



# WATER SHORTAGE CONTINGENCY PLAN

RUBIO CAÑON LAND AND WATER ASSOCIATION



JUNE 2021



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## Rubio Cañon Land and Water Association

583 E. Sacramento St.  
Altadena, CA 91001  
Phone: (626) 797-0509 | Fax: (626) 797-0520

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**Prepared by:**



**CONSULTING ENGINEERS**  
1130 W. Huntington Drive  
Unit 12  
Arcadia, CA 91007  
(626) 821-3456



## Table of Contents

<b>Section</b>	<b>Page</b>
1 Overview .....	1
2 Water Supply Reliability Analysis.....	1
3 Annual Water Supply and Demand Assessment Procedures .....	4
4 Shortage Stages and Shortage Response Actions.....	7
5 Communication Protocols .....	26
6 Compliance and Enforcement .....	29
7 Legal Authorities .....	30
8 Financial Consequences of WSCP Implementation .....	31
9 Monitoring and Reporting.....	31
10 Special Water Feature Distinction.....	32
11 WSCP Adoption and Refinement Procedures.....	32

## Appendices

<b>Appendix</b>	<b>Description</b>
Appendix A.....	RCLWA Board Resolution Adopting WSCP
Appendix B.....	RCLWA Water Conservation Program
Appendix C.....	2019 County of Los Angeles All-Hazards Mitigation Plan
Appendix D.....	RCLWA 2016 Seismic Assessment



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## ACRONYMS

AF	acre-feet
AWIA	America's Water Infrastructure Act of 2018
CalARP	California Accidental Release Prevention
CWC	California Water Code
DRA	Drought Risk Assessment
DWR	California Department of Water Resources
EOC	Emergency Operation Center
ERP	Emergency Response Plan
FMWD	Foothill Municipal Water District
FY	Fiscal Year
GW	Groundwater
ICS	Incident Command System
IRP	Integrated Resource Plan
LHMP	Local Hazard Mitigation Plan
MWD	Metropolitan Water District of Southern California
NIMS	National Incident Management System
RRA	Risk and Resilience Assessment
RCLWA	Rubio Cañon Land and Water Association
SEMS	Standardized Emergency Management System
SWP	State Water Project
UWMP	Urban Water Management Plan
WSAP	Water Supply Allocation Plan
WSCP	Water Shortage Contingency Plan
WSDM	Water Surplus and Drought Management Plan



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## **1. OVERVIEW**

Water supplies may be interrupted or reduced significantly in a number of ways, including droughts, earthquakes, and power outages, which hinder a water agency's ability to effectively deliver water. The ability to manage water supplies in times of drought or other emergencies is an important part of water resources management for a community.

Recent water supply challenges throughout the American Southwest and the State of California have resulted in the development of a number of policy actions that water agencies would implement in the event of a water shortage. In Southern California, the development of such policies has occurred at both the wholesale and retail level. This section addresses elements related to the urban water supplier's Water Shortage Contingency Plan (WSCP) describing new and existing policies that Metropolitan Water District of Southern California (MWD), Foothill Municipal Water District (FMWD), and Rubio Cañon Land and Water Association (RCLWA) have in place to respond to water supply shortages, including a catastrophic interruption and up to 50 percent or greater reduction in water supply.

## **2. WATER SUPPLY RELIABILITY ANALYSIS**

### **2.1 WATER SERVICE RELIABILITY ASSESSMENT**

Southern California is expected to experience an increase in regional demands in the years 2025 through 2045 as a result of population growth. Although increases in demand are expected, future demands are effectively limited due to the requirements of SBx7-7. It can be reasonably expected that the majority of agencies have met or were near their compliance targets for 2020 and will continue to meet, or will soon meet, their per-capita usage limit in the future.

The data in the MWD 2020 Urban Water Management Plan (UWMP) shows supply reliability projections for average and single dry years and is important to effectively project and analyze supply and demand over the next 25 years for many regional agencies. Projected supplies during single and multiple dry year scenarios indicate MWD's projected supply will exceed its projected single dry year demands in all years. Likewise, for average years, MWD supply exceeds projected demands for all years. Due to the semi-arid nature of RCLWA's climate and as a result of past drought conditions, RCLWA is vulnerable to water shortages due to its climatic environment and seasonally hot summer months. Section 3 of RCLWA's 2020 UWMP describes the water availability during single and multiple



dry year scenarios. **Tables 1, 2, and 3** summarize the supply and demand comparisons, in acre feet (AF), during normal, single-dry year, and multiple dry year, respectively. As shown, RCLWA is capable of providing a reliable supply of water to meet the future demands.

**Table 1: Normal Year Supply & Demand Comparison (AF)**

	2025	2030	2035	2040	2045
Supply totals	2,439	2,439	2,439	2,439	2,439
Demand totals	1,887	1,917	1,947	1,978	2,009
Difference	552	522	492	461	430

**Table 2: Single Dry Year Supply & Demand Comparison (AF)**

	2025	2030	2035	2040	2045
Supply totals	2,385	2,385	2,385	2,385	2,385
Demand totals	2,016	2,048	2,080	2,113	2,147
Difference	369	337	305	272	238

**Table 3: Multiple Dry Year Supply & Demand Comparison (AF)**

		2025	2030	2035	2040	2045
First year	Supply totals	2,419	2,419	2,419	2,419	2,419
	Demand totals	1,913	1,943	1,974	2,005	2,037
	Difference	506	476	445	414	382
Second year	Supply totals	2,419	2,419	2,419	2,419	2,419
	Demand totals	2,070	2,102	2,135	2,169	2,203
	Difference	349	317	284	250	216
Third year	Supply totals	2,419	2,419	2,419	2,419	2,419
	Demand totals	2,172	2,206	2,241	2,276	2,312
	Difference	247	213	178	143	107
Fourth year	Supply totals	2,419	2,419	2,419	2,419	2,419
	Demand totals	2,147	2,181	2,215	2,250	2,286
	Difference	272	238	204	169	133
Fifth year	Supply totals	2,419	2,419	2,419	2,419	2,419
	Demand totals	1,710	1,737	1,764	1,792	1,820
	Difference	709	682	655	627	599



## 2.2 FIVE-YEAR DROUGHT RISK ASSESSMENT

During a five-year drought, RCLWA may import water to meet demands in excess of its adjudicated pumping right of 1,221 AFY as necessary. Imported water supplies, like groundwater (GW), are subject to demand increases and reduced supplies during dry years; however, MWD modeling in its 2020 UWMP results in 100 percent reliability for full-service demands through the year 2045 for all climatic conditions. Based on the conditions described above, RCLWA anticipates the ability to meet water demand for all climatic conditions for the near future.

A Drought Risk Assessment (DRA) was conducted over a 5-year period examining the reliability of RCLWA’s water supplies. **Table 4** shows the results of the analysis. The analysis was done using the State of California’s Department of Water Resources’ (DWR) DRA Planning Tool to determine supply and demand projections, and to analyze RCLWA’s vulnerability to droughts. The tool also allows water purveyors to use potential water usage saving or supply augmentation methods to mitigate supply shortfalls. These water usages saving methods (restrictions) are further discussed in the WSCP. As shown, RCLWA is capable to meet the projected demands based on the estimated water supplies during drought conditions without the need for WSCP stage implementation and supply augmentation.

**Table 4: Five-Year Drought Risk Assessment (AF)**

	2021	2022	2023	2024	2025
Total Water Use	1,864	1,870	1,875	1,881	1,887
Total Supplies	2,419	2,419	2,419	2,419	2,419
Surplus/Shortfall w/o WSCP Action	555	549	544	538	532
Planned WSCP Actions (Use Reduction and Supply Augmentation)					
Supply Augmentation Benefit from WSCP Response	0	0	0	0	0
Use Reduction Savings Benefit from WSCP Response	0	0	0	0	0
Revised Surplus/Shortfall	555	549	544	538	532
Resulting % Use Reduction from WSCP Action	0%	0%	0%	0%	0%



Response to a future drought would follow the water use efficiency mandates of RCLWA's water conservation program along with implementation of the appropriate stage of regional plans, such as MWD's Water Surplus Drought Management (WSDM) Plan as described later in this section.

### **3. ANNUAL WATER SUPPLY AND DEMAND ASSESSMENT PROCEDURES**

Under CWC Section 10632(a)(2), beginning by July 1, 2022, each urban water supplier is required to prepare their annual water supply and demand assessment (Annual Assessment) and submit an Annual Water Shortage Assessment Report to DWR. The Annual Water Shortage Assessment Report will be due by July 1 of every year, as required by CWC Section 10632.1.

This section outlines RCLWA's procedures used in conducting an Annual Assessment, including the following: 1) written decision-making process for determining water supply reliability; and 2) key data inputs and assessment methodology for evaluating the water supply reliability for the current year and one dry year.

#### **3.1 DECISION-MAKING PROCESS**

RCLWA's Annual Assessment will be mostly based on daily recorded water production and supply figures, which are available to management on a daily basis and reported monthly to the Board of Directors throughout the year. Water consumption is monitored regularly through the metering of all RCLWA service connections in its distribution system. To determine its water supply reliability and actual reductions in water use during declared water shortages or emergencies, RCLWA can rely on its daily records as well as the production and sales reports including the monthly totals. These periodical analyses are used by RCLWA to manage resources to meet projected demands and adjust to changing conditions (i.e., precipitation) throughout the year.

Starting in 2022, RCLWA staff will submit and present a finalized Annual Water Shortage Assessment Report to the Board of Directors for approval by June each year. RCLWA staff will also present determination of recommended water shortage response actions deemed appropriate as a result of the Annual Assessment. Following approval, RCLWA staff will submit the approved Annual Water Shortage Assessment Report to DWR by July 1 of every year. The functional procedures for the decision-making process are depicted in the following timeline shown in **Figure 1**.

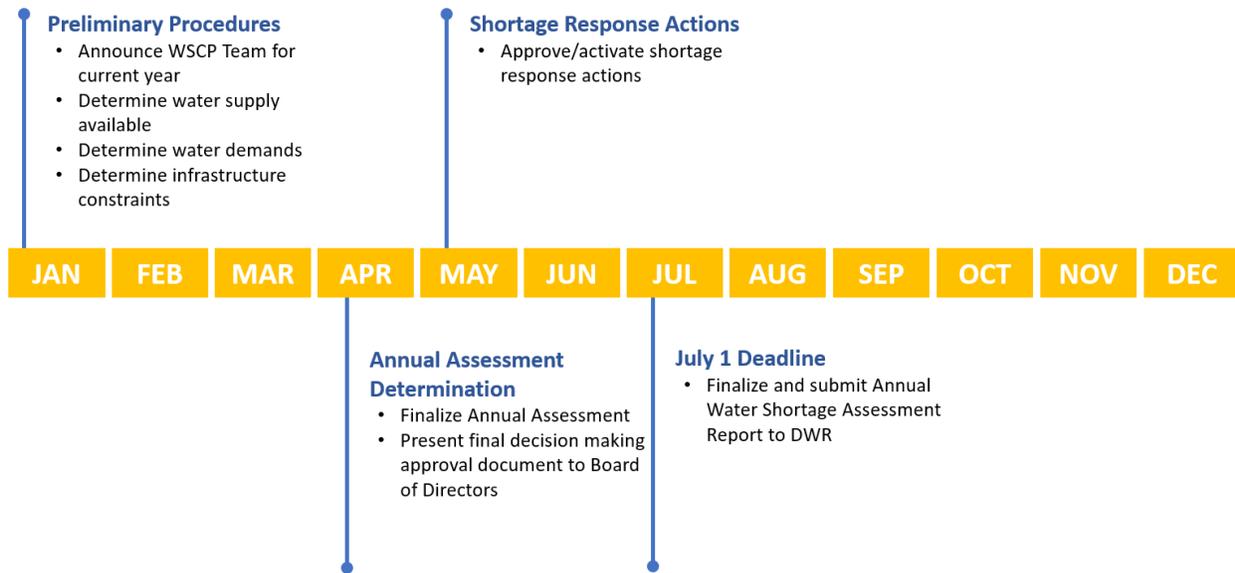


Figure 1: Sample Annual Assessment Decision-Making Process Timeline

### 3.2 KEY DATA INPUTS AND ASSESSMENT METHODOLOGY

This section defines the key data inputs and assessment methodology used to evaluate the water supply reliability for the anticipated conditions for the current year and for one dry year that follows. The Annual Assessment determination will focus on the current year unconstrained demand, infrastructure constraints, and total water supply availability. Moreover, the Annual Assessment will consider the current year’s weather, population growth, policies in place that will impact demands, and other influencing factors. The current year available supply will incorporate the hydrological regulatory conditions for the current year and following dry year.

#### LOCALLY APPLICABLE EVALUATION CRITERIA

The locally applicable evaluation criteria that will be consistently relied on for each Annual Assessment include the following:

- 1) Assumed unconstrained demand (i.e., demand without any conservation measures) for current year and one dry year
- 2) Assumed total water supply availability for current year and one dry year
- 3) Existing infrastructure capabilities and plausible constraints
  - Any known issues with the water facilities (including water quality conditions limiting local sources)
  - Planned power outages for operation and maintenance



- New construction and repairs
- Environmental mitigation measures
- Other constraints that may affect near-term water supply reliability

## WATER SUPPLY SOURCES DESCRIPTION AND QUANTIFICATION

As part of the Annual Assessment, the total available water supply evaluation criteria will comprise of RCLWA’s water supply sources as shown and quantified in **Tables 5 and 6**.

**Table 5: 2020 Water Supplies (AF)**

Water Supply	Additional Detail on Water Supply	2020	
		Actual Volume	Water Quality
Purchased or Imported Water	from FMWD	0	Drinking Water
Groundwater (not desalinated)	Raymond Basin	2,028	Drinking Water
Surface Water (not desalinated)	Rubio Canyon	146	Drinking Water
<b>Total</b>		<b>2,175</b>	

**Table 6: Projected Water Supply Availability (AF)**

Water Supply	Additional Detail on Water Supply	Projected Water Supplies				
		2025	2030	2035	2040	2045
Purchased or Imported Water	MWD via FMWD	500	500	500	500	500
Groundwater (not desalinated)	Raymond Basin	1,821	1,821	1,821	1,821	1,821
Surface water (not desalinated)	Rubio Canyon	118	118	118	118	118
<b>Total</b>		<b>2,439</b>	<b>2,439</b>	<b>2,439</b>	<b>2,439</b>	<b>2,439</b>

### ***Imported Water Purchases***

RCLWA receives its imported water supply from MWD through its wholesaler FMWD. Supply from MWD originates from the Colorado River and the Sacramento-San Joaquin River Delta in Northern California. Currently, RCLWA’s total water supply is comprised of 0 percent imported water and is projected to be able to have access of its full Tier 1 limit supply with FMWD of 500 AF as shown in **Table 6**.

### ***Groundwater Supply***



RCLWA uses groundwater from the Raymond Groundwater Basin. RCLWA draws from this groundwater basin through its wells which fulfill about 93 percent of its total supply. RCLWA's current safe yield of the Raymond Basin is 1,221 AFY as shown in **Table 5.6**. Furthermore, RCLWA has agreements with City of Pasadena to produce an additional 600 AFY of groundwater. Groundwater supplies within the Raymond Basin have remained stable throughout the recent drought during 2012–2016. As a result, groundwater production rights within the basin will continue to remain the same into the future until otherwise mandated for reduction by the Raymond Basin Management Board.

### ***Surface Water Supply***

Surface water from Rubio Canyon, which is treated at a conventional treatment plant, has supplied RCLWA with an average of 118 AFY (around 7 percent of total supplies) over the past 6 years. The canyon water is supplied through a shallow shaft well (Well #3), the Rubio stream, and a tunnel called Carter Tunnel.

## **4. SHORTAGE STAGES AND SHORTAGE RESPONSE ACTIONS**

### **4.1 MWD STAGES OF ACTION**

#### **WATER SURPLUS & DROUGHT MANAGEMENT PLAN (WSDM)**

In addition to the provisions of the County's Conservation Ordinance, RCLWA also works in conjunction with FWMD and MWD to implement conservation measures within the framework of MWD's WSDM Plan. The WSDM Plan was developed in 1999 by MWD with assistance and input with its member agencies. The plan addresses both surplus and shortage contingencies. MWD's WSDM Plan documents the stages of action that it would undertake in response to a water supply shortage. FMWD's water supply shortage stages reflect MWD's WSDM Plan.



**Figure 2: Severe Droughts Highlight the Importance of Conservation Ordinances (Lake Oroville in 2014)**



The WSDM Plan guiding principle is to minimize adverse impacts of water shortage. The plan guides the operations of water resources (local resources, Colorado River, State Water Project (SWP), and regional storage) to ensure regional reliability. It identifies the expected sequence of resource management actions MWD will take during surpluses and shortages of water to minimize the probability of severe shortages that require curtailment of full-service demands. Mandatory allocations are avoided to the extent practicable; however, in the event of an extreme shortage, an allocation plan will be implemented.

In addition to its WSDM Plan, MWD developed a Water Supply Allocation Plan (WSAP), which provides a standardized methodology for allocation of supplies during times of extreme shortage (Stage 7 in MWD’s WSDM Plan). During a shortage, RCLWA’s imported water supplies will be allocated based on the methodology documented in FMWD’s Allocation Plan, which mostly mirrors the MWD allocation plan.

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*MWD's WSDM and WSAP Plans help guide drought management for many agencies throughout the region.*

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The following description of shortage stages is from MWD’s 2020 UWMP, page 2-29:

*“**Shortage:** Metropolitan can meet full-service demands and partially meet or fully meet interruptible demands, using stored water or water transfers as necessary.*

***Severe Shortage:** Metropolitan can meet full-service demands only by using stored water, transfers, and possibly calling for extraordinary conservation.*

***Extreme Shortage:** Metropolitan allocates available supply to full-service customers.*

*The WSDM Plan also defines six shortage management stages to guide resource management activities. These stages are not defined merely by shortfalls in imported water supply, but also by the water balances in Metropolitan’s storage programs. Thus, a 10 percent shortfall in imported supplies could be a stage one shortage if storage levels are high. If storage levels are already depleted, the same shortfall in imported supplies could potentially be defined as a more severe shortage.*

*When Metropolitan must make net withdrawals from storage to meet demands, it is considered to be in a shortage condition. Under most of these stages, Metropolitan*



# RUBIO CAÑON LAND AND WATER ASSOCIATION WATER SHORTAGE CONTINGENCY PLAN

*is still able to meet all end-use demands for water. For shortage stages 1 through 3, Metropolitan will meet demands by withdrawing water from storage. At shortage stages 4 and 5, Metropolitan may undertake additional shortage management steps, including issuing public calls for extraordinary conservation and exercising water transfer options, or purchasing water on the open market.”*

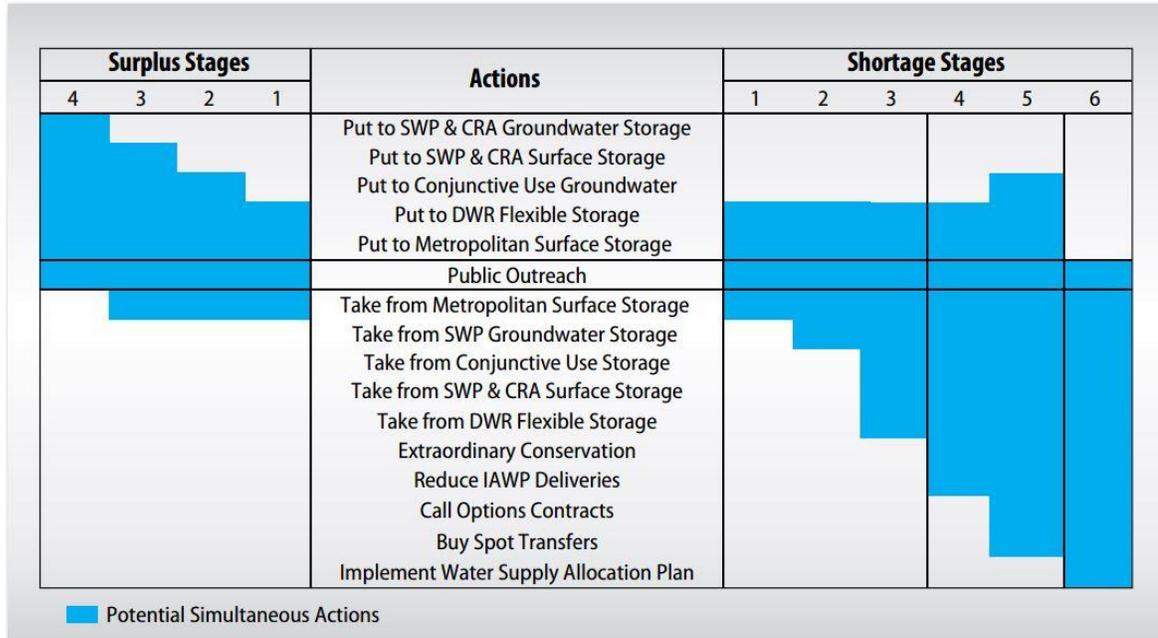


Figure 3: MWD WSDM Surplus & Drought Stages

## MWD WATER SUPPLY ALLOCATION PLAN (FOR WSDM SHORTAGE STAGE 7)

In February 2008, MWD’s Board of Directors adopted a WSAP, which includes a methodology for calculating supply allocations in the event that MWD enters a Shortage Stage 7 and is unable to meet the firm demands of its member agencies. MWD revised its WSAP in 2014 to include the following updates: new Fiscal Year (FY) 12-13 to FY 13-14 baseline, implement a Conservation Demand Hardening Adjustment, create a separate Groundwater Replenishment Allocation for applicable agencies, and replace WSAP Penalty Rates with Allocation Surcharges based on the marginal costs of turf removal. It should be noted that the WSAP is not a rationing plan. Rather, it is a pricing plan where water is allocated at regular prices and agencies that choose to take more water pay surcharges. The surcharge pricing mechanism acts to discourage the use of water above the allocation. The WSAP uses a combination of estimated total retail demands and historical local supply production within the member

*When a WSDM Shortage Stage 7 is triggered, MWD's WSAP helps to assess resources in the most equitable way possible.*



Figure 4: MWD’s Diamond Valley Lake (Potential Reserves for WSAP Allocations)

agency service area to estimate the demands on MWD from each member agency in a given year. Based on a number of factors, including storage and supply conditions, MWD then determines whether it has the ability to meet these demands or will need to allocate its limited supplies among its member agencies. Thus, implicit in MWD’s decision not to implement an allocation of its supplies is that, at a minimum, MWD will be able to meet the demands identified for each of the member agencies.

According to MWD’ 2015 Integrated Resource Plan (IRP), the approach seeks to balance the impacts of a shortage at the retail level while maintaining equity on the wholesale level and takes into account growth, local investments, changes in supply conditions and the demand hardening aspects of non-potable recycled water use and the implementation of conservation savings programs. The methodology attempts to allocate supplies based on an estimate of an agency’s relative need for imported water using the following process:

1. Establish a baseline for total retail demands (and adjust for growth) to determine the allocation year total retail demands. (“*What are your total water demands?*”)
2. Estimate the amount of local supplies to be used in the allocation year and subtract from total retail demands. This is the allocation year baseline demand on MWD. (“*How much imported water do you need from MWD?*”)
3. Apply the minimum allocation percentage (per the regional shortage level) to the allocation year baseline demand and provide minor adjustments based on various criteria. (“*Restrict normal supply deliveries and provide allocation.*”)



## BASE PERIOD CALCULATIONS (USED TO DETERMINE WSAP REDUCTIONS)

The Base Period is calculated using data from FY 2012-13 and FY 2013-14. Base Period wholesale demands are based on the two-year average of demands on MWD during the Base Period, including full-service, seawater barrier, seasonal shift, and surface storage operating agreement demands.

Local supplies for the base period are calculated using a two-year average of groundwater production, groundwater recovery, Los Angeles Aqueduct supply, surface water production, and other imported supplies. Non-potable recycling production is not included in this calculation, which, according to MWD, is intended to address the impact of demand hardening due to recycled water use.

Total potable retail demands for the Base Period are then calculated by adding the Base Period wholesale demands on MWD and the Base Period local supplies.

## WSAP ALLOCATION YEAR CALCULATIONS

The next step is to estimate water needs in an allocation year by (1) adjusting the Base Period total retail demands for population or economic growth, and (2) accounting for changes in local supplies.

The Base Period retail demands are adjusted for growth using the average annual rate of population growth occurring since the two-year base period based on county-level data generated by the California Department of Finance.



Figure 5: Lake Mead “Bathtub Ring” (December 20, 2020)

Next, these growth-adjusted demands are adjusted again to account for (1) gains and losses of local supply, and (2) extraordinary increases in production over the base year. According to MWD, these adjustments are made to give a more accurate estimate of actual supplies in the allocation year, and, in turn, more accurately reflect an agency’s demand for MWD supplies.

The adjustment for gains in local supplies is intended to account for planned or scheduled gains in local supply production above the Base Period, which are not due to extraordinary



actions to increase water supply in the allocation year. These previously scheduled increases in supply programs (i.e., SDCWA/IID) or local production are added to the base period local supplies. Again, new supplies from non-potable recycling projects are not counted as local supplies.

While the local agency does become more reliable with the addition of the new supplies, assuming that the new supplies are available during an allocation, the benefits of these programs are partially offset because the impact of adding the new supplies to the Base Period local supplies is to reduce an agency’s dependence on MWD and thus their allocation under the WSAP.

Alternatively, only a portion of the additional supplies from what are termed “extraordinary increases in production” are added back to Allocation Year local supplies depending on the retail shortage level. Extraordinary increases in production include such efforts as purchasing transfers or mining of groundwater basins. By adding only a percentage of the yield from these supplies to Allocation Year local supplies, it has the effect of “setting aside” the majority of yield for the agency who procured the supply.

**Table 7** reflects the set of percentages used in the WSAP to establish water allocations for each agency.

Table 7: Water Allocation Percentages

Regional Shortage Level	Regional Shortage Percentage	Wholesale Minimum Percentage	Maximum Retail Impact Adjustment Maximum
1	5%	92.5%	2.5%
2	10%	85.0%	5.0%
3	15%	77.5%	7.5%
4	20%	70.0%	10.0%
5	25%	62.5%	12.5%
6	30%	55.0%	15.0%
7	35%	47.5%	17.5%
8	40%	40.0%	20.0%
9	45%	32.5%	22.5%
10	50%	25.0%	25.0%

#### 4.2 FMWD SHORTAGE STAGES OF ACTION

FMWD’s plan mirrors MWD’s plan with two exceptions. The first exception is that since FMWD does not take delivery of any Seawater Barrier water and FMWD is considered ineligible for the Replenishment Allocation, reference to those deliveries has been deleted.



The second exception is because of the way the water is allocated, without a further adjustment, total water allocated to FMWD's member agencies will never match the total water allocated to FMWD. Thus, an adjustment has been added to prorate the difference between the amount allocated to FMWD by MWD and the initial allocation by FMWD.

Additionally, FMWD will reconcile over use and under use of member agency allocations at the same time that MWD does, typically at the end of every 12 months. Any allocation under used by agencies will be pooled together in one pot to be distributed to those agencies who over use their allocation. Any agency using that pooled water will be charged the regular FMWD Tier 1 or Tier 2 rate for having taken the water plus 50 percent of MWD's penalty rate. Any penalties assessed would go into the Water Resource and Conservation Fund.

FMWD only assesses 50 percent of the surcharge against its retail agencies in situations where FMWD is not subject to the Allocation Surcharge from MWD. In cases where FMWD as a whole is subject to the Allocation Surcharge from MWD, member retail agencies that have over used their allocation will take on the obligation proportionally and be subject to 100 percent of the surcharge.

### **Supply Allocation Formula Elements**

The following are the elements of the allocation formula:

***Base Period*** – A two-year average of historical water use using data from FY 2012-13 and FY 2013-14. Water use is divided into three components: total retail demand, locally produced water, and imported water.

***Growth Adjustment*** – Retail demands are adjusted for growth between the base period and the time of allocation based on county level estimates of average annual growth in population. Growth for Los Angeles County is 0.46 percent. Agencies have an option to use weighted average population and job growth instead based on an appeal process to MWD.

***Local Supplies*** – The amount of local supplies that are planned to be used in an allocation year.

***Extraordinary Allocation Year Local Supplies*** – These are previously unscheduled local water supplies to be used in an allocation year, including transfers, recycled water, desalination, and recovery of groundwater. This amount is credited without reduction in the Wholesale Minimum Allocation. In addition, it decreases both the Retail Impact Adjustment and the reliance on MWD.



***Conservation Demand Hardening Adjustment*** – An adjustment is made for demand hardening due to active conservation based on GPCD. Calculation considers conservation savings, dependence on MWD and the associated Regional Shortage Level percentage.

***Regional Shortage Percentage*** – This is the percentage of shortage between supplies and demands and will be declared by MWD’s board. **Table 5.7** contains the percentages used to establish water allocations for agencies.

***Wholesale Minimum Allocation*** – This is the first step in the formula and provides the minimum imported water allocation from MWD. It is calculated as an allocation baseline demand on MWD (Base Period Demands minus Local Supplies) multiplied by the Wholesale Minimum Percentage of the associated Regional Shortage Level.

***Retail Impact Adjustment*** – This is the maximum additional allocation an agency may receive based on impacts to retail customers. Those agencies with less local supplies would receive a higher adjustment than those agencies with more local supplies. This is calculated as percent dependence on MWD times the allocation baseline demand on MWD multiplied by the Retail Impact Adjustment factor of the associated Regional Shortage Level.

***Minimum Per-Capita Adjustment*** – An adjustment made should gallons per capita per day for an agency drop to 100 GPCD or lower.

***Total FMWD Allocation*** – A preliminary allocation is provided to agencies based on calculations that mirror MWD’s WSAP. Without a further adjustment, total water allocated to FMWD’s member agencies will never match the total water allocated to FMWD. Thus, an adjustment has been added to prorate the difference between the amount allocated to FMWD by MWD and the initial allocation by FMWD.

***Allocation Surcharge*** – Previously WSAP Penalty Rates, an Allocation Surcharge will be in effect that is based on the costs to implement outdoor water use reductions through turf removal programs. The Allocation Surcharge would provide a price signal based on the marginal conservation costs incurred to reduce water use in dry and shortage years.

## **Conservation Plan Ordinance**

FMWD’s Conservation Plan (adopted April 2009; revised plan adopted June 2021) establishes a comprehensive staged water conservation program, which will encourage reduced water consumption within FMWD through conservation, enable effective water supply planning, assure reasonable and beneficial use of water, prevent waste of water, and maximize the efficient use of water within FMWD. In June 2021, FMWD amended



its Conservation Plan to conform to six standard water shortage levels as required by CWC Section 10632(a)(3)(A) and to better align with long-term water use goals. Along with permanent water conservation requirements, FMWD’s Water Conservation Plan consists of six stages, which are described in **Table 8**, to respond to a reduction in potable water available to FMWD for distribution to its customers. Stage 1 conservation requirements are in effect at all times unless a mandatory conservation stage has been implemented by the Board of Directors.

### 4.3 RCLWA STAGES OF ACTION

On May 20, 2015, the RCLWA Board of Directors adopted a mandatory Conservation Program Resolution No. 2015.03.Cons (**Appendix B**) with a goal of reducing water use by 36 percent or more.

**Table 8: Water Supply Shortage Stages and Conditions – Rationing Stages**

RCLWA Shortage Levels			Mandated Standard Shortage Levels	
Stage No.	Water Supply Conditions	% Shortage	Shortage Level	% Shortage
1	Standard Water Conservation. FMWD can meet all Member Agency demands. Voluntary water conservation applies.	Up to 10%	1	Up to 10%
2	Increased Water Conservation. Some supplies have been impacted, and consumers should increase efforts to conserve.	10% to 20%	2	Up to 20%
3	Extraordinary Water Conservation. MWD is withdrawing water from most of its storage programs to meet demands. Extraordinary conservation is called for from consumers.	20% to 30%	3	Up to 30%
4	Allocation. MWD has implemented its allocation plan to its member agencies. Thus, supplies are limited.	30% to 40%	4	Up to 40%
5	Critical. Water supplies are reduced drastically.	40% to 50%	5	Up to 50%
6	Emergency. Water supplies are only available for health and safety needs.	Greater than 50%	6	>50%



Per California Water Code (CWC) Section 10632(a)(3)(B), a supplier may continue using their own water shortage levels that were previously used. **Table 8** correlates RCLWA’s water shortage levels to the six standard water shortage levels mandated by CWC Section 10632(a)(3)(A).

#### 4.4 PROHIBITIONS

The RCLWA Conservation Program Resolution No. 2015.03.Cons and FMWD Water Conservation Plan Resolution No. 913-0621 list water conservation requirements that shall take effect upon implementation by the RCLWA and FMWD Board of Directors. These prohibitions shall promote the efficient use of water, reduce or eliminate water waste, complement the RCLWA’s water quality regulations and urban runoff reduction efforts, and enable implementation of the RCLWA’s Water Shortage Contingency Measures. Prohibitions include but are not limited to the following restricted activities: outdoor watering, washing of vehicles, washing of hard or paved surfaces, filling or refilling swimming pools and decorative water features, and using potable water in construction activities. Additionally, RCLWA requires any leaks to be repaired in a time frame specific to each stage’s conservation requirements. The prohibitions and the stages at which they take effect can be found in **Table 9**.

**Table 9: Mandatory Prohibitions**

Examples of Prohibitions	Stage When Prohibition Becomes Mandatory
Leaks from any facility both inside and outside of a customer’s premises must be repaired within seventy-two hours after the customer is notified of, or discovers the leak.	At All Times
All new plumbing fixtures installed within the RCLWA service area must conform to the following requirements: <ul style="list-style-type: none"> <li>• Toilets shall use less than 1.6 gallons per flush.</li> <li>• Showerheads shall flow at less than 2.5 gallons per minute.</li> <li>• Non-residential lavatory faucets shall be metering or self-closing.</li> <li>• Urinals shall use not more than 1.5 gallons per flush.</li> </ul>	At All Times
Where recycled water is available and appropriate, the use of potable water for irrigation purposes shall be considered a waste of potable water. Upon written notice from the General Manager that recycled water is available and appropriate for use, the customer shall have 60 days to commence the use of recycled water.	At All Times
Potable water shall not be used for construction activities such as compaction and dust control when recycled water is available and appropriate. As used in this paragraph, “available” also means the cost of required recycled water	At All Times



RUBIO CAÑON LAND AND WATER ASSOCIATION  
WATER SHORTAGE CONTINGENCY PLAN

Examples of Prohibitions	Stage When Prohibition Becomes Mandatory
conveyance facilities, is less than or equal to the cost of an equivalent amount of potable water priced at 150% of regular potable water rates, plus the cost of necessary potable water conveyance facilities. Both potable and non-potable water for construction purposes including but not limited to de-brushing of vacant land, compaction of fills and pads, trench backfill and other construction uses, shall be used in an efficient manner which will not result in runoff.	
No irrigation of new or existing parks, median strips, landscaped public areas or landscaped areas, lawns, or gardens surrounding single-family homes, condominiums, townhouses, apartments, and industrial parks shall occur in such a way as to waste water. The rate and extent of application of water shall be controlled by the consumer so as to eliminate runoff or overspray from the irrigated areas.	At All Times
Watering or irrigating of lawn, landscape or other vegetated area with potable water is prohibited between the hours of 9:00 a.m. and 5:00 p.m. Pacific Standard Time on any day, except by use of a hand-held bucket or similar container, a hand- held hose equipped with a positive self-closing water shut-off nozzle or device, or for very short periods of time for the purpose of adjusting or repairing an irrigation system.	At All Times
Watering or irrigating of lawn, landscape or other vegetated area with potable water using a landscape irrigation system or a watering device not continuously attended is limited to no more than ten (10) minutes watering per day per station. This subsection does not apply to landscape irrigation systems using only very low-flow drip type irrigation systems when no emitter produces more than two (2) gallons of water per hour and weather based controllers or stream rotor sprinklers that meet a 70% efficiency standard.	At All Times
Irrigation of turf and ornamental landscapes is prohibited during and 48 hours following measurable precipitation.	At All Times
Washing down hard or paved surfaces, including but not limited to sidewalks, walkways, driveways, parking areas, tennis courts, patios or alleys, is prohibited except when necessary to alleviate safety or sanitary hazards, and then only by use of a hand-held bucket or similar container, a handheld hose equipped with a positive self-closing water shut-off device, a low-volume, high-pressure cleaning machine equipped to recycle any water used, or a low-volume high-pressure water broom.	At All Times
Operating a water fountain or other decorative water feature that does not use re-circulated water is prohibited.	At All Times
Using water to wash or clean a vehicle, including but not limited to any automobile, truck, van, bus, motorcycle, boat or trailer, whether motorized or not is prohibited, except by use of a hand-held bucket or similar container or a hand-held hose equipped with a positive self-closing water shut- off nozzle or device. This subsection does not apply to any commercial car washing facility or commercial service station; where health, safety and welfare of the public is contingent upon frequent vehicle cleaning, such as garbage trucks and vehicles which transport food and perishables.	At All Times



Examples of Prohibitions	Stage When Prohibition Becomes Mandatory
Eating or drinking establishments, including but not limited to a restaurant, hotel, cafe, cafeteria, bar, or other public place where food or drinks are sold, served, or offered for sale, are prohibited from providing drinking water to any person unless expressly requested.	At All Times
Food preparation establishments, such as restaurants or cafes, are prohibited from using non-water conserving dish wash spray valves.	At All Times
No watering, sprinkling or irrigating shall take place in any landscaped or vegetated areas on days when the wind is blowing causing overspray, and on days when it is raining.	At All Times
The use of potable water from fire hydrants shall be limited to firefighting related activities or other activities immediately necessary to maintain the health, safety, and welfare of the residents.	At All Times
Installation of single pass cooling systems is prohibited in buildings requesting new water service.	Stage 2
Installation of non-re-circulating water systems is prohibited in new commercial conveyor car wash and new commercial laundry systems.	Stage 2
All commercial conveyor car wash systems must have installed operational re-circulating water systems, or must have secured a waiver of this requirement from RCLWA.	Stage 2
Outdoor water use is limited to odd or even days, based on ending number of customer address.	Stage 2
Watering or irrigating of lawn, landscape or other vegetated area with potable water is limited to three days per week on Tuesdays, Thursdays and Saturdays. During the months of November through March, watering or irrigating of lawn, landscape or other vegetated area with potable water is limited to no more than two days per week on Tuesdays and Saturdays. This provision does not apply to landscape irrigation zones that exclusively use very low flow drip type irrigation systems when no emitter produces more than two (2) gallons of water per hour. This provision also does not apply to watering or irrigating by use of a hand-held bucket or similar container, a hand-held hose equipped with a positive self-closing water shut-off nozzle or device, or for the express purpose of adjusting or repairing an irrigation system.	Stage 3
Watering or irrigating of lawn, landscape or other vegetated area with potable water is limited to two days per week on Tuesdays and Saturdays. This provision does not apply to landscape irrigation zones that exclusively use very low flow drip type irrigation systems when no emitter produces more than two (2) gallons of water per hour. This provision also does not apply to watering or irrigating by use of a hand-held bucket or similar container, a hand-held hose equipped with a positive self-closing water shut-off nozzle or device, or for the express purpose of adjusting or repairing an irrigation system.	Stage 4
All leaks, breaks, or other malfunctions in the water user's plumbing or distribution system must be repaired within forty-eight (48) hours of notification by the local water purveyor unless other arrangements are made with RCLWA.	Stage 4



RUBIO CAÑON LAND AND WATER ASSOCIATION  
WATER SHORTAGE CONTINGENCY PLAN

Examples of Prohibitions	Stage When Prohibition Becomes Mandatory
Filling or re-filling ornamental lakes or ponds is prohibited, except to the extent needed to sustain aquatic life, provided that such animals are of significant value and have been actively managed within the water feature prior to declaration of a supply shortage level under this plan.	Stage 4
Using water to wash or clean a vehicle, including but not limited to, any automobile, truck, van, bus, motorcycle, boat or trailer, whether motorized or not, is prohibited except by use of a hand-held bucket or similar container, a hand-held hose equipped with a positive self-closing water shut-off nozzle or device, by high pressure/low volume wash systems, or at a commercial car washing facility that uses a re-circulating water system to capture or reuse water.	Stage 4
<p>No new potable water service will be provided, no new temporary meters or permanent meters will be provided, and no statements of immediate ability to serve or provide potable water service (such as, will-serve letters, certificates, or letters of availability) will be issued, except under the following circumstances:</p> <ul style="list-style-type: none"> <li>• A valid, unexpired building permit has been issued for the project; or</li> <li>• The project is necessary to protect the public health, safety, and welfare; or</li> <li>• The applicant provides substantial evidence of an enforceable commitment that water demands for the project will offset prior to the provision of a new water meter(s) to the satisfaction of the local water purveyor</li> </ul>	Stage 4
Watering or irrigating of lawn, landscape or other vegetated area with potable water is limited to 1 day per week. Any waivers to this restriction must be obtained from RCLWA.	Stage 5
Watering or irrigating of lawn, landscape or other vegetated area with potable water is prohibited. Any waivers to this restriction must be obtained from RCLWA.	Stage 6
All leaks, breaks, or other malfunctions in the water user’s plumbing or distribution system must be repaired within twenty-four (24) hours of notification by RCLWA unless other arrangements are made with RCLWA.	Stage 6

**4.5 CONSUMPTION REDUCTION MEHTHODS**

Methods to reduce the use of potable water exist in all Water Shortage Levels are listed in **Table 10**.



Table 10: Consumption Reduction Methods

Stage When Method Takes Effect	Consumption Reduction Methods	Projected Reduction (%)
1	Implement Stage 1 Conservation Measures	Up to 10%
2	Implement Stage 2 Conservation Measures	10% to 20%
3	Implement Stage 3 Conservation Measures	20% to 30%
4	Implement Stage 4 Conservation Measures	30% to 40%
5	Implement Stage 5 Conservation Measures	40% to 50%
6	Implement Stage 6 Conservation Measures	Greater than 50%

#### 4.6 CATASTROPHIC SUPPLY INTERRUPTION

Given the great distances that imported supplies travel to reach the FMWD service area, the region is vulnerable to interruptions along hundreds of miles aqueducts, pipelines and other facilities associated with delivering the supplies to the region. Additionally, this water is distributed to customers through an intricate network of pipes and water mains that are susceptible to damage from earthquakes and other disasters, natural or otherwise.

##### MWD

MWD has comprehensive plans for stages of actions it would undertake to address a catastrophic interruption in water supplies through its WSDM and WSAP Plans. MWD also developed an Emergency Storage Requirement to mitigate against potential interruption in water supplies resulting from catastrophic occurrences within the Southern California region, including seismic events along the San Andreas fault. In addition, MWD is working with the State to implement a comprehensive improvement plan to address catastrophic occurrences that could occur outside of the Southern California region, such as a maximum probable seismic event in the Delta that would cause levee failure and disruption of SWP deliveries.

In July 2019, MWD’s Board adopted amendments to their Administrative Code allowing deliveries of member agency water supplies in MWD’s system during an emergency. With these enabled deliveries, MWD’s member agencies will be able to deliver their water through MWD’s system under specific emergency conditions. Emergency deliveries using a portion of MWD’s system can only be made if MWD is unable to make deliveries to a member agency due to physical damage to its system resulting from a natural disaster or other emergency, and there are no alternatives.



Figure 6: Reservoirs Provide Emergency Supplies (Lake Skinner)

## **RCLWA**

For a sudden or catastrophic water supply interruption, RCLWA has recently developed an Emergency Response Plan (ERP) to ensure the most effective use of its resources for the benefit and protection of facilities and employees, in addition to the preservation of a reliable water supply for its customers.

In the event of a power outage, RCLWA has emergency generators at all of its key wells and booster locations. If the normal water supply is interrupted, water can be supplied to RCLWA from emergency interconnections with the City of Pasadena or Las Flores Mutual Water Company.

RCLWA's distribution system is located in the foothills of the San Gabriel Mountains. It ranges in elevation from 1,100 feet to 1,800 feet above mean sea level. As a result, with major reservoirs at the top of this system, water can be fed by gravity to all users. It is RCLWA's policy to keep these reservoirs as full as possible at all times. This means that users can usually be supplied with water for two to three days in the case of either a power or supply outage.

In addition, the Foothill Conjunctive Use Program is currently being implemented. This program provides for groundwater storage of up to 9,000 AF, with up to 3,000 AF to be produced for each of three consecutive dry years, thus decreasing dependence on imported surface water supply. Additionally, there are current considerations to implement the Raymond Basin Conjunctive Use Program, which would generate grant funding for the construction of a nitrate removal plant. This plant would further lessen RCLWA's



dependence on imported water supply. An implementation schedule is not yet available for the Raymond Basin Conjunctive Use Program.

Preparation actions for possible catastrophes are listed in **Table 11**.

**Table 11: RCLWA Preparation Actions for Catastrophe**

Possible Catastrophe	Preparation Actions
Regional Power Outage	<ul style="list-style-type: none"> <li>• Emergency Generators</li> <li>• Emergency Interconnections</li> <li>• Gravity Fed Distribution Systems</li> <li>• Reservoir Level Maintenance</li> <li>• Conjunctive Use Program</li> <li>• Emergency Response Fund</li> </ul>
Earthquake	
Supply Contamination	
Terrorist Act which Interrupts Service	
Other(s)	

## 4.7 SEISMIC RISK ASSESSMENT AND MITIGATION PLAN

### INTRODUCTION

Earthquakes can vary significantly in magnitude and the amount of damage caused. Major earthquakes can cause loss of electrical power, damage to RCLWA’s structures and equipment, disruption of service, and injuries to staff. This section provides a description of RCLWA’s procedures (i.e., response and mitigation) after an earthquake event.

As mandated in CWC Section 10632.5, beginning January 1, 2020, water suppliers are required to include a seismic risk assessment and mitigation plan as part of their WSCP to assess the vulnerability of each of the various facilities of their water system and mitigate those vulnerabilities. If an urban water supplier does not have a seismic risk assessment and mitigation plan, the urban water supplier may instead, per CWC Section 10632.5(c), include a local hazard mitigation plan (LHMP) or a multi-hazard mitigation plan. This requirement is satisfied by the incorporation of elements and analyses from RCLWA’s Risk and Resilience Assessment (RRA), ERP, and Chlorine System California Accidental Release Prevention (CalARP) Seismic Revalidation (**Appendix D**) as well as the 2019 County of Los Angeles All-Hazards Mitigation Plan (**Appendix C**). The complete RRA and ERP documents are not presented within this plan due to the highly confidential nature of the reports. Although RCLWA does not currently have a mitigation plan or a schedule to



prepare such a plan, RCLWA refers to the 2019 County of Los Angeles All-Hazards Mitigation Plan.

## **SEISMOLOGY OF WATER FACILITIES & VULNERABILITY**

An earthquake is caused by the shifting of tectonic plates beneath the Earth's surface. Ground shaking from moving geologic plates collapses buildings and bridges, and sometimes triggers landslides, avalanches, flash floods, fires and tsunamis. The strong ground motion of earthquakes has the potential to cause a great deal of damage to drinking water and wastewater utilities, particularly since most utility components are constructed from inflexible materials (i.e., concrete, metal pipes). Earthquakes create many cascading and secondary impacts that may include, but are not limited to:

- Structural damage to facility infrastructure and equipment
- Water tank damage or collapse
- Water source transmission line realignment or damage
- Damage to distribution lines due to shifting ground and soil liquefaction, resulting in potential water loss, water service interruptions, low pressure, contamination and sinkholes and/or large pools of water throughout the service area
- Loss of power and communication infrastructure
- Restricted access to facilities due to debris and damage to roadways

According to the maps provided on the California Office of Emergency Services' online planning tool (My Plan) and the California Geological Survey's online earthquake hazards zone application (EQ Zapp), no portion of the RCLWA system is crossed by a known fault line as shown in **Figure 7**. Therefore, there are no RCLWA potable water structures with an extremely high risk of earthquake damage. There are, however, three known fault lines (Verdugo Fault, Sierra Madre Fault, and Raymond Fault) in the vicinity of RCLWA's service area. The nearest fault line, the Raymond Fault, is within five miles of RCLWA's service area.

Furthermore, there are water facilities (i.e., Cañon Reservoir, Zane Grey Tanks, Zane Grey Pump Station, etc.) with increased risk due to landslides and soil liquefaction in the north part of RCLWA's service area. Liquefaction happens when loosely packed sandy or silty materials saturated with water are shaken hard enough to lose strength and stiffness. Liquefied soils behave like a liquid and are responsible for tremendous damage in an earthquake. Liquefaction susceptibility is typically defined on a scale ranging from very low to very high based on the intensity of the earthquake. According to RCLWA's CalARP

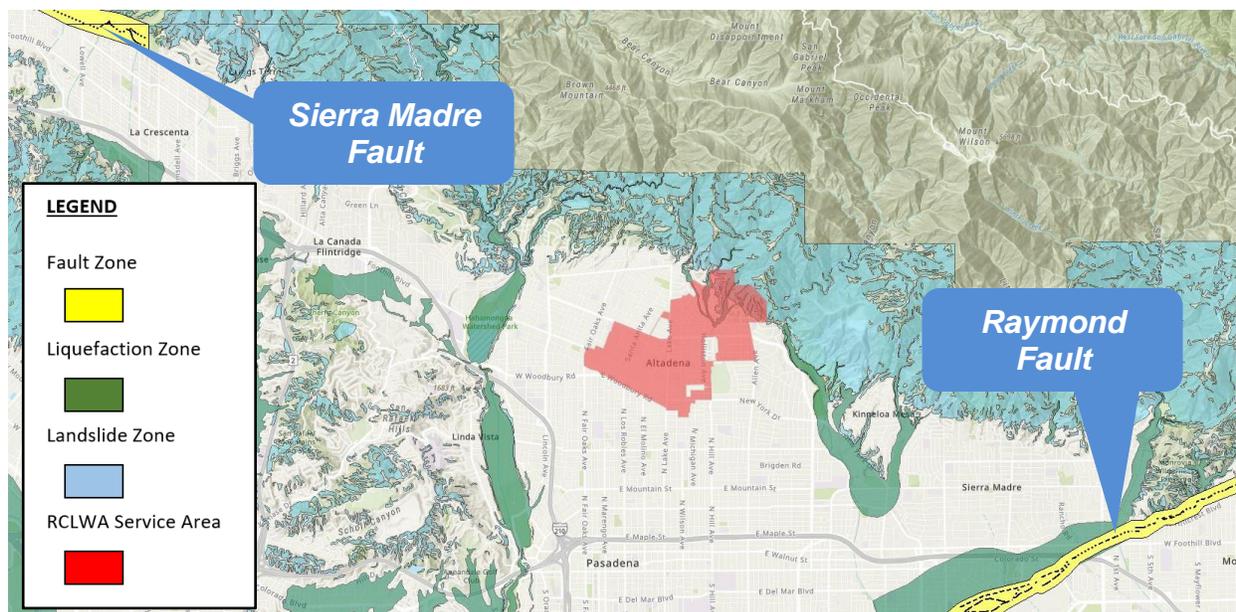


Figure 7: Seismic Hazards within RCLWA’s Service Area (California Geological Survey)

Seismic Revalidation report (2016), although part of RCLWA is located in landslide and liquefaction zones and in the vicinity of several known fault lines, the potential for landslide, liquefaction, and ground faulting, which is the movement and displacement of the ground’s surface, is low for RCLWA’s water facility sites.

## ERP – EARTHQUAKE EMERGENCY RESPONSE

RCLWA is currently preparing a new ERP to replace its existing ERP by December 31, 2021 in order to meet the requirements of America’s Water Infrastructure Act of 2018 (AWIA). The ERP provides RCLWA staff with the necessary information, strategies, procedures, and mitigation actions to address earthquake emergencies. RCLWA’s ERP policies are intended to guide disaster management planners and emergency responders, and to provide a consistently high level of preparedness at all the facilities.

Per the ERP, after a major earthquake, the Emergency Operations Center (EOC) will be activated if potential or significant damage has occurred in RCLWA’s service area, and the situation cannot be handled by routine public safety response or immediate mutual aid assistance. The General Manager shall assess the situation and establish the incident command post as necessary. In the event of an emergency, RCLWA personnel will be required to inspect all water facilities for apparent signs of damage or abnormal conditions and conserve the existing water supply in the reservoirs from loss through water line breaks in the distribution system.

## CHLORINE SYSTEM CalARP SEISMIC REVALIDATION

In September 2016, RCLWA performed a 5-year revalidation of its original seismic evaluations of the chlorine systems at four RCLWA facilities, including: Figueroa Sump Basin, Calaveras Reservoir, Maiden Lane Reservoir, and Ames Treatment Plant. Title 19 of the California Code of Regulations requires facilities with regulated substances to perform an evaluation of equipment and structures to minimize the risk of a release during a seismic event. Seismic evaluations follow a guidance document written for this purpose. Based on the revalidation, the chlorine equipment and buildings should perform adequately during a seismic event if all the deficiencies identified by the seismic evaluations are corrected.

## MITIGATION ACTIONS

Hazard mitigation may occur during any phase of a threat, emergency, or disaster. Mitigation can and may take place during the preparedness (before), response (during), and recovery (after) phases. The process of hazard mitigation involves evaluating a hazard's impact and identifying and implementing actions to minimize or eliminate the impact.



Figure 8: The Five Phases of Emergency Management

### **County of Los Angeles**

The goals of the County of Los Angeles All-Hazard Mitigation Plan are based on a risk assessment, representing a long-term vision for hazard reduction or enhanced mitigation capabilities.

The five mitigation goals and descriptions are listed below:

1. **Protect Life and Property** – Implement activities that assist in protecting lives by making homes, businesses, infrastructure, critical facilities, and other property more resistant to losses from natural, human-caused, and technological hazards. Improve hazard assessment information to make recommendations for avoiding new development in high-hazard areas and encouraging preventive measures for existing development in areas vulnerable to natural, human-caused, and technological hazards.



2. ***Enhance Public Awareness*** – Develop and implement education and outreach programs to increase public awareness of the risks associated with natural, human-caused, and technological hazards. Provide information on tools, partnership opportunities, and funding resources to assist in implementing mitigation activities.
3. ***Preserve Natural Systems*** – Support management and land use planning practices with hazard mitigation to protect life. Preserve, rehabilitate, and enhance natural systems to serve hazard mitigation functions.
4. ***Encourage Partnerships and Implementation*** – Strengthen communication and coordinate participation with public agencies, citizens, nonprofit organizations, business, and industry to support implementation. Encourage leadership within the County and public organizations to prioritize and implement local and regional hazard mitigation activities.
5. ***Strengthen Emergency Services*** – Establish policy to ensure mitigation projects are considered for critical facilities, services, and infrastructure.

The specific mitigation actions and measures established by the County of Los Angeles to mitigate seismic risks and vulnerabilities are described in detail within its hazard mitigation plan.

## **RCLWA**

As a result of the recommendations in the Chlorine System CalARP Seismic Revalidation, improvements to the chlorine cylinders and weigh scale located at three RCLWA facilities were made by adding/replacing chains around stored cylinders and adding anchor bolts.

RCLWA's mitigation actions to mitigate seismic risks and vulnerabilities are further described within its CalARP Seismic Revalidation report and ERP.

## **5. COMMUNICATION PROTOCOLS**

### **5.1 INTRODUCTION**

RCLWA's communication protocol includes the various channels that RCLWA will use to convey critical messages regarding water shortage allocations and voluntary and mandatory actions. The goal of RCLWA is to provide more public outreach to help increase awareness of water shortages. A strong communication strategy and a common understanding on the water supply situation and necessary actions between RCLWA and its customers, the public, elected officials, and other key stakeholders are essential should



the WSCP need to be activated. How the water shortage messages are addressed to the public are described in this communication protocol. The communication protocol will be in place prior to a water supply shortage and be initiated in Stage 2 Increased Water Conservation. Activation of the communication protocol will continue through all subsequent water shortage stages. RCLWA will ensure outreach efforts are reaching key audiences as needed.

It is important to communicate to its customers the following when urgent conservation is needed:

- Which shortage stage is being implemented;
- What response actions are triggered to save water;
- Why water needs to be saved; and
- What actions RCLWA is taking to respond to the water supply situation.

## **5.2 COORDINATION**

The goal of RCLWA’s outreach plans during dry periods and water shortages is to maintain effective coordination with key audiences. In order to maintain reliability in this communication, RCLWA will work closely with the Board of Directors. During dry periods or other times of limited supply, the frequency and extent of coordination will increase to ensure outreach tactics are consistent with the changing needs of RCLWA and its customers. In addition to collaboration with its wholesaler, FMWD, RCLWA will seek opportunities with outside organizations and agencies to complement its own outreach.

## **5.3 COMMUNICATION GOALS**

Communication objectives during an existing or anticipated water shortage condition include the following:

- Motivate key audiences (i.e., customers) to increase conservation in following any voluntary or mandatory actions called for at the current stage of the WSCP.
- Raise awareness of the drought, regulations, or other conditions affecting water sources and supplies.
- Educate customers, key stakeholders, elected officials, and the general public about water supply reliability, water quality, and water delivery.
- Prepare customers for any potential escalation of the supply shortage stages.



#### **5.4 COMMUNICATION PROTOCOL FOR CURRENT OR PREDICTED SHORTAGE**

A current or predicted shortage, as determined by RCLWA's Annual Assessment, will be addressed to the public and its customers upon submittal of the Annual Water Shortage Assessment Report to DWR by July 1 of every year. This notice may be conducted by RCLWA's website, signage in front of the RCLWA office, and wholesale agency coordination.

#### **5.5 COMMUNICATION PROTOCOL FOR SHORTAGE RESPONSE ACTIONS TRIGGERED OR ANTICIPATED TO BE TRIGGERED**

RCLWA's customers and public will be notified about any triggered or anticipated to be triggered shortage response actions. RCLWA monitors and measures the projected supply and demand for water by its customers monthly and recommends the stage of conservation required to the Board of Directors. After Stage 3, 4, 5, or 6 is declared, and at each regular board meeting, the Board of Directors will consider a report by the General Manager concerning the then current water supply status.

The Board will change the stage designation as appropriate; however, the Board will not impose mandatory measures without first conducting a duly-noticed public hearing pursuant to Water Code Sections 350 et seq., or 375 et seq. The appropriate stage of water conservation and the shortage response action triggered by the stage is then declared in a public notification posted on RCLWA's website and published in a daily newspaper. Upon declaration by the Board that a water shortage emergency exists, the WSCP shall be implemented. The plan shall remain in effect until the Board declares the water shortage emergency has ended.

#### **5.6 OTHER RELEVANT COMMUNICATION PROTOCOLS**

To reduce water use consumption during any water shortage stage, RCLWA will increase its public education and outreach efforts to build awareness of needed actions from the public. Moreover, RCLWA will regularly revise its outreach campaign to reflect current supply conditions. Key communication strategies and associated water shortage stage implementation are listed below:

- Promote available water assistance resources for vulnerable populations; specialized outreach for impacted industries (Stages 3 and 4).
- Keep stakeholders aware of conditions (all Stages).
- Proclaim stage change to key stakeholders and the general public (all Stages).
- Conduct meetings with elected officials and other key civic and business leaders (Stage 2).
- Encourage reduced optional outdoor use through outreach (Stages 3 and 4).



RCLWA may implement these communication strategies through its newsletters, website, and social media platforms to reflect supply conditions. In addition, RCLWA may conduct news briefings or other media outlets (i.e., TV, radio, newspapers) to announce changes in supply conditions.

## 5.7 CRISIS COMMUNICATION PROTOCOL

In the event of a catastrophic supply interruption due to a natural disaster or damage to RCLWA’s facilities, RCLWA will implement communication procedures in accordance with local, regional, state, and federal emergency response guidelines as outlined in its ERP. Depending upon the severity of the emergency and potential damage to RCLWA’s facilities, RCLWA may determine that it is necessary to use the Standardized Emergency Management System (SEMS) response and the Incident Command System (ICS). Public information and crisis communication are an integral part of the ICS structure. National Incident Management System (NIMS), SEMS, and ICS have been integrated into the ERP. It provides for a strategic response by all employees and assigns specific responsibilities in the event the plan is activated.

When an incident occurs, the General Manager and other assigned personnel will go to the designated EOC and begin implementation of RCLWA procedures and employ appropriate strategies from the shortage stages in **Table 8**.

Crisis communication efforts will concentrate on providing information to the public and external audiences. Furthermore, outreach messaging will reflect emergency conditions and the need to focus on health and public safety. RCLWA will keep the Board of Directors informed of incident status and coordinate with public health officials.

RCLWA will maintain communication with FMWD and its customers. Situation status reporting will be conducted during each operational shift during an event. In addition, RCLWA may also authorize release of public information to news media to announce conditions and explain needed action. Finally, RCLWA will ensure ongoing coordination with emergency response services with daily advisories or alerts as needed.

## 6. COMPLIANCE AND ENFORCEMENT

The means by which RCLWA will use to safeguard compliance with and enforcement of water shortage rules include, but are not limited to, the following:

- Warning and citation protocols
- Water-waste patrols



- Fines and surcharges
- Rules and measures associated with fixing breaks or leaks in irrigation systems
- Customer service, education, and communication programs
- Other responses

## 6.1 PENALTIES OR CHARGES

Any customer who violates provisions of the Water Conservation Program Resolution by either excess use of water or by specific violation of one or more of the applicable water use restrictions for a particular mandatory conservation stage may be cited by the RCLWA and may be subject to written notices, surcharges, fines, flow restrictions, service disconnection, and/or service termination, which are detailed in **Table 12**.

**Table 12: Penalties and Charges**

Penalties or Charges	Stage When Penalty Takes Effect
Written Notice	First Violation
Written Notice	Second Violation
Final Written Notice	Third Violation
\$100 Fine	Fourth Violation
\$250 - \$500 Fine	Fifth and Subsequent Violation

## 6.2 APPEAL REGARDING VIOLATIONS

Any customer of RCLWA who receives a notice of violation or any fine may appeal such notice or fine to RCLWA’s Board of Directors within 30 days after the date of such notice or fine. The decision of the Board of Directors on such appeal shall be conclusive and final.

## 7. LEGAL AUTHORITIES

Under California law, including CWC Chapter 3 (commencing with Section 350) of Division 1, Parts 2.55 and 2.6 of Division 6, Division 13, and Article X, Section 2 of the California Constitution, the RCLWA Board is authorized to implement the water shortage response actions outlined in this section. In all water shortage cases, shortage response actions to be implemented will be at the discretion of the RCLWA Board and will be based on an assessment of the supply shortage, customer response, and need for demand reductions.

It is noted that upon proclamation by the Governor of a state of emergency under the California Emergency Services Act, Chapter 7 (commencing with Section 8550) of



Division 1 of Title 2 of the Government Code, based on drought conditions, the state will defer to implementation of locally adopted water shortage contingency plans to the extent practicable. RCLWA will coordinate with any city or county within which it provides water supply services for the possible proclamation of a local emergency, as defined in Section 8558 of the Government Code.

## 8. FINANCIAL CONSEQUENCES OF WSCP IMPLEMENTATION

RCLWA has a long-established emergency reserve fund for use in earthquakes, a water shortage, or drought situations. Its rate structure is designed to allow for operations, capital improvements, and the maintenance of this reserve. In addition, RCLWA can institute additional levels of its existing tiered rate structure to offset the loss of revenue that might occur. Such measures taken by RCLWA are listed in **Tables 13** and **14**.

**Table 13: Proposed RCLWA Measures to Overcome Revenue Impacts**

Name of Measures
Emergency Reserve Fund
Rate Structure Adjustment
Tiered Rate Structure Adjustments

**Table 14: Proposed Measures to Overcome Expenditure Impacts**

Name of Measures
Obtain Alternative Sources of Funding
Defer certain expenditures

## 9. MONITORING AND REPORTING

### 9.1 REDUCTION MEASURING MECHANISM

A daily water use recording and monitoring system is in use under normal water supply conditions. During a declared water shortage emergency, the RCLWA management staff will compare daily water production with targeted goals and take appropriate action as outlined in this plan.



Reduction Monitoring Mechanisms are listed in **Table 15**.

**Table 15: Water Use Monitoring Mechanisms**

Mechanisms for Determining Actual Reductions	Type of Data Expected
Recording and Monitoring System	Daily Water Use

## 10. SPECIAL WATER FEATURE DISTINCTION

As required under CWC 10632(b), water features that are not pools or spas must be analyzed and defined separately from pools and spas in the WSCP. Non-pool or non-spa water features may use recycled water, whereas, for health and safety considerations, pools and spas must use potable water. Although RCLWA does not currently use recycled water and does not have the ability to use recycled water due to a lack of infrastructure, RCLWA would use non-potable water for non-pool water features if and when recycled water supply ever becomes available to RCLWA. Furthermore, the WSCP requires potable water recirculation for fountains and decorative water features.

## 11. WSCP ADOPTION AND REFINEMENT PROCEDURES

### 11.1 WSCP PUBLIC NOTICE AND ADOPTION

To encourage broad community participation in the WSCP preparation process, RCLWA provided 60-day notification letters to agencies within RCLWA’s service area. Copies of the draft WSCP were made available for public review at the RCLWA office prior to the public hearing. Shortly before the public hearing, a two-week and a one-week notice was published in the local press alerting the public of the public hearing. At a subsequent board meeting following the public hearing, RCLWA’s final WSCP was approved and adopted by its Board of Directors on June 24, 2021. **Appendix A** contains the Board resolution adopting the WSCP. The final plan was submitted to DWR within 30 days of Board adoption and includes all information necessary to meet the requirements of CWC Section 10632.

By July 1, 2021, RCLWA’s approved WSCP was filed with DWR. By July 1, 2021, RCLWA’s plan was submitted to the California State Library, County of Los Angeles, and cities within its service area. RCLWA will make the plan available for public review no later than 30 days after filing with DWR.



## 11.2 WSCP REFINEMENT PROCEDURES

This section discusses the process for reviewing and updating the WSCP to ensure it remains actively used, relevant and appropriate to the community, and consistent with applicable state and requirements. It is vital that RCLWA's WSCP remain up to date so as to best ensure shortage risk tolerance is adequate, appropriate water shortage mitigation strategies are implemented as needed, proper procedures for water efficient practices are in place for the community, and better alignment with long-term water use goals.

The RCLWA General Manager is responsible for maintaining this plan and updating it as needed. The General Manager is the primary RCLWA staff member who will carry out this process. In addition, the General Manager, or their designee, will serve as the WSCP project manager and will coordinate maintenance of the plan, conduct the formal review process, and direct the plan updates. The project manager will assign tasks, which may include collecting data, developing new or updated water shortage mitigation measures, updating sections of the plan, and presenting the plan to others.



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## **Appendix A: RCLWA Board Resolution Adopting WSCP**

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**Rubio Cañon Land and Water Association | Water Shortage Contingency Plan**

**Resolution #WSCP2020**

**Rubio Canon Land & Water Association  
Adopting the 2020 Water Shortage Contingency Plan**

WHEREAS, the California Legislature in 1983 enacted the Urban Water Management Plan Act (Water Code 10610 et seq.) which mandates that suppliers of water for municipal purposes to more than 3,000 customers or supplying more than 3,000-acre feet of water annually, prepare and adopt, in accordance with prescribed requirements, a Water Shortage Contingency Plan as part of its Urban Water Management Plan;

WHEREAS, pursuant to recent amendments to the Act, urban water suppliers are required to adopt and electronically submit their Water Shortage Contingency Plan to the California Department of Water Resources by July 1, 2021;

WHEREAS, Rubio Canon Land and Water meets the definition of an urban water supplier for purposes of the Act and is required to prepare and adopt a Water Shortage Contingency Plan as part of its 2020 Urban Water Management Plan;

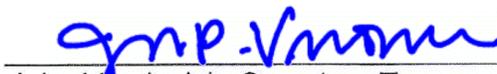
WHEREAS, Rubio has prepared a Water Shortage Contingency Plan in accordance with Act, and in accordance with applicable legal requirements, has undertaken certain coordination, notice, public involvement, public comment, and other procedures in relation to its Water Shortage Contingency Plan;

WHEREAS, Rubio Canon Land & Water Association has prepared and made available for public review, an update to its Urban Water Management Plan which includes the Water Shortage Contingency Plan for the 2020 update. In furtherance of its adoption, a properly notified public hearing regarding the Plan was held by the Board of Directors on June 24, 2021;

NOW, THEREFORE, BE IT RESOLVED, that Rubio Canon Land & Water Association hereby adopts its 2020 Water Shortage Contingency Plan.

ADOPTED, SIGNED AND APPROVED this 24th day of June, 2021.

  
\_\_\_\_\_  
Janet Fahey, President  
Rubio Canon Land & Water Association

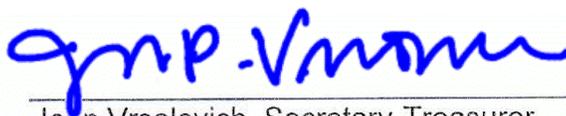
  
\_\_\_\_\_  
John V. Salovich, Secretary-Treasurer  
Rubio Canon Land & Water Association

ATTEST

STATE OF CALIFORNIA        )  
  )  
COUNTY OF LOS ANGELES    )

I, John Vrsalovich, Secretary-Treasurer of Rubio Canon Land and Water Association, do hereby certify that the attached is a full, true and correct copy of the 2020 Water Shortage Contingency Plan adopted by said Board, and that the same has not been amended or repealed.

DATED: June 24,2021



---

John Vrsalovich, Secretary-Treasurer  
Rubio Canon Land & Water Association



## **Appendix B: RCLWA Water Conservation Program**

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**Rubio Cañon Land and Water Association | Water Shortage Contingency Plan**

**RESOLUTION: 2015.03.Cons**

**RESOLUTION OF THE BOARD OF DIRECTORS OF  
RUBIO CAÑON LAND & WATER ASSOCIATION  
DECLARING A WATER SUPPLY ALERT,  
ESTABLISHING A MORATORIUM ON NEW WATER CONNECTIONS AND  
ADOPTING MANDATORY WATER CONSERVATION PROGRAM**

**WHEREAS**, Rubio Cañon Land & Water Association (the “Association”) is a mutual water company empowered to provide water service within its boundaries; and

**WHEREAS**, due to a prolonged drought condition and other issues affecting the deliveries of imported water to Southern California, the Association will likely face water shortages in the near future; and

**WHEREAS**, on January 17, 2014, California Gov. Edmund G. Brown Jr. formally proclaimed a State of Emergency for California in light of the drought conditions, calling on local water agencies and “all Californians to conserve water in every way possible;” and

**WHEREAS**, on July 15, 2014, the State Water Resources Control Board adopted findings regarding the existing statewide drought conditions and adopted emergency water conservation regulations prohibiting all individuals from engaging in certain water use practices and requiring public water suppliers to undertake mandatory conservation-related actions during the declared drought emergency; and

**WHEREAS**, on March 17, 2015, the State Water Resources Control Board adopted expanded emergency water use regulations to further limit water use throughout California; and

**WHEREAS**, the Office of Administrative Law (OAL) on March 27, 2015 approved the Urban Water Conservation Emergency Regulations that had been approved on March 17, 2015 by the State Water Resources Control Board; and

**WHEREAS**, on April 1, 2015, Governor Edmund G. Brown, Jr. issued an Executive Order requiring all Californians to reduce their water use by 25% as compared to 2013 consumption, and setting forth a variety of measures to meet that required reduction; and

**WHEREAS**, on May 5, 2015, the State Water Resources Control Board adopted amended emergency water regulations to implement the requirements of Governor Brown’s April 1, 2015 Executive Order; and

**WHEREAS**, under the State Water Resources Control Board’s further regulations, the Association must reduce its water use by 36% as compared to 2013 levels of use; and

**WHEREAS**, given the current drought conditions and the high likelihood of restricted water availability in the foreseeable future, the Association finds it necessary to again declare a

water supply alert and continue a temporary moratorium on new connections to the Association's distribution system.

**NOW, THEREFORE, BE IT RESOLVED** that the Association hereby issues a water supply alert and declares a drought condition to exist in its service area; and

**BE IT FURTHER RESOLVED**, that the Association finds that mandatory water restrictions, as currently expanded, must continue to remain in effect to further reduce consumption. Previous water restrictions have resulted in some reduction by its customers, further measures are necessary to avoid additional demands being placed on its system during the drought; and

**BE IT FURTHER RESOLVED**, that the Association hereby establishes a temporary moratorium on new connections and applications which lead to an added demand on the Association's water distribution system. All previous moratoriums will remain in effective. No Will-Serve Letters and/or Fire Flow Availability Information forms will be issued to developers seeking new meter connections or building permits for new construction. Existing Will-Serve Letters will be honored according to their terms. The Board will review the continued necessity for this moratorium as deemed appropriate by the Board until such time as drought conditions no longer exist and the statewide water supply has improved.

**BE IT FURTHER RESOLVED**, that the Association requires the following conservation measures from its customers to:

- a. Reduce irrigation to no more than two (2) days per week, and limit irrigation during those days to no longer than 15 minutes per irrigation station;
- b. Adjust sprinklers and irrigation systems to avoid overspray, runoff and waste;
- c. Not water lawns between 9:00 a.m. and 5:00 p.m.;
- d. Not irrigate turf or landscapes during and 48 hours following measurable precipitation;
- e. Shut off decorative fountains, ponds, or other similar aesthetic features, unless a water recycling system is used;
- f. Not hose down driveways, sidewalks and other paved surfaces, except when necessary for health or sanitary reasons;
- g. Not allow the hose to run while washing any vehicle and to use a bucket or a hose with an automatic cutoff valve;
- h. Have all restaurants and other food service establishments only serve water to customers upon request;

- i. All hotels, motels, bed and breakfast, inns or other commercial short-term lodging facilities shall provide guests with the option of choosing not to have towels and linens laundered daily and shall prominently display notice of this option;
- j. The Association shall promptly notify any customer of a leak of which the Association becomes aware. Customers must routinely check faucets, toilets and pipes, both indoor and outdoor, including house service laterals and sprinkler piping, for leaks and repair them, as well as any leaks the Association identifies, immediately, or upon demand of the Association.
- k. No potable water shall be used to irrigate ornamental turf on public street medians.

**BE IT FURTHER RESOLVED**, that the Association shall enforce the foregoing conservation measures as follows:

A violation of the regulations and restrictions set forth herein will result in progressive warnings, fines, or result in the discontinuance of service to consumers willfully violating the conservation measures set forth herein or such other penalty or restriction as may be allowed by law, as set forth below:

1. **First Violation:** The Association will issue a written notice of non-compliance, to be delivered by mail or personal delivery that sets forth the particular violation.
2. **Second Violation:** For a second violation within the preceding twelve (12) calendar months, the Association will issue a second written notice of non-compliance to be delivered by mail or personal delivery that sets forth the particular violation.
3. **Third Violation:** For a third violation within the preceding twelve (12) calendar months, the Association will issue a third and final written notice of non-compliance to be delivered by mail or personal delivery that sets forth the particular violation.
4. **Fourth and Subsequent Violations:** For a fourth violation within the preceding twelve (12) calendar months, the Association will impose a monetary fine, not to exceed one hundred dollars (\$100.00). For a fifth and each subsequent violation within the preceding twelve (12) calendar months, the Association will impose a monetary fine of no less than two hundred fifty dollars (\$250.00) and no more than five hundred dollars (\$500.00).
5. **Appeal:** Any customer of the Association who receives a notice of violation or any fine as set herein may appeal such notice or fine to the Association's Board of Directors within thirty (30) days after the date of such notice or fine.

The decision of the Board of Directors on such appeal shall be conclusive and final.

**BE IT FURTHER RESOLVED**, that if critical water shortages occur and supplies of imported water are reduced, the Association will consider further action to curtail water use. If any portion of this Resolution is found to be illegal or invalid, the Association hereby declares that it would have enacted the remainder of this Resolution regardless of the absence of any such invalid part.

**PASSED AND ADOPTED** at a regular meeting of the Board of Directors of the Rubio Cañon Land & Water Association held on May 20, 2015.

---

Janet Fahey, President

ATTEST:

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Secretary



## **Appendix C: 2019 County of Los Angeles All-Hazards Mitigation Plan**

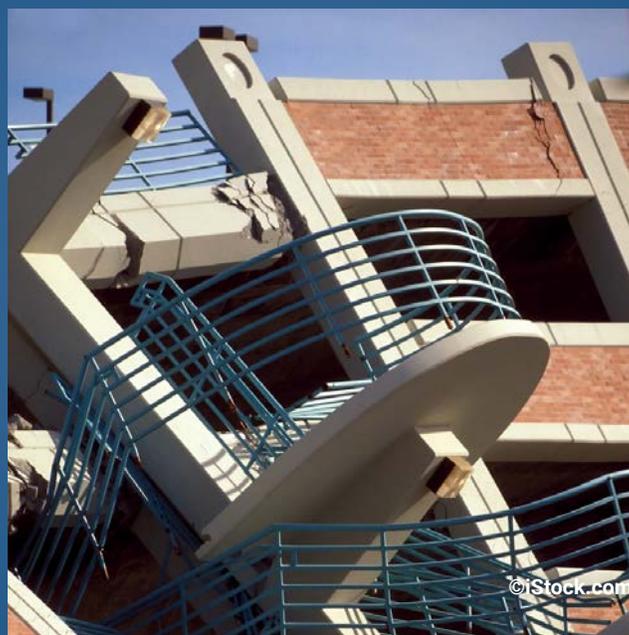
**Rubio Cañon Land and Water Association | Water Shortage Contingency Plan**



PUBLIC DRAFT

# 2019 County of Los Angeles All-Hazards Mitigation Plan

Chief Executive Office - Office of Emergency Management



**2019 COUNTY OF LOS ANGELES  
ALL-HAZARDS MITIGATION PLAN**

**TABLE OF CONTENTS**

1 Introduction..... 1-1

    1.1 Hazard Mitigation Planning ..... 1-1

    1.2 2019 All-Hazards Mitigation Plan Synopsis ..... 1-1

2 Planning Process ..... 2-1

    2.1 Overview of 2019 AHMP Planning Process..... 2-1

    2.2 Opportunities for Stakeholders..... 2-4

    2.3 Public Involvement ..... 2-4

    2.4 Review and Incorporation of Existing Plans and Reports..... 2-5

    2.5 Continued Public Participation..... 2-5

    2.6 Plan Update Method and Schedule ..... 2-6

3 Community Profile ..... 3-1

    3.1 Planning Area..... 3-1

    3.2 Population and Development Trends ..... 3-14

    3.3 Vulnerable Populations ..... 3-14

    3.4 Critical Facilities ..... 3-17

4 Hazard Identification and Risk Assessment ..... 4-1

    4.1 Climate Change ..... 4-2

    4.2 Dam Failure ..... 4-9

    4.3 Earthquake..... 4-16

    4.4 Flood..... 4-25

    4.5 Landslide ..... 4-32

    4.6 Tsunami ..... 4-37

    4.7 Wildfire ..... 4-42

5 Mitigation Strategy ..... 5-1

    5.1 Authorities, Policies, Programs, and Resources..... 5-1

    5.2 NFIP Participation..... 5-9

    5.3 Mitigation Goals..... 5-9

    5.4 Potential Mitigation Actions and Projects..... 5-9

    5.5 Mitigation Action Plans ..... 5-14

    5.6 Plan Integration ..... 5-15

6 Plan Review, Evaluation, and Implementation..... 6-1

    6.1 Changes in Development ..... 6-1

    6.2 Progress in Local Mitigation Efforts ..... 6-1

6.3 Changes in Priorities .....6-2  
7 Plan Adoption .....7-1  
7.1 Formal Adoption .....7-1

**LIST OF APPENDICES**

- Appendix A – Planning Process
- Appendix B – Community Profile
- Appendix C – Risk Assessment

**LIST OF FIGURES**

Figure 3-1. Location..... 3-8

Figure 3-2. Supervisorial District 1 ..... 3-9

Figure 3-3. Supervisorial District 2 ..... 3-10

Figure 3-4. Supervisorial District 3 ..... 3-11

Figure 3-5. Supervisorial District 4 ..... 3-12

Figure 3-6. Supervisorial District 5 ..... 3-13

Figure 3-7. People Experiencing Homelessness in the City of Los Angeles..... 3-15

Figure 3-8. People Experiencing Homelessness in Unincorporated Los Angeles County ..... 3-16

Figure 3-9. Los Angeles County Animal Care & Control..... 3-18

Figure 3-10. Los Angeles County Fire Department..... 3-19

Figure 3-11. Los Angeles County Health Services..... 3-20

Figure 3-12. Los Angeles County Library ..... 3-21

Figure 3-13. Los Angeles County Museum of Art and Museum of Natural History ..... 3-22

Figure 3-14. Los Angeles County Office of Education ..... 3-23

Figure 3-15. Los Angeles County Other (Offices) ..... 3-24

Figure 3-16. Los Angeles County Parks & Recreation..... 3-25

Figure 3-17. Los Angeles County Department of Public Health..... 3-26

Figure 3-18. Los Angeles County Public Works ..... 3-27

Figure 3-19. Los Angeles County Sheriff’s Department ..... 3-28

Figure 4-1. Temperature Change ..... 4-7

Figure 4-2. Sea Level Rise Inundation Areas ..... 4-8

Figure 4-3. Dam Breach Inundation Areas ..... 4-13

Figure 4-4. Major Faults in Southern California ..... 4-22

Figure 4-5. Historical Earthquakes (1769-2019) ..... 4-23

Figure 4-6. Seismic Hazard Areas ..... 4-24

Figure 4-7. Los Angeles County Flood Control System..... 4-30

Figure 4-8. Special Flood Hazard Areas ..... 4-31

Figure 4-9. Deep-Seated Landslide Susceptibility Areas ..... 4-36

Figure 4-10. Tsunami Inundation Areas ..... 4-41

Figure 4-11. Fire Hazard Severity Zones..... 4-47

Figure 4-12. Recent Wildfires (2000-2018)..... 4-48

**LIST OF TABLES**

Table 2-1. AHMP Timeline ..... 2-1

Table 2-2. Hazard Mitigation Advisory Committee ..... 2-3

Table 2-3. Existing Plans and Reports ..... 2-5

Table 3-1. Los Angeles County Land Area ..... 3-1

Table 3-2. Supervisorial District 1 ..... 3-1

Table 3-3. Supervisorial District 2 ..... 3-3

Table 3-4. Supervisorial District 3 ..... 3-4

Table 3-5. Supervisorial District 4 ..... 3-4

Table 3-6. Supervisorial District 5 ..... 3-5

Table 3-7. People Experiencing Homelessness ..... 3-14

Table 3-8. Los Angeles County-Owned and County-Related Critical Facilities..... 3-17

Table 4-1. Climate Change Identification Profile ..... 4-2

Table 4-2. Climate Change Impact on Land Area ..... 4-4

Table 4-3. Climate Change Impact on Vulnerable Populations – People Experiencing Homelessness ..... 4-4

Table 4-4. Climate Change Impact on County Critical Facilities..... 4-5

Table 4-5. Overall Summary of Vulnerability to Climate Change ..... 4-6

Table 4-6. Dam Failure Identification Profile..... 4-9

Table 4-7. Dam Failure Impact on Land Area ..... 4-11

Table 4-8. Dam Failure Impact on Vulnerable Populations – People Experiencing Homelessness ..... 4-11

Table 4-9. Dam Failure Impact on County Critical Facilities ..... 4-11

Table 4-10. Overall Summary of Vulnerability to Dam Failure..... 4-12

Table 4-11. Drought Identification Profile ..... 4-14

Table 4-12. Drought Impact..... 4-15

Table 4-13. Overall Summary of Vulnerability to Drought ..... 4-15

Table 4-14. Earthquake Identification Profile..... 4-16

Table 4-15. Seismic Hazard Impact on Land Area ..... 4-19

Table 4-16. Seismic Hazard Impact on Vulnerable Populations – People Experiencing Homelessness ..... 4-20

Table 4-17. Seismic Hazard Impact on County Critical Facilities ..... 4-21

Table 4-18. Overall Summary of Vulnerability to Earthquakes ..... 4-21

Table 4-19. Flood Identification Profile ..... 4-25

Table 4-20. Flood Impact on Land Area..... 4-27

Table 4-21. Flood Impact on Vulnerable Populations – People Experiencing Homelessness .. 4-27

Table 4-22. Flood Impact on County Critical Facilities ..... 4-28

Table 4-23. Overall Summary of Vulnerability to Floods ..... 4-29

Table 4-24. Landslide Identification Profile ..... 4-32

Table 4-25. Landslide Impact on Land Area ..... 4-34

Table 4-26. Landslide Impact on Vulnerable Populations – People Experiencing Homelessness ..... 4-34

Table 4-27. Landslide Impact on County Critical Facilities ..... 4-34

Table 4-28. Overall Summary of Vulnerability to Landslides ..... 4-35

Table 4-29. Tsunami Identification Profile..... 4-37

Table 4-30. Tsunami Impact on Land Area ..... 4-39

Table 4-31. Tsunami Impact on Vulnerable Populations – People Experiencing Homelessness .....4-39

Table 4-32. Tsunami Impact on County Critical Facilities.....4-39

Table 4-33. Overall Summary of Vulnerability to Tsunamis .....4-40

Table 4-34. Wildfire Identification Profile .....4-42

Table 4-35. Wildfire Impact on Land Area.....4-44

Table 4-36. Wildfire Impact on Vulnerable Populations – People Experiencing Homelessness .....4-45

Table 4-37. Wildfire Impact on County Critical Facilities .....4-45

Table 4-38. Overall Summary of Vulnerability to Wildfires.....4-46

Table 5-1 Human and Technical Resources for Hazard Mitigation .....5-2

Table 5-2. Financial Resources for Hazard Mitigation.....5-4

Table 5-3. Legal and Regulatory Resources for Hazard Mitigation.....5-7

Table 5-4. Potential Mitigation Actions and Projects .....5-9

Table 5-5. Tier 1 Mitigation Action Plan.....5-14

Table 5-6. Tier 2 Mitigation Action Plan.....5-15

Table 6-1. Completed Local Mitigation Efforts .....6-1

**LIST OF ACRONYMS AND ABBREVIATIONS**

°F	degrees Fahrenheit
AECOM	AECOM Technical Services, Inc.
AB	Assembly Bill
AHMP	All-Hazards Mitigation Plan
Cal FIRE	California Department of Forestry and Fire Protection
Cal OES	California Office of Emergency Services
CFR	Code of Federal Regulations
CGS	California Geological Survey
CWPP	Community Wildfire Protection Plans
CPG	Comprehensive Preparedness Guide
CRS	Community Rating System
DFIRM	Digital Flood Insurance Rate Map
DHS	Department of Homeland Security
DMA	Disaster Mitigation Act
DR	Disaster Declaration Number
DSOD	Division of Safety of Dams
EAP	Emergency Action Plan
EPA	Environmental Protection Agency
EQ	Earthquake
FEMA	Federal Emergency Management Agency
FHSZ	Fire Hazard Severity Zones
GIS	Geographic Information System
IPCC	Intergovernmental Panel on Climate Change
LACMA	Los Angeles County Museum of Art
LRA	Local Responsibility Area
M	Magnitude
MARAC	Mutual Aid Regional Advisory Committee
NFIP	National Flood Insurance Program
NHM	Los Angeles County Natural History Museum
OEM	Office of Emergency Management
PGA	Peak Ground Acceleration

RL	Repetitive Loss
SFHA	Special Flood Hazard Area
SRA	State Responsibility Area
U.S.	United States
USACE	United States Army Corps of Engineers
USGS	U.S. Geological Survey
WUI	wildland-urban interface

# 1 INTRODUCTION

## 1.1 HAZARD MITIGATION PLANNING

As defined in Title 44 of the Code of Federal Regulations (CFR), Subpart M, Section 206.401, hazard mitigation is “any action taken to reduce or eliminate the long-term risk to human life and property from natural hazards.” As such, hazard mitigation is any work to minimize the impacts of any type of hazard event before it occurs. Hazard mitigation aims to reduce losses from future disasters. It is a process that identifies and profiles hazards, analyzes the people and facilities at risk, and develops mitigation actions to reduce or eliminate hazard risk. The implementation of the mitigation actions, which include short- and long-term strategies that may involve planning, policy changes, programs, projects, and other activities, is the end result of this process.

In recent years, local hazard mitigation planning has been driven by a federal law, known as the Disaster Mitigation Act of 2000 (DMA 2000). On October 30, 2000, Congress passed the DMA 2000 (Public Law 106-390), which amended the Robert T. Stafford Disaster Relief and Emergency Assistance Act of 1988 (Stafford Act) (Title 42 of the United States Code Section 5121 et seq.) by repealing the act’s previous mitigation planning section (409) and replacing it with a new mitigation planning section (322). This new section emphasized the need for state, tribal, and local entities to closely coordinate mitigation planning and implementation efforts. This new section also provided the legal basis for the Federal Emergency Management Agency’s (FEMA’s) mitigation plan requirements for the Hazard Mitigation Assistance grant programs.

## 1.2 2019 ALL-HAZARDS MITIGATION PLAN SYNOPSIS

To meet the requirements of the DMA 2000, the Los Angeles County Office of Emergency Management (OEM) has prepared an All- Hazards Mitigation Plan (AHMP) (hereinafter referred to as the 2019 AHMP) to assess risks posed by natural hazards and to develop a mitigation action plan for reducing the risks in Unincorporated Los Angeles County. The 2019 AHMP replaces the AHMP that was approved in 2014.

The 2019 AHMP is organized to follow FEMA’s Local Mitigation Plan Review Tool, which demonstrates how local AHMPs meet the DMA 2000 regulations. As such, specific planning elements of this review tool are in their appropriate plan sections.

The 2019 AHMP structure has been updated to including the following sections:

- **Section 2 Planning Process** provides an overview of the 2019 planning process, starting with a plan update timeline. It identifies advisory committee members and describes their involvement with the plan update process. It also details stakeholder outreach, public involvement and continued public involvement. It provides an overview of the existing plans and reports and how they were incorporated into the 2019 AHMP and lastly lays out a plan update method and schedule. Supporting planning process documentation is listed in **Appendix A**.
- **Section 3 Community Profile** describes the planning area for the 2019 AHMP, which includes the unincorporated areas of the county. It touches on the current population and development trends in the county and discusses vulnerable populations in the county, including the growing homeless crisis. Finally, this section lists the county-owned and

county-related critical facilities included in this plan. Supporting community profile information can be found in **Appendix B**.

- **Section 4 Hazard Identification and Risk Assessment** describes each of the eight hazards addressed in this plan. Additionally, it includes impact (i.e., risk assessment) tables for the planning area, vulnerable populations and critical facilities within each hazard area. An overall summary description is also provided for each hazard. **Appendix C** contains supporting hazard identification and risk assessment information.
- **Section 5 Mitigation Strategy** details Los Angeles County's capabilities (authorities, policies, programs and resources) available for hazard mitigation. It also discusses the county's participation in the National Flood Insurance Program (NFIP). Finally, it describes the mitigation strategy, which is the blueprint for how the County will reduce its risks to hazards. The mitigation strategy is made up of three main components: mitigation goal(s); potential mitigation actions and projects; and a mitigation action plan.
- **Section 6 Plan Review, Evaluation and Implementation** discusses the revisions made to the 2019 AHMP to address changes in development, progress made in local mitigation efforts and changes to priorities.
- **Section 7 Plan Adoption** contains a scanned copy of the adoption resolution.

## 2 PLANNING PROCESS

Section 2 – Planning Process addresses Element A of the Local Mitigation Plan Regulation Checklist.

<b>Regulation Checklist – 44 CFR 201.6 Local Mitigation Plans</b>	
<b>Element A: Planning Process</b>	
A1. Does the Plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? (Requirement §201.6(c)(1))	
A2. Does the Plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development as well as other interests to be involved in the planning process? (Requirement §201.6(b)(2))	
A3. Does the Plan document how the public was involved in the planning process during the drafting stage? (Requirement §201.6(b)(1))	
A4. Does the Plan describe the review and incorporation of existing plans, studies, reports, and technical information? (Requirement §201.6(b)(3))	
A5. Is there discussion of how the community(ies) will continue public participation in the plan maintenance process? (Requirement §201.6(c)(4)(iii))	
A6. Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating and updating the mitigation plan within a 5-year cycle)? (Requirement §201.6(c)(4)(i))	

### 2.1 OVERVIEW OF 2019 AHMP PLANNING PROCESS

The development of the 2019 AHMP was collaborative effort between Los Angeles County OEM, AECOM Technical Services, Inc. (AECOM), an advisory committee, and various county departments and agencies. **Table 2-1** provides a timeline of the major plan update tasks and milestones by month over a 9-month period. **Table 2-2** lists the advisory committee members and how they contributed to the development of the plan.

**Table 2-1. AHMP Timeline**

<b>Date</b>	<b>Tasks</b>	<b>People Involved</b>
March 2019	Reviewed the 2014 AHMP and decided to continue efforts to streamline the plan Held 2019 AHMP advisory committee kick-off meeting (March 15)	AHMP project manager, advisory committee
April 2019	Determined the hazards to be profiled, including climate change (new to the 2019 AHMP), drought, dam failure, earthquake, flood, landslide, tsunami and wildfire (all addressed in the 2014 AHMP)	AHMP project manager, AECOM
May 2019	Collected local and regional existing plans and reports	AECOM
June 2019	Determined the Geographic Information System (GIS) strategy for risk assessment including land area/geographical boundaries and critical facilities and discussed how to incorporate people experiencing homelessness	AHMP project manager, AECOM, Los Angeles County Office of Emergency Management

**Table 2-1. AHMP Timeline**

Date	Tasks	People Involved
July 2019	Identified initial list of stakeholders Crafted public outreach messages for the Twitter handle @ReadyLACounty Created draft hazard figures Developed homeless people risk assessment tables Developed land area/geographic boundaries risk assessment tables Rewrote/updated the hazard profiles into a streamlined tabular format Began developing/updating/collecting draft mitigation actions Streamlined and updated the community profile section to only address the planning area, population and development trends and county critical facilities (deleted general County information)	AHMP project manager, AECOM
August 2019	Tweeted public outreach messages about the 2019 AHMP Emailed stakeholders about the 2019 AHMP Conducted conference call with Los Angeles County Regional Planning (August 5) to discuss joint public outreach efforts as well as mitigation strategies Conducted meeting with Los Angeles County Public Works (August 7) to discuss 2019 AHMP, progress made to date, and existing and new mitigation strategies Developed critical facilities risk assessment tables Created draft risk assessment tables Revised plan maintenance approach from quarterly meetings to annual review questionnaires	AHMP project manager, AECOM, Los Angeles County Department of Regional Planning, Los Angeles County Public Works, advisory committee
September 2019	Updated the capability assessment tables Developed a list of potential mitigation actions and prioritized actions based on a new tiered approach Created public outreach flyers in English and Spanish and placed on the Los Angeles County OEM website Documented progress in local mitigation efforts Addressed changes in development since the 2014 AHMP Created Initial Draft AHMP Created Public Draft AHMP	AHMP project manager, AECOM, advisory committee
October 2019	Created Final Draft AHMP	AECOM

**Table 2-2. Hazard Mitigation Advisory Committee**

<b>Name</b>	<b>Department / Agency, Title</b>	<b>Contribution</b>
Emily Montanez	Office of Emergency Management, AHMP project manager, Senior Program Manager	Led kick-off meeting, reviewed draft hazard figures and risk assessment tables, draft mitigation actions and initial draft plan.
Margaret Carlin	Office of Emergency Management, GIS Project Supervisor	Provided input on GIS, reviewed draft hazard figures and risk assessment tables, draft mitigation actions and initial draft plan.
Stephanie Kim	Office of Emergency Management, Academic Intern	Reviewed and updated the community profile, provided input on people experiencing homelessness, participated on conference calls, attended department meetings, and reviewed the initial draft plan.
Caroline Chen	Los Angeles County Department of Regional Planning, Regional Planner	Attended kick-off meeting, participated on conference call, reviewed draft hazard figures and risk assessment tables, draft mitigation actions, and initial draft plan.
Iris Chi	Los Angeles County Department of Regional Planning, Regional Planner	Attended kick-off meeting, participated on conference call, reviewed draft hazard figures and risk assessment tables, draft mitigation actions and initial draft plan.
Loni Eazell	Los Angeles County Public Works, Disaster Services Specialist	Coordinated August 7 department meeting, reviewed draft hazard figures and risk assessment tables, draft mitigation actions, and initial draft plan.
Frank Forman	Los Angeles County Fire Department, Battalion Chief	Reviewed draft hazard figures and risk assessment tables, draft mitigation actions and initial draft plan.
Andrew Gano	City of Glendale Fire Department, Captain	Attended kick-off meeting, reviewed draft hazard figures and risk assessment tables, draft mitigation actions, and initial draft plan.
Angine Geragoosian	Los Angeles County Public Works, Disaster Services Analyst	Attended kick-off meeting, reviewed draft hazard figures and risk assessment tables, draft mitigation actions, and initial draft plan.
Patricia Hachiya	Regional Planning, Supervising Regional Planner	Attended kick-off meeting, participated on conference call, reviewed draft hazard figures and risk assessment tables, draft mitigation actions, and initial draft plan.
Jack Husted	Department of Public Works, Senior Civil Engineer	Attended August 7 meeting, reviewed draft hazard figures and risk assessment tables, draft mitigation actions, and initial draft plan.
Sheryll Jones	Emergency Services Coordinator, Southern Region Cal OES	Advised Los Angeles County OEM about initial update process and reviewed initial draft plan.
Sinan Khan	Office of Emergency Management, Associate Director	Reviewed draft hazard figures and risk assessment tables, draft mitigation actions and initial draft plan.

**Table 2-2. Hazard Mitigation Advisory Committee**

<b>Name</b>	<b>Department / Agency, Title</b>	<b>Contribution</b>
Diana Manzano	Area D Disaster Management, Coordinator	Attended kick-off meeting, reviewed draft hazard figures and risk assessment tables, draft mitigation actions, and initial draft plan.
John Eric Pearce	Fire Department, Captain	Reviewed draft hazard figures and risk assessment tables, draft mitigation actions, and initial draft plan.
Christine Shaffer	Sheriff's Department, Deputy	Reviewed draft hazard figures and risk assessment tables, draft mitigation actions, and initial draft plan.
Nathaniel VerGow	Los Angeles Homeless Services Authority, Director of Access and Engagement	Reviewed draft hazard figures and risk assessment tables, draft mitigation actions, and initial draft plan.
Steven Wallace	San Gabriel Fire Department, Interim Fire Chief	Reviewed draft hazard figures and risk assessment tables, draft mitigation actions, and initial draft plan.
Iain Watt	Office of Emergency Management, Emergency Management Coordinator	Participated on conference call, reviewed draft hazard figures and risk assessment tables, draft mitigation actions, and initial draft plan.

## 2.2 OPPORTUNITIES FOR STAKEHOLDERS

On August 20, 2019, the AHMP project manager reached out to stakeholders about the 2019 AHMP to invite them to participate in the plan update process. The stakeholders were also notified on October 4, 2019, that a copy of the public draft plan was available for review on the Los Angeles County OEM website. Stakeholders include members of the Mutual Aid Regional Advisory Committee (MARAC) for the Southern Region. The MARAC consists of: the California Office of Emergency Services (Cal OES) regional administrator, or deputy, for the Administrative Region encompassing the mutual aid region(s); regional mutual aid coordinators (fire, law enforcement, disaster medical and other established mutual aid systems); a representative from each operational area located in the mutual aid region; representatives from two municipalities (small/large and rotates bi-annually); regional public utility representative; private utility representative; special district representative; and other designee as appointed by an individual MARAC. Stakeholder documentation is located in **Appendix A**.

## 2.3 PUBLIC INVOLVEMENT

The Los Angeles County OEM engaged the public in the plan update process through various media formats. A flyer about the 2019 AHMP was created in both English and Spanish and placed on the Los Angeles County OEM website. The website also includes a copy of the public draft plan for public comment on October 4, 2019.

<https://www.lacounty.gov/emergency/county-of-los-angeles-all-hazards-mitigation-plan/>

Additionally, the Los Angeles County OEM used Twitter, @ReadyLACounty, to engage the public through a series of tweets about the 2019 AHMP, hazards in Los Angeles County, hazard mitigation planning, and the public draft plan.

## 2.4 REVIEW AND INCORPORATION OF EXISTING PLANS AND REPORTS

The consultant reviewed existing relevant information to include in the 2019 AHMP. **Table 2-3** lists the plans and reports reviewed as well as information to be incorporated into the 2019 AHMP.

**Table 2-3. Existing Plans and Reports**

Plans and Reports	Information to be Incorporated into the 2019 AHMP
Los Angeles County Operational Area Emergency Response Plan (2012)	Appendix K Hazards-Specific to the operational area into Section 4 Hazard Identification and Risk Assessment
Los Angeles County 2035 General Plan (2015)	Safety element mitigation policies into Section 5 Mitigation Strategy
Los Angeles County Floodplain Management Plan (2016)	Flood hazard profile, non-implemented flood mitigation initiatives into Section 4 Hazard Identification and Risk Assessment
County of Los Angeles Floodplain Management Plan Progress Report 2017 – 2018	Non-implemented flood mitigation initiatives into Section 5 Mitigation Strategy, implemented flood mitigation initiatives into Section 6 Plan Review, Evaluation, and Implementation
County of Los Angeles Repetitive Loss Area Analysis Progress Report 2017 – 2018	Non-implemented flood mitigation initiatives into Section 5 Mitigation Strategy, implemented flood mitigation initiatives into Section 6 Plan Review, Evaluation, and Implementation
Unincorporated Los Angeles County Community Climate Action Plan 2020	Climate change mitigation objectives into Section 5 Mitigation Strategy
2019 Greater Los Angeles Homeless Count Results	People experiencing homelessness count into Section 4 Hazard Identification and Risk Assessment
Los Angeles County Fire Department 2018 Strategic Fire Plan	Vegetation management programs into Section 5 Mitigation Strategy
Southern California Earthquake Data Center’s Earthquake Catalogs	Historic seismic data into Section 4 Hazard Identification and Risk Assessment
Maritime Tsunami Response Playbooks: Background Information and Guidance for Response and Hazard Mitigation Use (2016)	Historical tsunami information and evaluation data into Section 4 Hazard Identification and Risk Assessment
FEMA Flood Insurance Study, Los Angeles County, California (2018)	Historical flood information and flood hazard areas into Section 4 Hazard Identification and Risk Assessment
U.S. Geological Survey (USGS): Rainfall and Landslides in Southern California (active)	Landslide nature, location, historical and extent information into Section 4 Hazard Identification and Risk Assessment

## 2.5 CONTINUED PUBLIC PARTICIPATION

A copy of the 2019 AHMP will be kept on the Los Angeles County OEM website along with contact information. The Los Angeles County OEM will also notify residents of any changes or

updates to the 2019 AHMP, including mitigation projects identified in the plan as they are implemented, via @ReadyLACounty on Twitter.

## 2.6 PLAN UPDATE METHOD AND SCHEDULE

The 2014 AHMP recommended quarterly meetings to discuss and track mitigation projects implemented during the lifespan of the 2014 AHMP. It is unknown how often specific departments/agencies met to track the status of their mitigation actions. For the 2019 AHMP, the plan update method and schedule has been revised to include an annual review and an advisory committee roundtable prior to the 5-year update. Mitigation projects will be monitored via a progress project report. Details are as follows:

- **Annual Review Worksheets:** Every 12 months from plan adoption, the AHMP project manager will email each member of the advisory committee an Annual Review Worksheet to complete. As shown in Appendix A, the Annual Review Worksheet reflects the Local Mitigation Plan Review Tool and includes the following: planning process, hazard profile, risk assessment, and mitigation strategy. Each member of the advisory committee will email completed worksheets back to the AHMP project manager to review. The AHMP project manager will summarize these findings and email them out to the committee. If the AHMP project manager believes that the 2019 AHMP needs to be updated based on the findings, then an invitation will be sent to advisory committee members to attend a formal AHMP update meeting.
- **Mitigation Progress Project Reports:** Mitigation actions will be monitored and updated using the Mitigation Project Progress Report. During each annual review, each department or agency currently administering a mitigation project will submit a progress report to the AHMP project manager. For projects that are being funded by a FEMA mitigation grant, FEMA quarterly reports may be used as the preferred reporting tool. As shown in Appendix A, the progress report will discuss the current status of the mitigation project, including any changes made to the project, identify implementation problems, and describe appropriate strategies to overcome them.
- **Advisory Committee Roundtable:** On the fourth year of the update, the AHMP project manager will reconvene the advisory committee (updating membership, if necessary) and lead a tabletop exercise with the advisory committee to: collect the Annual Review Worksheet and any Mitigation Project Progress Reports and FEMA quarterly reports; determine hazards to be included in the 2024 AHMP; develop a new work plan; and begin the plan update process.

### 3 COMMUNITY PROFILE

#### 3.1 PLANNING AREA

With approximately 4,760.72 square miles, Los Angeles County is geographically one of the largest counties in the country. As shown in **Figure 3-1**, the county stretches along 75 miles of the Pacific coast of Southern California and is bordered to the east by Orange County and San Bernardino County, to the north by Kern County, and to the west by Ventura County. Los Angeles County has two islands, Santa Catalina (75.00 square miles) and San Clemente (60.69 square miles), which are part of an eight-island group called the Channel Islands.

As shown in **Tables 3-1 – 3-6** and **Figures 3-2 – 3-6**, the county is divided into five supervisorial districts, each representing approximately 2 million people in 88 cities and approximately 140 communities or 122 county-wide statistical areas. The five supervisorial districts consist of 4,150 square miles, with 3,014.17 square miles located in the unincorporated areas. The remaining area of Los Angeles County is federal land, including the Los Padres National Forest and Angeles National Forest.

For the 2019 AHMP, the planning area is defined as Unincorporated Los Angeles County. However, the plan’s risk assessment includes: Los Angeles County, Unincorporated Los Angeles County, and supervisorial districts 1-5. In addition, specific county-wide statistical area risk assessment information is provided in **Appendix C**.

**Table 3-1. Los Angeles County Land Area**

Entity	Square Miles
Los Angeles County	4,760.72
Unincorporated Los Angeles County	3,041.17
Supervisorial District 1	246.19
Supervisorial District 2	161.83
Supervisorial District 3	431.21
Supervisorial District 4	439.95
Supervisorial District 5	2,807.00

**Table 3-2. Supervisorial District 1**

City	County-wide Statistical Area
Azusa	Arcadia
Baldwin Park	Angeles National Forest
Bell	Avocado Heights
Bell Gardens	Azusa
Claremont	Bandini Islands

**Table 3-2. Supervisorial District 1**

City	County-wide Statistical Area
Commerce	Bassett
Cudahy	Charter Oak
El Monte	Claremont
Huntington Park	Covina
Industry	Covina (Charter Oak)
Irwindale	Duarte
La Puente	East Los Angeles
Maywood	El Monte
Montebello	Florence – Firestone
Monterey Park	Glendora
Pico Rivera	Hacienda Heights
Pomona	La Verne
Rosemead	Lynwood
South El Monte	North Whittier
South Gate	Padua Hills
Vernon	Pellissier Village
Walnut	Pomona
West Covina	Rowland Heights
	San Jose Hills
	South El Monte
	South San Gabriel
	Sunrise Village
	Valinda
	Walnut
	Walnut Park
	West Puente Valley
	West Whittier / Los Nietos
	Whittier
	Whittier Narrows

**Table 3-3. Supervisorial District 2**

City	County-wide Statistical Area
Carson	Athens Village
Compton	Athens-Westmont
Culver City	Del Aire
Gardena	Del Rey
Hawthorne	East Rancho Dominguez
Inglewood	El Camino Village
Lawndale	Florence – Firestone
Los Angeles (portion)	Hawthorne
Lynwood	Ladera Heights
	Lennox
	Lynwood
	Marina del Rey
	Rancho Dominguez
	Rosewood
	Rosewood/East Gardena
	Rosewood/West Rancho Dominguez
	View Park/Windsor Hills
	Walnut Park
	West Carsen
	West Rancho Dominguez
	Willowbrook
	Wiseburn

**Table 3-4. Supervisorial District 3**

City	County-wide Statistical Area
Agoura Hills	Angeles National Forest
Beverly Hills	Franklin Canyon
Calabasas	Marina del Rey
Hidden Hills	Miracle Mile
Malibu	Kage/Lopez Canyons
San Fernando	Santa Monica Mountains
Santa Monica	Universal City
West Hollywood	West LA
Westlake Village	Westhills

**Table 3-5. Supervisorial District 4**

City	County-wide Statistical Area
Artesia	Cerritos
Avalon	Del Aire
Bellflower	East La Mirada
Cerritos	East Rancho Dominguez
Diamond Bar	East Whittier
Downey	El Camino Village
El Segundo	Hacienda Heights
Hawaiian Gardens	Harbor Gateway
Hermosa Beach	La Habra Heights
La Habra Heights	La Rambla
La Mirada	Lakewood
Lakewood	Lennox
Lomita	Long Beach
Long Beach	Lynwood
Los Angeles (portion)	Marina del Rey
Manhattan Beach	Palos Verdes Peninsula
Norwalk	Rancho Dominguez
Palos Verdes Estates	Rowland Heights
Paramount	San Clemente Island
Rancho Palos Verdes	Santa Catalina Island

**Table 3-5. Supervisorial District 4**

City	County-wide Statistical Area
Redondo Beach	South Whittier
Rolling Hills	Sunrise Village
Rolling Hills Estates	West Carson
Santa Fe Springs	West Whittier / Los Nietos
Signal Hill	Westfield/Academy Hills
Torrance	Whittier
Whittier	

**Table 3-6. Supervisorial District 5**

City	County-wide Statistical Area
Alhambra	Acton
Arcadia	Agua Dulce
Bradbury	Altadena
Covina	Anaverde
Duarte	Angeles National Forest
Glendale	Arcadia
Glendora	Azusa
La Canada – Flintridge	Bouquet Canyon
La Verne	Bradbury
Lancaster	Canyon Country
Monrovia	Castaic
Palmdale	Claremont
Pasadena	Covina
San Dimas	Covina (Charter Oak)
San Gabriel	Del Sur
San Marino	Desert View Highlands
Santa Clarita	Duarte
Sierra Madre	East Covina
South Pasadena	East Lancaster
Temple City	East Pasadena
Los Angeles City	Elizabeth Lake
Canoga Park (portion)	Glendora

**Table 3-6. Supervisorial District 5**

City	County-wide Statistical Area
Chatsworth (portion)	Hi Vista
Granada Hills (portion)	Kagel / Lopez Canyons
Hansen Dam (portion)	La Crescenta-Montrose
Lake View Terrace (portion)	La Verne
Mission Hills (portion)	Lake Hughes
Northridge (portion)	Lake Los Angeles
Olive View Hospital (Sylmar)	Lake Manor
Porter Ranch	Leona Valley
Shadow Hills	Littleton
Sun Valley (portion)	Littleton/Juniper Hills
Sunland	Littleton/Pearblossom
Sylmar (portion)	Llano
Tujunga	Monrovia
West Hills (portion)	Newhall
	North Lancaster
	Northeast San Gabriel
	Palmdale
	Pearblossom/Llano
	Placerita Canyon
	Pomona
	Quartz Hill
	Roosevelt
	San Francisquito Canyon/Bouquet Canyon
	San Pasqual
	Sand Canyon
	Saugus
	Saugus/Canyon Country
	South Antelope Valley
	South Edwards
	Southeast Antelope Valley
	Stevenson Ranch
	Sun Village
	Twin Lakes/Oat Mountain

**Table 3-6. Supervisorial District 5**

City	County-wide Statistical Area
	Val Verde
	Valencia
	West Antelope Valley
	West Chatsworth
	White Fence Farms

# Kern County

San Bernardino  
County

Ventura  
County

Orange  
County

Pacific Ocean

Los Angeles



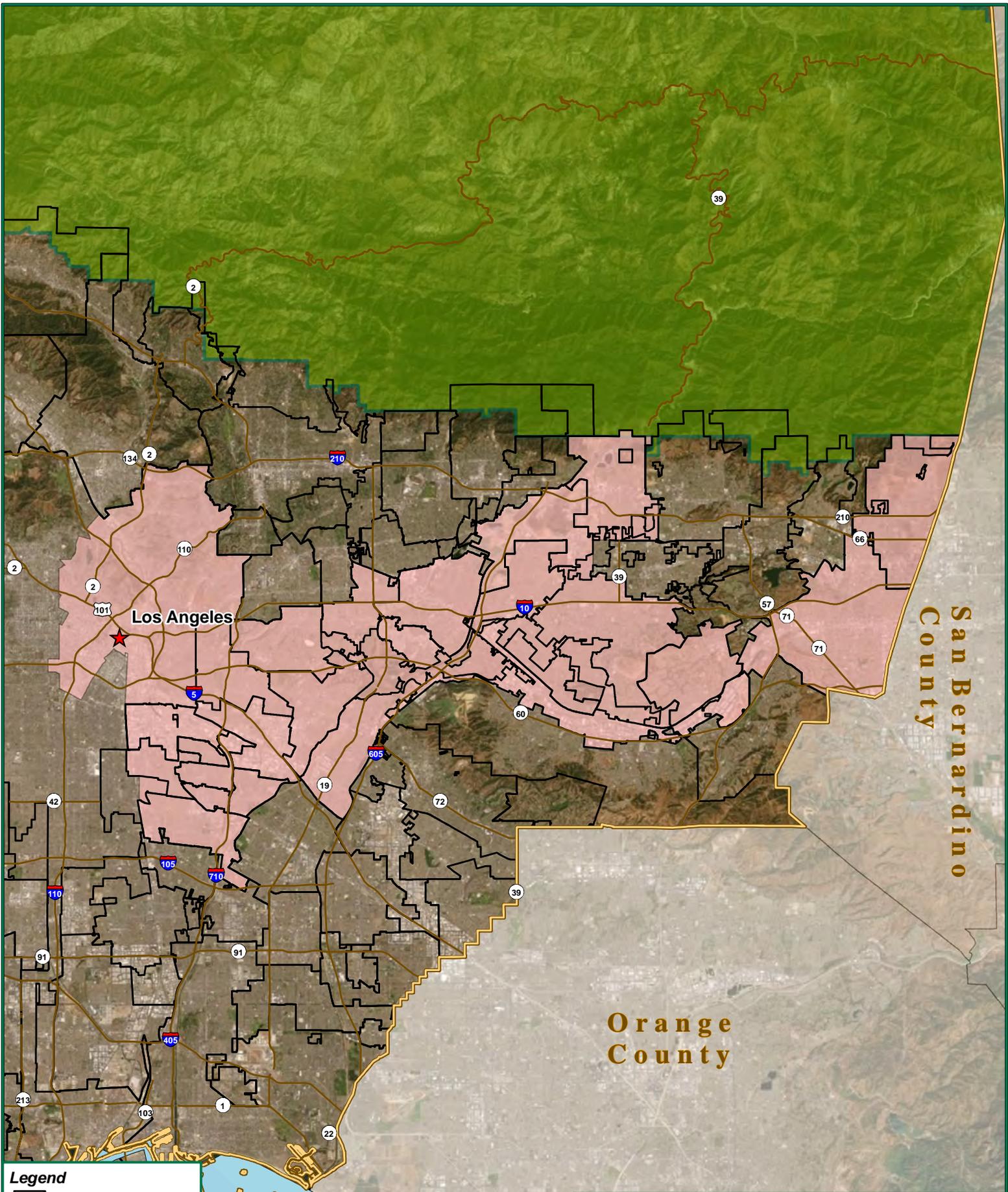
0 2.5 5 10 15 Miles

- Legend**
- Unincorporated County Boundary
  - National Forest

**Source**  
<https://egis3.lacounty.gov>, 2019

**Los Angeles County  
Figure 3-1**

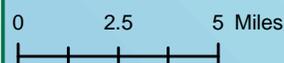
*2019 Los Angeles County  
All-Hazards Mitigation Plan*



**Legend**

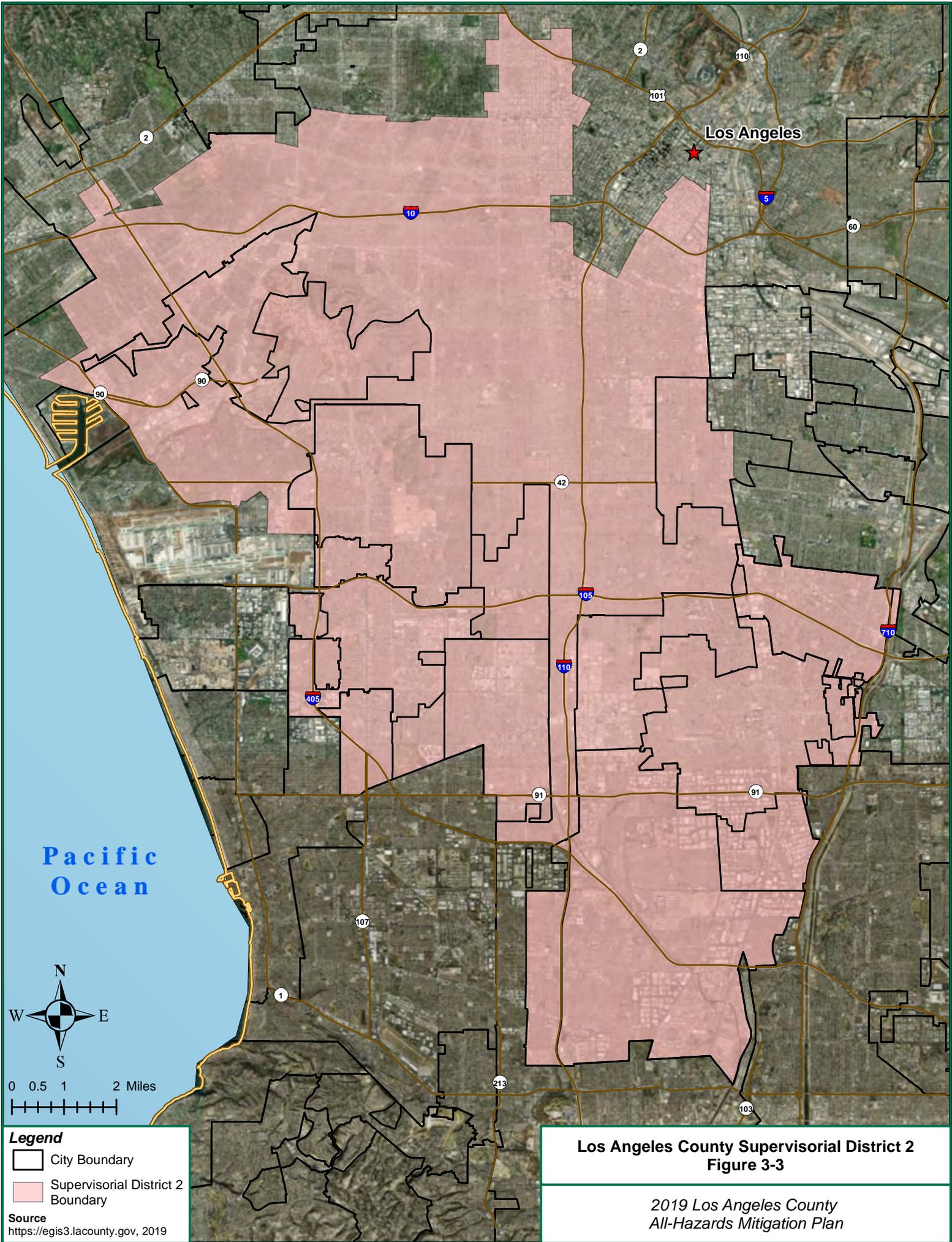
-  City Boundary
-  Supervisorial District 1 Boundary
-  National Forest

**Source**  
<https://egis3.lacounty.gov>, 2019



**Los Angeles County Supervisorial District 1**  
**Figure 3-2**

*2019 Los Angeles County All-Hazards Mitigation Plan*



Los Angeles

Pacific  
Ocean



0 0.5 1 2 Miles

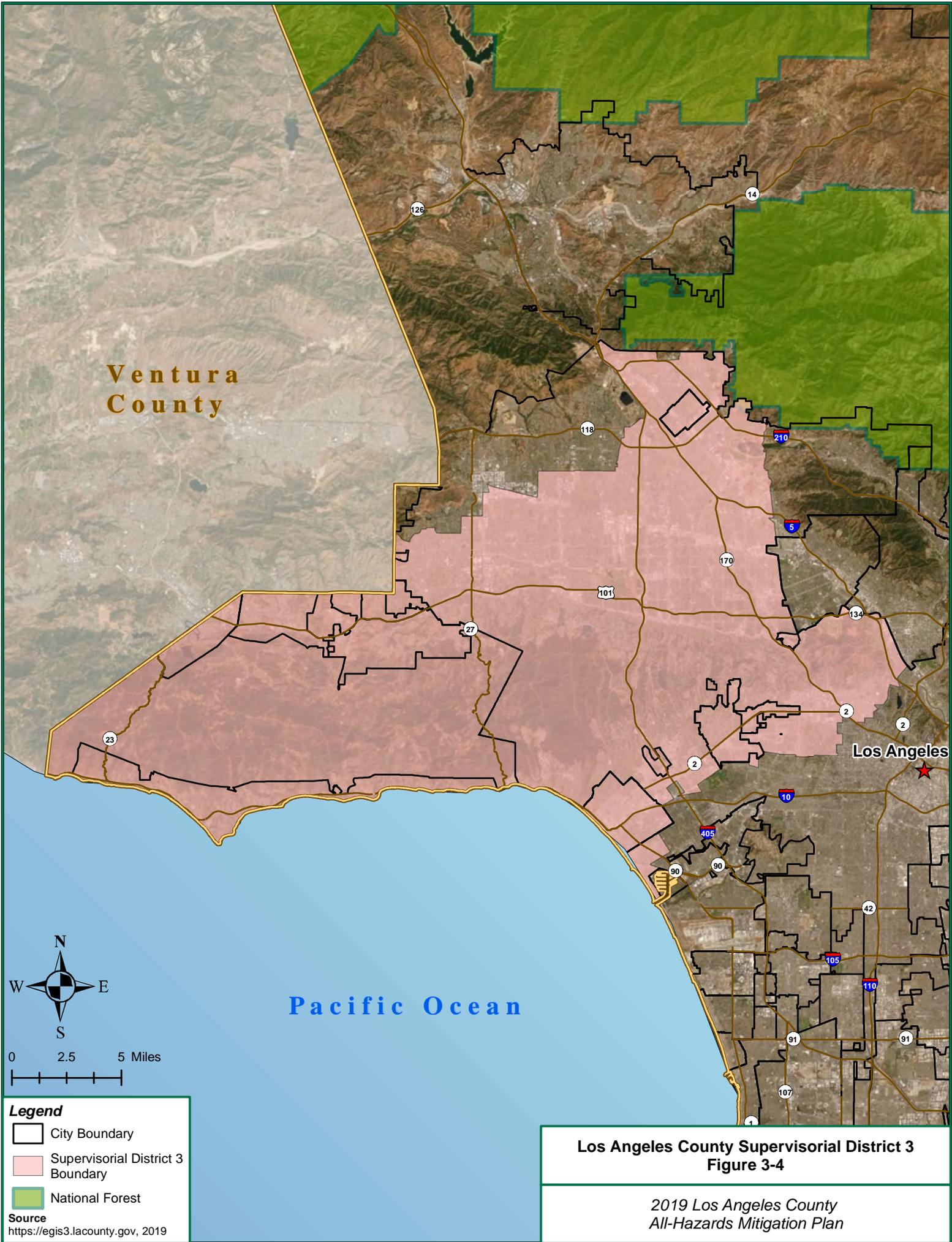
**Legend**

-  City Boundary
-  Supervisorial District 2 Boundary

Source  
<https://egis3.lacounty.gov>, 2019

**Los Angeles County Supervisorial District 2  
Figure 3-3**

*2019 Los Angeles County  
All-Hazards Mitigation Plan*



Ventura  
County

Los Angeles

Pacific Ocean



0 2.5 5 Miles

**Legend**

- City Boundary
- Supervisorial District 3 Boundary
- National Forest

**Source**  
<https://egis3.lacounty.gov>, 2019

**Los Angeles County Supervisorial District 3**  
**Figure 3-4**

*2019 Los Angeles County  
All-Hazards Mitigation Plan*





### 3.2 POPULATION AND DEVELOPMENT TRENDS

Since the drafting of the 2014 AHMP, United States (U.S.) Census Bureau Intercensal Estimates from July 1, 2015, to July 1, 2018, show the number of people residing in Los Angeles County only grew from 10,097,037 to 10,105,518. While the county experienced population growth of 0.50 percent in 2015 and 0.23 percent in 2016, the county population fell by 0.02 percent in 2017 and 0.13 percent in 2018.

The California Department of Finance noted that the decline in population can be linked in part to a decline in birthrate. Researchers at the University of Southern California Lusk Center for Real Estate also suggest that one of the biggest reasons behind Los Angeles County’s growth rate slip is due the lack of housing. Despite the city of Los Angeles adding between 15,000 and 17,000 units of housing each year from 2014 to 2018, housing has become prohibitively unaffordable, which has led many young Los Angeles County residents to move out-of-state or put down roots in nearby Inland Empire counties, where thousands of new jobs in distribution hubs and fulfillment centers have fueled more affordable housing development.

For the 2019 AHMP, population and residential buildings are not included in the risk assessment. As 2020 U.S. Census data become available, this information may be included in plan updates.

### 3.3 VULNERABLE POPULATIONS

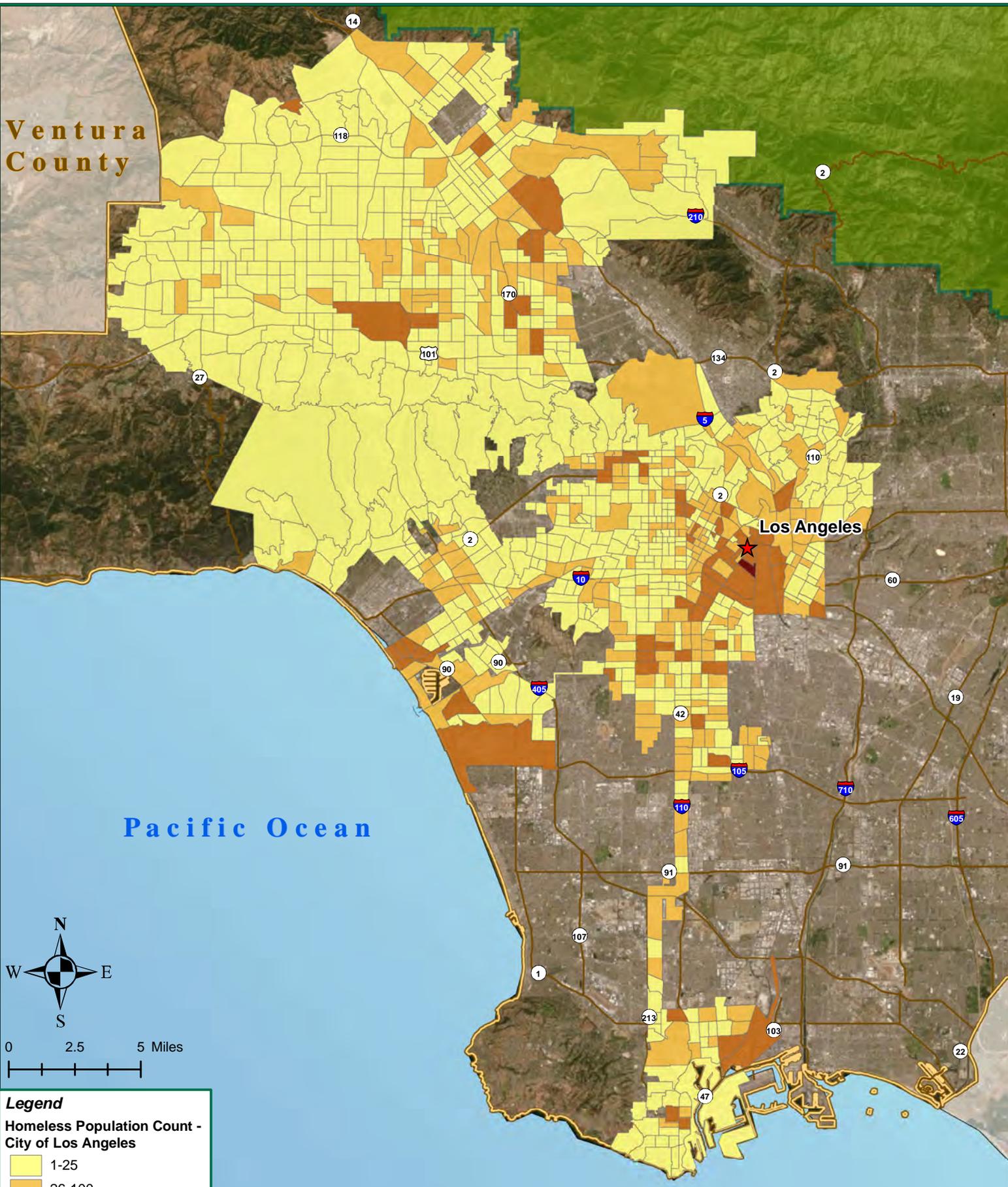
As noted by the Center for Disease Control (CDC), “Everyone must remain safe in an emergency. But for some, it’s more difficult.” Vulnerable or at-risk groups include people that may have difficulty communicating or accessing medical care, need help maintaining independence, require supervision, and need help accessing transportation.

For the 2019 AHMP, vulnerable population groups addressed in the risk assessment include people experiencing homelessness. People experiencing homelessness have become a regional crisis as the number of this vulnerable population group has risen to nearly 60,000 in Los Angeles County alone. **Table 3-7** and **Figures 3-7 and 3-8** show the total point-in-time number of people experiencing homelessness in the city of Los Angeles and Unincorporated Los Angeles County, as captured for the 2019 Greater Los Angeles Homeless Count.

There are several other vulnerable groups at-risk to hazards in Los Angeles County; future updates of the AHMP will expand vulnerable population categories as the 2020 U.S. Census socioeconomic status, household composition and disability, minority status and language, and housing and transportation data becomes available.

**Table 3-7. People Experiencing Homelessness**

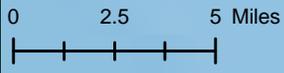
Entity	Total # of People Experiencing Homelessness (Sheltered and Unsheltered)
City of Los Angeles	32,931
Unincorporated Los Angeles County	5,881



Ventura County

Los Angeles

Pacific Ocean



**Legend**

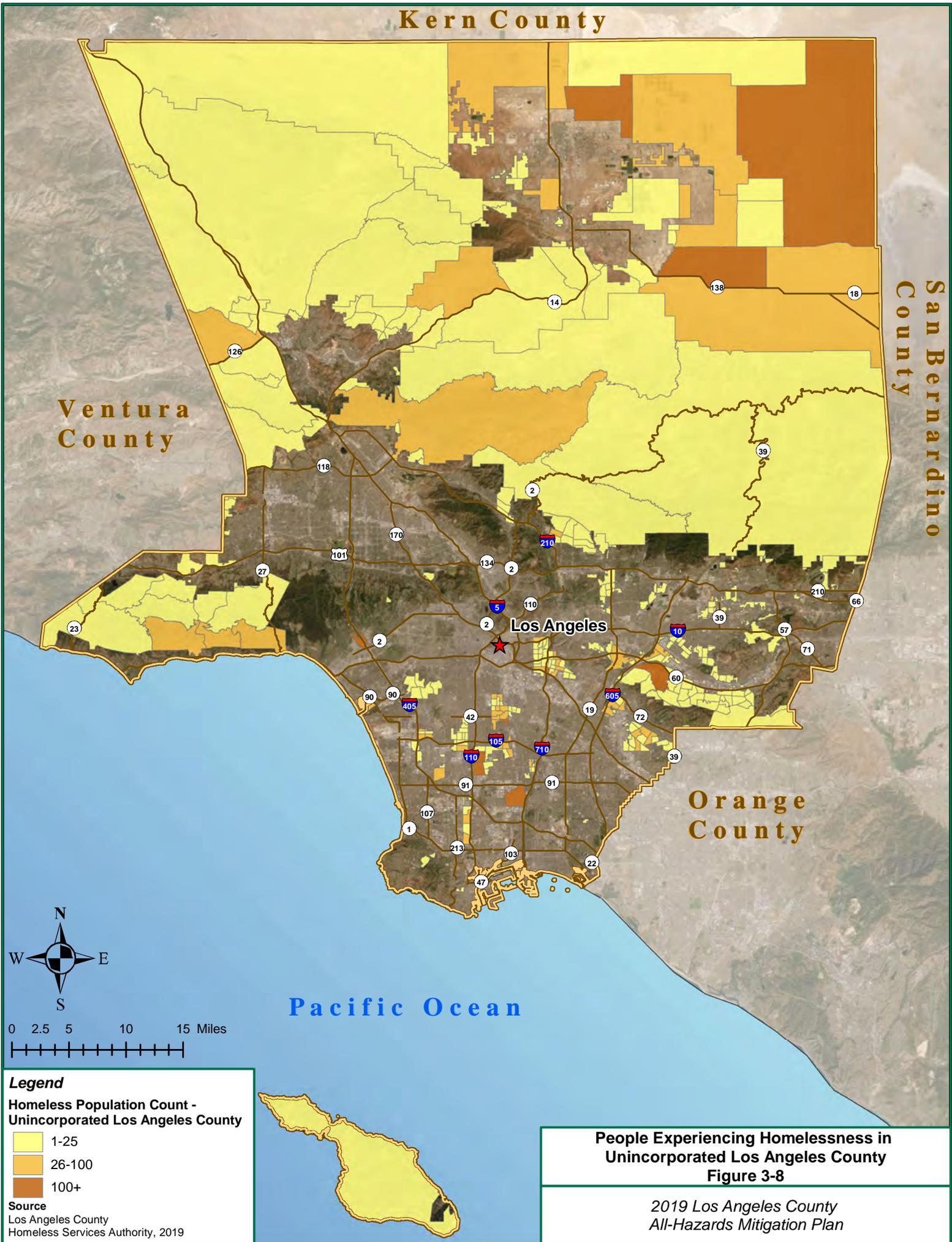
**Homeless Population Count - City of Los Angeles**

- 1-25
- 26-100
- 100-1000
- 1000+
- National Forest

**Source**  
 Los Angeles County  
 Homeless Services Authority, 2019

**People Experiencing Homelessness in the City of Los Angeles**  
**Figure 3-7**

*2019 Los Angeles County All-Hazards Mitigation Plan*



### 3.4 CRITICAL FACILITIES

A critical facility provides services and functions essential to a community, especially during and after a disaster. Common types of critical facilities include: fire stations, police stations, hospitals, schools, water and waste water systems, and utilities. Critical facilities may also include places that can be used for sheltering or staging purposes, such as community centers and libraries. Critical facilities may also include large public gathering spots.

Los Angeles County does not currently maintain a centralized critical facilities database. For the 2019 AHMP, 915 major county-owned and county-related critical facilities were collected from various county department and agencies and also from the U.S. Department of Homeland Security's (DHS) Homeland Infrastructure-Foundation-Level Data site. Critical facility names and addresses were then geocoded to a location and the resulting geographic features were used for the risk assessment. The results of this process are shown in **Table 3-8** and **Figure 3-9** through **Figure 3-19**. Facility-specific information is provided in **Appendix B**. Some departments and agencies have multiple facilities at the same location; hence there are duplications of facility sites.

The County hopes to implement a coordinated data collection and database system for critical facilities; as such, future updates to this plan will likely include an expanded critical facilities list.

**Table 3-8. Los Angeles County-Owned and County-Related Critical Facilities**

Department / Agency	# of Facilities
Los Angeles County Animal Care & Control	7
Los Angeles County Fire Department	337*
Los Angeles County Health Services	29
Los Angeles County Library	85
LACMA & NHM	4
Los Angeles County Office of Education	37
Los Angeles County - Other (offices)	24
Los Angeles County Parks & Recreation	117
Los Angeles County Public Health	14
Los Angeles County Public Works	230
Los Angeles County Sheriff's Department	31

Note: The fire stations identified for this plan include those located within the 59 cities and all the unincorporated areas that the Los Angeles County Fire Department serves.

# Kern County

San Bernardino  
County

Ventura  
County

Orange  
County

Pacific Ocean



0 2.5 5 10 15 Miles



### Legend

-  Animal Shelter
-  National Forest

Source  
Los Angeles County  
Animal Care and Control, 2019

Los Angeles County Animal Care & Control  
Figure 3-9

2019 Los Angeles County  
All-Hazards Mitigation Plan



# Kern County

San Bernardino County

Ventura County

Orange County

Pacific Ocean



0 2.5 5 10 15 Miles



### Legend

- Fire Station
- National Forest

Source  
Homeland Infrastructure  
Foundation-Level Data, 2019



Los Angeles County Fire Department  
Figure 3-10

2019 Los Angeles County  
All-Hazards Mitigation Plan

# Kern County

San Bernardino  
County

Ventura  
County

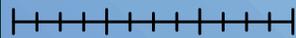
Orange  
County

Pacific Ocean

Los Angeles



0 2.5 5 10 15 Miles



### Legend

-  Hospital and Clinic
-  National Forest

Source  
Los Angeles County Department  
of Human Services, 2019

Los Angeles County Department of Health Services  
Figure 3-11

2019 Los Angeles County  
All-Hazards Mitigation Plan



# Kern County

San Bernardino County

Ventura County

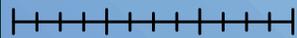
Orange County

Pacific Ocean

Los Angeles



0 2.5 5 10 15 Miles



### Legend

- Library
- National Forest

Source  
Los Angeles County  
Library, 2019

Los Angeles County Library  
Figure 3-12

2019 Los Angeles County  
All-Hazards Mitigation Plan



# Kern County

San Bernardino  
County

Ventura  
County

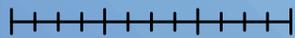
Orange  
County

Los Angeles

Pacific Ocean



0 2.5 5 10 15 Miles



### Legend

- Museum
- National Forest

Source  
Los Angeles County Museum of Art  
and Museum of Natural History, 2019

Los Angeles County Museum of Art  
and Museum of Natural History  
Figure 3-13

2019 Los Angeles County  
All-Hazards Mitigation Plan



# Kern County

San Bernardino County

Ventura County

Orange County

Los Angeles

Pacific Ocean



0 2.5 5 10 15 Miles



### Legend

-  School
-  National Forest

Source  
Los Angeles County  
Office of Education, 2019

Los Angeles County Office of Education  
Figure 3-14

2019 Los Angeles County  
All-Hazards Mitigation Plan





# Kern County

San Bernardino  
County

Ventura  
County

Orange  
County

Los Angeles

Pacific Ocean



0 2.5 5 10 15 Miles



### Legend

- Amphitheatre
- Auditorium
- Community Center
- Gymnasium
- Indoor Theater
- Senior Center
- Teen Center
- National Forest

Source  
Los Angeles County  
Parks and Recreation, 2019

Los Angeles County Parks & Recreation  
Figure 3-16

2019 Los Angeles County  
All-Hazards Mitigation Plan

# Kern County

San Bernardino  
County

Ventura  
County

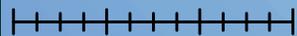
Orange  
County

Pacific Ocean

Los Angeles



0 2.5 5 10 15 Miles



### Legend

- Clinic
- National Forest

Source  
Los Angeles County  
Department of Public Health, 2019



Department of Public Health  
Figure 3-17

2019 Los Angeles County  
All-Hazards Mitigation Plan

# Kern County

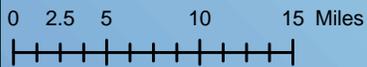
San Bernardino County

Ventura County

Orange County

Los Angeles

Pacific Ocean



### Legend

- Communications
- Drinking Well water
- Maintenance/Operations
- Pump Station
- Stormwater Pumping
- Treatment Plant
- Yard
- Water Tank/Water Tank pump station
- National Forest

Source  
Los Angeles County  
Department of Public Works, 2019

Los Angeles County Public Works  
Figure 3-18

2019 Los Angeles County  
All-Hazards Mitigation Plan

# Kern County

San Bernardino County

Ventura County

Orange County

Los Angeles

Pacific Ocean



0 2.5 5 10 15 Miles



### Legend

- Correction Facility
- Patrol Station
- National Forest

Source  
Los Angeles County  
Sheriff's Department, 2019



Los Angeles County Sheriff's Department  
Figure 3-19

2019 Los Angeles County  
All-Hazards Mitigation Plan

## 4 HAZARD IDENTIFICATION AND RISK ASSESSMENT

Section 4 – Hazard Identification and Risk Assessment addresses Element B of the Local Mitigation Plan Regulation Checklist.

<b>Regulation Checklist – 44 CFR 201.6 Local Mitigation Plans</b>
<b>Element B: Hazard Identification and Risk Assessment</b>
B1. Does the Plan include a description of the type, location, and extent of all natural hazards that can affect each jurisdiction(s)? (Requirement § 201.6(c)(2)(ii))
B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction? (Requirement § 201.6(c)(2)(i))
B3. Is there a description of each identified hazard’s impact on the community as well as an overall summary of the community’s vulnerability for each jurisdiction? (Requirement §201.6(c)(2)(ii))
B4. Does the Plan address NFIP insured structures within the jurisdiction that have been repetitively damaged by floods? (Requirement §201.6(c)(2)(ii))

For the 2019 AHMP, the AHMP project manager and consultant revisited the hazards addressed in the 2014 AHMP. It was determined that the primary focus of the 2019 AHMP should be natural hazards and secondary hazards, as a result of a natural hazard. In addition, it was decided that climate change should be included in the plan, as increasing surface temperatures will likely result in more droughts and subsequently the risk of wildfires. Therefore, climate change, dam failure, drought, earthquake, flood, landslide, tsunami, and wildfire are profiled in the 2019 AHMP.

Hazard identification consists of describing the nature of the hazard, disaster history, location, extent/severity, and probability of future events. Hazard identification profiles have been developed for each of the eight hazards addressed in **Section 4.1** through **Section 4.8**. Additionally, impact (i.e., risk assessment) tables have been created for each hazard. Quantitative impact tables were prepared using GIS analysis for climate change (sea level rise), dam failure, earthquake, flood, landslide, tsunami, and wildfire, while a qualitative impact table was prepared for drought. Impacts considered include: land area, vulnerable populations and critical facilities. Overall summary descriptions have been developed as well. NFIP insured structures are discussed in **Table 4-23**. **Appendix C** contains unincorporated area-specific and critical facility-specific impact tables.

According to the *Comprehensive Preparedness Guide (CPG) 201: Threat and Hazard Identification and Risk Assessment Guide—Second Edition* (CPG 201) drought, earthquake, flood, landslide, tsunami, and wildfire are classified natural hazards, while dam failure is classified as a technological hazard (but is often a secondary hazard of other natural hazards). CPG 201 does not classify climate change. As such, the hazards profiled for this AHMP are discussed in alphabetical order and not by CPG 201 classification. **The order does not signify level of risk.**

## 4.1 CLIMATE CHANGE

**Table 4-1. Climate Change Identification Profile**

Profile	Description
Nature	<p>Climate change is defined as the average statistics of weather, which includes temperature, precipitation, and seasonal patterns in a particular region. Climate change refers to the long-term and irrevocable shift in these weather-related patterns, either regionally or globally. The Earth and its natural ecosystem are very closely tied to the climate and any permanent climate change will lead to an imbalance in the existing ecosystem, impacting the way people live, the food they grow, their health, the wildlife, the availability of water, and much more. Research indicates that much of this warming is due to human activities, primarily burning fossil fuels and clearing forests, that release carbon dioxide (CO<sub>2</sub>) and other gases into the atmosphere, trapping in heat that would otherwise escape into space. Once in the atmosphere, these heat-trapping emissions remain there for many years (for example, CO<sub>2</sub> lasts about 100 years. If left unchecked, by the end of the century, CO<sub>2</sub> concentrations could reach levels three times higher than pre-industrial times.</p> <p>According to most climatologists, the planet is starting to experience shifts in climate patterns and increased frequency of extreme weather events at both the global and local levels. Over the next century, increasing atmospheric greenhouse gas concentrations are expected to cause a variety of changes to local climate conditions, including sea level rise and storm surge in coastal areas, reduced mountain snow pack, increased riverine flooding, and more frequent, higher temperatures (leading to extreme heat events and wildfires), particularly inland, decreasing air quality, and extended periods of drought.</p> <p>These effects of climate change are expected to negatively impact water and electricity demand and supplies in Los Angeles County. Decreasing air quality and extreme heat days will degrade public health, as well as and increase wildfire risk. And low-lying water front areas may flood or be underwater from sea level rise.</p>
Location	<p>According to the National Climate Assessment, the entire Pacific coastal region, including Los Angeles County, has been affected by climate change.</p>
History	<p>The history of the scientific discovery of climate change began in the early 19th century, when ice ages and other natural changes in paleoclimate were first suspected and the natural greenhouse effect first identified. In the late 19th century, scientists first argued that human emissions of greenhouse gases could change the climate. Many other theories of climate change were advanced, involving forces from volcanism to solar variation. In the 1960s, the warming effect of carbon dioxide gas became increasingly convincing, although some scientists also pointed out that human activities, in the form of atmospheric aerosols (e.g., "pollution"), could have cooling effects as well. During the 1970s, scientific opinion increasingly favored the warming viewpoint. By the 1990s, as a result of improving fidelity of computer models and observational work confirming the Milankovitch theory of the ice ages, a consensus position formed: greenhouse gases were deeply involved in most climate changes, and human emissions were bringing serious global warming.</p> <p>Since the 1990s, scientific research on climate change has included multiple disciplines and has expanded, significantly increasing our understanding of causal relations, links with historic data, and ability to numerically model climate change. The most recent work has been summarized in the Assessment Reports by the Intergovernmental Panel on Climate Change (IPCC). Climate change is a significant and lasting change in the statistical distribution of weather patterns over periods ranging from decades to millions of years. It may be a change in average weather conditions, or in the distribution of weather around the average conditions (i.e., more or fewer extreme weather events). Climate change is caused by factors that include oceanic processes (such as oceanic circulation), biotic processes, variations in solar radiation received by Earth, plate</p>

**Table 4-1. Climate Change Identification Profile**

Profile	Description
	<p>tectonics and volcanic eruptions, and human-induced alterations of the natural world; these latter effects are currently causing global warming, and "climate change" is often used to describe human-specific impacts.</p>
Extent / Severity	<p>Over the next century, weather patterns that are considered extreme today are expected to become the norm. The average summer temperature will rise, and in inland areas 100-plus degree Fahrenheit (°F) days will occur more frequently. A temperature change map (<b>Figure 4-1</b>) produced by the California Nevada Climate Applications Program predict that the average temperature in the region is expected to rise between 2.5 and 8°F. Drier conditions will also make wildfires more frequent and intense.</p> <p>The National Oceanic and Atmospheric Administration has produced a sea level rise view that shows the impacts of predicted sea level rise. As shown in <b>Figure 4-2</b>, a sea level rise of just 3 feet above mean higher high tide (approximate year 2050 – 2060) will result in coastal flooding of 2.25 square miles of Los Angeles County and 0.03 square miles of unincorporated areas of Los Angeles County, while a sea level rise of 6 feet above mean higher high tide (approximate year 2100) will result in coastal flooding of 6.13 square miles of Los Angeles County and 0.15 square miles of unincorporated areas of Los Angeles County.</p>
Recurrence Probability	<p>The specific probability of the extent and frequency climate change induced impacts is uncertain and depends on various climate modeling assumptions. While there is some uncertainty about the rate of climate of change and the severity and frequency of extreme weather events, the IPCC, in its Fifth Assessment of Climate Change (2014), concluded that:</p> <p style="padding-left: 40px;">...warming of the climate system is unequivocal, and since the 1950s, many of the observed changes are unprecedented over decades to millennia. The atmosphere and ocean have warmed, the amounts of snow and ice have diminished, sea level has risen, and the concentrations of greenhouse gases have increased...It is extremely likely that human influence has been the dominant cause of the observed warming since the mid-20th century.</p>

**Table 4-2. Climate Change Impact on Land Area**

Entity	3 Ft. Sea Level Rise		6 Ft. Sea Level Rise	
	# of Sq. Miles	% of Sq. Miles	# of Sq. Miles	% of Sq. Miles
Los Angeles County	2.25	0.05	6.13	0.13
Unincorporated Los Angeles County	0.03	0.00	0.15	0.00
Supervisory District 1	0.00	0.00	0.00	0.00
Supervisory District 2	0.03	0.02	0.07	0.04
Supervisory District 3	0.14	0.03	0.34	0.08
Supervisory District 4	1.98	0.45	5.58	1.27
Supervisory District 5	0.00	0.00	0.00	0.00

**Table 4-3. Climate Change Impact on Vulnerable Populations – People Experiencing Homelessness**

Entity	3 Ft. Sea Level Rise		6 Ft. Sea Level Rise	
	# of Homeless	% of Homeless	# of Homeless	% of Homeless
City of Los Angeles	51	0.15	126	0.38
Unincorporated Los Angeles County	0	0.00	2	0.04

**Table 4-4. Climate Change Impact on County Critical Facilities**

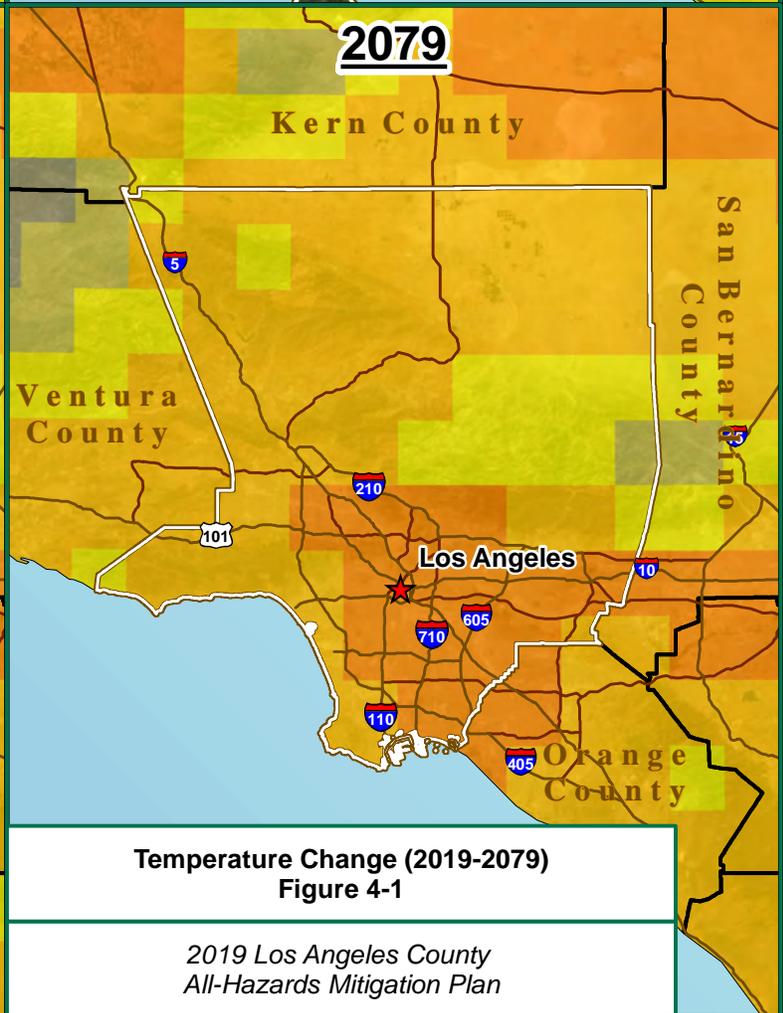
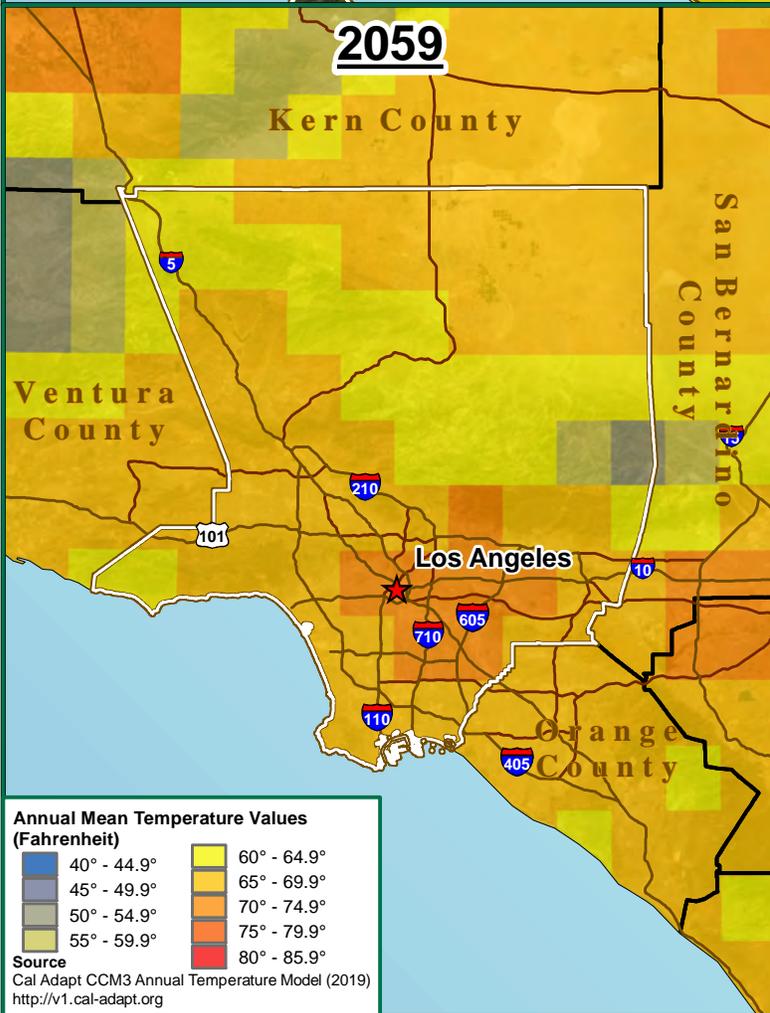
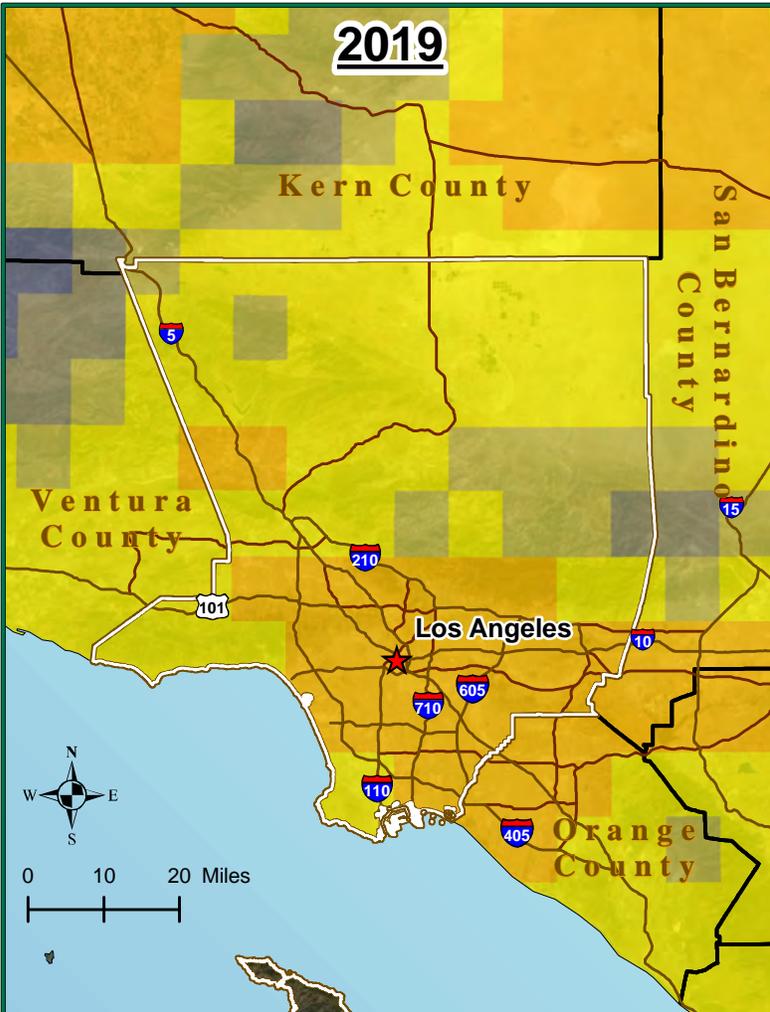
Department/ Agency	3 Ft. Sea Level Rise		6 Ft. Sea Level Rise	
	# of Facilities	% of Facilities	# of Facilities	% of Facilities
Los Angeles County Animal Care & Control	0	0.00	0	0.00
Los Angeles County Fire Department	1	0.00	5	1.4
Los Angeles County Health Services	0	0.00	0	0.00
Los Angeles County Library	0	0.00	0	0.00
LACMA & NHM	0	0.00	0	0.00
Los Angeles County Office of Education	0	0.00	0	0.00
Los Angeles County - Other (offices)	0	0.00	0	0.00
Los Angeles County Parks & Recreation	0	0.00	0	0.00
Los Angeles County Public Health	0	0.00	0	0.00
Los Angeles County Public Works	3	1.30	6	2.61
Los Angeles County Sheriff's Department	1	3.23	0	0.00

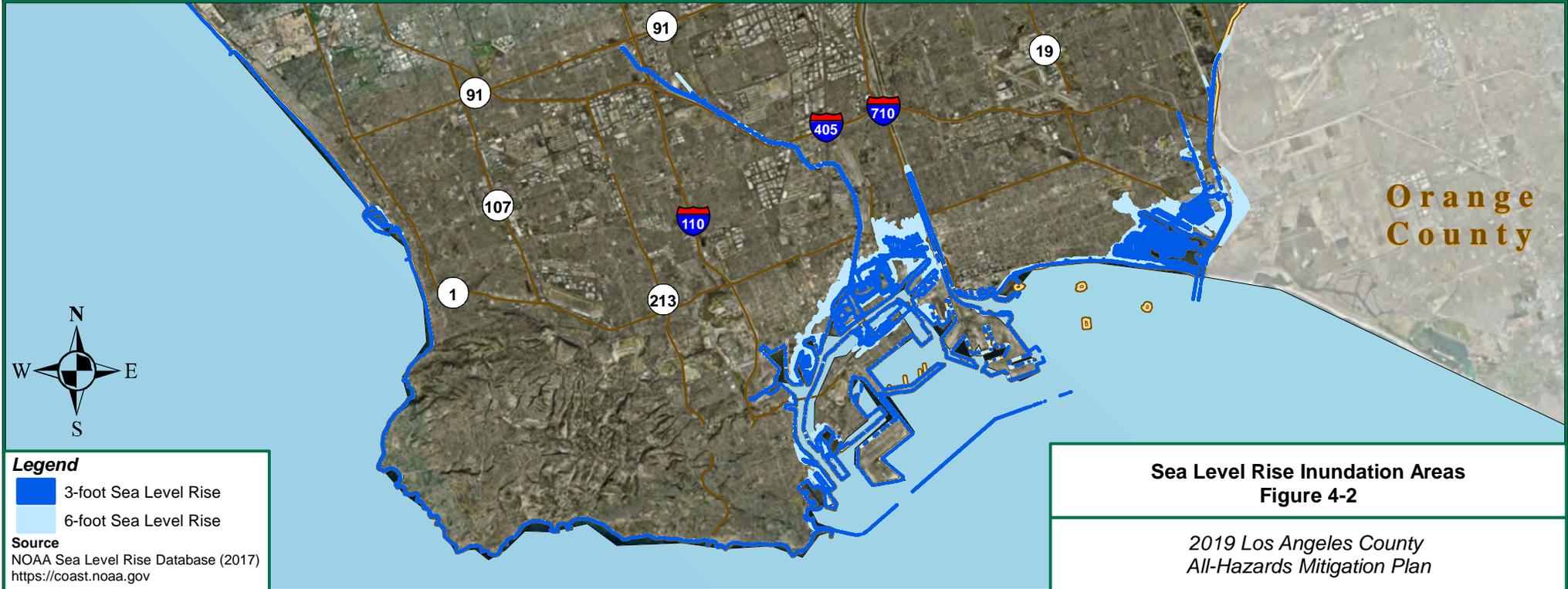
LACMA = Los Angeles County Museum of Art

NHM = Natural History Museum

**Table 4-5. Overall Summary of Vulnerability to Climate Change**

Climate Change	
Summary	<p>Climate change will affect every person and every area of Los Angeles County. As noted above, the number of extreme heat days will rise, and inland county areas will experience days with temperatures in excess of 100°F more frequently. Extreme heat can trigger a variety of heat stress conditions, such as heat stroke. Higher temperatures can also contribute to the build-up of harmful pollutants and cause respiratory issues. Drier, hotter conditions will also make wildfires more frequent and intense, particularly in the High and Very High Fire Hazard Severity Zones (FHSZ). Wildfires can: burn homes, businesses, and critical facilities; interrupt transportation and utilities; and cause death to people and animals.</p> <p>In addition, mega storms that are linked to climate change will cause severe flooding in cities and form lakes in the Central Valley and Mojave Desert. Along the coast, deadly and destructive storm surges will push farther inland than they once did, which means more frequent nuisance flooding.</p> <p>Los Angeles County is addressing climate change through the implementation of the 2015 Community Climate Action Plan. The plan describes how the County will address the impacts of climate change by reducing greenhouse gas emissions from community activities in the unincorporated areas of Los Angeles County by at least 11% below 2010 levels by 2020. Additionally, in April 2019 the mayor of Los Angeles released the city’s Green New Deal, which “sets aggressive goals for the city’s sustainable future, tackles the climate emergency with accelerated targets... and sets L.A. on course to be carbon neutral by 2050.”</p>





## 4.2 DAM FAILURE

**Table 4-6. Dam Failure Identification Profile**

Profile	Description
Nature	<p>Dam failure is the structural collapse of a dam that releases the water stored in the reservoir behind the dam. A dam failure is usually the result of the age of the structure, inadequate spillway capacity used in construction, or structural damage caused by an earthquake or flood. When a dam fails, a large quantity of water is suddenly released with a great potential to cause human casualties, economic loss, and environmental damage. This type of disaster is especially dangerous because it can occur suddenly, providing little warning and evacuation time for the people living downstream. The flows resulting from dam failure generally are much larger than the capacity of the downstream channels and therefore lead to extensive flooding. Flood damage occurs as a result of the momentum of the flood caused by the sediment-laden water flooding over the channelbanks and impact debris carried by the flow.</p>
Location	<p>According to the California Department of Water Resource’s Division of Safety of Dams (DSOD), there are 90 dams under State jurisdiction in Los Angeles County. A dam breach inundation map shows flooding that could result from a hypothetical failure of a dam or its critical appurtenant structure. In 2017, the California Legislature passed a law requiring all State jurisdictional dam owners, except for owners of low-hazard dams, to develop inundation maps approved by DSOD and emergency action plans approved by Cal OES.</p> <p>At the time of the drafting of this plan in early July 2019, 12 State jurisdictional dams in Los Angeles County had approved dam breach inundation maps, including:</p> <ul style="list-style-type: none"> <li>• Castaic Lake Dam: an earthen dam with a storage capacity of 323,700 acre-feet in Warm Springs Mountain</li> <li>• Pyramid Dam: an earthen and rock dam with a storage capacity of 178,700 acre-feet in Black Mountain</li> <li>• Chevy Chase 1290: an earthen dam with a storage capacity 17 acre-feet of in Pasadena</li> <li>• Elysian Dam: and earthen dam with a storage capacity of 167 acre-feet in Los Angeles</li> <li>• Lower San Fernando Dam: hydraulic fill dam with a storage capacity of 9,843 acre-feet in San Fernando</li> <li>• Eagle Rock Dam: an earthen dam with a storage capacity of 254 acre-feet in Pasadena</li> <li>• Santa Ynez Canyon Dam: an earthen dam with a storage capacity 356 acre-feet in Topanga</li> <li>• Devils Gate Dam: a gravity dam with a storage capacity of 2,600 acre-feet Pasadena</li> <li>• Palos Verdes Reservoir: an earthen dam with a storage capacity of 1,100 acre-feet in Torrance</li> <li>• Littlerock – Palmdale Dam: a roller-compacted concrete dam with a storage capacity of 4,600 acre-feet in Pacifico Mountain</li> <li>• Harold Reservoir: an earthen dam with a storage capacity of 3,870 acre-feet in Palmdale</li> <li>• Westlake Reservoir: an earthen dam with a storage capacity of 9,200 acre-feet in Westlake Village</li> </ul>

**Table 4-6. Dam Failure Identification Profile**

Profile	Description
History	<p>Los Angeles County was the scene of the worst dam failure in United States history. The St. Francis Dam was built in San Francisquito Canyon, approximately 40 miles northwest of downtown Los Angeles, in 1924. On the night of March 12-13, 1928, the dam catastrophically failed, releasing approximately 12.4 billion gallons of water. At least 411 people were killed. Subsequent investigations determined that the dam failed as a result of defective foundations that had been built upon an unstable rock formation. As a result of the disaster, the State of California increased dam safety legislation and oversight, and created a state Board of Registration for civil engineers to regulate the industry.</p>
Extent / Severity	<p>The Federal Guidelines for Inundation Mapping of Flood Risks Associated with Dam Incidents and Failures (FEMA P-946, July 2013) defines downstream hazards for dam incidents. Downstream hazards are based “solely on the potential downstream impacts to life and property should the dam fail when operating with a full reservoir.” FEMA has developed three categories in increasing severity for downstream hazards: Low, Significant, and High. DSOD adds a fourth category of Extremely High. In Los Angeles County there are 40 dams that are classified as High, with the potential impact expected to cause loss of at least one human life, and 30 dams classified as Extremely High, with the potential impact expected to cause considerable loss of human life or result in an inundation area with a population of 1,000 or more.</p> <p>As noted in <b>Figure 4-3</b>, nine Extremely High hazard dams and three High hazard dams in the county have approved dam breach inundation maps for a total of 45.70 square miles (0.96 %) in Los Angeles County, and a total of 13.37 square miles (0.44 %) in the unincorporated areas of Los Angeles County.</p>
Recurrence Probability	<p>Dams fail for a variety of reasons, including Sub-standard construction materials/techniques, spillway design error, geological instability, poor maintenance, and earthquakes, and therefore recurrence probabilities are unknown. State jurisdiction dams are regulated by the DSOD and each dam undergoes inspection on an annual basis to ensure it is safe, performing as intended, and is not developing issues. However, in 2017, the United States Army Corps of Engineers (USACE) discovered that the Whittier Narrows Dam was structurally unsafe and that an intense storm could prematurely open the dam’s massive spillway and flood the area below from Pico Rivera to Long Beach. The USACE has reclassified the dam as the agency’s highest dam priority nationally because of the risk of “very significant loss of life and economic impacts.” Construction on the dam is expected to start in 2021 and conclude by 2025.</p>

**Table 4-7. Dam Failure Impact on Land Area**

Entity	Dam Breach Inundation	
	# of Sq. Miles	% of Sq. Miles
Los Angeles County	45.70	0.96
Unincorporated Los Angeles County	13.37	0.44
Supervisory District 1	1.40	0.57
Supervisory District 2	0.00	0.00
Supervisory District 3	24.84	5.76
Supervisory District 4	0.67	0.15
Supervisory District 5	18.00	0.64

**Table 4-8. Dam Failure Impact on Vulnerable Populations – People Experiencing Homelessness**

Entity	Dam Breach Inundation	
	# of Homeless	% of Homeless
City of Los Angeles	1,193	3.62
Unincorporated Los Angeles County	13	0.22

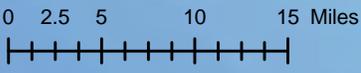
**Table 4-9. Dam Failure Impact on County Critical Facilities**

Department / Agency	Dam Breach Inundation	
	# of Facilities	% of Facilities
Los Angeles County Animal Care & Control	1	14.29
Los Angeles County Fire Department	3	0.89
Los Angeles County Health Services	2	6.90
Los Angeles County Library	1	1.18
LACMA & NHM	0	0.00
Los Angeles County Office of Education	2	5.41
Los Angeles County - Other (offices)	0	0.00
Los Angeles County Parks & Recreation	2	1.71
Los Angeles County Public Health	0	0.00
Los Angeles County Public Works	1	0.43
Los Angeles County Sheriff’s Department	3	9.68

**Table 4-10. Overall Summary of Vulnerability to Dam Failure**

Dam Failure	
Summary	<p>There are 90 dams in Los Angeles County under State jurisdiction. Seventy dams are classified as High and Extremely High hazard and failure of these types of dams will cause loss of human life and/or result in an inundation area with a population of 1,000 or more.</p> <p>As of June 2017, all dams except those classified as Low hazard are required by the DSOD to have an Emergency Action Plan (EAP). An EAP identifies incidents that can lead to potential emergency conditions at a dam, identifies the areas that could be affected by the loss of a reservoir and specifies pre-planned actions to be followed to minimize property damage, potential loss of infrastructure and water resources, and potential loss of life due to failure or misoperation of a dam. EAPs also require dam breach inundation maps to be prepared.</p> <p>While the State regulates dams to prevent failure, safeguard life, and protect property, some researchers doubt that the “overall safety of aging federal flood control systems that were not designed with climate change in mind.” They argue that as California experiences more intense storms, the aging dams in the area could fail and/or prematurely open and flood homes, schools, businesses, and roads.</p> <p>In 2016, Climate-Safe Infrastructure Bill (Assembly Bill [AB] 2800) became law and “established the Climate-Safe Infrastructure Working Group to develop recommendations to the California legislature on how to build and design our infrastructure to be safer for Californians in the face of growing climate extremes.” The Working Group’s 2018 report identified nearly 700 High hazard dams in California needing repairs and upgrades.</p>

# Kern County



- Legend**
- Dams With Inundation Mapping
  - Dam Inundation
  - National Forest

**Source**  
Department of Water Resources  
Database (2019)  
<https://fmds.water.ca.gov>

**Dam Breach Inundation Areas  
Figure 4-3**

*2019 Los Angeles County  
All-Hazards Mitigation Plan*

**Table 4-11. Drought Identification Profile**

Profile	Description
Nature	<p>Drought is a normal, recurrent feature of virtually all climatic zones, including areas of both high and low rainfall, although characteristics will vary significantly from one region to another. Drought differs from normal aridity, which is a permanent feature of the climate in areas of low rainfall. Drought is the result of a natural decline in the expected precipitation over an extended period of time, typically one or more seasons in length. Other climatic characteristics, such as high temperature, high wind, and low relative humidity, impact the severity of drought conditions. Four common definitions for drought are provided as follows:</p> <ul style="list-style-type: none"> <li>• <b>Meteorological drought</b> is defined solely on the degree of dryness, expressed as a departure of actual precipitation from an expected average or normal amount based on monthly, seasonal, or annual time scales.</li> <li>• <b>Hydrological drought</b> is related to the effects of precipitation shortfalls on stream flows and reservoir, lake, and groundwater levels.</li> <li>• <b>Agricultural drought</b> is defined principally in terms of soil moisture deficiencies relative to water demands of plant life, usually crops.</li> <li>• <b>Socioeconomic drought</b> associates the supply and demand of economic goods or services with elements of meteorological, hydrologic, and agricultural drought. Socioeconomic drought occurs when the demand for water exceeds the supply as a result of weather-related supply shortfall. It may also be referred to as a water management drought.</li> </ul> <p>A drought’s severity depends on numerous factors, including duration, intensity, and geographic extent, as well as regional water supply demands by humans and vegetation. Due to its multi-dimensional nature, drought is difficult to define in exact terms and poses difficulties in terms of comprehensive risk assessments.</p> <p>Drought differs from other natural hazards in three ways. First, the onset and end of a drought are difficult to determine due to the slow accumulation and lingering of effects of an event after its apparent end. Second, the lack of an exact and universally accepted definition adds to the confusion of its existence and severity. Third, in contrast with other natural hazards, the impact of drought is less obvious and may be spread over a larger geographic area. These characteristics have hindered the preparation of drought contingency or mitigation plans by many governments.</p>
Location	<p>The occurrence of drought is regional in nature and scope, which holds true for Los Angeles County. As such, when drought occurs it typically affects the entire county.</p>
History	<p>Drought is a cyclic part of the climate of California, occurring in both summer and winter, with an average recurrence interval between 3 and 10 years. Droughts in California over the past 100 years are listed as follows. The most recent drought from 2011 to 2015 was the driest 4-year period on record in California since recordkeeping began in 1895.</p> <ul style="list-style-type: none"> <li>• 1917-1921, Statewide except for central Sierra Nevada and north coast</li> <li>• 1922-1926, Statewide except for central Sierra Nevada</li> <li>• 1928-1937, Statewide</li> <li>• 1943-1951, Statewide</li> <li>• 1959-1962, Statewide</li> <li>• 1976-1977, Statewide, except for southwestern deserts</li> <li>• 1987-1992, Statewide</li> <li>• 2007-2009, Statewide, particularly the central coast</li> <li>• 2011-2015, Statewide</li> </ul>

**Table 4-11. Drought Identification Profile**

Profile	Description
Extent / Severity	The National Drought Mitigation Center produces drought monitor maps for the United States. It classifies droughts into five categories: D0 is the least severe, with abnormally dry conditions; and D4 is the most severe, with exceptional drought conditions. California, including Los Angeles County, was in some form of drought for 376 consecutive weeks from December 20, 2011 until March 14, 2019. As of August 13, 2019, Los Angeles County remains free of drought.
Recurrence Probability	Researchers for California’s Fourth Climate Change Assessment have noted that California has a “highly variable climate” with wet or dry periods that can span years and that are “heavily affected by extreme precipitation events.” Furthermore, climate scientists also suggest the possibility of longer and more destructive droughts with climate change. As such, California is likely to experience long-term droughts at least every decade.

**Table 4-12. Drought Impact**

Drought	
Summary	Severe droughts can impact the region’s agriculture, forests, hydropower, groundwater supply, recreation, aquatic ecosystems, as well as isolated communities that have limited water supply.

**Table 4-13. Overall Summary of Vulnerability to Drought**

Drought	
Summary	Climate scientists predict that Los Angeles County and the rest of southern California will get drier and northern California will get hotter. The resulting loss of snowpack in the Sierra Nevada will mean less water for all Californians – farmers, residents, utilities, and even hatchery fish. However, while drought cannot be controlled, according to the USGS, drought can be managed in two ways: through drought planning and in helping communities make the best day-to-day management decisions while the drought is taking place. During the drafting of this plan update, the Governor of California signed an executive order directing specific State agencies to develop a Water Resilience Portfolio to “ensure safe and dependable water supplies, flood protection and healthy waterways for the state’s communities, economy and environment.”

### 4.3 EARTHQUAKE

**Table 4-14. Earthquake Identification Profile**

Profile	Description
Nature	<p>An earthquake is a sudden motion or trembling caused by a release of strain accumulated in or along the edge of Earth’s tectonic plates. The effects of an earthquake can be felt far beyond the site of its occurrence. Earthquakes usually occur without warning and can cause massive damage and extensive casualties in a few seconds. Common effects of earthquakes are ground motion and shaking, surface fault ruptures, and ground failure. Ground motion is the vibration or shaking of the ground during an earthquake. When a fault ruptures, seismic waves radiate, causing the ground to vibrate. The severity of the vibration increases with the amount of energy released and decreases with distance from the causative fault or epicenter. Soft soils can amplify ground motions.</p> <p>In addition to ground motion, several secondary natural hazards can occur from earthquakes, such as the following:</p> <ul style="list-style-type: none"> <li>• <b>Surface Faulting:</b> Surface faulting is the differential movement of two sides of a fault at the Earth’s surface. Displacement along faults, both in terms of length and width, varies but can be significant (e.g., up to 20 feet), as can the length of the surface rupture (e.g., up to 200 miles). Surface faulting can cause severe damage to linear structures, including railways, highways, pipelines, tunnels and dams.</li> <li>• <b>Liquefaction:</b> Liquefaction occurs when seismic waves pass through saturated granular soil, distorting its granular structure, and causing some of the empty spaces between granules to collapse. Liquefaction causes lateral spreads (i.e., horizontal movements of commonly 10 to 15 feet, but up to 100 feet), flow failures (i.e., massive flows of soil, typically hundreds of feet, but up to 12 miles), and loss of bearing strength (i.e., soil deformations causing structures to settle or tip). Liquefaction can cause severe damage to property.</li> <li>• <b>Landslides/Debris Flows:</b> Landslides/debris flows occur as a result of horizontal seismic inertia forces induced in the slopes by the ground shaking. The most common earthquake-induced landslides include shallow, disrupted landslides such as rock falls, rockslides, and soil slides. Debris flows are created when surface soil on steep slopes becomes totally saturated with water. Once the soil liquefies, it loses the ability to hold together and can flow downhill at very high speeds, taking vegetation and/or structures with it. Slide risks increase after an earthquake during a wet winter.</li> </ul> <p>The two most common measures of earthquake intensity used in the United States are the Modified Mercalli Intensity Scale, which measures felt intensity, and peak ground acceleration (PGA), which measures instrumental intensity by quantifying how hard the earth shakes in a given location. Magnitude (M) is measured by the amplitude of the earthquake waves recorded on a seismograph using a logarithmic scale.</p>

**Table 4-14. Earthquake Identification Profile**

Profile	Description
Location	<p>As in most of southern and coastal California, the potential for earthquake damage exists throughout Los Angeles County because of the number of active faults in and near the county. These faults are shown on the California Geological Survey (CGS) Fault Activity Map of California. Descriptions of the active faults are provided below. The locations of the active and potentially active faults are shown on <b>Figure 4-4</b>. Some of the more significant faults are described below:</p> <ul style="list-style-type: none"> <li>• <b>Malibu Coast fault system:</b> The Malibu Coast fault system includes the Malibu Coast, Santa Monica, and Hollywood faults. The system begins in the Hollywood area, extends along the southern base of the Santa Monica Mountains, and passes offshore a few miles west of Point Dume. The 1973 Point Mugu earthquake is believed to have originated on this fault system.</li> <li>• <b>Oak Ridge fault system:</b> The Oak Ridge fault system is a steep (65 degrees) southerly dipping reverse fault that extends from the Santa Susana Mountains westward along the southerly side of the Santa Clara River Valley and into the Oxnard Plain. The system is more than 50 miles long on the mainland and may extend an equal or greater distance offshore. Several recorded earthquake epicenters on land and offshore may have been associated with the Oak Ridge fault system. Portions of the system are zoned by the state as active.</li> <li>• <b>Pine Mountain thrust fault and Big Pine fault:</b> These two large faults occur in the mountainous portion of Ventura County north of the Santa Ynez fault; the faults are located 9 and 16 miles north of the city of Ojai, respectively. The Pine Mountain thrust fault is reported to have ruptured the ground surface for 30 miles along its length during the northern Ventura County earthquakes of November 1852.</li> <li>• <b>San Andreas fault:</b> San Andreas is the longest and most significant fault in California. Because of clearly established historical earthquake activity, this fault has been designated as active by the State of California. The last major earthquake on this fault near Ventura County was the Fort Tejon earthquake of 1857, which was estimated at magnitude (M) 8.0 and would have caused considerable damage if there had been structures in the southern part of the county. There is a 59 % chance that an M 6.7 quake or larger will occur on this fault in the next 30 years.</li> <li>• <b>San Cayetano–Red Mountain–Santa Susana fault system:</b> This fault system consists of a major series of north-dipping reverse faults that extend over 150 miles from Santa Barbara County into Los Angeles County. In this system, the San Cayetano fault is the greatest hazard to Ventura County; it is a major, north-dipping reverse fault that extends for 25 miles along the northern portion of the Ventura Basin. The San Fernando earthquake of 1971, described in the previous section, was caused by activity along this fault.</li> <li>• <b>Simi–Santa Rosa fault system:</b> This fault system extends from the Santa Susana Mountains westward along the northern margin of the Simi and Tierra Rejada valleys and along the southern slope and crest of the Las Posas Hills to their westerly termination.</li> <li>• <b>Ventura-Pitas Point fault:</b> The western half of this fault is known as the Pitas Point fault, and the eastern half is known as the Ventura fault. The Pitas Point fault extends offshore into the Pacific Ocean and is roughly 14 miles long. The Ventura fault extends into the communities of Ventura and Sea Cliff and runs roughly parallel to portions of U.S. 101 and State Route 126. The fault is roughly 12 miles long and is a left-reverse fault.</li> </ul>

**Table 4-14. Earthquake Identification Profile**

Profile	Description
History	<p>As shown in <b>Figure 4-5</b>, according to the USGS, 163 earthquakes M 5.0&gt; have been recorded in southern California since 1769. Four of these earthquakes have been larger than M 7.0 including:</p> <ul style="list-style-type: none"> <li>• San Juan Capistrano Earthquake (M 7.5), December 8, 1812</li> <li>• Kern County Earthquake (M 7.5), July 21, 1952</li> <li>• West Ventura Earthquake (M 7.1), December 21, 1812</li> <li>• Ridgecrest, (M 7.1), July 6, 2019</li> </ul> <p>In Los Angeles County, significant earthquakes over the past 50 years include:</p> <ul style="list-style-type: none"> <li>• La Habra (M 5.1), March 28, 2014, resulting in a few injuries and \$10 million dollars in damages</li> <li>• Chino Hills (M 5.5), July 29, 2008, resulting in 8 injuries and limited damages</li> <li>• Northridge (M 6.7), January 17, 1994, resulting in 57 deaths, 8,700 injuries and up to \$40 billion dollars in damages.</li> <li>• Sierra Madre (M 5.6), June 28, 199, resulting in 1 death, 100+ injuries and up to \$40 million dollars in damages.</li> <li>• Upland (M 5.7), February 28, 1990, resulting in 30 injuries and \$12.7 million dollars in damages</li> <li>• Whittier (M 5.9), October 1, 1987, resulting in 8 deaths, 200 injuries and \$358 million in damages</li> <li>• San Fernando (M 6.6), February 9, 1971, resulting in 58 – 65 deaths, 200 – 2,000 injuries and up to \$553 million in damages</li> </ul>
Extent / Severity	<p>The strength of an earthquake’s ground movement can be measured by PGA. PGA measures the rate in change of motion relative to the established rate of acceleration due to gravity (g = 980 centimeters per second, per second). PGA is used to project the risk of damage from future earthquakes by showing earthquake ground motions that have a specified probability (e.g., 10%, 5%, or 2%) of being exceeded in 50 years. The ground motion values are used for reference in construction design for earthquake resistance and can also be used to assess relative hazard between sites when making economic and safety decisions.</p> <p>In 2008, CGS developed an updated map of earthquake shaking potential for California. The map shows the relative intensity of ground shaking and damage in California from anticipated future earthquakes. Regions near major, active faults are shown in red and pink and experience stronger earthquake shaking more frequently. Regions that are distant from known, active faults are shown in orange and yellow and experience lower levels of shaking less frequently. <b>Figure 4-6</b> indicates the level of low-frequency shaking potential in Los Angeles County (in which local soil conditions have greater effect on low frequency). In Los Angeles County there are 3,041.91 (63.90%) square miles with violent low frequency shaking potential; and 711.01 square miles (14.93%) with extreme low frequency shaking potential. In unincorporated areas of Los Angeles County, there are 1,783.57 (58.65%) square miles with violent low frequency shaking potential; and 527.60 square miles (17.35%) with extreme low frequency shaking potential.</p>

**Table 4-14. Earthquake Identification Profile**

Profile	Description
Recurrence Probability	<p>Ongoing field and laboratory studies suggest the likely maximum magnitudes and recurrence intervals for the major local faults are as follows:</p> <ul style="list-style-type: none"> <li>• Chatsworth fault: M 6.0-6.8, unknown recurrence interval</li> <li>• Hollywood fault: M 5.8-6.5, recurrence interval approximately every 1600 years</li> <li>• Malibu Coast fault: M 6.7, recurrence interval 2,908 years</li> <li>• Newport-Inglewood fault: M 6.0-7.4, unknown recurrence interval</li> <li>• Oak Ridge fault: M 6.9, recurrence interval 299 years</li> <li>• Palos Verdes fault: M 6.0-7.0 or greater, unknown recurrence interval</li> <li>• Red Hill fault (aka Etiwanda Avenue fault): M 6.0-7.0, unknown recurrence interval</li> <li>• Raymond fault: M 6.0-7.0, recurrence interval approximately 4500 years</li> <li>• San Andreas fault: M 6.8-8.0, recurrence interval of 140 years on Mojave segment to 300 years</li> <li>• San Cayetano fault: M. 6.5-7.3, unknown recurrence interval</li> <li>• San Fernando fault: M 6.0-6.8, recurrence interval approximately every 200 years</li> <li>• San Jose fault: M 6.0-6.5, unknown recurrence interval</li> <li>• Santa Susana fault system: M 6.6, recurrence interval 138 years</li> <li>• Santa Monica fault: M 6.0-7.0, unknown recurrence interval</li> <li>• Sierra Madre fault: M 6.0-7.0, recurrence interval several thousand years</li> <li>• Simi-Santa Rosa fault: M 6.7, recurrence interval 933 years</li> <li>• Verdugo fault: M 6.0-6.8, unknown recurrence interval</li> <li>• Whittier fault: M 6.0-7.2, unknown recurrence interval</li> </ul>

**Table 4-15. Seismic Hazard Impact on Land Area**

Entity	Violent EQ Shaking		Extreme EQ Shaking	
	# of Sq. Miles	% of Sq. Miles	# of Sq. Miles	% of Sq. Miles
Los Angeles County	3,041.91	63.90	711.01	14.93
Unincorporated Los Angeles County	1,783.57	58.65	527.60	17.35
Supervisory District 1	244.34	99.25	0.00	0.00
Supervisory District 2	161.74	99.94	0.00	0.00
Supervisory District 3	379.41	87.99	41.73	9.68
Supervisory District 4	305.40	69.42	0.00	0.00
Supervisory District 5	1,950.78	69.50	669.26	23.84

EQ = earthquake

**Table 4-16. Seismic Hazard Impact on Vulnerable Populations – People Experiencing Homelessness**

Entity	Violent EQ Shaking		Extreme EQ Shaking	
	# of Homeless	% of Homeless	# of Homeless	% of Homeless
City of Los Angeles	31,037	94.25	1,827	5.55
Unincorporated Los Angeles County	5,328	90.60	361	6.14

EQ = earthquake

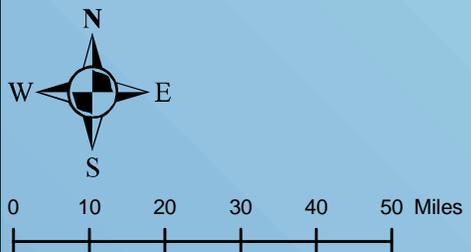
**Table 4-17. Seismic Hazard Impact on County Critical Facilities**

Department / Agency	Violent EQ Shaking		Extreme EQ Shaking	
	# of Facilities	% of Facilities	# of Facilities	% of Facilities
Los Angeles County Animal Care & Control	6	85.71	1	14.29
Los Angeles County Fire Department	314	93.18	19	5.64
Los Angeles County Health Services	24	82.76	5	17.24
Los Angeles County Library	79	92.94	5	5.88
LACMA & NHM	3	75.00	1	25.00
Los Angeles County Office of Education	32	86.49	5	13.51
Los Angeles County - Other (offices)	24	100.00	0	0.00
Los Angeles County Parks & Recreation	103	88.03	14	11.97
Los Angeles County Public Health	13	92.86	1	7.14
Los Angeles County Public Works	201	87.39	21	9.13
Los Angeles County Sheriff's Department	28	90.32	2	6.45

EQ = earthquake

**Table 4-18. Overall Summary of Vulnerability to Earthquakes**

Earthquake	
Summary	<p>Over 75% of unincorporated Los Angeles County is at risk to violent and extreme perceived shaking from future earthquakes. Violent perceived shaking can produce the potential for heavy damage. According to the USGS, this could mean that well-designed framed structures could be thrown out of plumb and substantial buildings could experience partial building collapse. In extreme shaking, the USGS notes that some well-built wooden structures could be destroyed, and most masonry and frame structures with foundations could be destroyed.</p> <p>Many people in California are looking to boost seismic regulations through the implementation of Assembly Bill (AB) 1857 and AB 2681. AB 1857 will instruct the California Building Standards Commission to increase minimum mandatory standards for most types of buildings in the state, such as apartments, office buildings, and commercial spaces, but would exempt single-family houses and duplexes, while AB 2681 will require cities and counties to create an inventory of potentially vulnerable buildings.</p>



**Legend**

**Quaternary and Younger Faults**

- Inferred
- - - Moderately Constrained
- · · Well Constrained

**Source**  
 Quaternary Fault and Fold Database  
 of the United States (2018)  
<https://earthquake.usgs.gov>

**Major Faults in Southern California**  
**Figure 4-4**

*2019 Los Angeles County  
 All-Hazards Mitigation Plan*



Ridgecrest Earthquake  
 Magnitude: 7.1  
 Date: 2019

Kern County

San Bernardino  
 County

Kern County Earthquake  
 Magnitude: 7.5  
 Date: 1952

Santa  
 Barbara  
 County

Ventura  
 County

San Juan Capistrano Earthquake  
 Magnitude: 7.5  
 Date: 1812

West Ventura Earthquake  
 Magnitude: 7.1  
 Date: 1812

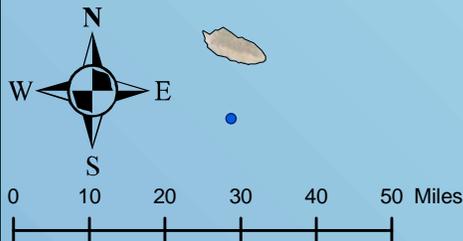
Los Angeles

Orange  
 County

Riverside  
 County

Pacific Ocean

San Diego  
 County



**Legend**

Earthquakes M 5.0 >

- 7+
- 6 - 7
- 5 - 6

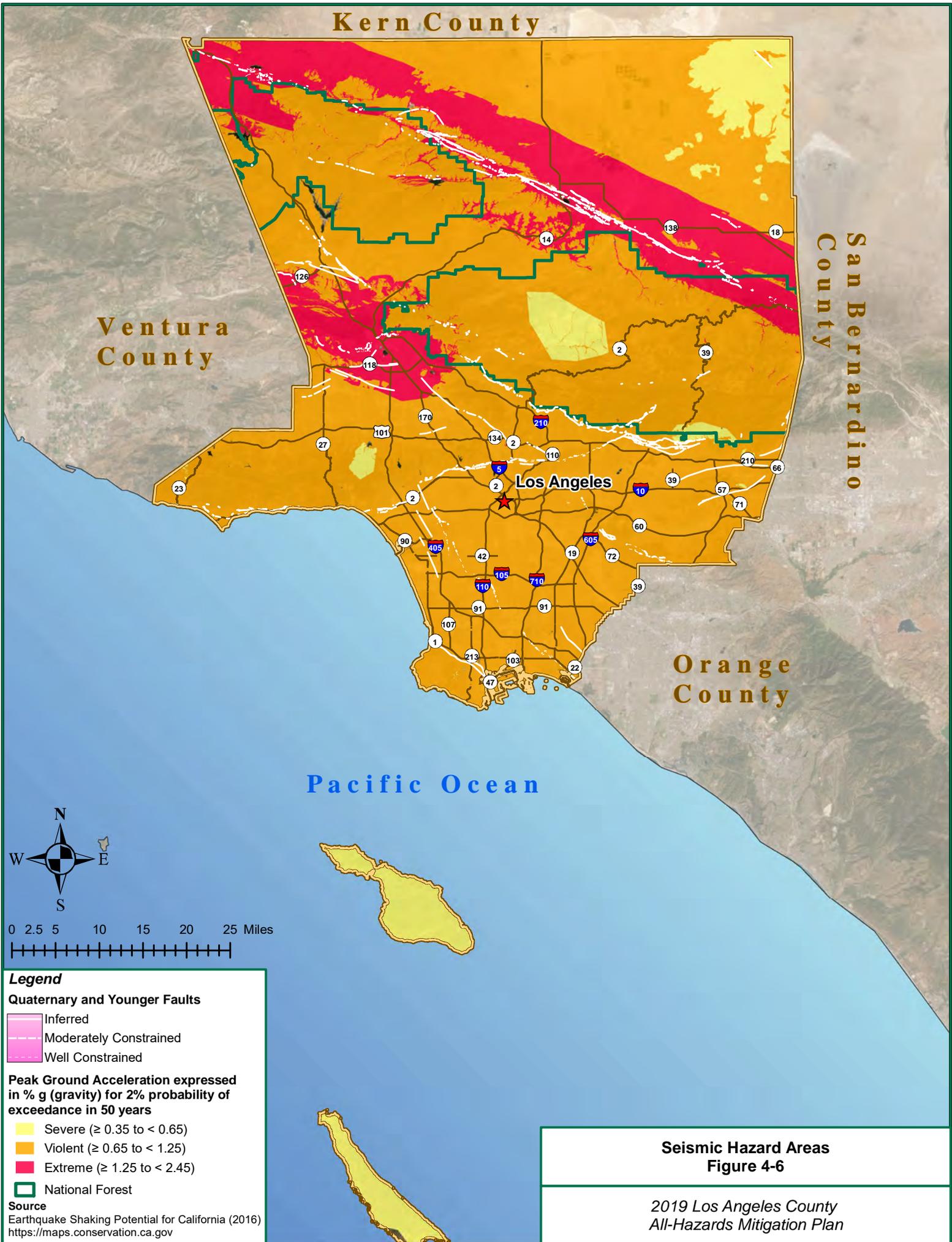
Quaternary and Younger Faults

- Inferred
- - - Moderately Constrained
- . . . Well Constrained

Source

Historic Earthquakes, 1769 to 2015 - California (Magnitude 5.0-plus) (2019)  
<https://hub.arcgis.com/>  
 Earthquake Catalogs 1932-2019 (2019)  
<http://service.scedc.caltech.edu>

**Historical Earthquakes (1769-2019)**  
**Figure 4-5**



Kern County

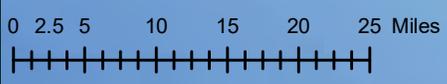
Ventura County

San Bernardino County

Orange County

Pacific Ocean

Los Angeles



**Legend**

**Quaternary and Younger Faults**

- Inferred
- Moderately Constrained
- Well Constrained

**Peak Ground Acceleration expressed in % g (gravity) for 2% probability of exceedance in 50 years**

- Severe ( $\geq 0.35$  to  $< 0.65$ )
- Violent ( $\geq 0.65$  to  $< 1.25$ )
- Extreme ( $\geq 1.25$  to  $< 2.45$ )

National Forest

**Source**  
 Earthquake Shaking Potential for California (2016)  
<https://maps.conservation.ca.gov>

**Seismic Hazard Areas**  
**Figure 4-6**

2019 Los Angeles County  
 All-Hazards Mitigation Plan

## 4.4 FLOOD

**Table 4-19. Flood Identification Profile**

Profile	Description
Nature	<p>A flood occurs when the existing channel of a stream, river, canyon, or other watercourse cannot contain excess runoff from rainfall or snowmelt, resulting in overflow onto adjacent lands. In coastal areas, flooding may occur when high winds or tides result in a surge of seawater into areas that are above the normal high tide line.</p> <p>Secondary hazards from floods can include:</p> <ul style="list-style-type: none"> <li>• Erosion or scouring of stream banks, roadway embankments, foundations, footings for bridge piers, and other features.</li> <li>• Impact damage to structures, roads, bridges, culverts, and other features from high-velocity flow and from debris carried by floodwaters. Such debris may also accumulate on bridge piers and in culverts, increasing loads on these features or causing overtopping or backwater effects.</li> <li>• Destruction of crops, erosion of topsoil, and deposition of debris and sediment on croplands.</li> <li>• Release of sewage and hazardous or toxic materials when wastewater treatment plants are inundated, storage tanks are damaged, and pipelines are severed.</li> </ul> <p>In areas such as Los Angeles County that do not have extended periods of below-freezing temperatures or significant snowfall, floods usually occur during the season of highest precipitation or during heavy rainfalls after prolonged dry periods. Los Angeles County is dry during the late spring, summer, and early fall, and receives most of its rain during the winter months. The rainfall season extends from November through April, with approximately 95% of the annual rainfall occurring during this period. Los Angeles County averages only 15 inches of precipitation per year; less in along the coast and the desert, and more in the foothills and mountains.</p>
Location	<p>Los Angeles County has an extensive flood control system (<b>Figure 4-7</b>) that has eliminated much of their flood hazards. However, major flood sources in Los Angeles County still include Ballona Creek, Los Angeles River, Malibu Creek, Pacific Ocean, Rio Hondo River, San Gabriel River and its tributaries, Santa Clara River, Topanga Canyon, and the Pacific Ocean.</p> <p>In the unincorporated areas of Los Angeles County, flooding sources include:</p> <ul style="list-style-type: none"> <li>• Little Rock and Big Rock Washes: Flooding occurs when the flows reach the valley floor where the channels flatten out. This allows the flows to spread over great distances, inundating the surrounding areas.</li> <li>• Antelope Valley: Flooding occurs when flows from the mountains reach the broad alluvial plain in the Antelope Valley are northerly from the mountains across the broad alluvial plain. During minor storms, much of the flow percolates into the ground. In major storms, flows reach the lake at the northern county limits, where flood flows pond until evaporated.</li> <li>• Foothills of Santa Clarita: Flooding and mudflows occur in the foothill areas during intense rainfall, usually following fires in the upstream watershed.</li> <li>• Coastline: Flooding is caused by waves generated by winter storms. The occurrence of such a storm event in combination with high astronomical tides and strong winds can cause a significant wave runup and allow storm waves to reach higher than normal elevations along the coastline.</li> </ul>

**Table 4-19. Flood Identification Profile**

Profile	Description
History	<p>The federal government has declared 13 flooding emergencies affecting Los Angeles County, including:</p> <ul style="list-style-type: none"> <li>• California Flood and Erosion (Disaster Declaration Number [DR]-15), February 5, 1954</li> <li>• California Flooding (DR-47), December 23, 1955</li> <li>• California Heavy Rainstorms, Flood (DR-82), April 4, 1958</li> <li>• California Floods (DR-122), March 6, 1962</li> <li>• California Severe Storms, Flooding (DR-138), October 24, 1962</li> <li>• California Severe Storms, Heavy Rains, Flooding (DR-145), February 25, 1963</li> <li>• California Flooding (DR-270), August 15, 1969</li> <li>• California Winter Storms Flooding (DR-547), February 15, 1978</li> <li>• Southern California Winter Storms (DR-615), February 7 and 21, 1980</li> <li>• Coastal Storms (DR-812), December 21, 1988</li> <li>• California Winter Storms (DR-935), February 12 and 19, 1992</li> <li>• California Winter Storms (DR-979), January 7, 1993-February 19, 1993</li> <li>• California Severe Winter Storms, Flooding, and Mudslides (DR-4305), January 18, 2017-January 23, 2017</li> </ul>
Extent / Severity	<p>The magnitude of flooding that is used as the standard for floodplain management in the United States is a flood with a probability of occurrence of 1% in any given year. This flood is also known as the 100-year flood (i.e., base flood). The 100-year flood, as well as the 500-year flood (0.2%), are considered Special Flood Hazard Areas (SFHA) and identified on FEMA’s Digit Flood Insurance Rate Maps (DFIRM). The Los Angeles County DFIRM (<b>Figure 4-8</b>) identifies 4.19 square miles (0.09%) with a 1% annual chance of flooding, and 243.32 square miles (5.11%) with a 0.2% annual chance of flooding. In the unincorporated areas of Los Angeles County, there are 1.23 square miles (0.04%) with a 1% annual chance of flooding, and an additional 64.77 square miles (2.13 %) with a 0.2% annual chance of flooding.</p>
Recurrence Probability	<p>Floods can occur at any time but are most common with winter storms packed with subtropical moisture.</p>

**Table 4-20. Flood Impact on Land Area**

Entity	0.2% Annual Chance of Flooding		1% Annual Chance of Flooding	
	# of Sq. Miles	% of Sq. Miles	# of Sq. Miles	% of Sq. Miles
Los Angeles County	243.32	5.11	4.19	0.09
Unincorporated Los Angeles County	64.77	2.13	1.23	0.04
Supervisory District 1	27.14	11.02	0.90	0.37
Supervisory District 2	19.32	11.94	0.20	0.12
Supervisory District 3	4.38	1.01	1.31	0.30
Supervisory District 4	80.06	18.20	0.32	0.07
Supervisory District 5	112.39	4.00	1.45	0.05

**Table 4-21. Flood Impact on Vulnerable Populations – People Experiencing Homelessness**

Entity	0.2% Annual Chance of Flooding		1% Annual Chance of Flooding	
	# of Homeless	% of Homeless	# of Homeless	% of Homeless
City of Los Angeles	1,601	4.86	87	0.26
Unincorporated Los Angeles County	170	2.88	0	0.00

**Table 4-22. Flood Impact on County Critical Facilities**

Department / Agency	0.2% Annual Chance of Flooding		1% Annual Chance of Flooding	
	# of Facilities	% of Facilities	# of Facilities	% of Facilities
Los Angeles County Animal Care & Control	2	28.57	0	0.00
Los Angeles County Fire Department	46	13.65	0	0.00
Los Angeles County Health Services	5	17.24	0	0.00
Los Angeles County Library	15	17.65	0	0.00
LACMA & NHM	0	0.00	0	0.00
Los Angeles County Office of Education	5	13.51	0	0.00
Los Angeles County - Other (offices)	2	8.33	0	0.00
Los Angeles County Parks & Recreation	8	6.84	0	0.00
Los Angeles County Public Health	0	0	0	0.00
Los Angeles County Public Works	41	17.38	1	0.43
Los Angeles County Sheriff's Department	5	16.13	0	0.000

**Table 4-23. Overall Summary of Vulnerability to Floods**

Flood	
Summary	<p>Los Angeles County has a long history of moderate to severe flooding during major storms. In the Los Angeles basin area, an extensive flood control system has eliminated much of this problem. However, in the less densely populated areas where relatively few flood controls have been constructed, flooding remains a problem. In areas with alluvial fans, flood flows discharge from the mountainous canyons in an uncontrolled manner onto the desert floor, thereby resulting in widespread damage to agricultural land, buildings, and infrastructure. In the foothill areas that experience intense rainfall, mudflows pose a risk to those downstream. Finally, along the coast, waves generated by winter storms in combination with high astronomical tides and strong winds can cause a significant wave runup, resulting in erosion and coastal flooding to low-lying portions of the shoreline.</p> <p>According to the Los Angeles County Public Works, there are 55 Repetitive Loss (RL) properties in 22 RL areas of unincorporated Los Angeles County as of the last submitted 2019 Community Rating System (CRS) Recertification. A Repetitive Loss (RL) property is any insurable building for which two or more claims of more than \$1,000 were paid by the National Flood Insurance Program (NFIP) in any rolling 10-year period, since 1978. Updated location information about RL properties in the unincorporated areas of Los Angeles County were not available during the drafting of this plan. Data from 2011 showed that 26 RL properties were located in the SFHA. At the time, Los Angeles County Public Works stated, “the majority of the repetitive losses are associated with localized urban drainage flood problems, even for properties within a FEMA-designated flood zone.” Los Angeles County Public Works oversees RL mitigation projects.</p>

# Kern County

San Bernardino  
County

Ventura  
County

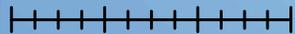
Orange  
County

Los Angeles

Pacific Ocean



0 2.5 5 10 15 Miles



### Legend

- Debris Basin
- Concrete Lined Channels
- Soft Bottom Channels
- LACFCD levees
- USACE levees
- National Forest

Source  
DPW (2019)  
<http://egjsgcx.isd.lacounty.gov>



Los Angeles County Flood Control System  
Figure 4-7

2019 Los Angeles County  
All-Hazards Mitigation Plan



**Kern County**

**San Bernardino County**

**Ventura County**

**Los Angeles**

**Orange County**

**Pacific Ocean**



0 2.5 5 10 15 Miles



**Legend**

**FEMA Flood Zones**

- 1% Annual Chance Flood
- 0.2% Annual Chance Flood
- National Forest

**Source**  
 FEMA Digital Flood Insurance Rate Map (2016, 2018)  
<https://geohub.lacity.org>

**Special Flood Hazard Areas  
Figure 4-8**

*2019 Los Angeles County  
All-Hazards Mitigation Plan*

## 4.5 LANDSLIDE

**Table 4-24. Landslide Identification Profile**

Profile	Description
Nature	<p>Landslide is a general term for the dislodging and fall of a mass of soil or rocks along a sloped surface, or for the dislodged mass itself. The term is used for varying phenomena, including mudflows, mudslides, debris flows, rock falls, rockslides, debris avalanches, debris slides, and slump-earth flows. Landslides may result from a wide range of combinations of natural rock, soil, or artificial fill. The susceptibility of hillside and mountainous areas to landslides depends on variations in geology, topography, vegetation, and weather. Landslides may also occur because of indiscriminate development of sloping ground or the creation of cut-and-fill slopes in areas of unstable or inadequately stable geologic conditions.</p> <p>Additionally, landslides often occur together with other natural hazards, thereby exacerbating conditions, as described below:</p> <ul style="list-style-type: none"> <li>• Shaking due to earthquakes can trigger events ranging from rock falls and topples to massive slides.</li> <li>• Intense or prolonged precipitation that causes flooding can also saturate slopes and cause failures leading to landslides.</li> <li>• Wildfires can remove vegetation from hillsides, significantly increasing runoff and landslide potential.</li> <li>• Landslides into a reservoir can indirectly compromise dam safety; a landslide can even affect the dam itself.</li> <li>• Another type of landslide occurs in areas cut by perennial streams. As floodwaters erode channel banks, rivers have undercut clay-rich sedimentary rocks along their south bank, thereby destabilizing the ground and causing the ground above it to slide.</li> </ul>
Location	<p>In 2011, CGS created a deep-seated landslide grip map to show the relative likelihood of deep landslides in California. The map combines landslide inventory, geology, rock strength, slope, average annual rainfall and earthquake shaking potential layers to create classes of landslide susceptibility. As shown in <b>Figure 4-9</b>, the map shows areas of low landslide susceptibility, mainly, the Los Angeles Basin, to areas of high susceptibility, including the Santa Monica Mountains, the San Gabriel Mountains, the Sierra Pelona Mountains, the Baldwin Hills, the Puente Hills, and the Palos Verdes Hills.</p>

**Table 4-24. Landslide Identification Profile**

Profile	Description
History	<p>Like much of California, Los Angeles County has experienced landslides. Landslides in Los Angeles are generally triggered by intense and/or prolonged rainfall but can also occur after an earthquake. Notable recent landslides in Los Angeles County include:</p> <ul style="list-style-type: none"> <li>• January 1994, the Northridge earthquake triggered more than 11,000 landslides, with the majority concentrated in the Santa Susana Mountains and the mountains north of the Santa Clara River valley. Most of the triggered landslides were shallow highly disrupted falls and slides. However, the larger disrupted slides were reactivations of previously existing landslides.</li> <li>• March 1995, heavy rains weakened the geologically unstable Pacific Palisades bluffs. A 300-foot section gave way and buried part of Pacific Coast Highway under up to 30 feet of rain-soaked earth, rock, and debris.</li> <li>• March 2005, a slide near Sunset Mesa caused 20,000 cubic yards of debris to cover the Pacific Coast Highway.</li> <li>• January 2018, a hillside in Malibu gave way leaving a house uninhabitable.</li> <li>• December 2018, heavy rain on the Woolsey Fire burned hillsides created debris flows and mudslides in and around Malibu causing several road closures.</li> <li>• January 2019, sections of the Pacific Coast Highway near the Ventura County line were closed due to mudslides.</li> </ul>
Extent / Severity	<p><b>Figure 4-9</b> shows deep seated landslide susceptibility areas in Los Angeles County. According to the Susceptibility to Deep-Seated Landslides map, there are 750.02 square miles (15.75%) of land in Los Angeles County located in the Classes IX and X. In the unincorporated areas of Los Angeles County, there are 577.63 square miles (18.99%) in this hazard area.</p>
Recurrence Probability	<p>Shallow landslides can occur at any time during the winter but are more likely happen when the ground is nearly saturated. According to the USGS, in Southern California “at least 10 inches of rainfall during the winter is needed to nearly saturate the ground. After this point, a rain burst of 0.2 to 0.25 in in one hour has been observed to trigger abundant shallow landslides.” However, deep-seated landslides generally need deep infiltration of rainfall (which can take weeks or months to occur) to be triggered.</p>

**Table 4-25. Landslide Impact on Land Area**

Entity	Deep Seated Landslide Class IX and X	
	# of Sq. Miles	% of Sq. Miles
Los Angeles County	750.02	15.75
Unincorporated Los Angeles County	577.63	18.99
Supervisory District 1	17.29	7.02
Supervisory District 2	2.73	1.68
Supervisory District 3	114.61	26.58
Supervisory District 4	105.12	23.89
Supervisory District 5	509.31	18.14

**Table 4-26. Landslide Impact on Vulnerable Populations – People Experiencing Homelessness**

Entity	Deep Seated Landslide Class IX and X	
	# of Homeless	% of Homeless
City of Los Angeles	234	0.71
Unincorporated Los Angeles County	325	5.55

**Table 4-27. Landslide Impact on County Critical Facilities**

Department / Agency	Deep Seated Landslide Class IX and X	
	# of Facilities	% of Facilities
Los Angeles County Animal Care & Control	0	0.00
Los Angeles County Fire Department	7	2.08
Los Angeles County Health Services	0	0.00
Los Angeles County Library	0	0.00
LACMA & NHM	0	0.00
Los Angeles County Office of Education	1	2.70
Los Angeles County - Other (offices)	0	0.00
Los Angeles County Parks & Recreation	2	1.71
Los Angeles County Public Health	0	0.00
Los Angeles County Public Works	37	16.09
Los Angeles County Sheriff's Department	1	3.23

**Table 4-28. Overall Summary of Vulnerability to Landslides**

<b>Landslide</b>	
Summary	<p>Areas prone to landslide include existing old landslides, base of slopes, base of minor drainage hollows, base or top of an old fill slope, base or top of a steep cut slope, and developed hillsides where leach field septic systems are used. In Los Angeles County, the majority of landslide-prone areas include the Santa Monica Mountains, the San Gabriel Mountains, the Sierra Pelona Mountains, the Baldwin Hills, the Puente Hills, and the Palos Verdes Hills. Landslides may: cause injury or death to those trapped; break utility lines; block/damage roadways; damage foundations, chimneys, or surrounding land; and lead to flash flooding and additional landsliding.</p> <p>In Los Angeles County, landslide risks are mitigated through the Hillside Management Area Ordinance &amp; Hillside Design Guidelines (<b>Table 5-3</b>).</p>

# Kern County

San Bernardino County

Ventura County

Orange County

Los Angeles

Pacific Ocean

### ROCK STRENGTH

1 2 3

SLOPE CLASS	ROCK STRENGTH		
	1	2	3
1	0	0	0
2	0	V	VII
3	0	V	VII
4	II	VIII	IX
5	VI	IX	X
6	VII	IX	X
7	VIII	IX	X
8	VIII	IX	X

### LANDSLIDE SUSCEPTIBILITY CLASSES

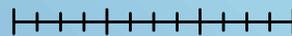
(0 III V VI VII VIII IX X)  
 increasing susceptibility →

 National Forest

Source  
 Susceptibility to Deep-Seated  
 Landslides in California (2018)  
<https://maps.conservation.ca.gov>



0 2.5 5 10 15 Miles



**Deep Seated Landslide Susceptibility Area  
 Figure 4-9**

2019 Los Angeles County  
 All-Hazards Mitigation Plan

## 4.6 TSUNAMI

**Table 4-29. Tsunami Identification Profile**

Profile	Description
Nature	<p>A tsunami is a series of traveling ocean waves of extremely long length, generated by disturbances associated primarily with earthquakes occurring below or near the ocean floor. Subduction zone earthquakes at plate boundaries often cause tsunamis. However, tsunamis can also be generated by underwater landslides or volcanic eruptions, the collapse of volcanic edifices, and—in very rare instances—large meteorite impacts in the ocean.</p> <p>In the deep ocean, a tsunami may have a length from wave crest to wave crest of 100 miles or more, but a wave height of only a few feet or less. Thus, the wave period can be up to several hours, and wavelengths can exceed several hundred miles. Therefore, tsunamis are unlike typical wind-generated swells on the ocean, which might have a period of about 10 seconds and a wavelength of up to 300 feet. Tsunamis cannot be felt aboard ships and they cannot be seen from the air or the open ocean. In deep water, the waves may reach speeds exceeding 700 miles per hour.</p> <p>Tsunamis arrive as a series of successive crests (high water levels) and troughs (low water levels). These successive crests and troughs can occur anywhere from 5 to 90 minutes apart; however, they usually occur 10 to 45 minutes apart.</p> <p>Tsunamis not only affect beaches that are open to the ocean, but also bay mouths, tidal flats, and the shores of large coastal rivers. Tsunami waves can also diffract around land masses. Because tsunamis are asymmetrical, the waves may be much stronger in one direction than another, depending on the nature of the source and the surrounding geography. However, tsunamis do propagate outward from their source, so coasts in the shadow of affected land masses are safer.</p>
Location	<p><b>Figure 4-10</b> shows tsunami evacuation area based on Maximum Phase as described in the California Tsunami Evacuation Playbook. This map illustrates coastal land areas that can become submerged due to tsunami run-up. The area of land subject to inundation is a factor of:</p> <ul style="list-style-type: none"> <li>• Distance of shoreline from the tsunami-generating event</li> <li>• Magnitude of the earthquake causing the event; duration and period of waves</li> <li>• Run-up elevations</li> <li>• Tidal level at time of occurrence</li> <li>• Location along shore and direction of shore in respect to propagated waves</li> <li>• Topography of the seabed</li> </ul> <p>In Los Angeles County, areas at risk to the maximum tsunami run up include the ports of Long Beach and Los Angeles, Catalina Island, and areas in the cities of Los Angeles, Long Beach, Manhattan Beach, Redondo Beach, Hermosa Beach, El Segundo, Palos Verdes, Santa Monica, and Malibu. In the unincorporated areas of Los Angeles County, the five coastal zones (i.e., Marin Del Rey, Santa Catalina Island, Santa Monica Mountains, San Clemente Island, and Ballona Wetlands Area A) are subject to inundation.</p>

**Table 4-29. Tsunami Identification Profile**

Profile	Description
History	<p>Between 1923 and 2011, 11 major tsunami events occurred in Los Angeles County, including:</p> <ul style="list-style-type: none"> <li>• April 13, 1923, a M 7.2 earthquake in Kamchatka caused a tsunami in Los Angeles.</li> <li>• August 30, 1930, a probable meteotsunami (i.e., a tsunami of meteorological origin) with a 10-foot run-up amplitude hit Santa Monica.</li> <li>• April 1, 1946, a M 8.8 earthquake in the Aleutian Islands caused tsunamis with run-up amplitudes ranging from 1 to 6 feet in Catalina Island, Los Angeles, and Long Beach, breaking ships from their moorings.</li> <li>• November 4, 1952, a M 9.0 earthquake in Kamchatka caused tsunamis with run-up amplitudes ranging from 1 to 2 feet in Santa Monica, Los Angeles, and Long Beach.</li> <li>• March 9, 1957, a M 8.6 earthquake in the Aleutian Islands caused tsunamis with run-up amplitudes ranging from 1 to 2 feet in Santa Monica, Los Angeles, and Long Beach.</li> <li>• May 22, 1960, a M 9.5 earthquake in Chile caused tsunamis with run-up amplitudes ranging from 2 to 5 feet in Catalina Island, Los Angeles, Long Beach, and Santa Monica. One person died, 800 small craft were unmoored, 200 boats were damaged, and 40 boats were sunk. The tsunamis resulting in \$1 million dollars in damages.</li> <li>• March 28, 1964, a M 9.2 earthquake in Alaska caused tsunamis with run-up amplitudes ranging from 2 to 3 feet in Catalina Island, Los Angeles, Long Beach, and Santa Monica. One longshoreman was killed, 100 boats were unmoored, and 7 boats were sunk. The tsunamis caused approximately \$350 thousand dollars in damages.</li> <li>• November 29, 1975, a M 7.1 earthquake in Hawaii caused a tsunami with a run-up amplitude of 4 feet in Catalina Island, damaging docks and boats.</li> <li>• September 29, 2009, a M 8.0 earthquake in Samoa caused a tsunami with a 1-foot run-up amplitude in Los Angeles.</li> <li>• February 27, 2010, a M 8.8 earthquake in Chile caused tsunamis with run-up amplitudes ranging from 1 to 3 feet in Catalina Island, Los Angeles, Long Beach, and Santa Monica, causing minor damage to docks and boats.</li> <li>• March 11, 2011, a M 9.0 earthquake in Japan caused tsunamis with run-up amplitudes ranging from 2 to 3 feet in Catalina Island, Los Angeles, Long Beach, Redondo Beach, and Santa Monica, damaging docks and boats.</li> </ul>
Extent / Severity	<p><b>Figure 4-10</b> shows the maximum considered tsunami runup from a number of extreme tsunami sources. There are 43.35 square miles (0.91%) in Los Angeles County located in this hazard area. In the unincorporated areas of Los Angeles County there are 2.07 square miles (0.07%) at risk to a maximum tsunami runup.</p>
Recurrence Probability	<p>Based on the history of tsunami run-ups in the region and the history of earthquakes in the Pacific Rim, another tsunami event is likely to occur, although the extent and probability is unknown.</p>

**Table 4-30. Tsunami Impact on Land Area**

Entity	Maximum Tsunami Inundation Area	
	# of Sq. Miles	% of Sq. Miles
Los Angeles County	43.35	0.91
Unincorporated Los Angeles County	2.07	0.07
Supervisory District 1	0.00	0.00
Supervisory District 2	0.12	0.08
Supervisory District 3	2.65	0.61
Supervisory District 4	18.00	4.09
Supervisory District 5	0.00	0.00

**Table 4-31. Tsunami Impact on Vulnerable Populations – People Experiencing Homelessness**

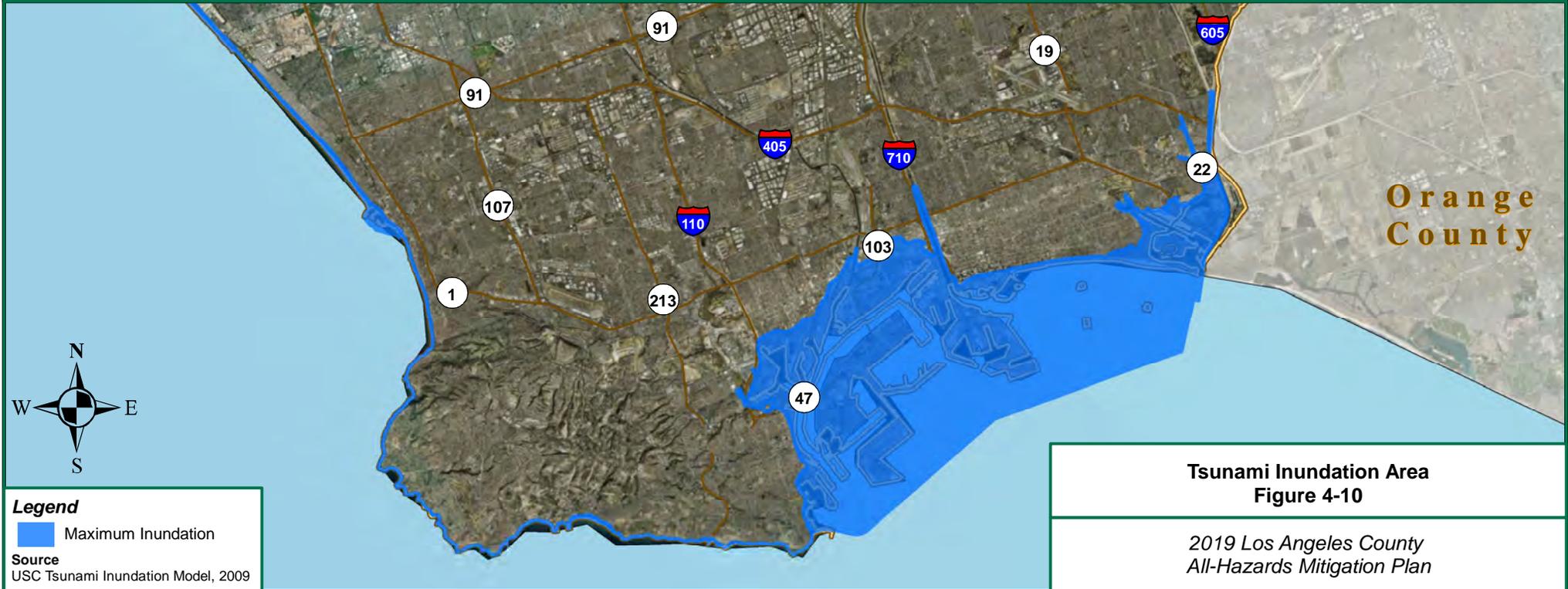
Entity	Maximum Tsunami Inundation Area	
	# of Homeless	% of Homeless
City of Los Angeles	622	1.89
Unincorporated Los Angeles County	20	0.34

**Table 4-32. Tsunami Impact on County Critical Facilities**

Department / Agency	Maximum Tsunami Inundation Area	
	# of Facilities	% of Square Facilities
Los Angeles County Animal Care & Control	0	0.00
Los Angeles County Fire Department	14	4.15
Los Angeles County Health Services	0	0.00
Los Angeles County Library	1	1.18
LACMA & NHM	0	0.00
Los Angeles County Office of Education	0	0.00
Los Angeles County - Other (offices)	1	4.17
Los Angeles County Parks & Recreation	0	0.00
Los Angeles County Public Health	0	0.00
Los Angeles County Public Works	15	6.52
Los Angeles County Sheriff's Department	1	3.23

**Table 4-33. Overall Summary of Vulnerability to Tsunamis**

Tsunami	
Summary	<p>In Southern California, an earthquake could trigger an underwater avalanche or submarine landslide in the Santa Monica Bay and produce a tsunami that could inundate low-lying areas of Los Angeles County. In fact, according to researchers a locally generated tsunami could bring water as high as 5 feet in Marina del Rey, 7 feet in Manhattan Beach, 8 feet at the ports, and 11 feet in Redondo Beach. Such a tsunami could flood homes and destroy many small boats in nearby harbors, thereby creating dangerous debris.</p> <p>Researchers warn that California needs to be better prepared for tsunamis and while new deep-sea sensors have helped in tsunami detection, they are better suited for far-away tsunamis rather than local tsunamis.</p> <p>California OES and CGS lead Tsunami Preparedness Week in California annually. During this week, governmental agencies, such as Los Angeles County OEM, and community organizations, participate in exercises, test warning systems and response plans, and host community events to promote tsunami awareness.</p>



4.7 WILDFIRE

Table 4-34. Wildfire Identification Profile

Profile	Description
Nature	<p>Wildfires spread by consuming flammable vegetation. This fire type often begins unnoticed, spreads quickly, and is usually signaled by dense smoke that may be visible from miles around. Wildfires can be caused by human activities (e.g., unattended burns, campfires, or off-road vehicles without spark arresting muffles) or by natural events such as lightning.</p> <p>Wildfires often occur in forests or other highly vegetated areas. In addition, wildfires can be classified as forest, urban, interface or intermix fires, and prescribed burns.</p> <p>The following three factors contribute significantly to wildfire behavior and can be used to identify wildfire hazard areas:</p> <ul style="list-style-type: none"> <li>• Topography describes slope increases, which influences wildfire spread rate increases. South-facing slopes are also subject to more solar radiation, making them drier and thereby intensifying wildfire behavior. However, ridge tops may mark the end of wildfire spread since fire spreads more slowly or may even be unable to spread downhill.</li> <li>• Fuel is the type and condition of vegetation that plays a significant role in wildfire spread occurrence. Certain plant types are more susceptible to burning or will burn with greater intensity. Dense or overgrown vegetation increases the amount of combustible material available as fire fuel (referred to as the “fuel load”). The living-to-dead plant matter ratio is also important. Certain climate changes may increase wildfire risk significantly during prolonged drought periods, as both living and dead plant matter moisture content decreases. Both the horizontal and vertical fuel load continuity is also an important factor.</li> <li>• Weather is the most variable factor affecting wildfire behavior. Temperature, humidity, wind, and lightning can affect ignition opportunities and fire spread rate. Extreme weather, such as high temperatures and low humidity, can lead to extreme wildfire activity. Climate change increases fire to vegetation ignition susceptibility due to longer dry seasons. By contrast, cooling and higher humidity often signal reduced wildfire occurrence and easier containment.</li> </ul> <p>Wildfire frequency and severity sometimes result from other hazard impacts, such as lightning, drought, and infestations (e.g., damage caused by spruce-bark beetle infestations). If not promptly controlled, wildfires may grow into an emergency or disaster. Even small fires can threaten lives and resources and destroy improved properties. In addition to affecting people, wildfires may severely affect livestock and pets. Such events may require emergency water/food, evacuation, and shelter.</p> <p>Indirect wildfire effects can be catastrophic. In addition to stripping the land of vegetation and destroying forest resources, large, intense fires can harm the soil, waterways, and the land itself. Soil exposed to intense heat may lose its capability to absorb moisture and support life. Exposed soils erode quickly and exacerbate river and stream siltation; thereby increasing flood potential, harming aquatic life, and degrading water quality. Vegetation-stripped lands are more susceptible to increased debris flow hazards.</p>
Location	<p>Public Resources Code 4201 4204 and Government Code 51175 89 directed the California Department of Forestry and Fire Protection (Cal FIRE) to map areas of significant fire hazards based on fuels, terrain, weather, and other relevant factors. These FHSZ are represented as very high, high, or moderate. Specifically, the maps were created using data and models describing development patterns, potential fuels over a 30- to 50-year time horizon, expected fire behavior, and expected burn probabilities. The maps are divided into local responsibility areas (LRAs) and state responsibility areas (SRAs). LRAs generally include cities, cultivated agriculture lands, and portions of the desert. LRA fire protection is typically provided by city fire departments, fire protection districts, counties, and by Cal FIRE under contract to the local government. SRA is a</p>

**Table 4-34. Wildfire Identification Profile**

Profile	Description
	<p>legal term defining the area where the state has financial responsibility for wildfire protection. The Los Angeles County Fire Department is one of six contract counties, which has executed a contract with the State of California to provide wildland fire protection on SRA.</p> <p><b>Figure 4-11</b> displays the areas of Los Angeles County most susceptible to wildfires and indicates areas of local or state responsibility. Very high FHSZs are generally located in mountainous or hillside areas, including the Santa Monica Mountains, San Gabriel Mountains, Palos Verdes Hills, and Puente Hills.</p>
History	<p>As shown in <b>Figure 4-12</b>, wildfires are a common occurrence in Los Angeles County. Some of the county’s most destructive fires have occurred since 2000, including:</p> <ul style="list-style-type: none"> <li>• The Grand Prix Fire started on October 21, 2003 and burned a total of 50,618 acres between Claremont and Lytle Creek. The fire destroyed 136 homes and was ruled “accidental but human-initiated.”</li> <li>• The Simi Fire started on October 25, 2003 and burned a total of 107,570 acres between Simi Hills and southeastern Simi Valley, in eastern Ventura County and western Los Angeles County, California. It destroyed 37 homes and 278 out buildings. The cause of the fire remains unknown.</li> <li>• The Day Fire started on October 30, 2006 and burned a total of 161,816 acres. The fire primarily burned the Los Padres National Forest. The cause of the fire was human-ignited debris.</li> <li>• The Ranch Fire started on October 20, 2007 and burned a total of 58,410 acres near Townsend Peak in the Angeles National Forest. The cause of the fire was equipment.</li> <li>• The Station Fire started on September 22, 2009 and burned a total of 160,883 acres in the Angeles National Forest. The Station Fire is the largest recorded fire in Los Angeles County. It destroyed 89 residences and another 120 buildings of significance. Two firefighters were killed. The cause of the fire was arson.</li> <li>• The Woolsey Fire started November 8, 2018 and burned a total of 96,949 acres in Los Angeles and Ventura counties including Thousand Oaks, Agoura Hills, Calabasas, the Santa Monica Mountains, Malibu, and West Hills. A total of 1,643 structures were destroyed and 3 people were killed.</li> </ul>
Extent / Severity	<p>As shown on the Cal FIRE FHSZ maps, in Los Angeles County, there are 386.06 square miles (8.11%) located in the very high LRA FHSZ, 625.01 square miles (13.13%) in the very high SRA FHSZ, and 132.77 square miles (2.79%) in the high SRA FHSZ. In the Unincorporated Los Angeles County, this includes: 23.53 square miles (0.77%) of very high LRA FHSZ; 610.94 square miles (20.09%) of very high SRA FHSZ; and 132.06 square miles (4.34%) of high SRA FHSZ.</p>
Recurrence Probability	<p>The climate in Los Angeles County is characterized as Mediterranean dry-summer featuring cool, wet winters and warm, dry summers. High moisture levels during the winter rainy season significantly increase the growth of plants. However, the vegetation is dried during the long, hot summers, decreasing plant moisture content and increasing the ratio of dead fuel to living fuel. As a result, fire susceptibility increases dramatically, particularly in late summer and early autumn. In addition, the presence of chaparral, a drought-resistant variety of vegetation that is dependent on occasional wildfires, is expected in Mediterranean dry-summer climates. The history of plant succession in Los Angeles County is important in predicting fire susceptibility. For several years after a fire has occurred, easily flammable herbaceous species thrive and increase the likelihood of new fires. When woody species become re-established, they contribute to a lower overall level of fire susceptibility for approximately 10 years. However, after this period, the slow aging plant</p>

**Table 4-34. Wildfire Identification Profile**

Profile	Description
	<p>community becomes ever more likely to burn because of increased levels of dead plant material and lowered plant moisture levels.</p> <p>Additionally, a local meteorological phenomenon, known as the Santa Ana winds, contributes to the high incidence of wildfires in Los Angeles County. These winds originate during the autumn months in the hot, dry interior deserts to the north and east of Los Angeles County. They often sweep west into the county, bringing extremely dry air and high wind speeds that further desiccate plant communities during the period of the year when the constituent species have very low moisture content. The effect of these winds on existing fires is particularly dangerous; the winds can greatly increase the rate at which fires spread.</p> <p>Based on the conditions described above and the history of occurrence in the past, future events are very likely to occur. In the past, fires burning more than 1,000 acres have occurred about every 1 to 3 years. The extent of future events will depend on specific conditions at the time of the fire.</p>

**Table 4-35. Wildfire Impact on Land Area**

Entity	Very High LRA FHSZ		High SRA FHSZ		Very High SRA FHSZ	
	# of Sq. Miles	% of Sq. Miles	# of Sq. Miles	% of Sq. Miles	# of Sq. Miles	% of Sq. Miles
Los Angeles County	386.06	8.11	132.77	2.79	625.01	13.13
Unincorporated Los Angeles County	23.54	0.77	132.06	4.34	610.94	20.09
Supervisory District 1	31.42	12.76	0.00	0.00	1.13	0.46
Supervisory District 2	3.25	2.01	0.00	0.00	0.00	0.00
Supervisory District 3	140.58	32.60	0.01	0.00	92.18	21.38
Supervisory District 4	45.78	10.41	1.11	0.25	86.61	19.69
Supervisory District 5	164.90	5.87	131.65	4.69	444.99	15.85

**Table 4-36. Wildfire Impact on Vulnerable Populations – People Experiencing Homelessness**

Entity	Very High LRA FHSZ		High SRA FHSZ		Very High SRA FHSZ	
	# of Homeless	% of Homeless	# of Homeless	% of Homeless	# of Homeless	% of Homeless
City of Los Angeles	1,291	3.92	0	0.00	0	0.00
Unincorporated Los Angeles County	88	1.49	58	0.99	465	7.91

**Table 4-37. Wildfire Impact on County Critical Facilities**

Department / Agency	Very High LRA FHSZ		High SRA FHSZ		Very High SRA FHSZ	
	# of Facilities	% of Facilities	# of Facilities	% of Facilities	# of Facilities	% of Facilities
Los Angeles County Animal Care & Control	1	14.29	0	0.00	1	14.29
Los Angeles County Fire Department	39	11.57	1	0.30	14	4.15
Los Angeles County Health Services	1	3.45	0	0.00	0	0.00
Los Angeles County Library	7	8.24	1	1.18	2	2.35
LACMA & NHM	1	25.00	0	0.00	0	0.00
Los Angeles County Office of Education	3	8.11	0	0.00	3	8.11
Los Angeles County - Other (offices)	0	0.00	0	0.00	0	0.00
Los Angeles County Parks & Recreation	13	11.11	1	0.85	12	10.26
Los Angeles County Public Health	52	22.61	4	1.74	41	17.83
Los Angeles County Public Works	0	0.00	0	0.00	0	0.00
Los Angeles County Sheriff's Department	3	9.68	1	3.23	3	9.68

**Table 4-38. Overall Summary of Vulnerability to Wildfires**

Wildfire	
Summary	<p>Wildfires are not only capable of burning down vegetation, homes, critical facilities, and infrastructure, but they can also cause loss of life to humans and animals, soil erosion, debris flows, air pollution, serious health problems, and restriction of access to recreational areas.</p> <p>The areas in Los Angeles County that are most susceptible to wildfires are generally located in mountainous or hillside areas, including the Santa Monica Mountains, San Gabriel Mountains, Palos Verdes Hills, and Puente Hills. However, the areas that pose greatest risk to people are generally along the wildland-urban interface (WUI) or intermix. These areas are the transition zones between wildlands and human development and often where areas of housing and vegetation commingle.</p> <p>According to researchers at the United States Forest Service, fires in the WUI areas have not deterred redevelopment. In fact, according to the same researchers, there is a push to return the area to “normal” as soon as possible. California has the strictest fire regulations in the country, which supersede any type of local regulations. However, the rules do not apply to existing homes built before 1991, with the average home in California built decades prior. And unlike earthquakes and floods, there is not a retrofit type of program to encourage homeowners to bring their homes up to current fire requirements.</p>



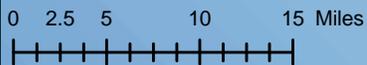
# Kern County

San Bernardino County

Ventura County

Orange County

Pacific Ocean



**Legend**

**Burned Areas**

- 10,000 - 49,999
- 50,000 - 99,999
- 100,000+

National Forest

**Source**  
Fire Resource and Assessment Program  
Fire Perimeters Database (2019)  
<http://frap.fire.ca.gov>

Day Fire  
2006  
(162,702 Acres)

Ranch Fire  
2007  
(54,716 Acres)

Simi Fire  
2003  
(107,560 Acres)

Station Fire  
2009  
(160,833 Acres)

Woolsey Fire  
2018  
(96,949 Acres)

Los Angeles

**Recent Wildfires (2000-2018)**  
**Figure 4-12**

2019 Los Angeles County  
All-Hazards Mitigation Plan

## 5 MITIGATION STRATEGY

Section 5 – Mitigation Strategy addresses Element C of the Local Mitigation Plan Regulation Checklist.

<b>Regulation Checklist – 44 CFR 201.6 Local Mitigation Plans</b>
<b>Element C: Mitigation Strategy</b>
<p>C1. Does the Plan document each jurisdiction’s existing authorities, policies, programs and resources and its ability to expand on and improve these existing policies and programs? (Requirement § 201.6(c)(3))</p> <p>C2. Does the Plan address each jurisdiction’s participation in the NFIP and continued compliance with NFIP requirements, as appropriate? (Requirement § 201.6(c)(3)(i))</p> <p>C3. Does the Plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? (Requirement §201.6(c)(3)(i))</p> <p>C4. Does the Plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure? (Requirement §201.6(c)(3)(ii))</p> <p>C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction? (Requirement §201.6(c)(3)(iv)); (Requirement §201.6(c)(3)(iii))</p> <p>C6. Does the Plan describe a process by which local governments will integrate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate? (Requirement §201.6(c)(4)(ii))</p>

### 5.1 AUTHORITIES, POLICIES, PROGRAMS, AND RESOURCES

Los Angeles County’s existing authorities, policies, programs and resources available for hazard mitigation are listed in **Table 5-1** through **Table 5-3**. These tables have been updated since the 2014 AHMP to reflect any changes in human, technical, financial, legal, and regulatory resources.

**Table 5-1 Human and Technical Resources for Hazard Mitigation**

Staff/Personnel	Department / Agency	Principal Activities Related to Hazard Mitigation
<p>Planner(s), engineer(s) and technical staff with knowledge of land development, land management practices, and human-caused and natural hazards.</p>	<p>Los Angeles County Department of Regional Planning</p>	<p>Develops and maintains the Los Angeles County 2035 General Plan, including the safety element.</p> <p>Develops area plans based on the Los Angeles County 2035 General Plan, to provide more specific guidance for the development of more specific areas.</p> <p>Reviews private development projects and proposed capital improvements projects and other physical projects involving property for consistency and conformity with the Los Angeles County 2035 General Plan.</p> <p>Anticipates and acts on the need for new plans, policies, and code changes.</p> <p>Applies the approved plans, policies, code provisions, and other regulations to proposed land uses.</p>
<p>Engineer(s), Building Inspectors/Code Enforcement Officers or other professional(s), and technical staff trained in construction requirements</p>	<p>Los Angeles County Public Works</p>	<p>Oversees the effective, efficient, fair, and safe enforcement of the 2017 County of Los Angeles Building Code.</p>
<p>Engineers, construction project managers, and supporting technical staff</p>	<p>Los Angeles County Public Works</p>	<p>Provides direct or contract civil, structural, and mechanical engineering services, including contract, project, and construction management.</p>
<p>Engineer(s), project manager(s), technical staff, equipment operators, and maintenance and construction staff</p>	<p>Los Angeles County Public Works</p>	<p>Maintains and operates of a wide range of local equipment and facilities and assists members of the public. This includes providing sufficient clean fresh water, reliable sewer services, street maintenance, storm drainage systems, street cleaning, street lights and traffic signals.</p>
<p>Floodplain Administrator</p>	<p>Los Angeles County Public Works</p>	<p>Enforces the floodplain management ordinance, ensures that new development proposals do not increase flood risk, and that new developments are not located below the 100-year flood level. In addition, the floodplain administrator is responsible for planning and managing flood risk reduction projects throughout the county.</p>
<p>Emergency Manager</p>	<p>Los Angeles County Chief Executive Office – Office of Emergency Management</p>	<p>Maintains and updates the Los Angeles County Operational Area Emergency Response Plan for the unincorporated areas of the county. In addition, coordinates local response and relief activities in the Emergency Operation Center, and works closely with local, state, and federal partners to support planning and training and to provide information and coordinate assistance.</p>

**Table 5-1 Human and Technical Resources for Hazard Mitigation**

<b>Staff/Personnel</b>	<b>Department / Agency</b>	<b>Principal Activities Related to Hazard Mitigation</b>
Procurement Services Manager	Internal Services Department	Provides a full range of municipal financial services, administers several licensing measures, and functions as the county’s procurement services manager.
Comptroller	Los Angeles County Auditor - Controller	Provides financial services including grant financial services.
District Attorney	Los Angeles County District Attorney	Provides legal services for the county.
Fire Chief	Los Angeles County Fire Department	Provides fire protection services including response, fire prevention, and mitigation activities for the county.
Sheriff	Los Angeles County Sheriff Department	Provides law enforcement services in the county.

**Table 5-2. Financial Resources for Hazard Mitigation**

Type	Administrator	Purpose	Amount
General Fund	Chief Executive Office	Program operations and specific projects.	Variable.
General Obligation Bonds	Los Angeles County Auditor-Controller	General obligation bonds are appropriately used for the construction and/or acquisition of improvements to real property broadly available to residents and visitors. Such facilities include but are not limited to: libraries, hospitals, parks, public safety facilities, and cultural and educational facilities.	Variable.
Special Tax and Revenue Bonds	Comptroller	Revenue bonds are used to finance capital projects that: 1) have an identified budgetary stream for repayment (e.g., specified fees, tax receipts); 2) generate project revenue but rely on a broader pledge of general fund revenues to reduce borrowing costs; or 3) finance the acquisition and installation of equipment for the local jurisdiction’s general governmental purposes.	Variable.
Vegetation Management Program	Cal FIRE	Cost-sharing program between Cal FIRE and private land owners, which focuses on the use of prescribed fire, mechanical, biological, and chemical means addressing wildland fire fuel hazards and other resource management issues on SRA and LRA lands	Project-specific.
Wildfire Emergency and Mitigation Funds	Cal FIRE	Administers funding from the FEMA, Bureau of Land Management, and U.S. Forest Service for certain types of wildfire emergency and mitigation funding	Project-specific.
California Residential Mitigation Program	California Earthquake Authority	Created by the California Earthquake Authority and the Governor’s Office of Emergency Services, Earthquake Brace + Bolt: Funds to Strengthen Your Foundation is the first incentive program offered by the California Residential Mitigation Program.	Project-specific.
Public Health Emergency Preparedness Cooperative Agreement.	Center for Disease Control	Funds are intended to upgrade state and local public health jurisdictions’ preparedness and response to bioterrorism, outbreaks of infectious diseases, and other public health threats and emergencies.	Grant award based on specific projects as they are identified.

**Table 5-2. Financial Resources for Hazard Mitigation**

Type	Administrator	Purpose	Amount
Hazard Mitigation Grant Program	FEMA	Supports pre- and post-disaster mitigation plans and projects. Available to California communities after a presidentially declared disaster has occurred in California, administered by Cal OES.	Grant award based on specific projects as they are identified.
Pre-Disaster Mitigation grant program	FEMA	Supports pre-disaster mitigation plans and projects. Available on an annual basis as a nationally competitive grant, administered by Cal OES.	Grant award based on specific projects as they are identified.
Flood Mitigation Assistance grant program	FEMA	Mitigates repetitively flooded structures and infrastructure. Available on an annual basis, distributed to California communities, administered by Cal OES.	Grant award based on specific projects as they are identified.
Homeland Security Preparedness Technical Assistance Program	FEMA/DHS	Build and sustain preparedness technical assistance activities in support of the four homeland security mission areas (i.e., prevention, protection, response, recovery) and homeland security program management.	Grant award based on specific projects as they are identified.
Assistance to Firefighters Grant Program	FEMA/U.S. Fire Administration	Provides equipment, protective gear, emergency vehicles, training, and other resources needed to protect the public and emergency personnel from fire and related hazards. Available to fire departments and nonaffiliated emergency medical services providers.	Grant awards based on specific projects as they are identified.
Land and Water Conservation Funds	U.S. Department of the Interior	Supports the protection of federal public lands and waters and voluntary conservation on private land.	Project-specific.
Community Action for a Renewed Environment	U.S. Environmental Protection Agency (EPA)	Through financial and technical assistance offers an innovative way for a community to organize and take action to reduce toxic pollution (e.g., stormwater) in its local environment. Through this program, a community creates a partnership that implements solutions to reduce releases of toxic pollutants and minimize people’s exposure to them.	Grant award based on specific projects as they are identified.
Clean Water State Revolving Fund	U.S. EPA	A loan program that provides low-cost financing to eligible entities on state and tribal lands for water quality projects, including all types of non-point source, watershed protection or restoration, estuary management projects, and more traditional municipal wastewater treatment projects.	Variable.

**Table 5-2. Financial Resources for Hazard Mitigation**

Type	Administrator	Purpose	Amount
Community Block Grant Program Entitlement Communities Grants	U.S. Department of Housing and Urban Development	Acquisition of real property, relocation and demolition, rehabilitation of residential and non-residential structures, construction of public facilities and improvements, such as water and sewer facilities, streets, neighborhood centers, and the conversion of school buildings for eligible purposes.	Grant award based on specific projects as they are identified.

**Table 5-3. Legal and Regulatory Resources for Hazard Mitigation**

Name	Description	Hazards Addressed	Emergency Management	Potential to Affect Development
Los Angeles County 2035 General Plan (2015)	Describes hazard areas and lists goals and policies to reduce the potential risk of death, injuries, and economic damage resulting from natural and human-caused hazards.	Seismic and geotechnical, flood and inundation hazards, and fire hazards.	Mitigation, Preparedness, Response	Yes
Comprehensive Floodplain Management Plan (2016)	Reviews existing floodplain management programs in the county and recommends enhancements to them through 35 mitigation actions.	Flood	Mitigation	Yes
Los Angeles County Fire Department 2018 Strategic Fire Plan	Identifies and prioritizes pre-fire and post-fire management strategies and tactics meant to reduce the loss of values at risk in Los Angeles County.	Wildfire	Preparedness, Mitigation	Yes
Greater Los Angeles County Region Integrated Regional Water Management Plan (2014)	Identifies a comprehensive set of solutions to achieve the several objectives over the 25-year planning horizon including reducing flood risk in flood prone areas by either increasing protection or decreasing needs using integrated flood management approaches and adapting to and mitigate against climate change vulnerabilities.	Flood, Climate Change	Mitigation	Yes
Unincorporated County Community Climate Action Plan 2020 (2015)	Provides a roadmap for successfully implementing greenhouse gas reduction measures in the County. It is a component of the General Plan Air Quality Element, the Community Climate Action Plan actions are closely tied to many of the goals, policies, and programs of the General Plan, as well as to several other existing programs in the County.	Climate Change	Mitigation	Yes
County of Los Angeles Local Coastal Programs	Requires coastal cities and counties to establish coastal resource conservation and development programs.	Climate change, flood	Prevention, Mitigation	Yes
Los Angeles County Floodplain Management Ordinance	Promotes the public health, safety, and general welfare. Additionally, aims to minimize public and private losses due to flood conditions in specific areas by legally enforceable regulations applied uniformly throughout the community to all publicly and privately owned land in flood prone, mudslide (i.e., mudflow) or flood related erosion areas.	Flood	Mitigation	Yes

**Table 5-3. Legal and Regulatory Resources for Hazard Mitigation**

Name	Description	Hazards Addressed	Emergency Management	Potential to Affect Development
Hillside Management Area Ordinance & Hillside Design Guidelines	Required for development in Hillside Management Areas, which are defined as areas with 25% or greater natural slopes. The guidelines include specific and measurable design techniques that can be applied to residential, commercial, industrial, and other types of projects.	Landslide	Mitigation	Yes
Los Angeles County Fuel Modification Code	Requires the review aspects such as structure location and type of construction, topography, slope, amount and arrangement of vegetation, and overall site settings for a new structure or an addition that is equal to or greater than 50% of the existing square footage. The objective of this approval plan process is to create defensible space necessary for effective fire protection of homes in the FHSZs.	Wildfire	Preparedness, Mitigation	Yes
California Fire Plan	Requires the County of Los Angeles Fire Plan Unit to implement the California Fire Plan, a statewide framework for minimizing costs and losses from wildland fires. The Fire Plan Unit uses a GIS platform to identify high hazard/high value areas and communities at risk in the wildland-urban interface.	Wildfire	Preparedness, Mitigation	Yes
Los Angeles County Brush Clearance Program	Legally declares both improved and unimproved properties a public nuisance, and where necessary, requires the clearance of hazardous vegetation. These measures create “Defensible Space” for effective fire protection of property, life, and the environment. The Brush Clearance Program is a joint effort between the County of Los Angeles Fire Department and the County of Los Angeles Department of Agricultural Commissioner/Weights and Measures, Weed Hazard, and Pest Abatement Bureau (Weed Abatement Division).	Wildfire	Mitigation	No

## 5.2 NFIP PARTICIPATION

The NFIP aims to reduce the impact of flooding to residential and non-residential buildings. It does so by providing insurance to property owners and by encouraging communities to adopt and enforce floodplain management regulations. Los Angeles County entered the NFIP in 1980, and the first Los Angeles County DFIRM was issued on December 2, 1980. The Los Angeles County Public Works enforces the county’s floodplain management ordinance and participate in FEMA’s Community Assisted Visits, which occur on a 3- to 5-year cycle. According to Los Angeles County Public Works, as of September 30, 2018, there are 1,553 floodplain policies in force in the unincorporated areas of Los Angeles County.

Los Angeles County also participates in the CRS program. The CRS program is a voluntary program for communities that engage in community floodplain management activities, which exceed the minimum NFIP standards. CRS communities benefit from reduced insurance rates and improved floodplain management programs. Los Angeles County is currently a Class 7 CRS community; therefore, homeowners who live in the SFHA can receive a 5 to 15 percent discount on their flood insurance policy.

## 5.3 MITIGATION GOALS

Mitigation goals are defined as general guidelines that explain what a community wants to achieve in terms of hazard and loss prevention. Goal statements are typically long-range, policy-oriented statements representing community-wide vision. For the 2019 AHMP, the overarching goal is for Los Angeles County to be a disaster resilient community. A disaster resilient community is able to prepare for, respond to, and recover from adverse hazards and disasters. According to laresilience.org, “in the resilience framework, less emphasis is placed on traditional, individually-focused preparedness efforts... building community resilience is really about making communities stronger.”

## 5.4 POTENTIAL MITIGATION ACTIONS AND PROJECTS

Mitigation actions and projects help achieve the goals of the AHMP. For the 2019 AHMP, potential mitigation actions to be considered are listed below in **Table 5-4** and include the following hazard mitigation categories: education and awareness; natural systems protection; structure and infrastructure projects; preparedness and response; and local plans and regulations. This list addresses every hazard profiled in this plan and is based on the plan’s risk assessment as well as lessons learned from recent disasters. It was developed using: FEMA success stories and best management practices; FEMA job aids; local and regional plans and reports; and input from subject matter experts and pertinent Los Angeles County departments and agencies.

**Table 5-4. Potential Mitigation Actions and Projects**

Red Flag Warning Public Outreach	
Project Description	Create an online and offline public outreach campaign for Red Flag Warnings. Include information about: what is a Red Flag Warning; what land may be closed; and what individuals should do to be prepared as well as what activities should be avoided. Tailor outreach material to various target groups, including people experiencing homelessness, the elderly, the young, and non-English speaking residents.

**Table 5-4. Potential Mitigation Actions and Projects**

Type of Project	Education and Awareness Programs
Hazard(s) Mitigated	Wildfire
Project Source	Red Flag Working Group, LA County Homeless Initiatives
Pros	Education can help reduce the risk of human-caused fires Public outreach is generally low-cost Public outreach to homeless individuals can help built rapport with county agencies
Cons	Maybe difficult to reach some target groups
<b>Vegetation Management Program</b>	
Project Description	Continue to implement the County’s Vegetation Management Program. The Los Angeles County Fire Department Vegetation Management Unit works closely with the Fire Plan Unit and the Air and Wildland Division’s Prescribed Fire Office to implement projects. The Vegetation Management Unit provides the State and County with required paperwork for prescribed burning, mechanical, biological and chemical treatment methods used in project areas.
Type of Project	Natural Systems Protection
Hazard(s) Mitigated	Wildfire
Project Source	Los Angeles County Fire Department
Pros	Program has been implemented in Los Angeles County for the last 40 years and are generally cost effective Can be used selectively to treat the most vulnerable areas
Cons	Often requires ongoing maintenance Can cause soil disturbance and increase sedimentation and erosion Prescribed fire and chemical application methods require close supervision
<b>Fireproof Coating of Critical Assets</b>	
Project Description	Fireproof coat critical facilities in Very High FHSZs which will allow structures to extend their strength in the event of a fire.
Type of Project	Structure and Infrastructure Projects
Hazard(s) Mitigated	Wildfire
Project Source	Los Angeles County Public Works
Pros	Generally cost-effective and non-toxic
Cons	None
<b>Auxiliary Power for Critical Facilities</b>	
Project Description	Determine which critical facilities need and do not have auxiliary power in order to remain functional during de-energization or “Public Safety Power Shut-Offs” and/or general loss of power and install auxiliary power systems. Auxiliary power systems may include back-up generators, local Solar Photovoltaic plus storage, and microgrids.
Type of Project	Structure and Infrastructure Projects
Hazard(s) Mitigated	Wildfire specifically, but also applies to all hazards

**Table 5-4. Potential Mitigation Actions and Projects**

Project Source	Los Angeles County Public Works
Pros	Provides emergency power to keep critical facilities operational and functional
Cons	Diesel generators can be expensive to operate and contribute to air pollution
<b>Earthquake-Resistant Ductile Iron Pipes Replacement</b>	
Project Description	Continue to replace aging critical pipes in extreme or violent shaking hazard areas and Class IX and X landslide hazard areas to improve seismic reliability/safeguard critical water distribution lines against the potential destructive impacts of large-scale earthquakes and accompanying landslides. Los Angeles County Public Works completed its' first earthquake-resistant ductile iron pipe replacement pilot program in 2013.
Type of Project	Structural and Infrastructure Projects
Hazard(s) Mitigated	Landslides, Earthquakes
Project Source	Los Angeles County Public Works
Pros	Improves water reliability Restores those without service more rapidly
Cons	None
<b>Watershed Ecosystem Restoration</b>	
Project Description	Modernize existing flood control retention facilities to improve flood protection, water quality and ecological health. Potential projects include: Arroyo Seco and Compton Creek.
Type of Project	Natural Systems Protection
Hazard(s) Mitigated	Climate Change, Flood, Tsunami
Project Source	County of Loss Angeles Repetitive Property Loss Area Analysis Progress Report (2017 – 2018), OurWaterLA
Pros	Reduces the risk of flooding to the surrounding neighborhoods Provides new recreational space and safety amenities
Cons	Additional studies needed to determine best approaches
<b>Green Streets</b>	
Project Description	Implement the Green Street Master Plan with the goal of identifying 110 feasible sites. A green street is a stormwater management approach that incorporates vegetation, soil, and engineered systems (e.g., permeable pavements) to slow, filter, and cleanse stormwater runoff from impervious surfaces. In addition to the traditional green street approach, incorporate “complete streets” design strategies to provide more room for emergency response vehicles and create defensible space in plaza areas and around buildings.
Type of Project	Natural Systems Protection, Preparedness and Response
Hazard(s) Mitigated	Stormwater/Flood, Climate Change
Project Source	Los Angeles County Public Works, U.S. EPA
Pros	Protects water quality in rivers and streams by removing pollutants

**Table 5-4. Potential Mitigation Actions and Projects**

	<p>Replenishes groundwater supplies</p> <p>Absorbs carbon</p> <p>Improves air quality and neighborhood aesthetics</p> <p>Improves pedestrian and bicycle safety</p>
Cons	Requires selected site suitability to do utility conflicts, and geotechnical and environmental characteristics
<b>Coordinated Data Collection and Database Systems</b>	
Project Description	Create coordinated data collection and database system in which intake and assessment information can be entered in real time and can support multiple users at the same time. Components can include critical facilities and vulnerable populations.
Type of Project	Preparedness and Response
Hazard(s) Mitigated	All hazards
Project Source	Los Angeles County OEM
Pros	Coordinated systems
Cons	Different data collection needs may require parallel databases
<b>Brush Clearance Program</b>	
Project Description	Expand the County’s Brush Clearance Program to include a grant fundable mitigation component for qualified low-income and/or elderly homeowners that have properties that are found to be non-compliant. Instead of warning property owners and imposing infractions for inadequate fire hazard reduction, Los Angeles County will work with the homeowner to develop and implement a fire reduction plan.
Type of Project	Natural Systems Protection, Preparedness and Response
Hazard(s) Mitigated	Wildfire
Project Source	Los Angeles County Fire Department
Pros	Proactive, not reactive approach to working with homeowners to reducing wildfire fuel hazards
Cons	Often requires ongoing maintenance
<b>Wildland Urban-Interface Ordinance</b>	
Project Description	Codifying development standards to guide development in the WUI areas that face a severe threat of wildfires.
Type of Project	Local Plans and Regulations
Hazard(s) Mitigated	Wildfire
Project Source	Draft Safety Element Update for Los Angeles County 2035 General Plan, Los Angeles County Sustainability Plan
Pros	Additional review of development in WUIs will enable best practices are incorporated in the project design.
Cons	Additional regulations may be perceived as too burdensome by property owners.

**Table 5-4. Potential Mitigation Actions and Projects**

<b>Urban Forest Management Plan</b>	
Project Description	Create Urban Forest Management Plan for Los Angeles County with a well-defined scope that includes a comprehensive tree inventory, assessment of tree health, identification of shade-poor neighborhoods, cost-benefit analysis of tree vs shade-structure interventions, urban forest financing plan, and a plan for sustainable management.
Type of Project	Local Plans and Regulations
Hazard(s) Mitigated	Climate Change, Drought
Project Source	Los Angeles County Sustainability Plan (Los Angeles County Chief Sustainability Office), A Greater L.A. Climate Action Framework (L.A. Regional Collaborative for Climate Action and Sustainability), and Los Angeles County 2035 General Plan
Pros	Extreme heat is the greatest health threat to Los Angeles County residents. Providing shade will help mitigate the effects of extreme heat in disadvantaged neighborhoods. Residents from these communities may not have private vehicles and encounter problems traveling to cooling centers; they may also have limited access to air conditioning.
Cons	The inability of residents to pay for water to establish newly planted trees may hinder the establishment of an urban forest. County-wide water conservation measures during times of drought may also conflict with efforts to establish and maintain an urban forest. In such situations, shade structures may fulfill the same needs.
<b>Community Wildfire Protection Plans</b>	
Project Description	Continue to work with communities to develop Community Wildfire Protection Plans (CWPP). CWPPs enable communities to plan how they will reduce the risk of wildfire by identifying strategic sites and methods for fuel reduction projects across the landscape and jurisdictional boundaries.
Type of Project	Local Plans and Regulations
Hazard(s) Mitigated	Wildfire
Project Source	Los Angeles County Fire Department 2018 Strategic Fire Plan
Pros	Opportunity to establish a localized definition and boundary for the WUI. Priority funding is often given to projects and treatment areas identified in a CWPP.
Cons	May be difficult to get collaboration from stakeholders.

### 5.5 MITIGATION ACTION PLANS

A mitigation action plan is a prioritized list of proposed mitigation projects and actions that a community hopes to implement to reduce its’ risks and vulnerabilities. The 2019 AHMP mitigation action plan, as shown in **Table 5-5 and Table 5-6**, is prioritized into Tier 1 and Tier 2 activities:

- Tier 1 activities are essential to remedy or prevent a major health/safety hazard. They meet FEMA HMA grant criteria, including project eligibility, benefit-cost, and performance period.
- Tier 2 activities are important in building a culture and practice of disaster resilience that will prevent new risks. They do not necessarily require and/or meet FEMA HMA grant criteria (but may qualify for other state and federal funds).

**Table 5-5. Tier 1 Mitigation Action Plan**

Project Name	Implementation Details
Red Flag Warning Public Outreach	Department/Agency: LAHSA, Los Angeles County OEM, Los Angeles County Fire Department, and Los Angeles County Sheriff’s Department Potential Funding Source: FEMA grants Performance Period: 6 months development, implementation prior to every summer/fall
Vegetation Management Program	Department/Agency: Los Angeles County Fire Department Potential Funding Source: Cal FIRE, FEMA grants Performance Period: Ongoing
Fireproof Coating of Critical Facilities	Department/Agency: Los Angeles County Public Works, Los Angeles County Fire Department Potential Funding Source: Cal FIRE, FEMA grants Performance Period: 1-3 years
Auxiliary Power for Critical Facilities	Department/Agency: Los Angeles County Public Works Potential Funding Source: FEMA grants Performance Period: Ongoing
Earthquake-Resistant Ductile Iron Pipes Replacement	Department/Agency: Los Angeles County Public Works Potential Funding Source: FEMA grants Performance Period: Ongoing
Brush Clearance Program	Department/Agency: Los Angeles County Fire Department Potential Funding Source: Cal FIRE, FEMA grants Performance Period: Ongoing
Community Wildfire Protection Plans	Department / Agency: Los Angeles County Fire Department Potential Funding Source: Cal FIRE, FEMA grants Performance Period: Ongoing

**Table 5-6. Tier 2 Mitigation Action Plan**

Project Name	Implementation Details
Watershed Ecosystem Restoration	Department/Agency: Los Angeles County Public Works Potential Funding Source: U.S. EPA, U.S. Department of Interior grants Performance Period: 3-5 years
Green Streets	Department/Agency: Los Angeles County Public Works Potential Funding Source: U.S. EPA grants Performance Period: 3-5 years
Coordinated Data Collection & Database Systems	Department/Agency: Los Angeles County OEM Potential Funding Source: County funds Performance Period: 1-2 years, Ongoing
Wildland Urban-Interface Ordinance	Department/Agency: Los Angeles County Department of Regional Planning, Los Angeles County Fire Department Potential Funding Source: County funds Performance Period: 6 months – 1 year
Urban Forest Management Plan	Department/Agency: Los Angeles County Department of Regional Planning, Los Angeles County Fire Department Potential Funding Source: County funds Performance Period: 1-2 years

**5.6 PLAN INTEGRATION**

The AHMP project manager will be the lead in working with Los Angeles County departments and agencies to ensure that elements of the 2019 AHMP are incorporated into other relevant county planning documents as they are created or updated.

As such, the AHMP project manager will work with:

- The Los Angeles County Public Works to incorporate the flood risk assessment and flood mitigation actions into the county’s Comprehensive Floodplain Management Plan. The Comprehensive Floodplain Management Plan is currently being updated and is expected to be completed in 2021.
- The Los Angeles County Department of Regional Planning to ensure that the 2019 AHMP’s hazard profiles and mitigation projects and actions align with those addressed in the General Plan’s Safety Element. The Safety Element is currently being updated and is expected to be completed in 2021.
- The Los Angeles County OEM to ensure that the hazard profiles are included in the Los Angeles County Threat and Hazard Identification Risk Assessment and the Los Angeles County Operational Area Emergency Response Plans and Annexes as they are updated.

## 6 PLAN REVIEW, EVALUATION, AND IMPLEMENTATION

Section 4 – Plan Review, Evaluation, and Implementation addresses Element D of the Local Mitigation Plan Regulation Checklist.

<b>Regulation Checklist – 44 CFR 201.6 Local Mitigation Plans</b>
<b>Element D: Plan Review, Evaluation, and Implementation</b>
D1. Was the plan revised to reflect changes in development? (Requirement § 201.6(d)(3))
D2. Was the plan revised to reflect progress in local mitigation efforts? (Requirement § 201.6(d)(3))
D3. Was the plan revised to reflect changes in priorities? Requirement § 201.6(d)(3))

### 6.1 CHANGES IN DEVELOPMENT

As noted in **Section 3.2**, the slowing population growth is in part due to the lack of housing. Most economists agree that building new housing is key to addressing the state’s housing crisis. During the drafting of the 2019 AHMP, nearly 28,000 units were under construction in Los Angeles County. In the city of Los Angeles, developers have targeted properties in older neighborhoods, rather than undeveloped land in the city’s outskirts. However, as the State of California pushes for greater growth in order to meet the governor’s goal of 3.5 million new units by 2025, there is growing concern that without land-use restrictions, new development will occur in fire-prone and other hazard areas of the county. These concerns are addressed within the 2019 AHMP mitigation strategy.

### 6.2 PROGRESS IN LOCAL MITIGATION EFFORTS

The 2014 AHMP Mitigation Actions Matrix was reviewed by each of the coordinating agencies identified on the matrix in order to determine mitigation action status. Mitigation actions that were identified as not having been implemented or deferred were considered for **Table 5-4**. Mitigation actions that were identified as completed are shown in **Table 6-1**.

In addition, the consultant reviewed the County of Los Angeles Floodplain Management Plan 2018 Progress Report to determine mitigation action status. Flood mitigation actions that were listed as “no progress” were considered for **Table 5-4**. Relevant flood mitigation actions that were listed as “project complete” are shown in **Table 6-1**.

**Table 6-1. Completed Local Mitigation Efforts**

<b>Coordinating Agency</b>	<b>Project Description</b>
Los Angeles County Department of Coroner	Purchased equipment to set up an off-site mobile morgue. This equipment was incorporated into the business continuity plan in case the main facility is unusable and would help to avoid unnecessary exposure of employees or the public to biological, radiological, or chemical agents.
Los Angeles County Department of Regional Planning	Updated building codes on January 1, 2017.

**Table 6-1. Completed Local Mitigation Efforts**

Coordinating Agency	Project Description
Los Angeles County Public Works	Continue the seismic upgrade to improve water reliability through earthquake-resistant pipe installation. The work took place on Reseda Boulevard from Roscoe to Strathern; Etiwanda Avenue from Roscoe to Strathern; Cantara Street from Reseda to Etiwanda; and Strathern Street from Reseda to Etiwanda.
Los Angeles County Public Works	In October 2017, the Los Angeles County Public Works mailed 3,551 copies of "Are You Prepared for A Flood?" brochure to property owners and residents in Special Flood Hazard Areas, County Floodways, and possible gaps in floodplain mapping (i.e., areas with possible flood hazards that are not on FEMA or County maps). The County of Los Angeles' National Flood Insurance Program (NFIP) website links were checked and updated. Previously, brochures were distributed to the Malibu, Rosemead, and Castaic Public Libraries. Brochures were distributed to additional public libraries closer to the floodplains including Topanga, Altadena, Duarte, and San Dimas.
Los Angeles County Public Works	In addition to the outreach efforts mentioned in Initiative No. 1 above, the Los Angeles County Public Works mailed 226 copies of CDs containing County of Los Angeles and FEMA publications to all property owners and residents in RL properties and properties in the RL areas.
Los Angeles County Public Works	In December 2017, the Los Angeles County Public Works mailed a letter and outreach materials to owners of critical facilities located in FEMA's-designated Special Flood Hazard Areas. Critical facilities that received outreach materials include schools, hospitals, fire stations, and health care facilities.
Los Angeles County Public Works	County of Los Angeles Office of Emergency Management, Fire Department, Sheriff's Department, and Public Works' Disaster Service Group participated in emergency preparedness events such as Los Angeles County's Preparation throughout this reporting period. Participants at the fair provided attendees with information and resources for preparation, such as the "Are You Prepared for a Flood?", "ALERT LA COUNTY" brochure, "Homeowner's Guide for Flood, Debris, and Erosion Control," and the "Emergency Survival Guide."

**6.3 CHANGES IN PRIORITIES**

The 2014 AHMP's Mitigation Action Matrix was prioritized using a number ranking system to determine a project's priority. For the 2019 AHMP, mitigation actions were prioritized into two separate groups, which both helped achieve meeting the goal of disaster resiliency. As noted in **Section 5.3**, resilient communities are able to minimize any disaster, making the return to normal life as soon and as effortless as possible. As such, the first part (i.e., first priority) of this goal is to ensure that life-safety needs are addressed as soon as possible. The second part (i.e., second priority) is to implement plans, policies, and programs to reduce current risks and prevent new/future ones.

## 7 PLAN ADOPTION

Section 6 – Plan Adoption addresses Element E of the Local Mitigation Plan Regulation Checklist.

<b>Regulation Checklist – 44 CFR 201.6 Local Mitigation Plans</b>
<b>Element E: Plan Adoption</b>
E1. Does the Plan include documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval? (Requirement §201.6(c)(5))
E2. For multi-jurisdictional plans, has each jurisdiction requesting approval of the plan documented formal plan adoption? (Requirement §201.6(c)(5))

### 7.1 FORMAL ADOPTION

**[To be completed]** The 2019 AHMP was formally adopted by the Los Angeles County Board of Supervisors via resolution on [To be completed]. A scanned copy of the resolution is included as **Figure 7-2**. It will also be kept on file with Los Angeles County OEM and additional be sent to Cal OES and FEMA.

**ADOPTION RESOLUTION**

## **APPENDIX A – PLANNING PROCESS**

**From:** Stephanie Kim

**Sent:** Tuesday, August 20, 2019 2:44 PM

**To:** XXX@monosheriff.org; XXX@ocsd.org; XXX@rivco.org; XXX@ontarioca.gov; XXX@inyocounty.us; XXX@co.imperial.ca.us; XXX@laquintaca.gov; XXX@sbcoem.org; XXX@mono.ca.gov; XXX@lcf.ca.gov; XXX@sa.ocgov.com; XXX@rivco.org; XXX@cbc-city.org; XXX@inyocounty.us; XXX@cityofbishop.com; XXX@sandiego.gov; XXX@rivco.org; XXX@octa.net; XXX@sbc-sd.org; XXX@sandiego.gov; XXX@octa.net; XXX@rcoe.us; XXX@dgs.ca.gov; XXX@sbc-sd.org; XXX@lawa.org; XXX@rivco.org; XXX@lausd.net; XXX@inyocounty.us; XXX@octa.net; XXX@ranchomirageca.gov; XXX@rivco.org; XXX@inyocounty.us; XXX@sbccd.edu; XXX@morongo-nsn.gov; XXX@noaa.gov; XXX@cityofredlands.org; XXX@morongo-nsn.gov; XXX@coachella.org; XXX@ocsd.org; XXX@sbc-sd.org; XXX@cityoftemecula.org; XXX@santabarbaraca.gov; XXX@mwdh2o.com; XXX@sbc-sd.org; XXX@kerncountyfire.org

**Cc:** XXX@ceooem.lacounty.gov

**Subject:** Los Angeles County Hazard Mitigation Plan Update

Dear Stakeholders,

We are reaching out to let you know that the Los Angeles County Office of Emergency Management is in the process of updating its' All-Hazards Mitigation Plan. I'm attaching our public outreach flyer for your information. We will send out an additional email when our draft plan goes out to public comment later this fall. If you have any questions or would like to be part of the plan update process, please contact me!

Emily Montanez

[emontanez@ceooem.lacounty.gov](mailto:emontanez@ceooem.lacounty.gov)

(323) 980-2813

Stephanie Kim  
Academic Intern  
LA County CEO Office of Emergency Management

# 2019 County of Los Angeles All-Hazards Mitigation Plan



The Los Angeles County Office of Emergency Management is updating the County's All-Hazards Mitigation Plan! Over the next few months, we will re-assess risks posed by natural disasters and review and revise existing strategies as well as develop new ones to protect life and property future events.

Natural disasters addressed in our plan include: climate change, dam failure, drought, flood, earthquake, landslide, tsunami, and wildfire.

Once our plan is completed and approved by FEMA, the County will be re-eligible to apply for and receive certain types of non-emergency disaster assistance, including funding for mitigation projects identified in our plan.

To learn more about hazard mitigation planning, please visit: <https://www.fema.gov/hazard-mitigation-planning>.

To learn more about our plan and/or participate in our planning process, please visit our website [lacounty.gov/emergency](http://lacounty.gov/emergency) or our Twitter account [@ReadyLACounty](https://twitter.com/ReadyLACounty).



# Plan de Mitigación para Todos los Peligros del Condado de Los Ángeles 2019



¡La Oficina de Manejo de Emergencias del Condado de Los Ángeles está actualizando el Plan de Mitigación para Todos los Peligros del Condado! En los próximos meses, reevaluaremos los riesgos debidos a los desastres naturales y repasaremos y revisaremos las estrategias existentes, y también desarrollaremos otras nuevas para proteger vidas y propiedades antes de que ocurran incidentes futuros.

Los riesgos discutidos en nuestro plan incluyen: cambios climáticos, falla de presas, sequías, inundaciones, terremotos, deslizamientos de tierra, tsunamis e incendios forestales.

Una vez que FEMA complete y apruebe nuestro plan, el Condado volverá a ser elegible para solicitar y recibir ciertos tipos de asistencia por desastre que no sea de emergencia, incluyendo la financiación para proyectos de mitigación identificados en nuestro plan.

Para obtener más información sobre la planificación de mitigación de riesgos, por favor visite: <https://www.fema.gov/hazard-mitigation-planning>.

Para obtener más información sobre nuestro plan y / o participar en nuestro proceso de planificación, visite nuestro sitio web [lacounty.gov/emergency](http://lacounty.gov/emergency) o nuestra cuenta de Twitter @ReadyLACounty.





**Ready Los Angeles County**  
@ReadyLACounty

Official account of the Los Angeles County Office of Emergency Management for disaster & preparedness information. Please note: change in account name to @readylacounty.

Los Angeles County

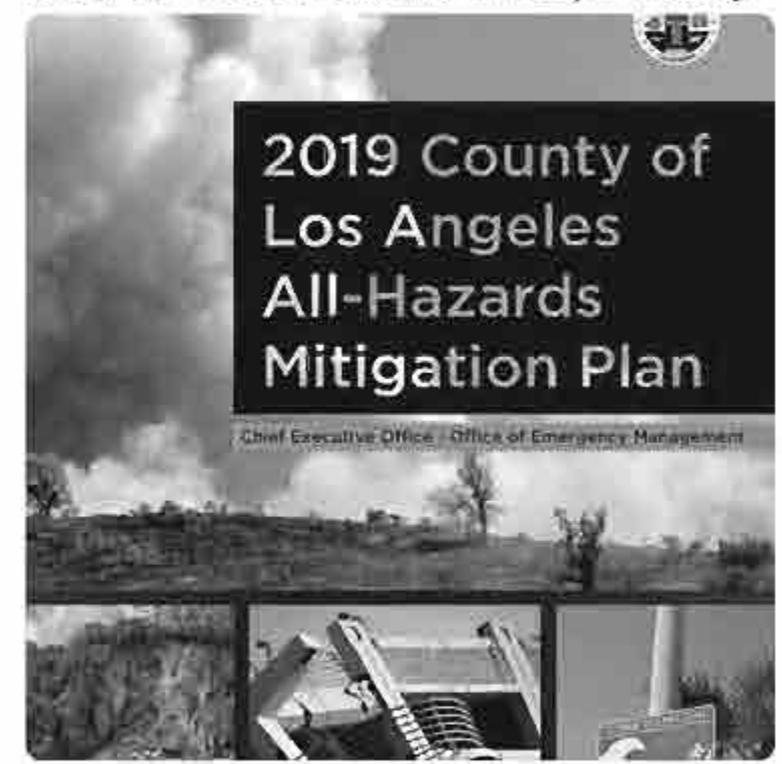
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We are updating the County of Los Angeles All-Hazards Mitigation Plan in order to help protect life and property from future disaster events. To learn more about our plan, please follow our Twitter account @ReadyLACounty.



# 2019 County of Los Angeles All-Hazards Mitigation Plan

Chief Executive Office - Office of Emergency Management

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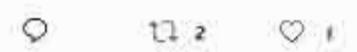
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Our updated All-Hazards Mitigation Plan will address climate change, dam failure, drought, flood, earthquake, landslide, tsunami, and wildfire. What natural hazard concerns you the most?



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Ready Los Angeles County

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A hazard mitigation plan is required to be eligible for certain types of disaster assistance. To learn more about hazard mitigation planning, please visit: [fema.gov/hazard-mitigat...](https://fema.gov/hazard-mitigat...)



# Local Mitigation Planning Handbook

March 2013



**2019 AHMP - Annual Review Worksheet**

<b>HMP Section</b>	<b>Questions</b>	<b>Yes</b>	<b>No</b>	<b>Comments</b>
<b>PLANNING PROCESS</b>	Has your County department/agency (or other type of organization) done any public outreach activities regarding the AHMP or a mitigation project? If yes, please describe.			
	Has your County department/agency (or other type of organization) integrated any of the AHMP's elements into other plans or policies? If yes, please describe.			
<b>HAZARD IDENTIFICATION</b>	Has a disaster occurred in this reporting period that affected your department/agency (or other type of organization)?			
	Do you know of new hazard studies, reports and/or mapping available for Los Angeles County? If so, what are they?			
<b>RISK ASSESSMENT</b>	Does your County department/agency have any new critical assets that should be included in the 2024 AHMP risk assessment?			
	Have there been changes in development trends that could create additional risks?			
<b>MITIGATION STRATEGY</b>	Are there different or additional resources (financial, technical, and human) that are now available for mitigation planning?			
	Should new mitigation actions be added?			

**2019 AHMP - Annual Review Worksheet**

<b>HMP Section</b>	<b>Questions</b>	<b>Yes</b>	<b>No</b>	<b>Comments</b>
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	Have there been changes in development trends that could create additional risks?			
<b>MITIGATION STRATEGY</b>	Are there different or additional resources (financial, technical, and human) that are now available for mitigation planning?			
	Should new mitigation actions be added?			

**2019 AHMP - Mitigation Project Progress Report**

<b>Progress Report Period From (date):</b>		<b>To (date):</b>	
<b>Project Title:</b>			
<b>Project ID:</b>			
<b>Description of Project:</b>			
<b>Implementing Department/Agency:</b>			
<b>Supporting Department/Agencies:</b>			
<b>Contact Name:</b>			
<b>Contact E-mail:</b>			
<b>Contact Number:</b>			
<b>Grant/Finance Administrator:</b>			
<b>Total Project Cost:</b>			
<b>Anticipated Cost Overrun/Underrun:</b>			
<b>Date of Project Approval:</b>			
<b>Project Start Date:</b>			
<b>Anticipated Completion Date:</b>			

**Summary of Progress of Project for this Reporting Period**

**1. What was accomplished during this reporting period?**

**2. What obstacles, problems, or delays did the project encounter, if any?**

**3. How were the problems resolved?**

## **APPENDIX B – COMMUNITY PROFILE**

**Table B-1. County Critical Facilities**

<b>Department / Agency</b>	<b>Facility Name</b>
Animal Care & Control	Agoura Animal Care Center
Animal Care & Control	Baldwin Park Animal Care Center
Animal Care & Control	Carson Animal Care Center
Animal Care & Control	Castaic Animal Care Center (Castaic)
Animal Care & Control	Downey Animal Care Center
Animal Care & Control	Lancaster County Animal Care Center
Animal Care & Control	Palmdale Animal Care Center
Fire Department	Bob Hope Airport Fire Department
Fire Department	City of Alhambra Fire Department - Training Facility
Fire Department	City of Alhambra Fire Department Station 71 - Headquarters
Fire Department	City of Alhambra Fire Department Station 72 - Southeast District
Fire Department	City of Alhambra Fire Department Station 73 - Northwest
Fire Department	City of Alhambra Fire Department Station 74 - Southwest
Fire Department	City of Arcadia Fire Department Station 105
Fire Department	City of Arcadia Fire Department Station 106 - Headquarters
Fire Department	City of Arcadia Fire Department Station 107
Fire Department	City of Avalon Fire Department
Fire Department	City of Beverly Hills Fire Department Station 1 - Headquarters
Fire Department	City of Beverly Hills Fire Department Station 2
Fire Department	City of Beverly Hills Fire Department Station 3
Fire Department	City of Burbank Fire Department Station 11 - Headquarters
Fire Department	City of Burbank Fire Department Station 12
Fire Department	City of Burbank Fire Department Station 13
Fire Department	City of Burbank Fire Department Station 14
Fire Department	City of Burbank Fire Department Station 15
Fire Department	City of Burbank Fire Department Station 16
Fire Department	City of Compton Fire Department Station 1 - Headquarters
Fire Department	City of Compton Fire Department Station 2
Fire Department	City of Compton Fire Department Station 3
Fire Department	City of Compton Fire Department Station 4
Fire Department	City of Downey Fire Department Station 1 - Headquarters
Fire Department	City of Downey Fire Department Station 2
Fire Department	City of Downey Fire Department Station 3
Fire Department	City of Downey Fire Department Station 4
Fire Department	City of Glendale Fire Department Station 21
Fire Department	City of Glendale Fire Department Station 22
Fire Department	City of Glendale Fire Department Station 23
Fire Department	City of Glendale Fire Department Station 24
Fire Department	City of Glendale Fire Department Station 25
Fire Department	City of Glendale Fire Department Station 26
Fire Department	City of Glendale Fire Department Station 27
Fire Department	City of Glendale Fire Department Station 28
Fire Department	City of Long Beach Fire Department - Beach Operations
Fire Department	City of Long Beach Fire Department - Headquarters
Fire Department	City of Long Beach Fire Department Station 1
Fire Department	City of Long Beach Fire Department Station 10
Fire Department	City of Long Beach Fire Department Station 11
Fire Department	City of Long Beach Fire Department Station 12
Fire Department	City of Long Beach Fire Department Station 13
Fire Department	City of Long Beach Fire Department Station 14
Fire Department	City of Long Beach Fire Department Station 15
Fire Department	City of Long Beach Fire Department Station 16
Fire Department	City of Long Beach Fire Department Station 17
Fire Department	City of Long Beach Fire Department Station 18
Fire Department	City of Long Beach Fire Department Station 19



**Table B-1. County Critical Facilities**

<b>Department / Agency</b>	<b>Facility Name</b>
Fire Department	City of Los Angeles Fire Department Station 65
Fire Department	City of Los Angeles Fire Department Station 66
Fire Department	City of Los Angeles Fire Department Station 67
Fire Department	City of Los Angeles Fire Department Station 68
Fire Department	City of Los Angeles Fire Department Station 7
Fire Department	City of Los Angeles Fire Department Station 71
Fire Department	City of Los Angeles Fire Department Station 76
Fire Department	City of Los Angeles Fire Department Station 80
Fire Department	City of Los Angeles Fire Department Station 82
Fire Department	City of Los Angeles Fire Department Station 9
Fire Department	City of Los Angeles Fire Department Station 92
Fire Department	City of Los Angeles Fire Department Station 94
Fire Department	City of Los Angeles Fire Department Station 95
Fire Department	City of Los Angeles Fire Department Station 97
Fire Department	City of Los Angeles Fire Department Station 99
Fire Department	City of Monterey Park Fire Department Station 61 - Headquarters
Fire Department	City of Monterey Park Fire Department Station 62
Fire Department	City of Monterey Park Fire Department Station 63
Fire Department	City of Santa Fe Springs Fire Department Station 1 - Headquarters
Fire Department	City of Santa Fe Springs Fire Department Station 2
Fire Department	City of Santa Fe Springs Fire Department Station 3
Fire Department	City of Santa Fe Springs Fire Department Station 4
Fire Department	City of Santa Monica Fire Department - Training Facility
Fire Department	City of Santa Monica Fire Department Station 1 - Headquarters
Fire Department	City of Santa Monica Fire Department Station 2
Fire Department	City of Santa Monica Fire Department Station 3
Fire Department	City of Santa Monica Fire Department Station 5
Fire Department	City of Vernon Fire Department Station 2
Fire Department	City of Vernon Fire Department Station 3
Fire Department	City of Vernon Fire Department Station 4
Fire Department	City of West Covina Fire Department Station 1
Fire Department	City of West Covina Fire Department Station 2
Fire Department	City of West Covina Fire Department Station 3
Fire Department	City of West Covina Fire Department Station 4
Fire Department	City of West Covina Fire Department Station 5
Fire Department	Culver City Fire Department Station 1 - Headquarters
Fire Department	Culver City Fire Department Station 2
Fire Department	Culver City Fire Department Station 3
Fire Department	La Verne Fire Department Station 1 - Headquarters
Fire Department	La Verne Fire Department Station 2
Fire Department	Los Angeles County Fire Department - HQ/Heliport/Training Facility
Fire Department	Los Angeles County Fire Department Station 1
Fire Department	Los Angeles County Fire Department Station 10
Fire Department	Los Angeles County Fire Department Station 101
Fire Department	Los Angeles County Fire Department Station 102
Fire Department	Los Angeles County Fire Department Station 103
Fire Department	Los Angeles County Fire Department Station 104
Fire Department	Los Angeles County Fire Department Station 105
Fire Department	Los Angeles County Fire Department Station 106
Fire Department	Los Angeles County Fire Department Station 107
Fire Department	Los Angeles County Fire Department Station 11
Fire Department	Los Angeles County Fire Department Station 110
Fire Department	Los Angeles County Fire Department Station 111
Fire Department	Los Angeles County Fire Department Station 112
Fire Department	Los Angeles County Fire Department Station 114







**Table B-1. County Critical Facilities**

Department / Agency	Facility Name
Fire Department	San Gabriel Fire Department Station 1 - Headquarters
Fire Department	San Gabriel Fire Department Station 2
Fire Department	San Marino Fire Department
Fire Department	Sierra Madre Volunteer Fire Department
Fire Department	South Pasadena Fire Department
Fire Department	The City of El Segundo Fire Department Station 1 - Headquarters
Fire Department	The City of El Segundo Fire Department Station 2
Fire Department	Torrance Fire Department Fire Station 1 - Headquarters
Fire Department	Torrance Fire Department Fire Station 2
Fire Department	Torrance Fire Department Fire Station 3
Fire Department	Torrance Fire Department Fire Station 4
Fire Department	Torrance Fire Department Fire Station 5
Fire Department	Torrance Fire Department Fire Station 6
Fire Department	Vernon Fire Department
Health Services	Antelope Valley Health Center
Health Services	Bellflower Health Center
Health Services	Central Public Health Center
Health Services	Curtis R. Tucker Health Center
Health Services	Dollarhide Health Center
Health Services	East Los Angeles Health Center
Health Services	East San Gabriel Valley Health Center
Health Services	Edward R. Roybal Comprehensive Health Center
Health Services	El Monte Comprehensive Health Center
Health Services	Glendale Health Center
Health Services	H. Claude Hudson Comprehensive Health Center
Health Services	Harbor-UCLA Medical Center
Health Services	High Desert Regional Health Center
Health Services	Hubert H. Humphrey Comprehensive Health Center
Health Services	La Puente Health Center
Health Services	LAC + USC Medical Center
Health Services	Lake Los Angeles Community Clinic
Health Services	Littlerock Community Clinic
Health Services	Long Beach Comprehensive Health Center
Health Services	Martin Luther King, Jr. Outpatient Center
Health Services	Mid Valley Comprehensive Health Center
Health Services	Olive View-UCLA Medical Center
Health Services	Rancho Los Amigos National Rehabilitation Center
Health Services	San Fernando Health Center
Health Services	South Valley Health Center
Health Services	Torrance Health Center
Health Services	Vaughn School Based Health Center
Health Services	West Valley Health Center
Health Services	Wilmington Health Center
Library	A C Bilbrew Library
Library	Acton Agua Dulce Library
Library	Agoura Hills Library
Library	Alondra Library
Library	Angelo M. Iacoboni Library
Library	Anthony Quinn Library
Library	Artesia Library
Library	Avalon Library
Library	Baldwin Park Library
Library	Bell Gardens Library
Library	Bell Library
Library	Carson Library

**Table B-1. County Critical Facilities**

<b>Department / Agency</b>	<b>Facility Name</b>
Library	Castaic Library
Library	Charter Oak Library
Library	Chet Holifield Library
Library	City Terrace Library
Library	Claremont Helen Renwick Library
Library	Clifton M. Brakensiek Library
Library	Compton Library
Library	Cudahy Library
Library	Culver City Julian Dixon Library
Library	Diamond Bar Library
Library	Dr. Martin Luther King, Jr. Library
Library	Duarte Library
Library	East Los Angeles Library
Library	East Rancho Dominguez Library
Library	El Camino Real Library
Library	El Monte Library
Library	Florence Express Library
Library	Gardena Mayme Dear Library
Library	George Nye Jr. Library
Library	Graham Library
Library	Hacienda Heights Library
Library	Hawaiian Gardens Library
Library	Hawthorne Library
Library	Hermosa Beach Library
Library	Hollydale Library
Library	Huntington Park Library
Library	La Canada Flintridge Library
Library	La Crescenta Library
Library	La Mirada Library
Library	La Puente Library
Library	La Verne Library
Library	Lake Los Angeles Library
Library	Lancaster Library
Library	Lawndale Library
Library	Leland R. Weaver Library
Library	Lennox Library
Library	Littlerock Library
Library	Live Oak Library
Library	Lloyd Taber-Marina del Rey Library
Library	Lomita Library
Library	Los Nietos Library
Library	Lynwood Library
Library	Malibu Library
Library	Manhattan Beach Library
Library	Masao W. Satow Library
Library	Maywood Cesar Chavez Library
Library	Montebello Library
Library	Norwalk Library
Library	Norwood Library
Library	Paramount Library
Library	Pico Rivera Library
Library	Quartz Hill Library
Library	Rivera Library
Library	Rosemead Library
Library	Rowland Heights Library

**Table B-1. County Critical Facilities**

Department / Agency	Facility Name
Library	San Dimas Library
Library	San Fernando Library
Library	San Gabriel Library
Library	Sorensen Library
Library	South El Monte Library
Library	South Whittier Library
Library	Stevenson Ranch Library
Library	Sunkist Library
Library	Temple City Library
Library	Topanga Library
Library	View Park Bebe Moore Campbell Library
Library	Walnut Library
Library	West Covina Library
Library	West Hollywood Library
Library	Westlake Village Library
Library	Willowbrook Library
Library	Wiseburn Library
Library	Woodcrest Library
Los Angeles County Museum of Arts & Museum of Natural History	La Brea Tar pits
Los Angeles County Museum of Arts & Museum of Natural History	Los Angeles County Museum of Art
Los Angeles County Museum of Arts & Museum of Natural History	Natural History Museum
Los Angeles County Museum of Arts & Museum of Natural History	William S. Hart Museum
Office of Education	Afflerbaugh-Paige Camp
Office of Education	Alma Fuerte Public
Office of Education	Animo City of Champions Charter High
Office of Education	Aspire Antonio Maria Lugo Academy
Office of Education	Aspire Ollin University Preparatory Academy
Office of Education	Central Juvenile Hall
Office of Education	Da Vinci RISE High
Office of Education	Environmental Charter Middle
Office of Education	Environmental Charter Middle - Inglewood
Office of Education	Intellectual Virtues Academy
Office of Education	International Polytechnic High
Office of Education	Jardin de la Infancia
Office of Education	Kirby, Dorothy Camp
Office of Education	L.A. County High School for the Arts
Office of Education	LA's Promise Charter High #1
Office of Education	LA's Promise Charter Middle #1
Office of Education	Lashon Academy
Office of Education	Los Angeles County Special Education
Office of Education	Los Angeles International Charter High
Office of Education	Los Padrinos Juvenile Hall
Office of Education	Magnolia Science Academy
Office of Education	Magnolia Science Academy 2
Office of Education	Magnolia Science Academy 3
Office of Education	Magnolia Science Academy 5
Office of Education	McNair Camp
Office of Education	Nidorf, Barry J.
Office of Education	North Valley Military Institute College Preparatory Academy
Office of Education	Odyssey Charter
Office of Education	Onizuka Camp

**Table B-1. County Critical Facilities**

Department / Agency	Facility Name
Office of Education	Optimist Charter
Office of Education	Phoenix Academy Residential Education Center
Office of Education	Renaissance County Community
Office of Education	Road to Success Academy at Campus Kilpatrick
Office of Education	Rockey, Glenn Camp
Office of Education	Scott, Joseph Camp
Office of Education	Soleil Academy Charter
Office of Education	Valiente College Preparatory Charter
Other (Office)	1000 S. Fremont Ave.
Other (Office)	1055 Wilshire Blvd.
Other (Office)	1100 North Eastern Ave.
Other (Office)	1104 N. Mission Rd.
Other (Office)	12300 Lower Azusa Rd.
Other (Office)	12400 Imperial Highway
Other (Office)	12860 Crossroads Parkway South
Other (Office)	1320 North Eastern Ave.
Other (Office)	13837 Fiji Way
Other (Office)	1816 S. Figueroa
Other (Office)	210 W. Temple St.
Other (Office)	211 W. Temple St.
Other (Office)	313 N Figueroa St.
Other (Office)	3175 West Sixth St.
Other (Office)	320 West Temple St.
Other (Office)	425 Shatto Place
Other (Office)	550 South Vermont Ave.
Other (Office)	5770 S. Eastern Ave.
Other (Office)	5898 Cherry Ave.
Other (Office)	5905 Wilshire Blvd.
Other (Office)	700 W. Main St.
Other (Office)	7400 East Imperial Highway
Other (Office)	900 South Fremont Ave.
Other (Office)	Kenneth Hahn Hall of Administration
Parks & Recreation	Acton Park
Parks & Recreation	Adventure Park
Parks & Recreation	Adventure Park
Parks & Recreation	Allen J. Martin Park
Parks & Recreation	Alondra Community Regional Park
Parks & Recreation	Alondra Community Regional Park
Parks & Recreation	Amelia Mayberry Park
Parks & Recreation	Amelia Mayberry Park
Parks & Recreation	Amigo Park
Parks & Recreation	Arcadia Community Regional Park
Parks & Recreation	Arcadia Community Regional Park
Parks & Recreation	Athens Park
Parks & Recreation	Athens Park
Parks & Recreation	Bassett Park
Parks & Recreation	Bassett Park
Parks & Recreation	Bassett Park
Parks & Recreation	Belvedere Community Regional Park
Parks & Recreation	Belvedere Community Regional Park
Parks & Recreation	Bodger Park
Parks & Recreation	Carolyn Rosas Park
Parks & Recreation	Castaic Regional Sports Complex
Parks & Recreation	Castaic Regional Sports Complex
Parks & Recreation	Charles S. Farnsworth Park

**Table B-1. County Critical Facilities**

Department / Agency	Facility Name
Parks & Recreation	Charles S. Farnsworth Park
Parks & Recreation	Charles S. Farnsworth Park
Parks & Recreation	Charles S. Farnsworth Park
Parks & Recreation	Charter Oak Park
Parks & Recreation	City Terrace Park
Parks & Recreation	City Terrace Park
Parks & Recreation	Col. Leon H. Washington Park
Parks & Recreation	Col. Leon H. Washington Park
Parks & Recreation	Crescenta Valley Community Regional Park
Parks & Recreation	Crescenta Valley Community Regional Park
Parks & Recreation	Dalton Park
Parks & Recreation	Del Aire Park
Parks & Recreation	Del Aire Park
Parks & Recreation	Devil's Punchbowl Natural Area and Nature Center
Parks & Recreation	Dexter Park
Parks & Recreation	Dexter Park
Parks & Recreation	Don Knabe Community Regional Park
Parks & Recreation	Don Knabe Community Regional Park
Parks & Recreation	Don Knabe Community Regional Park
Parks & Recreation	East Rancho Dominguez Park
Parks & Recreation	East Rancho Dominguez Park
Parks & Recreation	East Rancho Dominguez Park
Parks & Recreation	El Cariso Community Regional Park
Parks & Recreation	El Cariso Community Regional Park
Parks & Recreation	El Cariso Community Regional Park
Parks & Recreation	Enterprise Park
Parks & Recreation	Eugene A. Obregon Park
Parks & Recreation	Eugene A. Obregon Park
Parks & Recreation	Franklin D. Roosevelt Park
Parks & Recreation	Franklin D. Roosevelt Park
Parks & Recreation	George Lane Park
Parks & Recreation	George Lane Park
Parks & Recreation	George Washington Carver Park
Parks & Recreation	Hacienda Heights Community and Rec Center
Parks & Recreation	Hacienda Heights Community and Rec Center
Parks & Recreation	Hacienda Heights Community and Rec Center
Parks & Recreation	Helen Keller Park
Parks & Recreation	Hollywood Bowl
Parks & Recreation	Jackie Robinson Park
Parks & Recreation	Jackie Robinson Park
Parks & Recreation	Jesse Owens Community Regional Park
Parks & Recreation	Jesse Owens Community Regional Park
Parks & Recreation	John Anson Ford Amphitheatre
Parks & Recreation	John Anson Ford Amphitheatre
Parks & Recreation	Kenneth Hahn State Recreation Area
Parks & Recreation	Ladera Park
Parks & Recreation	Ladera Park
Parks & Recreation	Ladera Park
Parks & Recreation	Lennox Park
Parks & Recreation	Lennox Park
Parks & Recreation	Lennox Park
Parks & Recreation	Loma Alta Park
Parks & Recreation	Loma Alta Park
Parks & Recreation	Los Angeles County Arboretum and Botanic Garden
Parks & Recreation	Manzanita Park

**Table B-1. County Critical Facilities**

<b>Department / Agency</b>	<b>Facility Name</b>
Parks & Recreation	Mary M. Bethune Park
Parks & Recreation	Mary M. Bethune Park
Parks & Recreation	Mona Park
Parks & Recreation	Mona Park
Parks & Recreation	Pamela County Park
Parks & Recreation	Pamela County Park
Parks & Recreation	Pathfinder Community Regional Park
Parks & Recreation	Pearblossom County Park
Parks & Recreation	Peter F Schabarum Regional County Park
Parks & Recreation	Rimgrove Park
Parks & Recreation	Rowland Heights Park
Parks & Recreation	Roy Campanella Park
Parks & Recreation	Ruben F Salazar Park
Parks & Recreation	Ruben F Salazar Park
Parks & Recreation	Ruben F Salazar Park
Parks & Recreation	San Angelo Park
Parks & Recreation	San Fernando Recreation Park and Aquatic Center
Parks & Recreation	Saybrook Park
Parks & Recreation	Sorensen Park
Parks & Recreation	South Coast Botanic Garden
Parks & Recreation	Stephen Sorensen Park
Parks & Recreation	Sunshine Park
Parks & Recreation	Ted Watkins Memorial Park
Parks & Recreation	Ted Watkins Memorial Park
Parks & Recreation	Tesoro Adobe Historic Park
Parks & Recreation	Val Verde Community Regional Park
Parks & Recreation	Val Verde Community Regional Park
Parks & Recreation	Valleydale Park
Parks & Recreation	Valleydale Park
Parks & Recreation	Vasquez Rocks Natural Area and Nature Center
Parks & Recreation	Veterans Memorial Community Regional Park
Parks & Recreation	Victoria Community Regional Park
Parks & Recreation	Victoria Community Regional Park
Parks & Recreation	Walnut Nature Park
Parks & Recreation	Whittier Narrows Recreation Area
Parks & Recreation	William S. Hart Regional Park
Parks & Recreation	William Steinmetz Park
Parks & Recreation	William Steinmetz Park
Parks & Recreation	William Steinmetz Park
Public Health	Antelope Valley Health Center
Public Health	Central Public Health Center
Public Health	Curtis R. Tucker Health Center
Public Health	Glendale Health Center
Public Health	Hollywood/Wilshire Public Health Center
Public Health	Martin Luther King, Jr. Center for Public Health
Public Health	Monrovia Public Health Center
Public Health	North Hollywood Public Health Center
Public Health	Pacoima Public Health Center
Public Health	Pomona Public Health Center
Public Health	Ruth-Temple Public Health Center
Public Health	Simms/Mann Health and Wellness Center
Public Health	Torrance Public Health Center
Public Health	Whittier Public Health Center
Public Works	Big Dalton Dam
Public Works	Big Tujunga Dam

**Table B-1. County Critical Facilities**

Department / Agency	Facility Name
Public Works	Brackett Field Airport
Public Works	Cogswell Dam
Public Works	Compton/Woodley Airport
Public Works	Devil's Gate Dam
Public Works	Eaton Wash Dam
Public Works	General Wm. J. Fox Airfield
Public Works	Live Oak Dam
Public Works	Morris Dam
Public Works	Pacoima Dam
Public Works	Puddingstone Dam
Public Works	Puddingstone Diversion Dam
Public Works	PW Headquarters Building
Public Works	PW ITD – Mount Wilson Radio Antenna Tower
Public Works	PW ITD – Mount Wilson Radio Facility Bldg.
Public Works	PW OSD - Eaton Yard – Maintenance Office
Public Works	PW RMD – 518-B Maintenance Yard
Public Works	PW RMD – Baldwin Park Maintenance Yard
Public Works	PW RMD - Div 446 Maintenance Yard
Public Works	PW RMD – Div. #116 Maintenance Yard
Public Works	PW RMD – Div. #141/241 Maintenance Yard
Public Works	PW RMD – Div. #142 Maintenance Yard
Public Works	PW RMD – Div. #232 Maintenance Yard
Public Works	PW RMD – Div. #336 Maint. Yd.
Public Works	PW RMD – Div. #339/539 Agoura Maintenance Yard
Public Works	PW RMD – Div. #417 Maintenance Yard
Public Works	PW RMD – Div. #446 Sub Maintenance Yard
Public Works	PW RMD – Div. #518 Maintenance Yard
Public Works	PW RMD – Div. #519 Maintenance Yard
Public Works	PW RMD – Div. #523 Maintenance Yard
Public Works	PW RMD – Div. #524 Maintenance Yard
Public Works	PW RMD – Div. #526 Maint. Yd.
Public Works	PW RMD – Div. #551 Maintenance Yard
Public Works	PW RMD – Div. #555 Maintenance Yard
Public Works	PW RMD – Div. #558 Maint. Yard
Public Works	PW RMD – Div. #558a Jackson Lake Maintenance Yd.
Public Works	PW RMD – Div. #559b Maintenance Yard
Public Works	PW RMD - Lower Central Yard – Division Administration
Public Works	PW RMD – Maint. District 3 Yard
Public Works	PW RMD – Maintenance District No.4 Yard
Public Works	PW RMD – Palmdale Maintenance Dist. No. 5 Bldg. Yard
Public Works	PW RMD - Upper Central Yard
Public Works	PW RMD – Van Pelt Bridge Maintenance Yard
Public Works	PW SMD - 132ND Street
Public Works	PW SMD - 213TH Street
Public Works	PW SMD - AGAVE
Public Works	PW SMD - Balfour
Public Works	PW SMD - Bradhurst
Public Works	PW SMD - Broadway
Public Works	PW SMD - CAPALLERO
Public Works	PW SMD - Centinela
Public Works	PW SMD – Central Yard
Public Works	PW SMD - Commerce Center Drive
Public Works	PW SMD - Davids Road
Public Works	PW SMD – East Yard
Public Works	PW SMD - Heatherfield

**Table B-1. County Critical Facilities**

<b>Department / Agency</b>	<b>Facility Name</b>
Public Works	PW SMD – Lake Hughes
Public Works	PW SMD - Lake Hughes - Newvale
Public Works	PW SMD - Lake Hughes - Trail K
Public Works	PW SMD - Lawndale
Public Works	PW SMD - LOWRIDGE
Public Works	PW SMD – Malibu Mesa WWTP
Public Works	PW SMD – Malibu TP
Public Works	PW SMD - Marina Del Rey
Public Works	PW SMD - Maybrook
Public Works	PW SMD - Muscatel
Public Works	PW SMD – North Yard
Public Works	PW SMD - Painter
Public Works	PW SMD – South Yard
Public Works	PW SMD - Surrey Drive
Public Works	PW SMD - Trancas WWTP
Public Works	PW SMD - TYLER
Public Works	PW SMD - Ulmus
Public Works	PW SMD - Viewridge
Public Works	PW SWMD - 120th St. Pump Station
Public Works	PW SWMD - 17th St Pump Station
Public Works	PW SWMD – 83rd St. Maintenance Yard
Public Works	PW SWMD - Alameda Street 3B Pump Station
Public Works	PW SWMD - Alameda Street 3C Pump Station
Public Works	PW SWMD - Alamitos Bay Pump Station
Public Works	PW SWMD – Alamitos Maintenance Yard
Public Works	PW SWMD - Alondra Pump Station
Public Works	PW SWMD - Anaheim St. Pump Station
Public Works	PW SWMD - Appian Way Pump Station
Public Works	PW SWMD - Arena Pump Station
Public Works	PW SWMD - Avalon Pump Station
Public Works	PW SWMD - Belmont Pump Station
Public Works	PW SWMD - Boone Olive Pump Station
Public Works	PW SWMD - Century Frwy Pump Station
Public Works	PW SWMD - Cerritos Pump Station
Public Works	PW SWMD - Claretta Pump Station
Public Works	PW SWMD - Compton Creek Pump Station #1
Public Works	PW SWMD - Compton Creek Pump Station #2
Public Works	PW SWMD - Cordova Walk Pump Station
Public Works	PW SWMD - Dominger Pump Station
Public Works	PW SWMD - Dominguez Pump Station
Public Works	PW SWMD - Doris Pump Station
Public Works	PW SWMD - East Toledo Pump Station
Public Works	PW SWMD – Eaton Maintenance Yard
Public Works	PW SWMD - El Dorado Pump Station
Public Works	PW SWMD - El Segundo Pump Station
Public Works	PW SWMD – El Segundo Yard
Public Works	PW SWMD - Electric Ave Pump Station
Public Works	PW SWMD - Garnet Avenue Pump Station
Public Works	PW SWMD - Hamilton Bowl South Pump Station
Public Works	PW SWMD - Hamilton Bowl West Pump Station
Public Works	PW SWMD - Hill St. Pump Station
Public Works	PW SWMD – Imperial Yard
Public Works	PW SWMD - Johnson Pump Station
Public Works	PW SWMD - Lakewood Pump Station
Public Works	PW SWMD - Lennox Blvd Pump Station

**Table B-1. County Critical Facilities**

Department / Agency	Facility Name
Public Works	PW SWMD – Longden Yard
Public Works	PW SWMD - Los Altos Pump Station
Public Works	PW SWMD - Lynwood Pump Station
Public Works	PW SWMD - Manhattan Beach Pump Station
Public Works	PW SWMD - Market St. Pump Station
Public Works	PW SWMD - Naples Pump Station
Public Works	PW SWMD - Oxford Pump Station
Public Works	PW SWMD - Paramount Pump Station
Public Works	PW SWMD – Pickens Yard
Public Works	PW SWMD - Redondo Beach Blvd Pump Station
Public Works	PW SWMD – Redondo Yard Office
Public Works	PW SWMD – Rio Hondo Yard
Public Works	PW SWMD – Riverview Maintenance Yard
Public Works	PW SWMD – Rubio Yard
Public Works	PW SWMD – San Dimas Maintenance Yard
Public Works	PW SWMD – Santa Clara Flood Maintenance Yard
Public Works	PW SWMD – Saticoy Yard
Public Works	PW SWMD - Seaside Pump Station
Public Works	PW SWMD - Walteria Lake Pump Station
Public Works	PW SWMD - West Long Beach Pump Station
Public Works	PW SWMD - West Neapolitan Pump Station
Public Works	PW SWMD - West Toledo Pump Station
Public Works	PW SWMD - Wilmington Unit 2 Pump Station
Public Works	PW WWD - 116th street pump station
Public Works	PW WWD - 116th street Tank
Public Works	PW WWD - 168th and G Pump station
Public Works	PW WWD - 27 Tank
Public Works	PW WWD - 37-1 Well
Public Works	PW WWD - 37-3 Well
Public Works	PW WWD - 37-4 Well
Public Works	PW WWD - 39 Tank
Public Works	PW WWD - Adobe Tank
Public Works	PW WWD - Anaverde Tanks and pump station
Public Works	PW WWD - Bev martin tank and Pump Station
Public Works	PW WWD - Blue Rock Tank
Public Works	PW WWD - Butte’s Tank
Public Works	PW WWD - City Ranch Tanks
Public Works	PW WWD - Crown Valley Pump station
Public Works	PW WWD - Cuyama Tank
Public Works	PW WWD - Ft. Tejon Tank
Public Works	PW WWD - Hasley Pump Station
Public Works	PW WWD - Hasley Tank
Public Works	PW WWD - Joshua Ranch Tank
Public Works	PW WWD - Kohl’s tank
Public Works	PW WWD - Los Valles Pump station and Well
Public Works	PW WWD - M & 7th west Tank site
Public Works	PW WWD - McCennery Tank
Public Works	PW WWD - North Tank
Public Works	PW WWD - Old timers tank and pump station
Public Works	PW WWD - P-10 Pump station
Public Works	PW WWD - Q-9 Tanks
Public Works	PW WWD - Rancho Vista tanks
Public Works	PW WWD - South Tank
Public Works	PW WWD - Tierra Subida Pump Station
Public Works	PW WWD - Tierra Subida Tanks

**Table B-1. County Critical Facilities**

Department / Agency	Facility Name
Public Works	PW WWD - Vincent Pump station
Public Works	PW WWD #04 – M/5e Water Tank
Public Works	PW WWD #04 – North Administration Building
Public Works	PW WWD #04-M8/75w Water Tank
Public Works	PW WWD #29 - 20858 Regulating Station
Public Works	PW WWD #29 - Big Rock 1010 Tank
Public Works	PW WWD #29 - Big Rock 1200 Tank
Public Works	PW WWD #29 - Big Rock 900 Pump Station
Public Works	PW WWD #29 - Broad Beach Regulating Station
Public Works	PW WWD #29 - Carbon Mesa Tank
Public Works	PW WWD #29 - Entrada Pump Station
Public Works	PW WWD #29 - Entrada Tank
Public Works	PW WWD #29 - Fernwood Tank
Public Works	PW WWD #29 - Guernsey Regulating Station
Public Works	PW WWD #29 - Heather Cliff Regulating Station
Public Works	PW WWD #29 - Horizon Tank
Public Works	PW WWD #29 - Hume Tank
Public Works	PW WWD #29 - La Chusa Feeder Regulating Station
Public Works	PW WWD #29 - La Costa
Public Works	PW WWD #29 - La Costa Regulating Station
Public Works	PW WWD #29 – LADWP Emergency Mindanao Connection
Public Works	PW WWD #29 - Las Flores Pump Station
Public Works	PW WWD #29 - Las Flores Tank
Public Works	PW WWD #29 - Latigo Tank
Public Works	PW WWD #29 - Lower Big Rock 195 Pump Station
Public Works	PW WWD #29 - Lower Busch Pump Station
Public Works	PW WWD #29 - LVMWD , Saddle Peak Interconnection
Public Works	PW WWD #29 - LVMWD, Hume Connection
Public Works	PW WWD #29 - LVMWD, Latigo Connection
Public Works	PW WWD #29 - Malibu Beach Pump Station
Public Works	PW WWD #29 - Malibu Knolls Tank
Public Works	PW WWD #29 - New Summit Tank
Public Works	PW WWD #29 - Nicholas Beach Tank
Public Works	PW WWD #29 - Old Summit Tank
Public Works	PW WWD #29 - Owen Pump Station
Public Works	PW WWD #29 - Pepperdine 545 Pump Station
Public Works	PW WWD #29 - Pepperdine 812 Tank
Public Works	PW WWD #29 - Pepperdine 907 Tank
Public Works	PW WWD #29 - Philip Tank
Public Works	PW WWD #29 - Point Dume Pump Station and Tank
Public Works	PW WWD #29 - Portshhead Tank
Public Works	PW WWD #29 - Saddle Peak Tank
Public Works	PW WWD #29 - Santa Maria Tank
Public Works	PW WWD #29 - Serra Pump Station
Public Works	PW WWD #29 - Sumac Ridge Tank
Public Works	PW WWD #29 - Sweetwater Hydro Pump Station
Public Works	PW WWD #29 - Sweetwater Mesa Tank
Public Works	PW WWD #29 - Topanga Beach Pump Station
Public Works	PW WWD #29 - Topanga Beach Tank
Public Works	PW WWD #29 - Topanga Forks Tank
Public Works	PW WWD #29 - Topanga Oaks Tank
Public Works	PW WWD #29 - Topanga Park Pump Station
Public Works	PW WWD #29 - Trancas Tank
Public Works	PW WWD #29 - Upper Big Rock 730 Pump Station
Public Works	PW WWD #29 - Upper Encinal Tank

**Table B-1. County Critical Facilities**

<b>Department / Agency</b>	<b>Facility Name</b>
Public Works	PW WWD #29 - Winding Wy Tank
Public Works	PW WWD #29 LADWP Emergency Via Dolce Connection
Public Works	San Dimas Dam
Public Works	San Gabriel Dam
Public Works	San Gabriel Valley Airport
Public Works	Santa Anita Dam
Public Works	Thompson Creek Dam
Public Works	Whiteman Airport
Sheriff's Department	Altadena Sheriff's Station
Sheriff's Department	Avalon Sheriff's Station
Sheriff's Department	Carson Sheriff's Station
Sheriff's Department	Century Regional Detention Facility
Sheriff's Department	Century Sheriff's Station
Sheriff's Department	Cerritos Sheriff's Station
Sheriff's Department	Compton Sheriff's Station
Sheriff's Department	Crescenta Valley Sheriff's Station
Sheriff's Department	East Los Angeles Sheriff's Station
Sheriff's Department	Industry Sheriff's Station
Sheriff's Department	Inmate Reception Center
Sheriff's Department	Lakewood Sheriff's Station
Sheriff's Department	Lancaster Sheriff's Station
Sheriff's Department	Lomita Sheriff's Station
Sheriff's Department	Malibu/Lost Hills Sheriff's Station
Sheriff's Department	Marina Del Rey Sheriff's Station
Sheriff's Department	Men's Central Jail
Sheriff's Department	North County Correctional Facility
Sheriff's Department	Norwalk Sheriff's Station
Sheriff's Department	Palmdale Sheriff's Station
Sheriff's Department	Pico Rivera Sheriff's Station
Sheriff's Department	Pitchess Detention Center East Facility
Sheriff's Department	Pitchess Detention Center North Facility
Sheriff's Department	Pitchess Detention Center South Facility
Sheriff's Department	San Dimas Sheriff's Station
Sheriff's Department	Santa Clarita Valley Sheriff's Station
Sheriff's Department	South Los Angeles Sheriff's Station
Sheriff's Department	Temple Sheriff's Station
Sheriff's Department	Twin Towers Correctional Facility
Sheriff's Department	Walnut/Diamond Bar Sheriff's Station
Sheriff's Department	West Hollywood Sheriff's Station

## **APPENDIX C – RISK ASSESSMENT**



**Table C-1: County-wide Statistical Area Hazard Impacts**

CSA	S.D.	3 Ft Sea Level Rise	6 Ft Sea Level Rise	Dam Failure	Violent EQ Shaking	Extreme EQ Shaking	0.2% Annual Chance Flooding	1% Annual Chance Flood	Deep Seated Landslide Class IX & X	Max Tsunami Inundation	Very High Wildfire LRA	High Wildfire SRA	Very High Wildfire SRA
View Park/Windsor Hills	2				1				1		1		
West Rancho Dominguez	2				1								
Willowbrook	2				1		1		1				
Wiseburn	2				1								
Franklin Canyon	3				1		1		1		1		
Miracle Mile	3				1		1						
Santa Monica Mountains	3	1	1	1	1		1	1	1	1	1	1	1
Universal City	3				1				1		1		
West LA	3				1				1				
Westhills	3				1				1		1		1
Cerritos	4				1		1						
East La Mirada	4				1		1		1				
East Whittier	4				1								
Harbor Gateway	4				1								
La Habra Heights	4				1				1				
La Rambla	4				1				1				
Lakewood	4				1		1		1				
Long Beach	4				1		1						
Palos Verdes Peninsula	4				1				1		1		
San Clemente Island	4								1				
Santa Catalina Island	4								1	1	1	1	1
South Whittier	4				1		1		1				
Westfield/Academy Hills	4				1				1		1		
Acton	5				1	1			1		1		1

**Table C-1: County-wide Statistical Area Hazard Impacts**

CSA	S.D.	3 Ft Sea Level Rise	6 Ft Sea Level Rise	Dam Failure	Violent EQ Shaking	Extreme EQ Shaking	0.2% Annual Chance Flooding	1% Annual Chance Flood	Deep Seated Landslide Class IX & X	Max Tsunami Inundation	Very High Wildfire LRA	High Wildfire SRA	Very High Wildfire SRA
Agua Dulce	5				1	1			1		1	1	1
Altadena	5				1		1		1		1	1	1
Anaverde	5			1	1	1			1			1	1
Bouquet Canyon	5				1	1	1		1		1		1
Bradbury	5				1				1		1		
Canyon Country	5				1				1		1	1	1
Castaic	5			1	1	1	1	1	1		1	1	1
Del Sur	5				1	1	1		1				
Desert View Highlands	5					1							
East Covina	5				1				1				
East Lancaster	5			1	1		1						
East Pasadena	5				1				1		1		1
Elizabeth Lake	5				1	1			1			1	1
Hi Vista	5				1				1				
La Crescenta-Montrose	5				1				1		1		1
Lake Hughes	5				1	1			1				1
Lake Los Angeles	5				1	1			1				
Lake Manor	5				1				1		1		1
Leona Valley	5				1	1	1		1		1	1	1
Littlerock	5			1		1	1		1			1	
Littlerock/Juniper Hills	5			1	1	1	1		1			1	1
Littlerock/Pearblossom	5			1	1	1	1		1			1	
Llano	5				1	1			1			1	1
Monrovia	5				1								
Newhall	5					1			1		1		1
North Lancaster	5				1		1		1				
Northeast San Gabriel	5				1				1				

**Table C-1: County-wide Statistical Area Hazard Impacts**

CSA	S.D.	3 Ft Sea Level Rise	6 Ft Sea Level Rise	Dam Failure	Violent EQ Shaking	Extreme EQ Shaking	0.2% Annual Chance Flooding	1% Annual Chance Flood	Deep Seated Landslide Class IX & X	Max Tsunami Inundation	Very High Wildfire LRA	High Wildfire SRA	Very High Wildfire SRA
Palmdale	5			1	1	1	1						
Pearblossom/Llano	5				1	1	1		1			1	
Placerita Canyon	5				1	1			1		1		1
Quartz Hill	5				1	1	1		1				
Roosevelt	5				1		1						
San Francisquito Canyon/Bouquet Canyon	5				1	1			1		1		1
San Pasqual	5				1								
Sand Canyon	5				1	1			1		1		1
Saugus	5				1				1		1		1
Saugus/Canyon Country	5				1				1				1
South Antelope Valley	5			1	1	1			1			1	1
South Edwards	5				1		1	1	1				
Southeast Antelope Valley	5			1	1	1			1			1	1
Stevenson Ranch	5			1	1	1			1		1	1	1
Sun Village	5			1	1	1	1		1				
Twin Lakes/Oat Mountain	5				1	1			1		1		1
Val Verde	5			1	1	1			1		1	1	1
Valencia	5				1				1		1	1	1
West Antelope Valley	5				1	1	1	1	1		1	1	1
West Chatsworth	5				1				1		1		1
White Fence Farms	5					1	1						
Florence-Firestone	1 and 2				1								
Walnut Park	1 and 2				1								
Hacienda Heights	1 and 4				1		1		1		1	1	1

**Table C-1: County-wide Statistical Area Hazard Impacts**

CSA	S.D.	3 Ft Sea Level Rise	6 Ft Sea Level Rise	Dam Failure	Violent EQ Shaking	Extreme EQ Shaking	0.2% Annual Chance Flooding	1% Annual Chance Flood	Deep Seated Landslide Class IX & X	Max Tsunami Inundation	Very High Wildfire LRA	High Wildfire SRA	Very High Wildfire SRA
Rowland Heights	1 and 4				1				1		1	1	1
Sunrise Village	1 and 4				1		1		1				
West Whittier/Los Nietos	1 and 4				1		1		1				
Whittier	1 and 4				1		1		1		1	1	1
Arcadia	1 and 5				1				1				
Azusa	1 and 5				1				1		1		1
Claremont	1 and 5				1				1		1		1
Covina	1 and 5				1		1		1		1	1	1
Covina (Charter Oak)	1 and 5				1				1				
Duarte	1 and 5				1				1				
Glendora	1 and 5				1		1		1		1		1
La Verne	1 and 5				1				1		1		1
Pomona	1 and 5				1				1		1	1	1
Lynwood	1, 2, and 4				1		1		1				
Angeles National Forest	1, 3, and 5			1	1	1	1	1	1		1	1	1
Del Aire	2 and 4				1				1				
East Rancho Dominguez	2 and 4				1		1		1				
El Camino Village	2 and 4				1				1				
Lennox	2 and 4				1				1				
Rancho Dominguez	2 and 4				1		1		1				
West Carson	2 and 4				1		1		1				
Marina del Rey	2, 3, and 4	1	1		1		1	1	1	1			
Kagel/Lopez Canyons	3 and 5				1	1	1		1		1		1

**Table C-2: Animal Care & Control Facility Hazard Impacts**

Facility Name	3 Ft Sea Level Rise	6 Ft Sea Level Rise	Dam Failure Inundation	Violent EQ Shaking	Extreme EQ Shaking	0.2% Annual Chance Flooding	1% Annual Chance Flooding	Deep Seated Landslide Class IX & X	Max Tsunami Inundation	Very High Wildfire LRA	High Wildfire SRA	Very High Wildfire SRA
Agoura Animal Care Center				1						1		
Baldwin Park Animal Care Center				1								
Carson Animal Care Center				1								
Castaic Animal Care Center (Castaic)			1	1								1
Downey Animal Care Center				1		1						
Lancaster County Animal Care Center				1								
Palmdale Animal Care Center					1	1						



**Table C-3: Fire Department Facility Hazard Impacts**

Facility Name	3 Ft Sea Level Rise	6 Ft Sea Level Rise	Dam Failure Inundation	Violent EQ Shaking	Extreme EQ Shaking	0.2% Annual Chance Flooding	1% Annual Chance Flooding	Deep Seated Landslide Class IX & X	Max Tsunami Inundation	Very High Wildfire LRA	High Wildfire SRA	Very High Wildfire SRA
City of Burbank Fire Department Station 11 - Headquarters				1								
City of Burbank Fire Department Station 12				1								
City of Burbank Fire Department Station 13				1								
City of Burbank Fire Department Station 14				1								
City of Burbank Fire Department Station 15				1								
City of Burbank Fire Department Station 16				1						1		
City of Compton Fire Department Station 1 - Headquarters				1		1						
City of Compton Fire Department Station 2				1		1						
City of Compton Fire Department Station 3				1								
City of Compton Fire Department Station 4				1								
City of Downey Fire Department Station 1 - Headquarters				1		1						
City of Downey Fire Department Station 2				1		1						
City of Downey Fire Department Station 3				1		1						
City of Downey Fire Department Station 4				1		1						

**Table C-3: Fire Department Facility Hazard Impacts**

Facility Name	3 Ft Sea Level Rise	6 Ft Sea Level Rise	Dam Failure Inundation	Violent EQ Shaking	Extreme EQ Shaking	0.2% Annual Chance Flooding	1% Annual Chance Flooding	Deep Seated Landslide Class IX & X	Max Tsunami Inundation	Very High Wildfire LRA	High Wildfire SRA	Very High Wildfire SRA
City of Glendale Fire Department Station 21				1								
City of Glendale Fire Department Station 22				1								
City of Glendale Fire Department Station 23				1						1		
City of Glendale Fire Department Station 24				1						1		
City of Glendale Fire Department Station 25				1								
City of Glendale Fire Department Station 26				1								
City of Glendale Fire Department Station 27				1								
City of Glendale Fire Department Station 28				1								
City of Long Beach Fire Department - Beach Operations				1					1			
City of Long Beach Fire Department - Headquarters				1								
City of Long Beach Fire Department Station 1				1								
City of Long Beach Fire Department Station 10				1								
City of Long Beach Fire Department Station 11				1		1						
City of Long Beach Fire Department Station 12				1		1						

**Table C-3: Fire Department Facility Hazard Impacts**

Facility Name	3 Ft Sea Level Rise	6 Ft Sea Level Rise	Dam Failure Inundation	Violent EQ Shaking	Extreme EQ Shaking	0.2% Annual Chance Flooding	1% Annual Chance Flooding	Deep Seated Landslide Class IX & X	Max Tsunami Inundation	Very High Wildfire LRA	High Wildfire SRA	Very High Wildfire SRA
City of Long Beach Fire Department Station 13				1		1						
City of Long Beach Fire Department Station 14		1		1					1			
City of Long Beach Fire Department Station 15				1					1			
City of Long Beach Fire Department Station 16				1								
City of Long Beach Fire Department Station 17				1								
City of Long Beach Fire Department Station 18				1		1						
City of Long Beach Fire Department Station 19				1		1						
City of Long Beach Fire Department Station 2				1								
City of Long Beach Fire Department Station 20		1		1					1			
City of Long Beach Fire Department Station 21		1		1		1			1			
City of Long Beach Fire Department Station 22				1		1						
City of Long Beach Fire Department Station 24				1					1			
City of Long Beach Fire Department Station 3				1								
City of Long Beach Fire Department Station 4				1								
City of Long Beach Fire Department Station 5				1		1						















**Table C-3: Fire Department Facility Hazard Impacts**

Facility Name	3 Ft Sea Level Rise	6 Ft Sea Level Rise	Dam Failure Inundation	Violent EQ Shaking	Extreme EQ Shaking	0.2% Annual Chance Flooding	1% Annual Chance Flooding	Deep Seated Landslide Class IX & X	Max Tsunami Inundation	Very High Wildfire LRA	High Wildfire SRA	Very High Wildfire SRA
Los Angeles County Fire Department Station 112				1		1						
Los Angeles County Fire Department Station 114												
Los Angeles County Fire Department Station 115				1		1						
Los Angeles County Fire Department Station 116				1								
Los Angeles County Fire Department Station 117				1		1						
Los Angeles County Fire Department Station 118				1								
Los Angeles County Fire Department Station 119				1				1				
Los Angeles County Fire Department Station 12				1								
Los Angeles County Fire Department Station 120				1								
Los Angeles County Fire Department Station 121				1				1				
Los Angeles County Fire Department Station 122				1								
Los Angeles County Fire Department Station 123					1					1		
Los Angeles County Fire Department Station 124				1				1				
Los Angeles County Fire Department Station 125				1						1		
Los Angeles County Fire Department Station 126					1							

**Table C-3: Fire Department Facility Hazard Impacts**

Facility Name	3 Ft Sea Level Rise	6 Ft Sea Level Rise	Dam Failure Inundation	Violent EQ Shaking	Extreme EQ Shaking	0.2% Annual Chance Flooding	1% Annual Chance Flooding	Deep Seated Landslide Class IX & X	Max Tsunami Inundation	Very High Wildfire LRA	High Wildfire SRA	Very High Wildfire SRA
Los Angeles County Fire Department Station 127				1		1						
Los Angeles County Fire Department Station 129					1							
Los Angeles County Fire Department Station 130				1		1						
Los Angeles County Fire Department Station 131					1							
Los Angeles County Fire Department Station 132				1				1		1		
Los Angeles County Fire Department Station 134					1							
Los Angeles County Fire Department Station 135				1		1						
Los Angeles County Fire Department Station 14				1								
Los Angeles County Fire Department Station 140					1							1
Los Angeles County Fire Department Station 141				1				1				
Los Angeles County Fire Department Station 144			1	1						1		
Los Angeles County Fire Department Station 145				1								
Los Angeles County Fire Department Station 146				1								
Los Angeles County Fire Department Station 147				1								
Los Angeles County Fire Department Station 148				1		1						









**Table C-3: Fire Department Facility Hazard Impacts**

Facility Name	3 Ft Sea Level Rise	6 Ft Sea Level Rise	Dam Failure Inundation	Violent EQ Shaking	Extreme EQ Shaking	0.2% Annual Chance Flooding	1% Annual Chance Flooding	Deep Seated Landslide Class IX & X	Max Tsunami Inundation	Very High Wildfire LRA	High Wildfire SRA	Very High Wildfire SRA
Los Angeles County Fire Department Station 40				1		1						
Los Angeles County Fire Department Station 41				1								
Los Angeles County Fire Department Station 42				1								
Los Angeles County Fire Department Station 43				1								
Los Angeles County Fire Department Station 44				1								
Los Angeles County Fire Department Station 45				1		1						
Los Angeles County Fire Department Station 47				1								
Los Angeles County Fire Department Station 48				1								
Los Angeles County Fire Department Station 49				1								
Los Angeles County Fire Department Station 5				1								
Los Angeles County Fire Department Station 50				1								
Los Angeles County Fire Department Station 51				1						1		
Los Angeles County Fire Department Station 53				1						1		
Los Angeles County Fire Department Station 54				1		1						
Los Angeles County Fire Department Station 55										1		



**Table C-3: Fire Department Facility Hazard Impacts**

Facility Name	3 Ft Sea Level Rise	6 Ft Sea Level Rise	Dam Failure Inundation	Violent EQ Shaking	Extreme EQ Shaking	0.2% Annual Chance Flooding	1% Annual Chance Flooding	Deep Seated Landslide Class IX & X	Max Tsunami Inundation	Very High Wildfire LRA	High Wildfire SRA	Very High Wildfire SRA
Los Angeles County Fire Department Station 7				1								
Los Angeles County Fire Department Station 70				1						1		
Los Angeles County Fire Department Station 71				1						1		
Los Angeles County Fire Department Station 72				1								1
Los Angeles County Fire Department Station 73					1							
Los Angeles County Fire Department Station 74					1							1
Los Angeles County Fire Department Station 75				1						1		
Los Angeles County Fire Department Station 76			1	1							1	
Los Angeles County Fire Department Station 77					1							1
Los Angeles County Fire Department Station 78					1							1
Los Angeles County Fire Department Station 79					1							
Los Angeles County Fire Department Station 8				1								
Los Angeles County Fire Department Station 80					1							1
Los Angeles County Fire Department Station 81				1								1
Los Angeles County Fire Department Station 82				1						1		

**Table C-3: Fire Department Facility Hazard Impacts**

Facility Name	3 Ft Sea Level Rise	6 Ft Sea Level Rise	Dam Failure Inundation	Violent EQ Shaking	Extreme EQ Shaking	0.2% Annual Chance Flooding	1% Annual Chance Flooding	Deep Seated Landslide Class IX & X	Max Tsunami Inundation	Very High Wildfire LRA	High Wildfire SRA	Very High Wildfire SRA
Los Angeles County Fire Department Station 83				1						1		
Los Angeles County Fire Department Station 84					1	1						
Los Angeles County Fire Department Station 85				1								
Los Angeles County Fire Department Station 86				1								
Los Angeles County Fire Department Station 87				1								
Los Angeles County Fire Department Station 88				1					1	1		
Los Angeles County Fire Department Station 89				1								
Los Angeles County Fire Department Station 90				1								
Los Angeles County Fire Department Station 91				1								1
Los Angeles County Fire Department Station 92					1							
Los Angeles County Fire Department Station 94				1		1						
Los Angeles County Fire Department Station 95				1								
Los Angeles County Fire Department Station 96				1								
Los Angeles County Fire Department Station 97				1						1		
Los Angeles County Fire Department Station 98				1		1						

**Table C-3: Fire Department Facility Hazard Impacts**

Facility Name	3 Ft Sea Level Rise	6 Ft Sea Level Rise	Dam Failure Inundation	Violent EQ Shaking	Extreme EQ Shaking	0.2% Annual Chance Flooding	1% Annual Chance Flooding	Deep Seated Landslide Class IX & X	Max Tsunami Inundation	Very High Wildfire LRA	High Wildfire SRA	Very High Wildfire SRA
Los Angeles County Fire Department Station 99				1						1		
Manhattan Beach Fire Department Station 1 - Headquarters				1								
Manhattan Beach Fire Department Station 2				1								
Montebello Fire Department Station 1 - Headquarters				1								
Montebello Fire Department Station 2				1								
Montebello Fire Department Station 3				1								
Pasadena Fire Department Station 31				1								
Pasadena Fire Department Station 32				1								
Pasadena Fire Department Station 33				1								
Pasadena Fire Department Station 34				1								
Pasadena Fire Department Station 36				1								
Pasadena Fire Department Station 37				1								
Pasadena Fire Department Station 38				1						1		
Pasadena Fire Department Station 39				1						1		









**Table C-5: Library Hazard Impacts**

Facility Name	3 Ft Sea Level Rise	6 Ft Sea Level Rise	Dam Failure Inundation	Violent EQ Shaking	Extreme EQ Shaking	0.2% Annual Chance Flooding	1% Annual Chance Flooding	Deep Seated Landslide Class IX & X	Max Tsunami Inundation	Very High Wildfire LRA	High Wildfire SRA	Very High Wildfire SRA
A C Bilbrew Library				1								
Acton Agua Dulce Library					1							1
Agoura Hills Library				1						1		
Alondra Library				1		1						
Angelo M. Iacoboni Library				1		1						
Anthony Quinn Library				1								
Artesia Library				1		1						
Avalon Library										1		
Baldwin Park Library				1								
Bell Gardens Library				1								
Bell Library				1								
Carson Library				1								
Castaic Library				1						1		
Charter Oak Library				1								
Chet Holifield Library				1								
City Terrace Library				1								
Claremont Helen Renwick Library				1								
Clifton M. Brakensiek Library				1		1						
Compton Library				1		1						
Cudahy Library				1		1						





**Table C-5: Library Hazard Impacts**

Facility Name	3 Ft Sea Level Rise	6 Ft Sea Level Rise	Dam Failure Inundation	Violent EQ Shaking	Extreme EQ Shaking	0.2% Annual Chance Flooding	1% Annual Chance Flooding	Deep Seated Landslide Class IX & X	Max Tsunami Inundation	Very High Wildfire LRA	High Wildfire SRA	Very High Wildfire SRA
Norwalk Library				1								
Norwood Library				1								
Paramount Library				1		1						
Pico Rivera Library				1		1						
Quartz Hill Library					1							
Rivera Library				1		1						
Rosemead Library				1								
Rowland Heights Library				1								
San Dimas Library				1								
San Fernando Library					1							
San Gabriel Library				1								
Sorensen Library				1								
South El Monte Library				1								
South Whittier Library				1								
Stevenson Ranch Library					1					1		
Sunkist Library				1								
Temple City Library				1								
Topanga Library				1								1
View Park Bebe Moore Campbell Library				1								
Walnut Library				1								
West Covina Library				1		1						



**Table C-6: LACMA+MNH Hazard Impacts**

Facility Name	3 Ft Sea Level Rise	6 Ft Sea Level Rise	Dam Failure Inundation	Violent EQ Shaking	Extreme EQ Shaking	0.2% Annual Chance Flooding	1% Annual Chance Flooding	Deep Seated Landslide Class IX & X	Max Tsunami Inundation	Very High Wildfire LRA	High Wildfire SRA	Very High Wildfire SRA
La Brea Tarpits				1								
Los Angeles County Museum of Art				1								
Natural History Museum				1								
William S. Hart Museum					1					1		

**Table C-7: Office of Education Hazard Impacts**

Facility Name	3 Ft Sea Level Rise	6 Ft Sea Level Rise	Dam Failure Inundation	Violent EQ Shaking	Extreme EQ Shaking	0.2% Annual Chance Flooding	1% Annual Chance Flooding	Deep Seated Landslide Class IX & X	Max Tsunami Inundation	Very High Wildfire LRA	High Wildfire SRA	Very High Wildfire SRA
Afflerbaugh-Paige Camp				1								1
Alma Fuerte Public				1								
Animo City of Champions Charter High				1								
Aspire Antonio Maria Lugo Academy				1								
Aspire Ollin University Preparatory Academy				1								
Central Juvenile Hall				1								
Da Vinci RISE High				1								
Environmental Charter Middle				1								
Environmental Charter Middle - Inglewood				1								
Intellectual Virtues Academy				1								
International Polytechnic High				1								
Jardin de la Infancia				1								
Kirby, Dorothy Camp				1								
L.A. County High School for the Arts				1								
LA's Promise Charter High #1				1								
LA's Promise Charter Middle #1				1		1						
Lashon Academy			1	1								
Los Angeles County Special Education				1		1						





























**Table C-10: Public Works Facility Hazard Impacts**

Facility Name	3 Ft Sea Level Rise	6 Ft Sea Level Rise	Dam Failure Inundation	Violent EQ Shaking	Extreme EQ Shaking	0.2% Annual Chance Flooding	1% Annual Chance Flooding	Deep Seated Landslide Class IX & X	Max Tsunami Inundation	Very High Wildfire LRA	High Wildfire SRA	Very High Wildfire SRA
PW RMD – Div. #232 Maintenance Yard				1								
PW RMD – Maint. District 3 Yard				1								
PW SWMD – 83rd St. Maintenance Yard				1								
PW RMD – Div. #336 Maint. Yd.				1						1		
PW RMD – Div. #339/539 Agoura Maintenance Yard				1								1
PW SWMD – Saticoy Yard				1			1					
PW WWD #29 - 20858 Regulating Station				1		1				1		
PW WWD #29 - Big Rock 900 Pump Station				1				1				1
PW WWD #29 - Big Rock 1010 Tank				1				1				1
PW WWD #29 - Big Rock 1200 Tank				1				1				1
PW WWD #29 - Broad Beach Regulating Station				1				1		1		
PW WWD #29 - Carbon Mesa Tank				1						1		
PW WWD #29 - Entrada Pump Station				1				1				1
PW WWD #29 - Entrada Tank				1				1				1

**Table C-10: Public Works Facility Hazard Impacts**

Facility Name	3 Ft Sea Level Rise	6 Ft Sea Level Rise	Dam Failure Inundation	Violent EQ Shaking	Extreme EQ Shaking	0.2% Annual Chance Flooding	1% Annual Chance Flooding	Deep Seated Landslide Class IX & X	Max Tsunami Inundation	Very High Wildfire LRA	High Wildfire SRA	Very High Wildfire SRA
PW WWD #29 - Fernwood Tank				1				1				1
PW WWD #29 - Guernsey Regulating Station				1						1		
PW WWD #29 - Heather Cliff Regulating Station				1						1		
PW WWD #29 - Horizon Tank				1						1		
PW WWD #29 - Hume Tank				1								1
PW WWD #29 - La Chusa Feeder Regulating Station				1						1		
PW WWD #29 - La Costa				1						1		
PW WWD #29 - La Costa Regulating Station				1				1		1		
PW WWD #29 - Las Flores Pump Station				1						1		
PW WWD #29 - Las Flores Tank				1						1		
PW WWD #29 - Latigo Tank				1				1				1
PW WWD #29 - Lower Big Rock 195 Pump Station				1				1		1		
PW WWD #29 - LVMWD, Hume Connection				1				1				1

**Table C-10: Public Works Facility Hazard Impacts**

Facility Name	3 Ft Sea Level Rise	6 Ft Sea Level Rise	Dam Failure Inundation	Violent EQ Shaking	Extreme EQ Shaking	0.2% Annual Chance Flooding	1% Annual Chance Flooding	Deep Seated Landslide Class IX & X	Max Tsunami Inundation	Very High Wildfire LRA	High Wildfire SRA	Very High Wildfire SRA
PW WWD #29 - LVMWD, Latigo Connection				1				1				1
PW WWD #29 - LVMWD, Saddle Peak Interconnection				1								1
PW WWD #29 - Lower Busch Pump Station				1						1		
PW WWD #29 - Malibu Beach Pump Station				1						1		
PW WWD #29 - Malibu Knolls Tank				1						1		
PW WWD #29 - New Summit Tank				1								1
PW WWD #29 - Nicholas Beach Tank				1				1		1		
PW WWD #29 - Old Summit Tank				1						1		
PW WWD #29 - Owen Pump Station				1								1
PW WWD #29 - Pepperdine 545 Pump Station				1						1		
PW WWD #29 - Pepperdine 812 Tank				1								1
PW WWD #29 - Pepperdine 907 Tank				1				1				1
PW WWD #29 - Philip Tank				1						1		



**Table C-10: Public Works Facility Hazard Impacts**

Facility Name	3 Ft Sea Level Rise	6 Ft Sea Level Rise	Dam Failure Inundation	Violent EQ Shaking	Extreme EQ Shaking	0.2% Annual Chance Flooding	1% Annual Chance Flooding	Deep Seated Landslide Class IX & X	Max Tsunami Inundation	Very High Wildfire LRA	High Wildfire SRA	Very High Wildfire SRA
PW WWD #29 - Trancas Tank				1						1		
PW WWD #29 - Upper Big Rock 730 Pump Station				1				1		1		
PW WWD #29 - Upper Encinal Tank				1				1		1		
PW WWD #29 - Winding Wy Tank				1				1				1
PW RMD - Div 446 Maintenance Yard				1		1						
PW RMD – Div. #446 Sub Maintenance Yard				1								
PW RMD – Maintenance District No.4 Yard				1		1						
PW SWMD – Alamitos Maintenance Yard				1		1						
PW SWMD – El Segundo Yard				1								
PW SWMD – Redondo Yard Office				1								
PW WWD #29 LADWP Emergency Via Dolce Connection				1		1			1			
PW WWD #29 – LADWP Emergency Mindanao Connection				1								
PW OSD - Eaton Yard – Maintenance Office				1				1				

**Table C-10: Public Works Facility Hazard Impacts**

Facility Name	3 Ft Sea Level Rise	6 Ft Sea Level Rise	Dam Failure Inundation	Violent EQ Shaking	Extreme EQ Shaking	0.2% Annual Chance Flooding	1% Annual Chance Flooding	Deep Seated Landslide Class IX & X	Max Tsunami Inundation	Very High Wildfire LRA	High Wildfire SRA	Very High Wildfire SRA
PW RMD – 518-B Maintenance Yard				1						1		
PW RMD – Div. #523 Maintenance Yard				1						1		
PW RMD – Div. #524 Maintenance Yard				1						1		
PW RMD – Div. #518 Maintenance Yard				1								
PW RMD – Div. #519 Maintenance Yard				1								
PW RMD – Div. #526 Maint. Yd.			1	1		1				1		
PW RMD – Div. #551 Maintenance Yard					1	1						
PW RMD – Div. #555 Maintenance Yard				1								
PW RMD – Div. #558 Maint. Yard					1							
PW RMD – Div. #558a Jackson Lake Maintenance Yd.					1							
PW RMD – Div. #559b Maintenance Yard				1								
PW RMD – Palmdale Maintenance Dist. No. 5 Bldg. Yard					1	1						
PW SWMD – Eaton Maintenance Yard				1								
PW SWMD – Pickens Yard				1						1		



**Table C-10: Public Works Facility Hazard Impacts**

Facility Name	3 Ft Sea Level Rise	6 Ft Sea Level Rise	Dam Failure Inundation	Violent EQ Shaking	Extreme EQ Shaking	0.2% Annual Chance Flooding	1% Annual Chance Flooding	Deep Seated Landslide Class IX & X	Max Tsunami Inundation	Very High Wildfire LRA	High Wildfire SRA	Very High Wildfire SRA
PW WWD - 116th street pump station					1							
PW WWD - P-10 Pump station					1							
PW WWD - Tierra Subida Pump Station				1								
PW SMD - CAPALLERO				1								1
PW SMD - COMMERCE CENTER DRIVE				1				1				
PW SMD - LAKE HUGHES - NEWVALE					1							1
PW SMD - LAKE HUGHES - TRAIL K					1							1
PW SMD - LOWRIDGE				1						1		
PW SMD - MARINA DEL REY				1					1			
PW SMD - TYLER				1								
PW WWD - Crown Valley Pump station				1								1
PW WWD - Hasley Pump Station				1								1
PW SWMD - 120th St. Pump Station				1								
PW SWMD - Alameda Street 3B Pump Station				1		1						
PW SWMD - Alameda Street 3C Pump Station				1		1						

**Table C-10: Public Works Facility Hazard Impacts**

Facility Name	3 Ft Sea Level Rise	6 Ft Sea Level Rise	Dam Failure Inundation	Violent EQ Shaking	Extreme EQ Shaking	0.2% Annual Chance Flooding	1% Annual Chance Flooding	Deep Seated Landslide Class IX & X	Max Tsunami Inundation	Very High Wildfire LRA	High Wildfire SRA	Very High Wildfire SRA
PW SWMD - Avalon Pump Station				1		1						
PW SWMD - Compton Creek Pump Station #1				1		1						
PW SWMD - Compton Creek Pump Station #2				1		1						
PW SWMD - Dominger Pump Station				1		1						
PW SWMD - Lennox Blvd Pump Station				1								
PW SWMD - Oxford Pump Station				1					1			
PW SWMD - Redondo Beach Blvd Pump Station				1								
PW SWMD - Boone Olive Pump Station				1		1			1			
PW SWMD - Electric Ave Pump Station				1								
PW SWMD - 17th St Pump Station				1								
PW SWMD - Alamitos Bay Pump Station		1		1					1			
PW SWMD - Alondra Pump Station				1		1						
PW SWMD - Anaheim St. Pump Station		1		1		1			1			

**Table C-10: Public Works Facility Hazard Impacts**

Facility Name	3 Ft Sea Level Rise	6 Ft Sea Level Rise	Dam Failure Inundation	Violent EQ Shaking	Extreme EQ Shaking	0.2% Annual Chance Flooding	1% Annual Chance Flooding	Deep Seated Landslide Class IX & X	Max Tsunami Inundation	Very High Wildfire LRA	High Wildfire SRA	Very High Wildfire SRA
PW SWMD - Appian Way Pump Station		1		1		1			1			
PW SWMD - Arena Pump Station				1								
PW SWMD - Belmont Pump Station	1	1		1					1			
PW SWMD - Century Frwy Pump Station				1		1						
PW SWMD - Cerritos Pump Station				1		1						
PW SWMD - Claretta Pump Station				1		1						
PW SWMD - Cordova Walk Pump Station									1			
PW SWMD - Dominguez Pump Station				1		1						
PW SWMD - Doris Pump Station				1								
PW SWMD - East Toledo Pump Station									1			
PW SWMD - El Dorado Pump Station				1		1						
PW SWMD - El Segundo Pump Station				1								
PW SWMD - Garnet Avenue Pump Station				1		1						
PW SWMD - Hamilton Bowl South Pump Station				1		1						
PW SWMD - Hamilton Bowl West				1		1						

**Table C-10: Public Works Facility Hazard Impacts**

Facility Name	3 Ft Sea Level Rise	6 Ft Sea Level Rise	Dam Failure Inundation	Violent EQ Shaking	Extreme EQ Shaking	0.2% Annual Chance Flooding	1% Annual Chance Flooding	Deep Seated Landslide Class IX & X	Max Tsunami Inundation	Very High Wildfire LRA	High Wildfire SRA	Very High Wildfire SRA
Pump Station												
PW SWMD - Hill St. Pump Station				1		1						
PW SWMD - Johnson Pump Station				1								
PW SWMD - Lakewood Pump Station				1		1						
PW SWMD - Los Altos Pump Station				1								
PW SWMD - Lynwood Pump Station				1		1						
PW SWMD - Manhattan Beach Pump Station				1								
PW SWMD - Market St. Pump Station				1		1						
PW SWMD - Naples Pump Station									1			
PW SWMD - Paramount Pump Station				1		1						
PW SWMD - Seaside Pump Station				1		1			1			
PW SWMD - Walteria Lake Pump Station				1								
PW SWMD - West Long Beach Pump Station	1	1		1					1			
PW SWMD - West Neapolitan Pump Station	1	1		1					1			

**Table C-10: Public Works Facility Hazard Impacts**

Facility Name	3 Ft Sea Level Rise	6 Ft Sea Level Rise	Dam Failure Inundation	Violent EQ Shaking	Extreme EQ Shaking	0.2% Annual Chance Flooding	1% Annual Chance Flooding	Deep Seated Landslide Class IX & X	Max Tsunami Inundation	Very High Wildfire LRA	High Wildfire SRA	Very High Wildfire SRA
PW SWMD - West Toledo Pump Station									1			
PW SWMD - Wilmington Unit 2 Pump Station				1								
PW SMD – Malibu Mesa WWTP				1						1		
PW SMD – Malibu TP				1						1		
PW SMD - Trancas WWTP				1		1				1		
PW SMD – LAKE HUGHES					1							
PW WWD - 27 Tank					1						1	
PW WWD - 39 Tank					1						1	
PW WWD - 116th street Tank				1							1	
PW WWD - Adobe Tank												
PW WWD - Blue Rock Tank				1								
PW WWD - Butte's Tank												
PW WWD - City Ranch Tanks					1							
PW WWD - Ft. Tejon Tank					1						1	
PW WWD - Joshua Ranch Tank				1						1		
PW WWD - Kohl's tank					1	1						
PW WWD - M & 7th west Tank site					1							

**Table C-10: Public Works Facility Hazard Impacts**

Facility Name	3 Ft Sea Level Rise	6 Ft Sea Level Rise	Dam Failure Inundation	Violent EQ Shaking	Extreme EQ Shaking	0.2% Annual Chance Flooding	1% Annual Chance Flooding	Deep Seated Landslide Class IX & X	Max Tsunami Inundation	Very High Wildfire LRA	High Wildfire SRA	Very High Wildfire SRA
PW WWD - Q-9 Tanks					1							
PW WWD - Rancho Vista tanks				1				1		1		
PW WWD - Tierra Subida Tanks				1								
PW WWD #04 – M/5e Water Tank					1							
PW WWD #04-M8/75w Water Tank					1							
PW WWD - Cuyama Tank				1				1				1
PW WWD - Hasley Tank				1								1
PW WWD - North Tank				1								1
PW WWD - McCenery Tank					1			1				1
PW WWD - South Tank				1								1
PW WWD - 168th and G Pump station				1								
PW WWD - Anaverde Tanks and pump station				1						1		
PW WWD - Old timers tank and pump station				1								
PW WWD - Los Valles Pump station and Well				1								1
PW WWD - Vincent Pump station					1							1

**Table C-10: Public Works Facility Hazard Impacts**

Facility Name	3 Ft Sea Level Rise	6 Ft Sea Level Rise	Dam Failure Inundation	Violent EQ Shaking	Extreme EQ Shaking	0.2% Annual Chance Flooding	1% Annual Chance Flooding	Deep Seated Landslide Class IX & X	Max Tsunami Inundation	Very High Wildfire LRA	High Wildfire SRA	Very High Wildfire SRA
PW WWD - Bev martin tank and Pump Station				1		1						
PW SMD – East Yard				1								
PW SMD - Lawndale				1								
PW SMD – South Yard				1								
PW SMD – Central Yard				1								
PW SMD – North Yard				1		1						

**Table C-11: Sheriff's Department Facility Hazard Impacts**

Facility Name	3 Ft Sea Level Rise	6 Ft Sea Level Rise	Dam Failure Inundation	Violent EQ Shaking	Extreme EQ Shaking	0.2% Annual Chance Flooding	1% Annual Chance Flooding	Deep Seated Landslide Class IX & X	Max Tsunami Inundation	Very High Wildfire LRA	High Wildfire SRA	Very High Wildfire SRA
Altadena Sheriff's Station				1								
Avalon Sheriff's Station										1		
Carson Sheriff's Station				1		1						
Century Regional Detention Facility				1								
Century Sheriff's Station				1								
Cerritos Sheriff's Station				1								
Compton Sheriff's Station				1		1						
Crescenta Valley Sheriff's Station				1						1		
East Los Angeles Sheriff's Station				1								
Industry Sheriff's Station				1								
Inmate Reception Center				1								
Lakewood Sheriff's Station				1		1						
Lancaster Sheriff's Station				1		1						
Lomita Sheriff's Station				1								
Malibu/Lost Hills Sheriff's Station				1						1		
Marina Del Rey Sheriff's Station				1					1			
Men's Central Jail				1								
North County Correctional Facility			1	1							1	
Norwalk Sheriff's Station				1								
Palmdale Sheriff's Station					1							
Pico Rivera Sheriff's Station				1		1						
Pitchess Detention Center East Facility				1				1				1





## **Appendix D: RCLWA 2016 SEISMIC ASSESSMENT**

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**Rubio Cañon Land and Water Association | Water Shortage Contingency Plan**

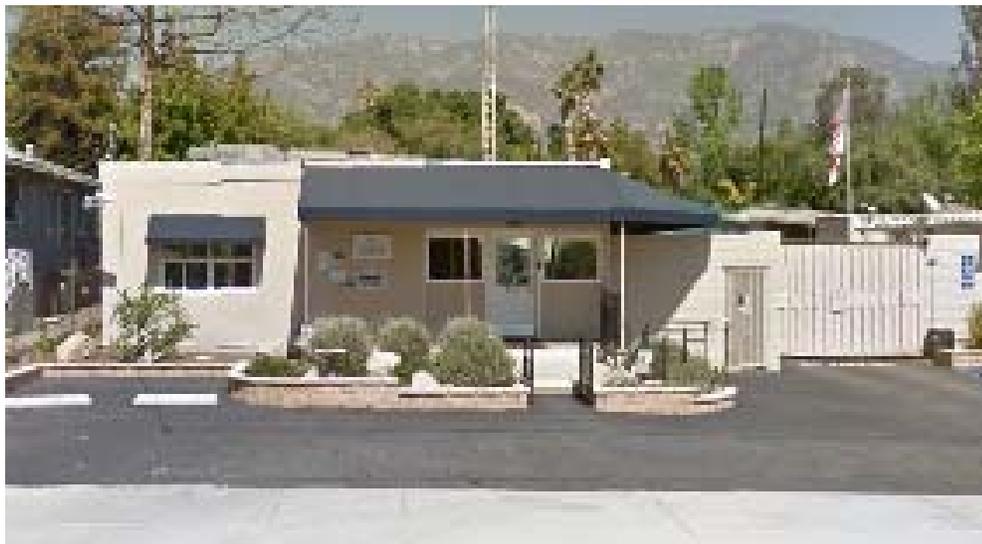
**Argos Engineers, Inc.**

369 Van Ness Way • Suite 730 • Torrance, CA 90501

Phone: (310) 782 – 3353

Fax: (310) 533 – 9206

**RUBIO CAÑON LAND AND WATER ASSOCIATION  
CHLORINE SYSTEM CalARP SEISMIC REVALIDATION**



Prepared for: SCS Tracer Environmental  
5963 La Place Court, Suite 207  
Carlsbad, CA 92008

Revision 0

September 2016

Project Number 16-842

Calculation Title: RUBIO CAÑON CalARP SEISMIC REVALIDATION	Page: 2
Section: Table of Contents	Sheet: 1 of 1

1.0 Introduction	4
1.1 Problem Statement	4
1.2 Investigation Approach	5
1.3 Results Summary	6
2.0 Seismic Hazards	7
3.0 Walkdown Findings	11
4.0 References	18
Appendices	
Appendix A	Prior Recommendations Status
Appendix B	Walkdown Forms

Revision: 0	Date: 8/19/16	Revision:	Date:	Revision:	Date:
By: GMR	Ck:	By:	Ck:	By:	Ck:

Calculation Title: RUBIO CAÑÓN CalARP SEISMIC REVALIDATION	Page: 3
Section: Sign Off Sheet	Sheet: 1 of 1

Revision 0 – Initial Issue



Prepared By: Grace M. Reilly  
Grace M. Reilly

9/1/16  
Date

Calculation Title: RUBIO CAÑON CalARP SEISMIC REVALIDATION	Page: 4
Section: 1.0 Introduction	Sheet: 1 of 3

1.1 Problem Statement

Title 19 of the California Code of Regulations [1] requires facilities with regulated substances to perform an evaluation of equipment and structures to minimize the risk of a release during a seismic event. Seismic evaluations follow a guidance document written for this purpose [2]. Additionally, the seismic evaluations are to be updated and revalidated every five years. This is a 5-year revalidation of the chlorine systems at the Rubio Cañon Land & Water Association facilities.

The chlorine process facilities and their locations are as follows:

- Figueroa Sump Basin – 263 Figueroa Drive, Altadena, CA
- Calaveras Reservoir – 825 E. Calaveras Street, Altadena, CA
- Maiden Lane Reservoir – 2663 Maiden Lane, Altadena, CA
- Ames Treatment Plant – 3371 Rubio Cañon Road, Altadena, CA

Revision: 0	Date: 8/19/16	Revision:	Date:	Revision:	Date:
By: GMR	Ck:	By:	Ck:	By:	Ck:

Calculation Title: RUBIO CAÑON CalARP SEISMIC REVALIDATION	Page: 5
Section: 1.0 Introduction	Sheet: 2 of 3

1.2 Investigation Approach

The earthquake loading for the facility of interest will be determined using the United States Geological Survey seismic hazards ground motion website [3].

The facilities containing the equipment and piping will be visited and a walkdown of the relevant items will be conducted. Any nearby items that could impact the chlorine containing equipment during a seismic event will also be assessed. The equipment and piping will be assessed for seismic resistance capability following the Guidance For California Accidental Release Prevention (CalARP) Program Seismic Assessments [2]. Remediation recommendations if any from prior seismic evaluation will be verified. Any additional items found that require remediation or further evaluation will be identified. This report will list remediation recommendations only. No detailed engineering calculations will be performed as part of this effort.

Revision: 0	Date: 8/19/16	Revision:	Date:	Revision:	Date:
By: GMR	Ck:	By:	Ck:	By:	Ck:

Calculation Title: RUBIO CAÑON CalARP SEISMIC REVALIDATION	Page: 6
Section: 1.0 Introduction	Sheet: 3 of 3

1.3 Results Summary

A total of thirty-one components were evaluated along with the associated piping. The revalidation findings can be found in Table 3.0.1.

A prior evaluation [7] found five deficiencies. See Appendix A for the list of prior recommendations and current status.

Based upon the walkdown, there were no cylinders at the Calaveras Reservoir and at the Maiden Lane Reservoir. The cylinders at the Ames Treatment Plant requires tightening of the chains and additional anchor bolts at the cylinder scale. Also as the Ames Treatment Plant, the pump at the Injector needs to be anchored. See Appendix B for the walkdown forms.

These opinions are based upon a visual inspection only of the conditions observed on the date of the walkdown. No calculations, further evaluations, or investigations have been prepared to support or counter these opinions.

Revision: 0	Date: 8/19/16	Revision:	Date:	Revision:	Date:
By: GMR	Ck:	By:	Ck:	By:	Ck:

Calculation Title: RUBIO CAÑON CalARP SEISMIC REVALIDATION	Page: 7
Section: 2.0 Seismic Hazards	Sheet: 1 of 4

Site-specific seismic loads are obtained from the United States Geological Survey [3].

### Site Location

34.18199 Latitude, - 118.1383 Longitude

### Ground Motions for Site

In the vicinity of these sites are the Verdugo Fault, the Sierra Madre Fault, the Raymond Fault and the San Andreas Fault. The approximate distances from the sites to each fault are included in Table 2.0.1 [4].

Fault System	Approximate Distance from Site (km)
Verdugo	2
Sierra Madre	2
Raymond	2
San Andreas	35

Table 2.0.1 Distances to Fault Systems

The design spectral acceleration and the maximum considered earthquake (MCE) spectral acceleration for this site can be seen in Figures 2.0.1 and 2.0.2 [3]. The design spectral acceleration corresponds to recurrence interval of 475 years and the MCE corresponds to a recurrence interval of 2,500 years. There is a 10% probability of exceeding Richter magnitude of 7.9 earthquake within 50 years and within 50 km of the sites [4].

Revision: 0	Date: 8/19/16	Revision:	Date:	Revision:	Date:
By: GMR	Ck:	By:	Ck:	By:	Ck:

Calculation Title: RUBIO CAÑÓN CalARP SEISMIC REVALIDATION	Page: 8
Section: 2.0 Seismic Hazards	Sheet: 2 of 4

The potential for landslide, liquefaction, tsunami/seiche and ground faulting is low for these sites [7] [9].

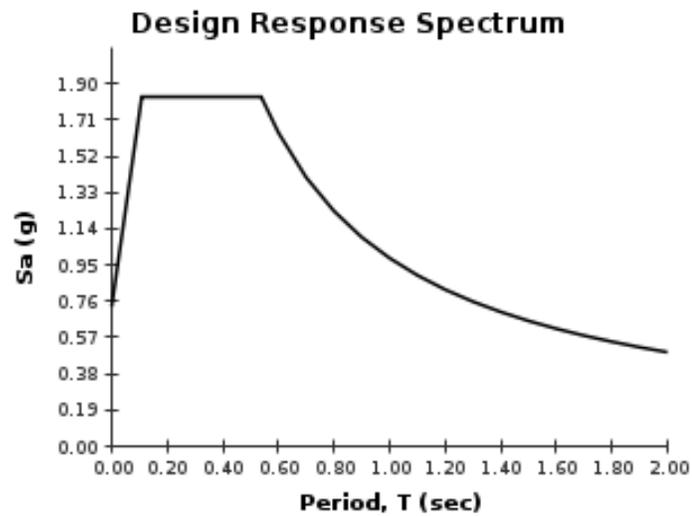


Figure 2.0.1 Design Response Spectrum for Rubio Cañon facilities [3]

Revision: 0	Date: 8/19/16	Revision:	Date:	Revision:	Date:
By: GMR	Ck:	By:	Ck:	By:	Ck:

Calculation Title: RUBIO CAÑON CalARP SEISMIC REVALIDATION	Page: 9
Section: 2.0 Seismic Hazards	Sheet: 3 of 4

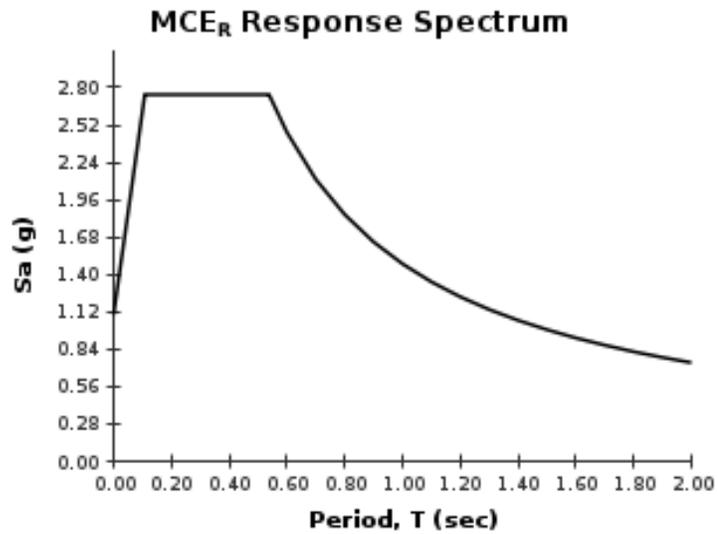


Figure 2.0.2 MCE Response Spectrum for Rubio Cañon facilities [3]

Revision: 0	Date: 8/19/16	Revision:	Date:	Revision:	Date:
By: GMR	Ck:	By:	Ck:	By:	Ck:

Calculation Title: RUBIO CAÑON CalARP SEISMIC REVALIDATION	Page: 10
Section: 2.0 Seismic Hazards	Sheet: 4 of 4

**Comparison of 2014 CalARP Seismic Requirement to 1979 Uniform Building Code:**

The facilities were originally built in 1940. The Chlorine systems were added later and appear to be of 1980's vintage.

2014 CalARP Seismic Demand -

$$\frac{E_e}{Q}$$

$E_e$  is the unreduced elastic earthquake load based upon ground motion determined in ASCE 7-10.  $E_e = 1.83 W_p \times 0.7$

Q is the ductility based reduction factor per Table 1 of CalARP Guidance Document [2].  $Q=4$  for anchored vessels

1979 Uniform Building Code Seismic Demand –

$$F_p = Z I C_p W_p$$

$$F_p = 0.20 W_p \quad \text{for equipment at grade}$$

Seismic Demands:

1979 UBC	2014 CalARP
0.20 $W_p$	0.32 $W_p$

The current CalARP seismic demand exceeds the original design seismic load by 60%. Due to their minimal seismic loading, the chlorine equipment and buildings should perform adequately during a seismic event if all of the deficiencies are corrected.

Revision: 0	Date: 8/19/16	Revision:	Date:	Revision:	Date:
By: GMR	Ck:	By:	Ck:	By:	Ck:

Calculation Title: RUBIO CAÑON CalARP SEISMIC REVALIDATION	Page: 11
Section: 3.0 Walkdown Findings	Sheet: 1 of 7

The chlorine equipment, associated piping and the findings list is in Table 3.0.1.

A prior evaluation [8] had five recommendations. All the Chlorine Cylinders required chains around the base of the cylinders and the existing chains should be replaced with heavy welded chains. Also the number of cylinders chained should be limited to two per chain system. The weigh scale at the Calaveras Reservoir should be bolted to the floor and the Pump at the Ames Treatment was missing anchor bolt nuts and washers.

The current walkdown found all but one of the prior recommendations have been addressed. The Pump was replaced and it requires anchorage to the concrete floor. See Figure 3.0.1.

Additionally the chains around the Cylinders at the Ames Treatment Plant should be tightened. See Figure 3.0.2. Add missing nut at the top bracket of the Cylinder Scale. See Figure 3.0.3. Additional anchor bolts are required at the base of the Cylinder Scale. See Figure 3.0.4. Weigh scale may be strapped to the CMU wall near the top bracket in lieu of the additional anchor bolts at base.

All remaining component, piping and buildings were found to be adequate.

These opinions are based upon a visual inspection only of the conditions observed on the date of the walkdown. No calculations, further evaluations, or investigations have been prepared to support or counter these opinions.

Revision: 0	Date: 8/19/16	Revision:	Date:	Revision:	Date:
By: GMR	Ck:	By:	Ck:	By:	Ck:

Calculation Title: RUBIO CAÑON CalARP SEISMIC REVALIDATION	Page: 12
Section: 3.0 Walkdown Findings	Sheet: 2 of 7

**Figueroa Sump Basin:**

Component	Findings	Recommendations
150 Pound Cylinders (2)	Adequate	-
Vacuum Regulators (2)	Adequate	-
Flow Meter (1)	Adequate	-
Injector (1)	Adequate	-
Chlorine Sensor w/ SCADA monitoring	Adequate	-
Piping	Adequate	-
Building	Adequate	-

**Calaveras Reservoir (Standby):**

Component	Findings	Recommendations
150 Pound Cylinders (1)	Further Evaluation Required	Not on site
Vacuum Regulator w/ Flow Meter (1)	Further Evaluation Required	Not on site
Injector (1)	Adequate	-
Chlorine Sensor w/ SCADA monitoring	Adequate	-
Piping/Tubing	Adequate	-
Building	Adequate	-

Table 3.0.1 Chlorine Process System Findings List  
(Continued on next page)

Revision: 0	Date: 8/19/16	Revision:	Date:	Revision:	Date:
By: GMR	Ck:	By:	Ck:	By:	Ck:

Calculation Title: RUBIO CAÑON CalARP SEISMIC REVALIDATION	Page: 13
Section: 3.0 Walkdown Findings	Sheet: 3 of 7

**Maiden Lane Reservoir (Not Connected – Standby):**

Component	Findings	Recommendations
150 Pound Cylinder (1)	Further Evaluation Required	Not on site
Vacuum Regulator (1)	Further Evaluation Required	Not on site
Flow Meter (1)	Adequate	-
Injector (1)	Adequate	-
Chlorine Sensor w/ SCADA monitoring	Adequate	-
Piping/tubing	Adequate	-
Building	Adequate	-

**Ames Treatment Plant:**

Component	Findings	Recommendations
150 Pound Cylinders (2 on scale, 12 in storage)	Not Adequate	Tighten chains, add missing nut and anchor bolts at weigh scale
Vacuum Regulators (2)	Adequate	-
Flow Meter (1)	Adequate	-
Injector (1)	Not Adequate	Anchor associated pump to concrete
Chlorine Sensor w/ SCADA monitoring	Adequate	-
Piping/tubing	Adequate	-
Buildings	Adequate	-

Table 3.0.1 Chlorine Process System Findings List  
(Continued)

Revision: 0	Date: 8/19/16	Revision:	Date:	Revision:	Date:
By: GMR	Ck:	By:	Ck:	By:	Ck:

Calculation Title: RUBIO CAÑON CalARP SEISMIC REVALIDATION	Page: 14
Section: 3.0 Walkdown Findings	Sheet: 4 of 7



Figure 3.0.1 Anchor the pump at the Ames Treatment Plant

Revision: 0	Date: 8/19/16	Revision:	Date:	Revision:	Date:
By: GMR	Ck:	By:	Ck:	By:	Ck:

Calculation Title: RUBIO CAÑON CalARP SEISMIC REVALIDATION	Page: 15
Section: 3.0 Walkdown Findings	Sheet: 5 of 7



Figure 3.0.2 Tighten chains around stored cylinders at Ames Treatment Plant

Revision: 0	Date: 8/19/16	Revision:	Date:	Revision:	Date:
By: GMR	Ck:	By:	Ck:	By:	Ck:

Calculation Title: RUBIO CAÑON CalARP SEISMIC REVALIDATION	Page: 16
Section: 3.0 Walkdown Findings	Sheet: 6 of 7



Figure 3.0.3 Add missing nut at top bracket on the weigh scale

Revision: 0	Date: 8/19/16	Revision:	Date:	Revision:	Date:
By: GMR	Ck:	By:	Ck:	By:	Ck:

Calculation Title: RUBIO CAÑON CalARP SEISMIC REVALIDATION	Page: 17
Section: 3.0 Walkdown Findings	Sheet: 7 of 7



Figure 3.0.4 Additional anchor bolts required at the Ames Treatment Plant weigh scale

Revision: 0	Date: 8/19/16	Revision:	Date:	Revision:	Date:
By: GMR	Ck:	By:	Ck:	By:	Ck:

Calculation Title: RUBIO CAÑON CalARP SEISMIC REVALIDATION	Page: 18
Section: 4.0 References	Sheet: 1 of 1

- 1) California Code of Regulations, Title 19, Division 2, Chapter 4.5, "California Accidental Release Prevention (CalARP) Program Detailed Analysis," 2004.
- 2) Guidance For California Accidental Release Prevention (CalARP) Program Seismic Assessments, Prepared for the Administering Agency (AA) Subcommittee Region I Local Emergency Planning Committee (LEPC), Prepared by CalARP Program Seismic Guidance Committee, March 2014.
- 3) United States Geological Survey's U.S. Seismic Design Maps <http://earthquake.usgs.gov/designmaps/us/application.php>.
- 4) United States Geological Survey's 2009 Earthquake Probability Mapping, <http://geohazards.usgs.gov/eqprob/2009/index.php>.
- 5) "Maps of Known Active Faults Near-Source Zones in California and Adjacent Portions of Nevada," 1997 Uniform Building Code.
- 6) Email from Jeanne Lemaster (Tracer) to Ken Saunders (Argos), "Rubio Canyon Seismic Assessment Revalidation," August 18, 2016.
- 7) California Emergency Management Agency/Hazard Mitigation Portal, <http://myhazards.caloes.ca.gov>, September 22, 2011.
- 8) Argos Engineers Report 11-402, "Rubio Cañon Land & Water Association Chlorine Process CalARP Seismic Evaluation," August, 2011, Revision 0.
- 9) California Department of Conservation, Division of Mines and Geology, "State of California seismic Hazard Zones," Mt. Wilson Quadrangle, December 2007.

Revision: 0	Date: 8/19/16	Revision:	Date:	Revision:	Date:
By: GMR	Ck:	By:	Ck:	By:	Ck:

Calculation Title: RUBIO CAÑON CalARP SEISMIC REVALIDATION	Page: A1
Section: Appendix A	Sheet: 1 of 2

Prior Recommendations Status

Revision: 0	Date: 8/19/16	Revision:	Date:	Revision:	Date:
By: GMR	Ck:	By:	Ck:	By:	Ck:

Calculation Title: RUBIO CAÑON CalARP SEISMIC REVALIDATION	Page: A2
Section: Appendix A	Sheet: 2 of 2

**Rubio Cañon Facilities Seismic Evaluation  
CalARP Prior Recommendations and Status**

Date:	9/1//16	By:	GMR
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Item	Location	Comment	Fixed?		
			Y	N	Note
1	All Chlorine Cylinders	<b>Add chains at bottom</b>	√		
2	Chlorine Cylinders (except at Ames Treatment)	<b>Replace existing chains with heavier welded chains</b>	√		
3	Ames Treatment – Chlorine Cylinders	<b>Limit number of cylinders to two per chain system</b>	√		
4	Calaveras Reservoir – Weigh Scale	<b>Bolt to floor</b>	√		
5	Ames Treatment – Pump connected to Injector	<b>Add missing nuts and washers at anchors</b>		√	

Reference: [8]

Notes:

Revision: 0	Date: 8/19/16	Revision:	Date:	Revision:	Date:
By: GMR	Ck:	By:	Ck:	By:	Ck:

Calculation Title: RUBIO CAÑON CalARP SEISMIC REVALIDATION	Page: B1
Section: Appendix B	Sheet: 1 of 29

Walkdown Forms

Revision: 0	Date: 8/19/16	Revision:	Date:	Revision:	Date:
By: GMR	Ck:	By:	Ck:	By:	Ck:

# Argos Engineers

## Rubio Cañon Facilities Seismic Evaluation CalARP Walk Down Review Sheet Rigid Mechanical Equipment

FIGUEROA

Component ID:	150lb CYLINDERS (2)	Date:	9/1/16
Component Type:	VERT. P.V.	By:	GR

**Evaluation Summary** (Circle one)

Adequate

Not Adequate

Further Evaluation Required

**Bolting of Equipment to Foundation/Structure**

	Y	N		Y	N
Size of bolts OK	✓		Number of bolts OK	✓	
Missing/loose bolts		✓	Bolt spacing/edge distance	✓	
Bolt damage		✓	Bolt corrosion		✓
Concrete quality	✓		Weld quality	✓	

Notes 2 HEAVY CHAIRS, TOP & BOTT, TO  
SCALE. SCALE IS BOLTED TO CONCRETE  
W/ (4) 3/8" φ A.B.'S.

**Interaction/Deflection with Adjacent Structures or Equipment**

Risk of damage from adjacent component failure Y  N

If yes, list adjacent components and type of risk if known

INSIDE BLDG.

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**Notes and Sketches** (over)

# Argos Engineers

## Rubio Cañon Facilities Seismic Evaluation CalARP Walk Down Review Sheet Rigid Mechanical Equipment

FIGUEROA

Component ID:	VACUUM REGULATORS	Date:	9/1/16
Component Type:	- (2)	By:	GR

**Evaluation Summary** (Circle one)

Adequate                     
  Not Adequate                     
  Further Evaluation Required

**Bolting of Equipment to Foundation/Structure**

	Y	N		Y	N
Size of bolts OK			Number of bolts OK		
Missing/loose bolts			Bolt spacing/edge distance		
Bolt damage			Bolt corrosion		
Concrete quality			Weld quality		

} N/A                      } N/A

Notes THREADED TO TOPS OF CHLORINE CYLINDERS

**Interaction/Deflection with Adjacent Structures or Equipment**

Risk of damage from adjacent component failure Y  N

If yes, list adjacent components and type of risk if known

INSIDE BUILDING

**Notes and Sketches** (over)

# Argos Engineers

## Rubio Cañon Facilities Seismic Evaluation CalARP Walk Down Review Sheet Rigid Mechanical Equipment

FIGUEROA

Component ID:	FLOW METER (1)	Date:	9/1/16
Component Type:	VERT. P.V.	By:	GR

**Evaluation Summary** (Circle one)

Adequate

Not Adequate

Further Evaluation Required

**Bolting of Equipment to Foundation/Structure**

	Y	N		Y	N
Size of bolts OK	✓		Number of bolts OK	✓	
Missing/loose bolts		✓	Bolt spacing/edge distance	✓	
Bolt damage		✓	Bolt corrosion		✓
Concrete quality	✓		Weld quality	N/A	

Notes (2) 1/4"  $\phi$  SCREWS TO CMU WALL

**Interaction/Deflection with Adjacent Structures or Equipment**

Risk of damage from adjacent component failure Y  N

If yes, list adjacent components and type of risk if known

ATTACHED TO BUILDING

**Notes and Sketches** (over)

# Argos Engineers

## Rubio Cañon Facilities Seismic Evaluation CalARP Walk Down Review Sheet Rigid Mechanical Equipment

*FIGUEROA*

Component ID:	<i>INJECTOR (1)</i>	Date:	<i>9/1/16</i>
Component Type:	<i>-</i>	By:	<i>GR</i>

**Evaluation Summary** (Circle one)

Adequate

Not Adequate

Further Evaluation Required

**Bolting of Equipment to Foundation/Structure**

	Y	N		Y	N
Size of bolts OK	<input checked="" type="checkbox"/>		Number of bolts OK	<input checked="" type="checkbox"/>	
Missing/loose bolts		<input checked="" type="checkbox"/>	Bolt spacing/edge distance	<input checked="" type="checkbox"/>	
Bolt damage		<input checked="" type="checkbox"/>	Bolt corrosion		<input checked="" type="checkbox"/>
Concrete quality	<input checked="" type="checkbox"/>		Weld quality	<i>N/A</i>	

Notes *THREADED TO TUBING & ANCHORED TO CMU WALL*

**Interaction/Deflection with Adjacent Structures or Equipment**

Risk of damage from adjacent component failure Y  N

If yes, list adjacent components and type of risk if known

*INSIDE BLDG*

**Notes and Sketches** (over)

# Argos Engineers

## Rubio Cañon Facilities Seismic Evaluation CalARP Walk Down Review Sheet Rigid Mechanical Equipment

FIGUEROA

Component ID:	CHLORINE SENSOR w/	Date:	9/1/16
Component Type:	SCADA MONITORING	By:	GR.

**Evaluation Summary** (Circle one)

Adequate

Not Adequate

Further Evaluation Required

**Bolting of Equipment to Foundation/Structure**

	Y	N		Y	N
Size of bolts OK	✓		Number of bolts OK	✓	
Missing/loose bolts		✓	Bolt spacing/edge distance	✓	
Bolt damage		✓	Bolt corrosion		✓
Concrete quality	✓		Weld quality	N/A	

Notes SCREWED TO CMU WALL

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**Interaction/Deflection with Adjacent Structures or Equipment**

Risk of damage from adjacent component failure Y  N

If yes, list adjacent components and type of risk if known

INSIDE BLDG.

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**Notes and Sketches** (over)

# Argos Engineers

## Rubio Cañon Facilities Seismic Evaluation CalARP Walk Down Review Sheet Piping

FIGUEROA

Line Number:	TUBING	Date:	9/1/16
Drawing Number:	—	By:	GR.

**Evaluation Summary** (Circle one)

Adequate

Not Adequate

Further Evaluation Required

Inspection Attributes				
	Yes	No	Inac	Comments
Piping				
Damaged		✓		
Corrosion		✓		
Flanged/Threaded Joints	✓			
Buried Run		✓		
Adequate Branch Flexibility	✓			
Rigidly Spans Components		✓		
Supports				
Piping Spans OK	✓			
Missing Hardware		✓		
Corrosion		✓		
Hardware Damaged/Loose		✓		
Seismic Interaction				
Adequate Clearance	✓			
Adjacent Comps. Secure	✓			
Clearance at AOVs/MOVs	✓			

# Argos Engineers

TIGWELDA

Line Number:	TUBING	Date:	9/1/16
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## Notes and Sketches

/

# Argos Engineers

## Rubio Cañon Facilities Seismic Evaluation CalARP Walk Down Review Sheet Rigid Mechanical Equipment

CALAVERAS

Component ID:	150 lbs. CYLINDER (1)	Date:	9/1/16
Component Type:	VERT. P.V.	By:	GR

### Evaluation Summary (Circle one)

Adequate

Not Adequate

Further Evaluation Required

### Bolting of Equipment to Foundation/Structure

	Y	N		Y	N
Size of bolts OK			Number of bolts OK		
Missing/loose bolts			Bolt spacing/edge distance		
Bolt damage			Bolt corrosion		
Concrete quality			Weld quality		

Notes NOT ON SITE

### Interaction/Deflection with Adjacent Structures or Equipment

Risk of damage from adjacent component failure Y \_\_\_ N \_\_\_

If yes, list adjacent components and type of risk if known

Notes and Sketches (over)

NO CYLINDER

# Argos Engineers

## Rubio Cañon Facilities Seismic Evaluation CalARP Walk Down Review Sheet Rigid Mechanical Equipment

*CALAVE RAS*

Component ID:	<i>VACUUM REGULATOR</i>	Date:	<i>9/1/16</i>
Component Type:		By:	<i>GR.</i>

### Evaluation Summary (Circle one)

Adequate

Not Adequate

Further Evaluation Required

### Bolting of Equipment to Foundation/Structure

	Y	N		Y	N
Size of bolts OK			Number of bolts OK		
Missing/loose bolts			Bolt spacing/edge distance		
Bolt damage			Bolt corrosion		
Concrete quality			Weld quality		

Notes *NOT ON SITE*

### Interaction/Deflection with Adjacent Structures or Equipment

Risk of damage from adjacent component failure Y \_\_\_ N \_\_\_

If yes, list adjacent components and type of risk if known

Notes and Sketches (over)

*NOT ON SITE.*

# Argos Engineers

## Rubio Cañon Facilities Seismic Evaluation CalARP Walk Down Review Sheet Rigid Mechanical Equipment

*CALAVERAS*

Component ID:	<i>INJECTOR (1)</i>	Date:	<i>9/1/16</i>
Component Type:		By:	<i>GR</i>

**Evaluation Summary** (Circle one)

Adequate

Not Adequate

Further Evaluation Required

**Bolting of Equipment to Foundation/Structure**

	Y	N		Y	N
Size of bolts OK			Number of bolts OK		
Missing/loose bolts	<i>} N/A</i>		Bolt spacing/edge distance	<i>} N/A</i>	
Bolt damage			Bolt corrosion		
Concrete quality			Weld quality		

Notes *THREADED IN LINE W/ PVC PIPING*

**Interaction/Deflection with Adjacent Structures or Equipment**

Risk of damage from adjacent component failure Y  N

If yes, list adjacent components and type of risk if known

*INSIDE BUILDING*

**Notes and Sketches** (over)

# Argos Engineers

## Rubio Cañon Facilities Seismic Evaluation CalARP Walk Down Review Sheet Rigid Mechanical Equipment

*CAMAVERAS*

Component ID:	<i>CM CHLORINE SENSOR w/</i>	Date:	<i>9/1/16</i>
Component Type:	<i>SCADA MONITORING</i>	By:	<i>GR</i>

**Evaluation Summary** (Circle one)

Adequate                     
  Not Adequate                     
  Further Evaluation Required

**Bolting of Equipment to Foundation/Structure**

		Y	N			Y	N
Size of bolts OK		✓		Number of bolts OK		✓	
Missing/loose bolts			✓	Bolt spacing/edge distance		✓	
Bolt damage			✓	Bolt corrosion			✓
Concrete quality	<i>N/A</i>			Weld quality	<i>N/A</i>		

Notes *BOLTED TO FIBERGLASS BUILDING WALL*

**Interaction/Deflection with Adjacent Structures or Equipment**

Risk of damage from adjacent component failure Y  N

If yes, list adjacent components and type of risk if known

*INSIDE BLDG.*

**Notes and Sketches** (over)

# Argos Engineers

## Rubio Cañon Facilities Seismic Evaluation CalARP Walk Down Review Sheet Piping

*CANAVERAS*

Line Number:	<i>PIPING / TUBING</i>	Date:	<i>9/1/16</i>
Drawing Number:		By:	<i>GR</i>

**Evaluation Summary** (Circle one)

Adequate

Not Adequate

Further Evaluation Required

Inspection Attributes				
	Yes	No	Inac	Comments
Piping				
Damaged		✓		
Corrosion		✓		
Flanged/Threaded Joints	✓			
Buried Run		✓		
Adequate Branch Flexibility	✓			
Rigidly Spans Components		✓		
Supports				
Piping Spans OK	✓			
Missing Hardware		✓		
Corrosion		✓		
Hardware Damaged/Loose		✓		
Seismic Interaction				
Adequate Clearance	✓			
Adjacent Comps. Secure	✓			
Clearance at AOVs/MOVs	✓			

# Argos Engineers

CAVAVERAS

Line Number:	PIPING / TUBING	Date:	9/1/16
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## Notes and Sketches

/

# Argos Engineers

## Rubio Cañon Facilities Seismic Evaluation CalARP Walk Down Review Sheet Rigid Mechanical Equipment

*MAIDEN LAKE*

Component ID:	<i>150 lbs. CYLINDER</i>	Date:	<i>9/1/16</i>
Component Type:	<i>VERT. P.V.</i>	By:	<i>GR</i>

**Evaluation Summary** (Circle one)

Adequate

Not Adequate

Further Evaluation Required

**Bolting of Equipment to Foundation/Structure**

	Y	N		Y	N
Size of bolts OK			Number of bolts OK		
Missing/loose bolts			Bolt spacing/edge distance		
Bolt damage			Bolt corrosion		
Concrete quality			Weld quality		

Notes \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**Interaction/Deflection with Adjacent Structures or Equipment**

Risk of damage from adjacent component failure Y \_\_\_ N \_\_\_

If yes, list adjacent components and type of risk if known

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**Notes and Sketches** (over)

*NOT ON SITE*

# Argos Engineers

## Rubio Cañon Facilities Seismic Evaluation CalARP Walk Down Review Sheet Rigid Mechanical Equipment

MAIDEN LANE

Component ID:	VACUUM REGULATOR	Date:	9/1/16
Component Type:	—	By:	GR

### Evaluation Summary (Circle one)

Adequate

Not Adequate

Further Evaluation Required

### Bolting of Equipment to Foundation/Structure

	Y	N		Y	N
Size of bolts OK			Number of bolts OK		
Missing/loose bolts			Bolt spacing/edge distance		
Bolt damage			Bolt corrosion		
Concrete quality			Weld quality		

Notes \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

### Interaction/Deflection with Adjacent Structures or Equipment

Risk of damage from adjacent component failure Y \_\_\_ N \_\_\_

If yes, list adjacent components and type of risk if known

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

### Notes and Sketches (over)

NOT ON SITE

# Argos Engineers

## Rubio Cañon Facilities Seismic Evaluation CalARP Walk Down Review Sheet Rigid Mechanical Equipment

*MAIDEN LANE*

Component ID:	<i>FLOW METER</i>	Date:	<i>9/1/16</i>
Component Type:	<i>VERT. P.V.</i>	By:	<i>GR</i>

**Evaluation Summary** (Circle one)

Adequate

Not Adequate

Further Evaluation Required

**Bolting of Equipment to Foundation/Structure**

	Y	N		Y	N
Size of bolts OK	✓		Number of bolts OK	✓	
Missing/loose bolts		✓	Bolt spacing/edge distance	✓	
Bolt damage		✓	Bolt corrosion		✓
Concrete quality <i>N/A</i>			Weld quality <i>N/A</i>		

Notes *(2) 1/4" SCREWS TO FIBERGLASS BUILDING WALL.*

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**Interaction/Deflection with Adjacent Structures or Equipment**

Risk of damage from adjacent component failure Y  N

If yes, list adjacent components and type of risk if known

*ATTACHED TO BLDG*

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**Notes and Sketches** (over)

# Argos Engineers

## Rubio Cañon Facilities Seismic Evaluation CalARP Walk Down Review Sheet Rigid Mechanical Equipment

*MAIDEN LAKE*

Component ID:	<i>INJECTOR (1)</i>	Date:	<i>9/1/16</i>
Component Type:		By:	<i>CR</i>

**Evaluation Summary** (Circle one)

Adequate

Not Adequate

Further Evaluation Required

**Bolting of Equipment to Foundation/Structure**

	Y	N		Y	N
Size of bolts OK			Number of bolts OK		
Missing/loose bolts	<i>} N/A</i>		Bolt spacing/edge distance	<i>} N/A</i>	
Bolt damage			Bolt corrosion		
Concrete quality			Weld quality		

Notes *THREADED INTO PVC PIPING.*

**Interaction/Deflection with Adjacent Structures or Equipment**

Risk of damage from adjacent component failure Y  N

If yes, list adjacent components and type of risk if known

*INSIDE BLDG.*

**Notes and Sketches** (over)

# Argos Engineers

## Rubio Cañon Facilities Seismic Evaluation CalARP Walk Down Review Sheet Rigid Mechanical Equipment

*MAIDEN CANYON*

Component ID:	<i>CHLORINE SENSOR W,</i>	Date:	<i>9/1/16</i>
Component Type:	<i>SCADA MONITORING</i>	By:	<i>GR</i>

**Evaluation Summary** (Circle one)

**Adequate**

Not Adequate

Further Evaluation Required

**Bolting of Equipment to Foundation/Structure**

	Y	N		Y	N
Size of bolts OK	✓		Number of bolts OK	✓	
Missing/loose bolts		✓	Bolt spacing/edge distance	✓	
Bolt damage		✓	Bolt corrosion		✓
Concrete quality <i>N/A</i>			Weld quality <i>N/A</i>		

Notes *BOLTED TO FIBERGLASS BLDG. WALL.*

**Interaction/Deflection with Adjacent Structures or Equipment**

Risk of damage from adjacent component failure Y  N

If yes, list adjacent components and type of risk if known

*INSIDE BLDG.*

**Notes and Sketches** (over)

# Argos Engineers

## Rubio Cañon Facilities Seismic Evaluation CalARP Walk Down Review Sheet Piping

MAIDEN LAKE

Line Number:	PIPING / TUBING	Date:	9/1/16
Drawing Number:	-	By:	GR

**Evaluation Summary** (Circle one)

Adequate

Not Adequate

Further Evaluation Required

Inspection Attributes				
	Yes	No	Inac	Comments
Piping				
Damaged		✓		
Corrosion		✓		
Flanged/Threaded Joints	✓			
Buried Run		✓		
Adequate Branch Flexibility	✓			
Rigidly Spans Components		✓		
Supports				
Piping Spans OK	✓			
Missing Hardware		✓		
Corrosion		✓		
Hardware Damaged/Loose		✓		
Seismic Interaction				
Adequate Clearance	✓			
Adjacent Comps. Secure	✓			
Clearance at AOVs/MOVs	✓			

# Argos Engineers

MAIDEN LAKE

Line Number:	PIPING / TUBING	Date:	9/1/16
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## Notes and Sketches

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# Argos Engineers

## Rubio Cañon Facilities Seismic Evaluation CalARP Walk Down Review Sheet Rigid Mechanical Equipment

*AMES TREATMENT*

Component ID:	150 lb. CYLINDERS IN	Date:	9/1/16
Component Type:	VERT. P.V. STORAGE	By:	GR

**Evaluation Summary** (Circle one)

Adequate

Not Adequate

Further Evaluation Required

**Bolting of Equipment to Foundation/Structure**

	Y	N		Y	N
Size of bolts OK	✓		Number of bolts OK	✓	
Missing/loose bolts		✓	Bolt spacing/edge distance	✓	
Bolt damage		✓	Bolt corrosion		✓
Concrete quality	✓		Weld quality	N/A	

Notes TOP & BOTTOM CHAINS AROUND 2  
CYLINDERS, EA. & BOLTED TO S.M.V. WALL

**Interaction/Deflection with Adjacent Structures or Equipment**

Risk of damage from adjacent component failure Y  N

If yes, list adjacent components and type of risk if known

INSIDE BLDG

**Notes and Sketches** (over)

TIGHTEN CHAINS AROUND  
CYLINDERS

# Argos Engineers

## Rubio Cañon Facilities Seismic Evaluation CalARP Walk Down Review Sheet Rigid Mechanical Equipment

*AMES TREATMENT*

Component ID:	<i>150 lbs. CYLINDERS (2)</i>	Date:	<i>9/11/16</i>
Component Type:	<i>VERT. P.V.</i>	By:	<i>GR</i>

**Evaluation Summary** (Circle one)

Adequate

**Not Adequate**

Further Evaluation Required

**Bolting of Equipment to Foundation/Structure**

	Y	N		Y	N
Size of bolts OK	✓		Number of bolts OK		✓
Missing/loose bolts		✓	Bolt spacing/edge distance	✓	
Bolt damage		✓	Bolt corrosion		✓
Concrete quality	✓		Weld quality	✓	

Notes *(2) 3/8" φ BOLTS BACK OF SCALE.*  
*(1) 3/8" φ BOLT IN FRONT OF SCALE*  
*TIGHTEN CHAINS AROUND CYLINDER*

**Interaction/Deflection with Adjacent Structures or Equipment**

Risk of damage from adjacent component failure Y ✓ N     

If yes, list adjacent components and type of risk if known

*INSIDE BLDG.*

**Notes and Sketches** (over)

*ADD ANCHOR BOLT TO FRONT  
OF CYLINDER SCALE &  
TIGHTEN CHAINS AROUND CYLINDERS  
& ADD MISSING NUT @  
TOP SUPPORT.*

# Argos Engineers

## Rubio Cañon Facilities Seismic Evaluation CalARP Walk Down Review Sheet Rigid Mechanical Equipment

*AMES TREATMENT*

Component ID:	<i>VACUUM REGULATORS (2)</i>	Date:	<i>9/1/16</i>
Component Type:	<i>-</i>	By:	<i>CR</i>

**Evaluation Summary** (Circle one)

Adequate

Not Adequate

Further Evaluation Required

**Bolting of Equipment to Foundation/Structure**

	Y	N		Y	N
Size of bolts OK			Number of bolts OK		
Missing/loose bolts	<i>N/A</i>		Bolt spacing/edge distance	<i>N/A</i>	
Bolt damage			Bolt corrosion		
Concrete quality			Weld quality		

Notes *ATTACHED TO TOPS OF CYLINDERS*

**Interaction/Deflection with Adjacent Structures or Equipment**

Risk of damage from adjacent component failure Y  N

If yes, list adjacent components and type of risk if known

*INSIDE BLOG*

**Notes and Sketches** (over)

# Argos Engineers

## Rubio Cañon Facilities Seismic Evaluation CalARP Walk Down Review Sheet Rigid Mechanical Equipment

AMES TREATMENT

Component ID:	Flow Meter (1)	Date:	9/1/16
Component Type:	VERT. P.V.	By:	GR

### Evaluation Summary (Circle one)

Adequate

Not Adequate

Further Evaluation Required

### Bolting of Equipment to Foundation/Structure

	Y	N		Y	N
Size of bolts OK	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Number of bolts OK	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Missing/loose bolts	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Bolt spacing/edge distance	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Bolt damage	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Bolt corrosion	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Concrete quality	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Weld quality	N/A	<input type="checkbox"/>

Notes (2) 1/4"  $\phi$  SCREWS INTO CMU WALL

### Interaction/Deflection with Adjacent Structures or Equipment

Risk of damage from adjacent component failure Y  N

If yes, list adjacent components and type of risk if known

ATTACHED TO BLDG

### Notes and Sketches (over)

# Argos Engineers

## Rubio Cañon Facilities Seismic Evaluation CalARP Walk Down Review Sheet Rigid Mechanical Equipment

*AMES TREATMENT*

Component ID:	<i>INJECTOR (1)</i>	Date:	<i>9/1/16</i>
Component Type:		By:	<i>GR</i>

**Evaluation Summary** (Circle one)

Adequate

**Not Adequate**

Further Evaluation Required

**Bolting of Equipment to Foundation/Structure**

	Y	N		Y	N
Size of bolts OK			Number of bolts OK		
Missing/loose bolts	<i>} N/A</i>		Bolt spacing/edge distance	<i>} N/A</i>	
Bolt damage			Bolt corrosion	<i>} N/A</i>	
Concrete quality	<input checked="" type="checkbox"/>		Weld quality		

Notes

*THREADED TO PVC PIPING.*

*ASSOCIATED PUMP IS NOT ANCHORED*

**Interaction/Deflection with Adjacent Structures or Equipment**

Risk of damage from adjacent component failure Y  N

If yes, list adjacent components and type of risk if known

*INSIDE BLDG*

**Notes and Sketches** (over)

*ANCHOR ASSOCIATED PUMP*

# Argos Engineers

## Rubio Cañon Facilities Seismic Evaluation CalARP Walk Down Review Sheet Rigid Mechanical Equipment

*AMES TREATMENT*

Component ID:	<i>CHLORINE SENSOR w/</i>	Date:	<i>9/1/16</i>
Component Type:	<i>SCADA MONITORING</i>	By:	<i>GR</i>

**Evaluation Summary** (Circle one)

Adequate

Not Adequate

Further Evaluation Required

**Bolting of Equipment to Foundation/Structure**

	Y	N		Y	N
Size of bolts OK	✓		Number of bolts OK	✓	
Missing/loose bolts		✓	Bolt spacing/edge distance	✓	
Bolt damage		✓	Bolt corrosion		✓
Concrete quality	✓		Weld quality <i>N/A</i>		

Notes *SCREWS INTO CMU WALL*

**Interaction/Deflection with Adjacent Structures or Equipment**

Risk of damage from adjacent component failure Y  N

If yes, list adjacent components and type of risk if known

*INSIDE BLDG*

**Notes and Sketches** (over)

# Argos Engineers

## Rubio Cañon Facilities Seismic Evaluation CalARP Walk Down Review Sheet Piping

*AMES TREATMENT*

Line Number:	<i>PIPING / TUBING</i>	Date:	<i>9/1/16</i>
Drawing Number:		By:	<i>GR</i>

**Evaluation Summary** (Circle one)

Adequate

Not Adequate

Further Evaluation Required

Inspection Attributes				
	Yes	No	Inac	Comments
Piping				
Damaged		✓		
Corrosion		✓		
Flanged/Threaded Joints	✓			
Buried Run	✓			<i>PARTIAL TO INJECTION POINT</i>
Adequate Branch Flexibility	✓			
Rigidly Spans Components		✓		
Supports				
Piping Spans OK	✓			
Missing Hardware		✓		
Corrosion		✓		
Hardware Damaged/Loose		✓		
Seismic Interaction				
Adequate Clearance	✓			
Adjacent Comps. Secure	✓			
Clearance at AOVs/MOVs	✓			

# Argos Engineers

AMES TREATMENT

Line Number:	PIPING / TUBING.	Date:	9/1/16
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## Notes and Sketches

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