

Appendix H: Safety Element Resources

I. Active Faults

A significant number of known active earthquake faults are located throughout Los Angeles County. The locations of active faults are mapped to understand the potential likelihood and severity of seismic activity for existing and proposed development. Faults that are considered active by the State of California are included within the Alquist-Priolo Earthquake Fault Zones. Additional faults may be considered active by Los Angeles County and other jurisdictions based on seismic and geological data. Information on known active and inactive faults can be accessed through the source(s) below.

U.S. Geological Survey's Quaternary Faults Database: This source provides fault trace locations, fault name, section name, age, dip direction, slip rate, slip sense, fault class, strike, and fault length, and other fault characteristics.

Source:

U.S. Geological Survey and California Geological Survey, Quaternary fault and fold database for the United States, accessed October 13, 2021, at: <https://www.usgs.gov/natural-hazards/earthquake-hazards/faults>.

II. Zones of Required Investigation

The Seismic Hazards Mapping Act (SHMA) of 1990 (Public Resources Code, Chapter 7.8, Section 2690-2699.6) directs the Department of Conservation, California Geological Survey to identify and map areas prone to earthquake hazards of liquefaction, earthquake-induced landslides and amplified ground shaking. The purpose of the SHMA is to reduce the threat to public safety and to minimize the loss of life and property by identifying and mitigating these seismic hazards. The SHMA was passed by the legislature following the 1989 Loma Prieta earthquake.

A Seismic Hazard Zone is a regulatory zone that encompasses areas prone to liquefaction (failure of water-saturated soil) and earthquake-induced landslides.

Liquefaction occurs when loose, water-saturated sediments lose strength and fail during strong ground shaking. Liquefaction is defined as the transformation of granular material from a solid state into a liquefied state as a consequence of increased pore-water pressure. The process of zoning for liquefaction combines Quaternary geologic mapping, historical ground-water information and subsurface geotechnical data. Required Investigation boundaries are based on the presence of shallow historic groundwater (< 40 feet depth) in uncompacted sands and silts deposited during the last 15,000 years and sufficiently strong levels of earthquake shaking expected during the next 50 years.

Landslides tend to occur in weak soil and rock on sloping terrain. The landslide hazard Zone of Required Investigation boundaries generally indicate steep hillslopes composed of weak materials that may fail when shaken by an earthquake. The process for zoning earthquake-induced landslides incorporates expected future earthquake shaking, existing landslide features, slope gradient, and strength of hillslope materials.

The SHMA requires the State Geologist to establish regulatory zones (Zones of Required Investigation) and to issue appropriate maps (Seismic Hazard Zone maps). These maps are distributed to all affected cities, counties, and state agencies for their use in planning and controlling construction and development. Single family frame dwellings up to two stories not part of a development of four or more units are exempt from the state requirements. Information on fault, liquefaction, and landslide zones can be accessed through the source(s) below.

California Department of Conservation, California Geological Survey's Earthquake Zones of Required Investigation: This source depicts California Geological Survey Official Zone Maps for fault rupture, liquefaction, and seismic landslide hazards in California. Please note that portions of the Sierra Madre Fault zone and the western San Gabriel Fault zone are not included in this map because the State of California has not designated these faults as active. Los Angeles County does consider the Sierra Madre Fault and the western San Gabriel Fault to be active. Faults may be considered active or inactive in other jurisdictions.

Source:

California Department of Conservation, California Geological Survey, Earthquake Zones of Required Investigation, accessed October 13, 2021, at: <https://www.conservation.ca.gov/cgs/maps-data>.

III. Awareness Floodplain Mapping

The intent of the Awareness Floodplain Mapping project by the California Department of Water Resources (DWR) is to identify all pertinent flood hazard areas by 2015 for areas that are not mapped under the Federal Emergency Management Agency's (FEMA) National Flood Insurance Program (NFIP). The Awareness project will also provide the community and residents with an additional tool in understanding potential flood hazards currently not mapped as a regulated floodplain. The awareness maps identify the 100-year flood hazard areas using approximate assessment procedures. These floodplains will be shown as flood prone areas without specific depths and other flood hazard data.

For more information and to view the Awareness Floodplain Mapping layer, please visit DWR's Best Available Maps web mapping portal at: <http://gis.bam.water.ca.gov/bam/>.

IV. Development in Flood Hazard Zones

Figures H.1 through H.3 represent existing and planned developments, and streets, which are located within the County's flood hazard zones.

Figure H.1: Existing Development in Flood Hazard Zones

Figure H.2: Planned Development in Flood Hazard Zones

Figure H.3: Streets in Flood Hazard Zones

V. Flood Repetitive Loss Sites

The County adopted an updated Repetitive Loss Area Analysis on June 15, 2021, to mitigate the flooding of repetitive loss properties. Los Angeles County had 54 FEMA-designated repetitive loss properties in its unincorporated areas as of September 2018, including four that FEMA has approved as being mitigated. The 50 remaining unmitigated properties have been mapped into 24 repetitive loss areas. The Repetitive Loss Area Analysis included mapping of the repetitive loss areas and recommended action items to mitigate the flooding issues.

For more information on the County’s Repetitive Loss Area Analysis, please visit PW’s web site at: <https://dpw.lacounty.gov/wmd/NFIP/FMP/RLAA.aspx>.

VI. Regulatory Agencies for Flood Management, Protection, and Financial Assistance

Table H.5: Federal, State, and Local Agencies Responsible for Flood Management, Protection, and Financial Assistance

Agency	Type
U.S. Army Corps of Engineers	Federal
Federal Emergency Management Agency	Federal
U.S. Bureau of Reclamation	Federal
Natural Resources Conservation Service	Federal
U.S. Fish and Wildlife Service	Federal
National Marine Fisheries Service	Federal
U.S. Environmental Protection Agency	Federal
U.S. Geological Survey	Federal
U.S. Small Business Administration	Federal
U.S. Department of Housing and Urban Development	Federal
California Department of Water Resources	State
California Water Commission	State
State Water Resources Control Board	State

California Department of Fish and Wildlife	State
State Lands Commission	State
California Emergency Management Agency	State
California Department of Housing and Community Development	State
California Department of Real Estate	State
Los Angeles County Public Works	Local
Los Angeles County Flood Control District	Local
Los Angeles Office of Emergency Management	Local

VII. Historic Wildfires in Los Angeles County

Table H.6: Los Angeles County Wildfire Incident Statistics, 2007- 2020**

Fire Name	Year	Acres Burned	Structures	
			<i>Damaged</i>	<i>Destroyed</i>
Buckweed/ Agua Dulce	2007	38,356	30	43
Canyon	2007	4,500	14	8
Magic	2007	2,824	0	0
Ranch	2007	58,401	2	10
Meadow Ridge	2007	20	0	0
October	2007	100	0	0
Sayre	2008	11,262	0	634
Sesnon	2008	14,703	11	78
Marek	2008	4,824	10	42
Osito	2009	304	0	0

Morris	2009	2,168	0	0
Station	2009	160,577	57	209
Crown	2010	14,000	6	10
Briggs	2010	530	0	0
Oasis	2011	355	0	0
Wagon Wheel	2011	500	0	0
Mint	2011	634	0	0
Sage	2016	1,100	2	0
Old	2016	465	1	9
Fish	2016	4,253	0	0
Reservoir	2016	1,146	0	0
Sand	2016	41,383	20	116
Lake	2017	850	2	0
Creek	2017	15,619	81	123
Rye	2017	6,049	3	6
La Tuna	2017	7,194	0	5
Skirball	2017	422	13	9
Stone	2018	1,352	0	0
Charlie	2018	3,380	0	0
Woolsey***	2018	96,949	364	1,643
Saddle Ridge	2019	8,799	91	24
Tick	2019	3,950	46	29
Getty	2019	745	19	13
Totals		507,714	772	3,011

Source: Cal Fire Wildfire Activity Statistics

*Data on structures damaged and destroyed was not available for all wildfires, just for the ones listed above.

** Year 2020 statistics pending availability of 2020 Wildfire Activity Statistics from Cal Fire

*** Categorized under Ventura County by Cal Fire

Table H.7: Acres Burned in Los Angeles County, 2004 - 2020

Year	Unincorporated Areas	Other Jurisdictions	All Jurisdictions
2004	34,354	362	34,715
2005	5,221	23,835	29,056
2006	7,355	164	7,519
2007	116,894	2,231	119,125
2008	30,714	402	31,116
2009	162,266	871	163,136
2010	1,514	45	1,559
2011	1,813	64	1,883
2012	5,077	885	5,962
2013	31,464	282	31,746
2014	320	1,755	2,075
2015	943	343	1287
2016	42,762	5,796	48,559
2017	19,276	4,833	24,109
2018	49,728	13,377	63,106
2019	8,897	4,861	13,759
2020	149,987	4,516	154,503
Totals	668,586	64,623	733,214

Source: Los Angeles County Fire Department, Information Management Section, 2021.

VIII. Fire Department Functions

The following provides an overview of applicable functions of the County of Los Angeles Fire Department:

1. **Fire Prevention Division:** This Division is responsible for conducting plan checks for building, processes and fire extinguishing systems. The Division coordinates with building and safety officials, federal, state, city and County officials to implement the Title 26 Building (Wildland-Urban Interface and Chapter 7A) and the County Fire Code, Title 32.

The Fire Prevention Division also focuses on educating the community about the benefits of proper safety practices and identifying and eliminating all types of hazardous conditions, which pose a threat to life, the environment and property. Commercial, industrial, and residential development and operations are processed and inspected.

2. **Forestry Division:** The Forestry Division enforces and observes all orders and ordinances of the Board of Supervisors pertaining to forest, brush, and other fires, and all statutes relating to prevention or extinguishment of forest, brush or grass fires. The Division cooperates with the State Forester and the Federal Forest Supervisors in the prevention and suppression of forest fires in the County of Los Angeles. The Forestry Division coordinates inspections with Emergency Operations personnel on private lands for the purpose of determining if a fire hazard exists. Where it is found that a fire hazard exists, the County Forester orders the owner or person responsible to abate or diminish such hazard. County Foresters educate the public about fire prevention and the conservation of natural resources, and disseminate such information by means of lectures, motion pictures, slides or other projection of pictures, displays and exhibits, or by any other appropriate means. The Forestry Division program areas are:

Conservation Education

Urban and Wildland Forestry Programs

Fire Hazard Reduction Programs

Oak Tree Ordinance

Fire Weather/Fire Danger

Emergency Incident Services

Wildland Urban Interface/Fire Safety Organizations

- **Environmental Review Unit:** This unit works with the Department of Regional Planning (DRP) to implement existing environmental ordinances. Unit personnel review all County Oak Tree Permit applications submitted to DRP, and develop recommendations for implementation. Additionally, unit personnel produce environmental documentation and recommendations, such as non-significant impact documents, negative declarations and mitigation measures consistent with California Environmental Quality Act (CEQA) mandates for construction projects and

developments. The County Forester and Fire Warden are also represented on the Subdivision Committee, which advises the Regional Planning Commission and Hearing Examiner (Title 21, Subdivisions, Section 21.12.010).

- **Fuel Modification Unit:** This unit provides guidelines and reviews the landscape and irrigation plans submitted by the property owner for approval before construction or remodeling of a structure. As described in the Strategic Fire Plan, the objective of the Fuel Modification Unit is to create the defensible space necessary for effective fire protection in newly constructed and/or remodeled homes within the Department's Fire Hazard Severity Zones (FHSZ). Fuel modification reduces the radiant and convective heat, and provides valuable defensible space for firefighters to make an effective stand against an approaching fire front. Fuel modification zones are strategically placed as a buffer to open space or areas of natural vegetation and generally would occur surrounding the perimeter of a subdivision, commercial development, or isolated development of a single-family dwelling.
- **Brush Clearance Unit:** The Brush Clearance Program is a joint effort between the Fire Department and the County of Los Angeles Department of Agricultural Commissioner/Weights and Measures, Weed Hazard and Pest Abatement Bureau (Weed Abatement Division). This unified enforcement legally declares both improved and unimproved properties a public nuisance, and where necessary, requires the clearance of hazardous vegetation. The Department's Brush Clearance Unit enforces the Fire Code as it relates to brush clearance on improved parcels, coordinates inspections and compliance efforts with fire station personnel, and provides annual brush clearance training to fire station personnel.
- **Fire Plan Unit/Fire Safe Councils:** The Fire Plan Unit coordinates countywide projects and provides direction in the planning of pre-fire projects.

Fire Safe Councils are grassroots community-based organizations that share the objective of making California's communities less vulnerable to catastrophic wildfire. Fire Safe Councils accomplish this objective through education programs and fire hazard reduction projects such as shaded fuel breaks or home structure hardening to protect area residents against an oncoming wildfire and to provide fire fighters with a place to fight the oncoming fire.

The Fire Plan Unit supports fire prevention efforts of local Fire Safe Councils, assisting with project planning and implementation. Projects include hazardous tree and plant removal and trimming as well as fuel break treatment. A list of geographically-specific fire risk reduction projects (operational and proposed) is published annually in the Strategic Fire Plan.

IX. Post-Fire Safety, Recovery and Maintenance

The Fire Department's Forestry Division implements post-fire reforestation projects to create resilient landscapes and restore functioning ecosystems. For example, the Forestry Division operates nurseries to supply native plants for revegetation of burned areas.

The Fire Department uses Cal MAPPER (CAL FIRE's Management Activity Project Planning Event Reporter) as the Department's designated GIS database for collecting activity and fiscal data on forest and fuels reduction projects executed through the County. CAL MAPPER assists with project planning and maintenance, risk assessment, performance measures and emergency response.

The following are additional programs at the County for Post-Fire Safety, Recovery, and Maintenance:

- **Coordinated Agency Recovery Effort (C.A.R.E):** During storm season there is an elevated risk of flooding, as well as an increased threat of mud and debris flows, particularly in foothill communities and in communities below recent wildfire burn areas. After the 2009 Station Fire, the Los Angeles County Public Works Department developed the Coordinated Agency Recovery Effort (C.A.R.E.), a multi-agency media and community outreach campaign. C.A.R.E. partners include County Public Works, Sheriff's and Fire Departments, the County Office of Emergency Management, the U.S. Forest Service, U.S. Geological Survey, the National Incident Management Organization, the National Weather Service, the California Department of Transportation (Caltrans), the American Red Cross, and the City of Los Angeles. C.A.R.E. program elements and community resources include a speakers' bureau for community meetings; educational/storm preparation materials; and information on road closures and evacuations, weather forecasts and updates, and links to other emergency response and recovery agencies. In addition, C.A.R.E.'s eNotfy System allows at-risk residents to register to receive storm-related updates and alerts. More information on C.A.R.E. is available at <http://dpw.lacounty.gov/care/>.
- **Burned Area Emergency Response (BAER) and Watershed Emergency Response Team (WERT):** While many wildfires cause little damage to the land and pose few threats to fish, wildlife and people downstream, some fires create situations that require special efforts to prevent further catastrophic damage after the fire. Loss of vegetation exposes soil to erosion; runoff may increase and cause flash flooding; sediments may move downstream and damage houses or fill reservoirs; and put endangered species and community water supplies may be at risk. The Burned Area Emergency Response (BAER) federal program and Watershed Emergency Response Team (WERT) program address these situations with the goal of protecting life, property, water quality, and deteriorated ecosystems from further damage after the fire is out. Concern for possible post-fire effects on fish, wildlife, archeological sites and endangered species is often a primary consideration in the development of BAER and WERT plans.
- **Wildland-Urban Interface Fire Safety Organizations:** The Fire Department is represented in many local collaborative fire safety and prevention efforts. These include the following:

California Fire Safe Council (CFSC)

California Fire Safe Council's mission is to "mobilize Californians to protect their homes, communities and environment from wildfires." California Fire Safe Council was formed as a committee of the California Department of Forestry and Fire Protection (CDF) (now called CAL FIRE) in 1993 and its intent was to bring together governmental agencies and corporations to provide education to the residents of California on the dangers of wildfires and how they could be prevented. For more information, please visit www.cafiresafecouncil.org.

Santa Monica Mountains Fire Safe Alliance (SMMFSA)

The mission of the Santa Monica Mountains Fire Safe Alliance, a collaboration of related public agencies, departments, and communities, is to find solutions and resources for property owners and land managers to improve stewardship in the wildland-urban interface. Integration of best management practices will create defensible space while protecting wildland. The Alliance will help create safer communities and protect natural areas by involving and educating stakeholders, sharing information, and locating and providing beneficial resources.

Sustainable and Fire Resistant Landscapes (SAFER Landscapes)

Fire safety in the wildland-urban interface starts in the home, with the use of fire-resistant building materials and architectural features, practices to avoid starting fires in and around the home, and a household fire response plan. University of California Cooperative Extension provides information on maintaining sustainable and fire-safe landscapes in the home and beyond. For more information, please visit <http://ucanr.edu/sites/SAFERLandscapes/>.

Los Angeles County Weed Management Area (LAWMA)

The WMA brings together local landowners, managers, and stewards to coordinate efforts and expertise against invasive plant species. For more information, please visit <http://lacountywma.org>.

Center for Invasive Species Research (CISR)

Inadvertent introductions of exotic insect pests, plant diseases, weeds, and other noxious organisms (e.g., exotic crabs and mussels) pose a major and continuing threat to California's agricultural, urban, and natural environments as well as the state's precious supplies of fresh water. The Center for Invasive Species Research, based at the University of California, Riverside, provides a forward-looking approach to managing invasions by exotic pests and diseases. The Fire Department's Forestry Division alerts CISR when invasive species are discovered. For more information, please visit <http://cizr.ucr.edu/>.

X. Possible Evacuation Routes

Methodology for Identifying Possible Evacuation Routes

Evacuation routes are determined by emergency responders at the time of the emergency the routes that should be used for evacuation after assessing the conditions and location of the emergency to avoid endangering the lives of others, personal injury, or death. Roads that were (1) public, (2) paved, and (3) through-ways were identified as possible evacuation routes.

To identify these roads, two datasets were combined: (1) the Los Angeles County Master Plan of Highways (updated March 9, 2016), and (2) the Countywide Address Management System (CAMS). The Master Plan of Highways designates roadways in Los Angeles County by their planned capacity. All roads from this dataset were coded possible evacuation routes because all roads were public and paved. From the CAMS dataset, all primary and secondary roads were coded as possible evacuation routes because they met all three criteria. Other categories in the CAMS dataset, such as

trails, dirt roads, onramps, offramps, some driveways, some private roads, and pedestrian walkways were excluded. Gates or road obstacles were not identified due to lack of data. Information on the capacity of these roads is available by clicking on the following links: (1) Master Plan of Highways - Overview (arcgis.com), and (2) CAMS Data (arcgis.com).

The County also classifies some roads as disaster routes (last updated September 24, 2012 by PW). Disaster routes are freeway, highway or arterial routes pre-identified for use during times of crisis. These routes are utilized to bring in emergency personnel, equipment, and supplies to impacted areas in order to save lives, protect property, and minimize impact to the environment. During a disaster, these routes have priority for clearing, repairing, and restoration over all other roads. Disaster routes are not evacuation routes. Although an emergency may warrant a road to be used as both a disaster and evacuation route, an evacuation route is used to move affected populations out of an impacted area.

Methodology for Identifying Communities with Residential Developments with Limited Egress

A list of unincorporated communities was compiled using a combination of Countywide Statistical Areas (CSA) and the County of Los Angeles Chief Executive Office's List of Unincorporated Communities. As some CSAs are quite large, such as the Santa Monica Mountains and the Antelope Valley, combining CSAs and community names as the unit for analysis enabled a refined identification of residential developments with access to fewer than two possible evacuation routes. The list of unincorporated communities from the Chief Executive Office is here: <https://ceo.lacounty.gov/wp-content/uploads/2018/08/Unincorp-Alpha-Web.pdf>

A multi-step process was undertaken to determine communities with residential developments with access to fewer than two possible evacuation routes. Residential developments, based upon zones that allow for residential development, located on non-through streets were identified. The possible evacuation routes were overlaid to determine if these residential developments were able to access two possible evacuation routes. The CSA was used as the unit basis for determining whether or not a community contained a residential development with access to fewer than two possible evacuation routes. If a minimum of one residential development within the CSA had access to fewer than two possible evacuation routes, the CSA would be identified as having limited egress. The community names found on the County Chief Executive Office's List of Unincorporated Communities was then used to augment the CSA community names to refine the referenced community. Unincorporated communities that had only one possible evacuation route were flagged and included in Table 12.23 in Chapter 12: Safety Element of the General Plan. These communities are visible on the Residential Developments with Limited Egress mapping application (<http://bit.ly/SE-SB99>).