically pose a higher fire risk.

Appropriate fire protection measures are necessary in mixed-use developments since residential units are typically in close proximity—either above or adjoining—to higher fire load non-residential occupancies, such as retail stores, offices, restaurants, etc.

