

**Sonoma County
Hazard Mitigation Plan**

COMMUNITY PROFILE

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COMMUNITY PROFILE

1. COMMUNITY PROFILE

**DMA 2000, Stafford Act, and Title 44 Code of Federal Regulations (CFR) §201.6.
Requirements:**

Hazard Identification and Risk Assessment

Requirement §201.6(c)(2)(ii): *[The risk assessment shall include a] description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community. All plans approved after October 1, 2008 must also address NFIP insured structures that have been repetitively damaged by floods. The plan should describe vulnerability in terms of:*

Requirement §201.6(c)(2)(ii)(A): *The types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas;*

Requirement §201.6(c)(2)(ii)(B): *An estimate of the potential dollar losses to vulnerable structures identified in this section and a description of the methodology used to prepare the estimate.*

Requirement §201.6(c)(2)(ii)(C): *Providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.*

Source: FEMA, March 2011.

The Regional Setting

Sonoma County, the most northerly of the nine counties in the San Francisco Bay Region, is located along the Pacific coastline about forty miles north of San Francisco and the Golden Gate Bridge. The County is just over 1,500 square miles, making it the largest of the nine Bay Area counties. Sonoma County is bordered by the Pacific Ocean on the west, Marin County and San Pablo Bay to the south, Solano, Napa and Lake Counties to the east, and Mendocino County to the north.

The County Setting

Sonoma County's approximate 1,500 square miles include a diverse mosaic of landforms, environments, and communities. The broad, flat Santa Rosa Plain, which lies between the Sonoma Mountains on the east and low coastal hills on the west, contains the cities of Santa Rosa, Rohnert Park, and Cotati. The sparsely settled coastal area of the county, includes redwood and mixed conifer forests of the Mendocino Highlands in the north and rolling oak woodland, dairy lands, and coastal prairies in the south. The Mayacamas Range forms the

eastern boundary of the county. The Mayacamas and Sonoma Mountain ranges, it encloses the Sonoma Valley or "Valley of the Moon," a valley which extends from near Santa Rosa southeastward to the City of Sonoma and the baylands of San Pablo Bay. In the north, the Mayacamas Range and Mendocino Highlands surround the farming regions of Alexander and Dry Creek Valleys. In the far northeast, the remote interior of the Mayacamas Range contains the Geysers geothermal steam field.

Topography in the County is varied and includes mountainous areas, rolling hills and broad flat river valleys, and bay flats. The valleys and foothills are predominantly in agricultural uses with some urbanized areas and with a dense population. The County contains numerous watersheds, but the Russian River is the largest and most significant, draining over 1,485 square miles as it flows to the Pacific Ocean. The Russian River is the primary water supply and a key attraction to many communities along its banks. Approximately half of the County is in rugged rural areas with limited access and most of the development in these areas is limited to open space and timber/natural resource production. The economic base of the unincorporated County is largely tourism and agriculture.

Incorporated Area Local Hazard Mitigation Plans

The City of Santa Rosa is the only incorporated area of Sonoma County with a FEMA approved and locally adopted Local Hazard Mitigation Plan.

Adjacent Counties

Sonoma County shares borders with the following four counties: Mendocino, Lake, Napa and Marin. The Hazard Mitigation Plans for these counties may be found on their respective websites.

2. DISASTER DECLARATION HISTORY

Disaster declarations are proclaimed when the severity and magnitude of the event's impact surpasses the ability of the local government to respond and recover. Disaster assistance is supplemental and sequential. When the local government's capacity has been surpassed, a state emergency proclamation may be issued, allowing for the provision of state assistance. Should the disaster be so severe that both the local and state government's capacity is exceeded; a federal disaster declaration may be issued allowing for the provision of federal disaster assistance.

The frequency of disasters in the County's past highlights the need to mitigate disaster risk. Table CP-1 includes a list of emergencies and declared disasters since 1991. Some events were ultimately combined into a single state or federal declaration. There have been 29 Governor Proclaimed States of Emergency in Sonoma County from 1950-2016. Eighteen of those events were winter storm or flood related. Wildland fires account for four events, drought accounts for two events, and one was the result of the energy shortage.

Since 1991, the Sonoma County Operational Area, which includes the unincorporated county, its nine cities, Santa Rosa Junior College, and Sonoma State University, has experienced:

- 18 Emergency Operations Center (EOC) Activations for actual events
- 21 Proclamations of Local Emergency
- 14 Gubernatorial Disaster Proclamations
- 12 Presidential Emergency/Disaster Declarations
- 7 Activations of the Russian River Incident Command Post for actual events

Table CP-1: Sonoma County Hazard Events 1991-2015

Year	Event Name	Dates	EOC Activated	Local Emergency	Gubernatorial Declaration	Presidential Declaration
1990-1991	Freeze of '91	Dec. 90–Feb. 91		X	X	X
1993	Flood of '93	Jan. 20-25	X	X	X	X
1994	Fishing Emergency	May–Sep.		X	X	X
1995	Flood of '95, Part 1	Jan. 8-31	X	X	X	X
1995	Flood of '95, Part II	Mar. 7-15	X	X	X	X
1995	December Winter Storm	Dec. 11-12	X	X		
1996	February Winter Storm	Feb. 4-5	X			
1996	Cavedale Fire	Jul. 31–Aug. 20	X	X		
1996	Jenner Sandbarrier	Jul. 31–Aug. 20		X		
1996	Porter Creek Fire	Oct. 27-28	X			
1996-1997	New Year's Flood	Dec. 30, 96–Jan. 4, 97	X	X	X	X
1997	Superbowl Flood	Jan. 25	X			
1998-2000	Flood of '98/ Rio Nido Debris Flow	Feb. 2, 1998–Jan. 4, 2000	X	X	X	X
1999	February Winter Storm	Feb. 8-10		X	X	
2002-2003	December Winter Storms	Dec. 17, 02–Apr. 8, 03		X		
2004	Geysers Fire	Sept. 3-8	X	X		
2005-2006	New Year's Floods	Dec. 31, 05–Jan. 3, 06	X	X	X	X
2006	Late Spring Storms	Mar. 29-Apr. 16		X	X	X
2007	SF Oil Spill	Nov. 7		X	X	
2009	H1N1 Influenza Pandemic	Apr.-May		X		
2011	Great Tohoku Tsunami	Mar. 11	X		X	X
2012	Holiday Decoration Flood	Dec. 2	X			
2013	Lopez Protests	Oct. 29 and Nov. 5	X			
2014-2016	Drought	Feb. 25		X	X	
2014	South Napa Earthquake	Aug. 24	X	X	X	X
2014	December Winter Storm	Dec. 11-12	X	X		
2015	Valley Fire	Sep. 12-25	X	X	X	X

Table CP-2. Provides a list of potential hazards as compiled using the list of natural hazards included in the FEMA Mitigation Plan Review Crosswalk, and those identified in the Sonoma County Operational Area Emergency Operations Plan, and historic disaster declarations.

Table CP-2: Sonoma County Hazard Identification Matrix

Natural Hazards	History	Frequency	Probability	Impact	Comments
Avalanche	No	Low	Low	Low	Snow uncommon
Coastal Erosion	Yes	Ongoing	Low	Low	Limited exposure
Coastal Storm	Yes	High	Low	Low	Limited exposure
Earthquake	Yes	Low	High	High	Included in plan
Expansive Soils	Yes	Low	Low	Low	Limited exposure
Extreme Heat	No	Low	Low	Low	Short duration events
Flood	Yes	High	High	High	Included in plan
Hailstorm	No	Low	Low	Low	Hail uncommon
Land Subsidence	Yes	Low	Low	Low	Limited exposure
Landslide	Yes	Medium	Medium	High	Included in plan
Severe Winter Storm	Yes	Medium	Medium	Medium	Discussed in flood analysis
Tornado	No	Low	Low	Low	Tornado uncommon
Tsunami	No	Low	Low	Low	Secondary earthquake impact
Volcano	No	Low	Low	Low	No active volcanoes
Wildfire	Yes	High	High	High	Included in plan
Windstorm	No	Low	Low	Low	Related to winter storms above
Hurricane	No	Low	Low	Low	Not probable
Drought	Yes	Low	Low	Medium	Private sector economic loss
Freeze	Yes	Medium	Medium	Medium	Private sector economic loss
Pest	Yes	Medium	Medium	Medium	Several pests and disease threats to agriculture
Global warming / Climate change	No	Gradual ongoing Long-term	High	High	Increasing impacts, may affect flooding and fires and cause new hazards. Included in the plan
Technological Hazards	No	Low	Medium	High	New dependency on technology
Dam Failure	No	Low	Low	Medium	No risk from large dams
Energy Shortage	Yes	Low	Low	Medium	Industry/gov't controlled
Hazardous Materials	Yes	Medium	Low	Medium	Single incidents likely; Multiple as secondary hazard
Pandemic Influenza	Yes	Low	Unknown	High	Potential for public health impacts. Addressed by Health Services
Radiological	No	Low	Low	Low	Primarily single incidents
Terrorism	Yes	Low	Unknown	Medium	Law Enforcement led
Bioterrorism	No	Low	Unknown	Low	Bioterrorism attacks uncommon. Limited effectiveness
Transportation	Yes	Medium	Low	Medium	Primarily single incidents
Levee failure	Yes	Low	Medium	Medium	Few significant levees
Pipeline failure	No	Low	Low	Medium	Public utilities

Table CP-3 indicates the probability and frequency of earthquake, flood, fire and landslide related events hazard events.

Table CP-3: Summary of Hazard Frequency and Probability in the County

Hazard	Probability	Variables	History
Earthquakes	<p>72% probability of at least one earthquake of magnitude 6.7 or greater striking somewhere in the San Francisco Bay region before 2043. (USGS)</p> <p>30-year probabilities for a M7.0 rupture of the Rodger's Creek fault is 15.2%.</p> <p>30-year probability of a M7.9 rupture of the entire N. CA segment of the San Andreas Fault (possible repeat of 1906 earthquake) is 4.7%.</p>	<p>Probability of damage increases with the size of the earthquake, the location of development within a high liquefaction, fault rupture or ground-shaking area, and the type and age of construction.</p>	<p>Since 1991, local emergencies for earthquakes or related events were declared in 1989, 2011 and 2015.</p>
Floods	<p>The 2-year flood has a 50% chance of occurring in any one year; a 10-year flood has a 10-percent chance, a 50-year flood has a 2-percent chance, and a 100-year flood has a 1-percent chance.</p>	<p>Probability depends on a structures location within the 100-year flood zone and the elevation of the property relative to the inundation level of different size floods.</p> <p>The actual occurrence of flood events can vary from statistical probabilities.</p>	<p>Since 1991, there have been 6 local flood emergencies and 5 winter storm emergencies.</p>
Wildland Fires	<p>95% of wildland fires are caused by humans, probability increases with human activity and or development in wildland areas.</p>	<p>Probability also increases with increased fuel loads, heat and drought conditions, and global warming.</p> <p>The number of annual wildland fire response calls varies between 70 and 200 per year making it the highest frequency hazard. Each small fire has the potential to grow into a large wildland fire in the absence of swift and effective fire response.</p>	<p>Since 1991 there have been four large fire local emergencies including the 2015 Valley Fire.</p>
Landslides	<p>Approximately 50 landslides occur each winter that block County roads.</p>	<p>Landslide probability varies depending upon the site-specific geology, slope, rainfall, soil saturation and seismic shaking conditions of a property.</p>	<p>Several larger slides such as the Rio Nido debris flow and Monte Rio slides affecting multiple residential parcels have occurred since 1991.</p>

Sonoma County is about 1,500 square miles and has a total population of 483,878 people (2010 Census Bureau data). There are an estimated 176,000 buildings in the region with a total building replacement value (excluding contents) of over 60 million dollars. Approximately 98 percent of the buildings (and 79 percent of the building value) are associated with residential structures.

Table CP-4 provides an overview of the population and property exposed to earthquake, floods, wildland fires and landslides. This Table presents the people and structures exposed in unincorporated areas of the County. The risk within incorporated cities and unincorporated areas are highly dependent, with many people living and working in different areas, and County offices located within incorporated areas. For additional information regarding the hazard exposure of Sonoma County owned assets please visit Appendix G.

Table CP-4: Summary of Sonoma County Hazard Exposure

	Earthquakes	Flood	Wildland Fire	Landslides
Population	62,000	12,535	33,900	19,200
Number of Private Buildings	61,000	3,508	12,600	6,500
Private Buildings Estimated Value	\$15.5 billion	\$768 million	\$4.8 billion	\$2.6 billion

The threat of wildland fires cover the largest area followed by exposure to earthquake shaking. The percentage of the total acreage in the County that are considered to be in high hazards zones according to a 2005 Association of Bay Area Governments (ABAG) determination is expressed below (ABAG 2006):

- Earthquake Shaking Potential
- Liquefaction Susceptibility
- 100-Year Flood Zone
- Wildfire threat
- Wildland-urban interface threat Areas
- Dam Failure Inundation area
- Rainfall induced landslide areas

As of 2005 the total of urban land in high hazard areas in Sonoma County is as a percentage below (ABAG 2006):

- Earthquake Shaking Potential
- Liquefaction Susceptibility
- 100-Year Flood Zone
- Wildfire threat
- Wildland-urban interface threat Areas
- Dam Failure Inundation area
- Rainfall induced landslide areas

Table CP-5 demonstrates the total population of unincorporated Sonoma County in high hazard areas to each hazard as of 2006.

Table CP-5: 2006 SCHMP People and Private Buildings

Risk	Best Estimate	Minimum	Maximum
Earthquake shaking	151,000 (entire unincorporated population)	151,000	151,000
Liquefaction	10,600	1,600	61,000
Landslide	19,200	1,400	58,500
Wildfire	33,900	19,100	45,300

3. LAND USE

The Sonoma County General Plan and Land Use Maps govern the types of land uses and development that may occur in different areas of the unincorporated county. Table CP-6 indicates the acreages under different land use and zoning districts as of June 2011. Current land use policies promote city and community centered growth, and limit new development to levels consistent with adequate infrastructure and services, including public safety considerations.

Table CP-6: Land Use and Zoning of Unincorporated Areas of Sonoma County

Land use category	Zoning Districts	Total Acres
Land Intensive Agriculture	LIA	70,243
Land Extensive Agriculture	LEA	180,203
Diverse Agriculture	DA	66,770
Resources and Rural Development	RRD, RRDWA, TP	490,670
Rural Residential	RR, AR	69,722
Urban Residential	R1, R2, R3, PC	7,869
Commercial	C1, C2, C3, CO, LC, RC, K	3,176
Industrial	MP, M1, M2, M3	2,120
Public/Quasi public	PF	56,424

Source: Sonoma County Permit and Resource Management Department

4. DEMOGRAPHIC PROFILE

A comprehensive hazard and risk assessment must take into account the development trends and future development that could affect the overall vulnerability of the community. This section provides a general description of development trends within the County so that mitigation options can be considered in future land use and development decisions. It provides a basis for setting priorities for mitigation approaches to consider, and locations where these approaches could most effectively be applied.

Population Growth

According to the Sonoma County Economic and Demographic Profile 2014-15 prepared for the Sonoma County Economic Development Department, the County population as of 2013, was 490,423. Approximately one-third of county residents reside in the unincorporated areas of the county, including the communities of Annapolis, Bodega, Bodega Bay, Cazadero, Duncans Mills, Forestville, Fort Ross, Geyserville, Glen Ellen, Graton, Guerneville, Kenwood, Jenner, Monte Rio, Occidental, Salmon Creek, and The Sea Ranch. The remaining two-thirds of the population reside in the incorporated cities of Cloverdale, Cotati, Healdsburg, Petaluma, Rohnert Park, Santa Rosa, Sebastopol, Sonoma, and Town of Windsor which comprise about 78 square miles of land. Most of the population is located in the Highway 101 urban corridor.

Population growth rates in Sonoma County are slowing, as shown in Table CP-7. The rate of growth in the period 1980-1990 was 2.62 percent. The growth rate declined in 1990-2000 to 1.68 percent, and is projected to slow again during the period 2000-2020 to 0.88 percent. By 2020, it is expected that 73 percent of the population will reside in Sonoma County's nine cities (up from 68 percent in 1990), with the remaining 27 percent residing in the unincorporated areas. The growth rate in the unincorporated areas is expected to be much lower than in the cities (.69 percent versus 1.29 percent, respectively).

Table CP-7: Historic and Projected Annual Population Growth Rates

Area	1980-1990	1990-2000	2000-2020
All of Sonoma County	2.62%	1.68%	.88%
All city urban service areas	3.34%	2.54%	1.29%
Unincorporated areas outside of city USA	2.11%	.67%	.69%

The slower anticipated growth in the unincorporated area is due to several factors. Physical factors such as septic suitability, slopes, water availability, distance from services, etc., often limit development. The County's land use policies encourage city-centered growth by establishing zoning densities which favor population growth in urbanized areas where adequate services exist.

A comparison of the 2010 census data with the 2000 census data in Tables CP-7 and CP-8 indicates that population growth has generally been much slower than projected, and in the unincorporated areas, the population actually declined. Though the countywide average growth rate projected from 2000 to 2020 would have resulted in about an 8.8 percent increase by 2010, the most recent census data indicates that the overall growth was only 5.5 percent.

Though the General Plan projected that the unincorporated area of the county would grow by about 6.9 percent from 2000 to 2010, the most recent census data shows that the unincorporated areas declined in population by 3.57 percent from 150,565 to 145,186.

Table CP-8: Population Changes from 2000 to 2010 in County and Area Cities

	Total Population	Change, 2000-2010
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State / County / City	April 1, 2000	April 1, 2010	Number	Percent Increase
Total Sonoma County	458,614	483,878	25,264	5.5%
City of Cloverdale	6,831	8,618	1,787	26.2%
City of Cotati	6,471	7,265	794	12.3%
City of Healdsburg	10,722	11,254	532	5.0%
City of Petaluma	54,548	57,941	3,393	6.2%
City of Rohnert Park	42,236	40,971	-1,265	-3.0%
City of Santa Rosa	147,595	167,815	20,220	13.7%
City of Sebastopol	7,774	7,379	-395	-5.1%
City of Sonoma	9,128	10,648	1,520	16.7%
Town of Windsor	22,744	26,801	4,057	17.8%
Unincorporated Sonoma County	150,565	145,186	-5,379	-3.57%

Demographic Trends

Understanding the demographic composition of the County can aid hazard mitigation efforts by identifying more vulnerable subpopulations, and those communities that may benefit from cross cultural or multi-language educational materials. According to US Census statistics the racial breakdown of Sonoma County's population is mostly white and Latino as shown on Table CP-9.

Table CP-9: Sonoma County Population by Race/Ethnicity

Race/ethnicity	2012 population	2012 percentage
White	319,689	65.0 %
Hispanic or Latino	125,660	25.5 %
American Indian	2,477	0.5 %
Black or African American	6,962	1.4 %
Asian	19,531	4.0 %
Native Hawaiian/Pacific Islander	1,486	0.3 %
Other/Multiple	16,024	3.3 %

Source: US Census Bureau, Census 2012

A comparison of the 2010 Census data with the 2000 data reveals two prominent demographic trends. First, the county is becoming more diverse with a growing Latino population. In 2010, twenty-five percent of the population is Latino, up from 17 percent in the 2000 Census. As the Latino population increases in high hazard areas, preparedness and mitigation outreach programs in Spanish may be an appropriate mitigation.

Second, the County's population is aging. In 2000 the number of people over the age of 60 was 16.2 percent of the population; by 2010 these numbers increased to 20 percent of the population. This trend, driven by aging baby boomers, is expected to continue to present challenges. Elderly populations are more vulnerable to disasters than younger populations and require special preparedness and mitigation initiatives.

Household and Housing Growth

Sonoma County General Plan 2020 projections forecast household growth of about 38,490 units over the 2000-2020 period for an average annual growth rate of about 1,920 households per year. About 80 percent of this growth is expected to occur within City urban service areas and 20 percent in unincorporated areas outside of the cities. A review of the 2010 census data in Table CP-10 indicates that the number of housing units increased by 21,419 units between 2000 and 2010 with 16.6 percent occurring in the unincorporated area.

Table CP-10: Change in Housing Units from 2000 to 2010

	April 1, 2000	April 1, 2010	Increase, Percent 2000-2010
State / County / City	Total Housing Units	Total Housing Units	Total Housing Units
Total Sonoma County	183,153	204,572	11.7%
City of Cloverdale	2,619		30.9%
City of Cotati	2,585	3,143	21.6%
City of Healdsburg	4,138	4,794	15.9%
City of Petaluma	20,304	22,736	12.0%
City of Rohnert Park	15,808	16,551	4.7%
City of Santa Rosa	57,578	67,396	17.1%
City of Sebastopol	3,321	3,465	4.3%
City of Sonoma	4,671	5,544	18.7%
Town of Windsor	7,728	9,549	23.6%
Unincorporated Sonoma County	64,401	67,967	5.5%

Due to the siting restrictions and construction standards of the existing code, newly constructed units are less vulnerable to hazards than older units, which do not meet or conform to current day standards. For instance, new development in a fault zone has additional geotechnical and foundation requirements; new development in areas of strong ground shaking has additional foundation, bracing and bolt requirements; new construction in a high fire hazard area has additional building restrictions on venting, roofing and siding materials; new development in the flood plain must have first floor above the 100-year flood elevation and other foundation requirements; new development along the coastal bluffs have a coastal bluff setback. Pre-existing development, which predate current day siting restrictions or construction standards, are more vulnerable to hazards and pose a greater risk of failure. The large number of older units suggest the need to develop seismic retrofit programs. Table CP-11 indicates the age distribution of housing structures in the County as of 2006.

Table CP-11: Distribution of Housing Units by Age of Structure in Sonoma County

Age of Structures	Percentage of Buildings
Built 1939 or earlier	13.5%
Built 1940 to 1949	8.0%
Built 1950 to 1959	14.0%
Built 1960 to 1969	14.9%
Built 1970 to 1979	18.5%
Built 1980 to 1989	15.2%
Built 1990 to 1999	11.45%
Built 2000 to 2006	4.6%

Housing Stock

Dwelling location and structure type affect risks and vulnerability. Table CP-12 provides a breakdown of the housing types in the County.

Table CP-12: Sonoma County Housing Stock Characteristics, 2010

Structure	2010 Unincorporated County	Percentage	2010 Countywide Total	Percentage
Total housing units	72,942	100%	203,847	100.0%
1-unit, detached	59,602	81.7%	139,237	68.3%
1-unit, attached	3,272	4.5%	14,731	7.2%
2 units	1,266	1.7%	5,235	2.6%
3 or 4 units	972	1.3%	7,781	3.8%
5 to 9 units	962	1.3%	7,642	3.7%
10 to 19 units	436	0.6%	6,297	3.1%
20 or more units	1,148	1.6%	11,542	5.7%

5. FUTURE GROWTH AND VULNERABILITY

Land use policies discussed above help reduce the potential impact of new development on hazard vulnerability within the unincorporated areas of Sonoma County. However, increased development near the urban center of Santa Rosa will expose additional residential and commercial properties, and their populations to the risk of earthquake from an event on the Rodgers Creek fault. New development along the Sonoma Coast, near Bodega Bay, may place individuals and structures at risk from an earthquake event on the San Andreas Fault. New development will meet current codes, allowing the County to build more disaster resilient communities. As populations grow, it is critical that the services supporting these communities, such as water, sewer, power, roads, hospitals and public safety agencies are able to maintain or quickly resume functionality after a disaster.

Placement of additional housing in the wildland/urban interface areas located in “high” or “very high” fire hazard severity zones can increase the fire threat, particularly in the historic fire corridors north and east of Santa Rosa and in the Sonoma Valley. Development in these areas can burden existing fire protection services, particularly in those areas dependent on volunteer firefighters.

New development in the Russian River floodplain is of particular concern since there are a number of pre-existing communities that experience repetitive flooding. Currently there are 2,356 parcels all or partially within the 100-year flood plain, which are in an urban service area served by sewer and water. There are no current plans to extend sewer service in the Russian River area. Additionally there are 3,894 parcels all or partially within the 100-year flood zone, which are not in an urban service area. Many of the existing lots may not comply with current day design standards and siting restrictions, but have a legal right to continue existing uses.

Development in the flood plain areas outside of an urban service area are generally constrained by strict septic requirements. New standards of Onsite Wastewater Treatment Systems (OWTS) become effective in May of 2016 pursuant to new regulations adopted by the State Water Resources Control Board (SWRCB) regulations. These regulations establish a risk-based, tiered approach for the management of OWTS installations and replacements. They mandate that these systems meet increasing levels of performance and protection if the OWTS are adversely affecting water quality in nearby water bodies i.e. exceeding Total Maximum Daily Loads or Basin Plan prohibitions of discharges from OWTS. These higher standards may limit development on some lots and parcels in the flood plain. In addition the County Riparian Corridor Zoning combining district further restricts development in many portions of the flood plain.

6. CRITICAL INFRASTRUCTURE

As infrastructure systems are critical for life safety and economic viability, it is important that these operations continue during and following a disaster. Infrastructure plays a key role in reducing impacts, speed of recovery, and overall resilience. A complete vulnerability and risk assessment was completed for all facility types, including County-owned utilities. These facilities include fire stations, several County-owned properties, and other facilities that provide important services to the community. Facilities such as hospitals, water treatment plants, and dams provide the ability to protect important services and could cause further harm if damaged. Damage to these facilities caused by a hazard event has the potential to impair response and recovery and may lead to disruption of services. This list includes critical facilities owned and operated by the County or agencies that work closely with the County but are outside of the County's jurisdiction, such as schools.

Critical Facilities

County Buildings

The County owns 1009 physical assets, ranging from high occupancy structures like office buildings and the Main Adult Detention Facility to low occupancy structures such as storage sheds. Inventory of County Facilities is provided in Appendix G.

There are an estimated 183,000 buildings in Sonoma County's incorporated and unincorporated areas with a total building replacement value (excluding contents) of approximately 46 billion dollars. Approximately 93 percent of the buildings (and 81 percent of the building value) are associated with residential housing. The population of unincorporated Sonoma County is about 151,000 people.

Emergency Response Buildings

A number of County departments play key roles in emergency response and recovery. The buildings which house these specific operations can be considered critical for emergency response. The departments that support these specific operations are Fire and Emergency Services, Permit and Resource Management Department, Department of Transportation and Public Works, Sonoma County Water Agency, Department of Human Services, Department of Health Services, and Information Systems Department.

The County's General Services Department classified 193 county facilities according to their importance in emergency response and recovery. The buildings were categorized into one of the following classes listed in order of importance:

- Essential Services facilities
- Critical to emergency response,
- Important to emergency response,
- Important to emergency recovery,
- Helpful to emergency recovery

Emergency Operations Center:

The Sonoma County Operational Area Emergency Operations Center (EOC) is located at 600 Administration Drive, Santa Rosa. The building is located on a relatively flat lot in Santa Rosa about ¼ mile east of highway 101. The structure is a one story, rectangular shaped concrete building comprising approximately 6100 square feet of area. The structure was constructed circa 1975 as part of the adjacent expansion of the Sonoma County Hall of Justice.

The Emergency Operations Center include an approximately 50 foot high steel truss framed antenna tower, which is located on the building roof and supports a variety of communication infrastructure.

Fire Stations

The County owns one fire station, and it insures twelve fire stations and a number of truck barns and garages used by the thirteen volunteer fire companies that make up County Service

Area #40 (CSA #40). These facilities have not been assessed for their risk to natural disasters. Valley Ford and Bodega companies have recently built new structures in accordance with County code that are designed to be resistant to disasters.

The County Airport has an aircraft rescue and firefighting building which houses the airport's two fire trucks. Response activities are carried out by Airport personnel and supported by mutual aid.

Hospitals

There are 10 private hospitals and seven of which provide acute care beds in Sonoma County, most having multiple buildings.

Table CP-13: Sonoma County Private Hospitals

Hospital	City	Emergency Department	Trauma Center	Critical Access Hospital	Disproportionate Share Hospital	Primary Care HPSA	Medically Underserved Area	Medically Underserved Population
Aurora Behavioral Healthcare-Santa Rosa	Santa Rosa							
Healdsburg District Hospital	Healdsburg	X		X				
Kaiser Foundation Hospital	Santa Rosa	X						
Palm Drive Hospital	Sebastopol	X						
Petaluma Valley Hospital	Petaluma	X						
Santa Rosa Memorial Hospital-Montgomery	Santa Rosa	X	X					
Santa Rosa Memorial Hospital-Sotoyome	Santa Rosa						X	
Sonoma Developmental Center	Eldridge					X		X
Sonoma Valley Hospital	Sonoma	X				X		
Sutter Medical Center of Santa Rosa	Santa Rosa	X			X			

Special Health Districts

- Cloverdale Health Care District
- North Sonoma County Health Care District
- Palm Drive Health Care District
- Petaluma Health Care District
- Sonoma Valley Health Care District

Law Enforcement

Currently the Sheriff's Office is comprised of over 650 employees. Servicing a county of over 1600 square miles and population of nearly 500,000, the Sheriff's Office is responsible for

primary law enforcement services of the unincorporated area and the cities of Windsor and Sonoma.

Main Office Headquarters: 2796 Ventura Avenue, Santa Rosa, CA. The Sonoma County Sheriff's Office moved to the current building on April 19, 2002. This two-story, concrete block structure is over 60,000 square feet and houses the Sheriff's Administrative staff, Investigations Bureau, Dispatch Bureau, the Crime Scene Investigation Laboratory and is where the majority of Patrol staff work. Redwood Empire Dispatch Communications Authority, which dispatches ambulances and fire department first responders, is physically located at the Sheriff's Office main headquarters.

Main Adult Detention Facility: 2777 Ventura Avenue in the County of Sonoma's Hall of Justice Complex. The Main Adult Detention Facility was opened in 1991. This "new generation" facility was based on a "direct supervision" design, as opposed to the "linear" design of the County's earlier jails. Originally designed to hold close to 500 inmates, the facility quickly reached its housing capacity and an expansion was opened in 1997 to provide an additional 290 beds. The facility is a medium/maximum security facility, housing both pre-trial and sentenced inmates.

North County Detention Facility: 2254 Ordinance Road, Santa Rosa, CA. Adjacent to the Charles M. Schulz Airport, the site originally housed the Santa Rosa Army Airfield (SRAAF) during World War II. After WWII, SRAAF was deactivated and subdivided into several parcels. In 1967 one of these parcels became the "honor farm" for 35 minimum security inmates. The facility grew to house the rated capacity of 559 inmates until April 1997, when 172 inmates were moved to the expansion at the Main Adult Detention Facility (MADF). The NCDF sits on 15.3 acres with 9.62 acres for the facility and 5.91 acres used for the Agriculture Program. Inmate programs are coordinated by the Program Officer and benefit both inmates and the county.

Other law enforcement agencies critical facilities include contract cities, Windsor Police Department and Sonoma Police Department, and the California Highway Patrol office in Rohnert Park. Hazard vulnerabilities of the California Highway Patrol buildings would be assessed in the state hazard mitigation plan.

Schools

Sonoma County Office of Education maintains 40 public school districts consisting of 184 schools. There are 31 elementary, 3 high school, and 6 unified districts. Unified districts operate both elementary and secondary schools for the students residing within their boundaries. The county's school districts vary in size, serving both rural and urban areas. The smallest district in the county, Kashia, is located in a rural area and has about 11 students. The largest district, Santa Rosa City High, enrolls over 11,000 students in the county's most populous city.

There are three vocational and higher education institutions in the County including Sonoma State University, Santa Rosa Junior College, and Empire College.

Shelters

A variety of buildings in the County have been surveyed to use as emergency shelters. The County entered into a Memorandum of Understanding with the American Red Cross that states that all shelters opened by the Sonoma County Operational Area will be operated by the American Red Cross using American Red Cross standards for shelter management, with the provision that the Emergency Operations Center would support any unmet needs for staffing and/or resources. The American Red Cross maintains a list of 170 potential shelters and contacts in Sonoma County. The potential emergency shelter list includes 11 Veteran's Memorial buildings, 50 public schools and several community centers, private facilities and churches. County owned Veteran's Memorial buildings are considered a primary shelter location. The Veteran's Memorial buildings were seismically upgraded in the 1980's.

Infrastructure Systems

Emergency Communications System

The County has a wireless communications network used for public safety and emergency response. The communications network is used by the County and City agencies, public safety officials and emergency responders. The network is comprised of remote mountain top communication sites, consisting of towers and equipment buildings, which provide wireless communications coverage throughout Sonoma County. Emergency generators and uninterrupted power supply have been installed at tower sites to help assure operability. The County uses eleven tower sites for communications antennas. The county structure at 445 Fiscal Drive which formerly housed much of the County's communication system, was considered at risk of collapse in the event of an earthquake. In 2015, this vulnerability was eliminated by relocating all voice services and network infrastructure from 445 Fiscal to the updated ISD Data Center at Paulin Drive.

Power Utilities

PG&E

PG&E's Sonoma Division serves nearly 170,000 residential customers across 1,500 square miles, including the communities of Sonoma County.

Transportation

County Roads

The County owns and maintains 2,769 lane miles, which indicate the total length of roadway including number of lanes (shown in Table CP-14). Responsibility for these roadways is broken down as shown in Table CP-15.

Table CP-14: Total Centerline Miles by Functional Class

Other Principal Arterial:	1.33 miles
Minor Arterial:	35.31 miles
Major Collector:	317.90 miles

Minor Collector:	114.78 miles
Local:	909.92 miles

Table CP-15: Roadway Responsibility by Government Entity

Government Entity	Number of miles maintained	Percentage of miles maintained
State	236 miles	10%
City	892 miles	34%
County	1,384 miles	56%

Sonoma County Transportation and Public Works owns six Road Yard Location. These include Annapolis, Cotati, Guerneville, Healdsburg, Santa Rosa, and Sonoma.

Airports

The Sonoma County Airport (Charles M. Schulz Airport) is the largest airport in the County, located 6 miles northwest of Santa Rosa. It has facilities for airline passenger service, business and recreational aircraft, plus law enforcement, emergency medical service and firefighting aircraft. The airport complex has many buildings, ranging from control towers, passenger terminals, hangars and maintenance shops. The vulnerability of the Airport to seismic events was assessed as part of the recently adopted 2030 Airport Master Plan and the associated Environmental Impact Report.

The following airports are either owned by city municipalities or are private airports not under the control of the County.

- Cloverdale Municipal Airport
- Healdsburg Municipal Airport
- Petaluma Municipal Airport
- Sonoma Skypark Airport
- Sonoma Valley Airport

Bridges

Sonoma County Transportation and Public Works currently maintains 327 bridges, which serve over 800,000 trips per day on average. Maintenance of bridges includes bridge scouring, resurfacing, seismic retrofits, and reconstruction.

Sonoma-Marin Area Rail Transit (SMART Train)

Sonoma-Marin Area Rail Transit (SMART) is a passenger train and bicycle & pedestrian pathway project located in San Francisco's North Bay. SMART will provide rail service along 70 miles of the historic Northwestern Pacific Railroad alignment, connecting urban and rural residents of the two counties. SMART Train will serve passengers from Santa Rosa in Sonoma County to San Rafael, Marin County. SMART's studies project 5,000 to 6,000 passenger trips per day will be made on the train and 7,000 to 10,000 daily trips will be made on the bicycle/pedestrian pathway.

Water and Wastewater Systems

Sonoma County Water Agency

The Sonoma County Water Agency (SCWA) is the primary wholesale water supplier in the county serving approximately 600,000 people in the southern Sonoma County and Marin County communities including; the City of Santa Rosa, North Marin Water District, City of Petaluma, City of Rohnert Park, Valley of the Moon Water District, City of Sonoma, City of Cotati and Town of Windsor. The Sonoma County Water Agency is governed independently from the County. The projected total annual water demand from the Agency's customers is approximately 74 Million of Gallon per Day (MGD) for 2010 to 96 Million of Gallon per Day for 2030.

The Sonoma County Water Agency water supply and transmission system is made up of transmission pipelines (aqueducts), collector wells, booster pump stations, storage tank reservoirs, and other facilities that allow the agency to supply water for drinking and firefighting, manage flood risk, and maintain health of key watersheds. The Agency also manages two major reservoirs impounded by dams which are owned by the Army Corps of Engineers, and one inflatable dam. These facilities all face the risk of damage in an earthquake, and many of them are located in high hazard areas.

In addition to the Sonoma County Water Agency water supply system, the State Office of Drinking Water regulates over 417 other community water supplies in the county that have 15 or more connections.

The Sonoma County Water Agency owns and operates sanitation systems in the Airport/Larkfield/Wikiup area, Geyserville, Sea Ranch and Penngrove. It operates four other sanitation systems owned by the county in the South Park, Sonoma Valley, Occidental and Russian River Sanitation Districts. In total, the SCWA provides wastewater collection and treatment, and recycled water distribution and disposal services to approximately 22,000 residences. There are two independent wastewater systems operated by the Forestville Sewer and Water District and the Graton Community Service District.

Ellis Creek Water Recycling Facility

Petaluma's wastewater utility provides 24-hour collection, treatment, disposal and reuse of domestic, commercial and industrial wastewater generated by Petaluma and the unincorporated Sonoma County community of Penngrove. The wastewater collection system is the underground piping that transports raw (untreated) wastewater from businesses and residences to the treatment plant. The collection system consists of more than 195 miles of sewer collection pipes and nine pump stations.

City of Santa Rosa Sewer and Wastewater System

The City of Santa Rosa's Sewer System consists of 535 miles of sewer main ranging from 4" up to 66". The Laguna Wastewater Treatment Plant (located on Llano Road) takes the wastewater from homes, businesses and industry located within the city of Santa Rosa along with the other partners in the Santa Rosa Subregional Water Reuse System. The Sewer System also maintains 17 Wastewater Lift Pump. The Laguna Wastewater Treatment Plant consists of over 500 miles

of underground pipes bring wastewater to the treatment plant where water goes through three stages of treatment prior to disinfection, storage, and reuse. Since its inception in 1968, the facility has increased its volume of treated recycled water from 2 million gallons a day (mgd) to 21 mgd.

Water Service Districts

The Sonoma County Department of Transportation & Public Works (TPW) administers water service to four small districts: Fitch Mountain, Freestone, Jenner, and Salmon Creek. On-site operation and maintenance of these water systems is managed by a private contractor, Russian River Utility.

Integrated Waste Facilities

The Sonoma County Transportation and Public Works Department maintains several integrated waste facilities including: disposal sites (5), reuse and recycling center (1), household toxics disposal (1), municipal composting (5), and wood recycling.

Sanitation Districts

- Airport/Larkfield/Wikiup Sanitation Zone
- Geyserville Sanitation District
- Occidental County Sanitation District
- Penngrove Sanitation Zone
- Russian River County Sanitation District
- Sea Ranch Sanitation Zone
- Sonoma Valley County Sanitation District
- South Park County Sanitation District

Special Water Districts

- Forestville Water District
- North Bay Water District
- North Marin Water District
- Rains Creek Water District
- Russian River County Water District
- Sonoma Mountain County Water District
- Sweetwater Springs Water District
- Timber Cove County Water District
- Valley of the Moon Water District

Special Utility Districts

- Bodega Bay Public Utility District

High Potential Loss Facilities

Dams

Coyote Valley Dam and Lake Mendocino (US Army Corps of Engineers): Located on the East Fork of the Russian River, Coyote Dam is a rolled earth embankment dam that forms Lake Mendocino. Lake Mendocino is a U.S. Army Corps of Engineers project that began storing water in 1959. It captures a drainage area of about 105 square miles, and provides a total storage capacity of 118,000 acre-feet with a water supply pool of 70,000 acre-feet.

Warm Springs Dam and Lake Sonoma (US Army Corps of Engineers): Located about 14 miles northwest of Healdsburg, Warm Springs Dam is a rolled earth embankment dam that forms Lake Sonoma. The Sonoma County Water Agency generates electricity at Warm Springs Dam through a hydroelectric turbine. Located at the confluence of Warm Springs Creek and Dry Creek, this lake began storing water in 1984 and has a total storage capacity of 381,000 acre-feet with a water supply pool of 245,000 acre-feet. Warm Springs Dam is a multi-purpose reservoir that serves as a flood control, water supply and recreational facility. The Water Agency is the local cost-sharing partner for Warm Springs Dam, and determines the amount of water to be released when the lake level is in the water supply pool, and the US Army Corps of Engineers manages flood control releases.

Inflatable Dam (Sonoma County Water Agency): The Water Agency operates an inflatable dam on the Russian River in the Mirabel area to increase production capacity during peak demand months.

Hazardous Materials Sites

The County has many sites containing hazardous materials. These sites include drycleaners, gas and service stations, agricultural sites, industrial sites, high-tech facilities, chlorination plants, and wastewater treatment plants. The majority of these sites are clustered along Highway 101 or associated with the Geysers geothermal field.

Military and Civil Defense Installations

US Coast Guard Training Center

The Training Center at Two Rock Ranch in Petaluma comprises 800 acres of land with 219 buildings with 129 family units, a chapel, clinic, fire department and a small police department with complete training facilities in their over 200,000 square feet.