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Moraga–Orinda Wildfire Action Plan

An Appendix to the Contra Costa Countywide
 Community Wildfire Protection Plan (CWPP)



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Executive Summary

The Moraga–Orinda Fire District (MOFD) Community Wildfire Protection Plan provides an analysis of wildfire hazards and risks in the wildland-urban interface (WUI) of the City of Orinda, Town of Moraga, the unincorporated community of Canyon, and surrounding unincorporated lands in Contra Costa County, California. The Plan is an appendix to the Contra Costa Countywide Community Wildfire Protection Plan (CWPP) and follows the standards for CWPPs established by the federal Healthy Forest Restoration Act, including:

Based on the analysis, recommendations have been identified to reduce the threat of wildfire. The Plan enhances long-standing collaboration between local agencies and organizations and existing plans for wildfire protection to create a coordinated effort to determine appropriate wildfire management actions.

The Contra Costa Countywide CWPP is the result of an area-wide planning effort. The Moraga–Orinda Fire District Community Wildfire Protection Plan looks at similar issues but allows for a more detailed evaluation and customized recommendations for MOFD communities. The first countywide CWPP in 2009 began with a compilation of existing documents, analysis of fire behavior developed (based on fuels, topography, and historical weather conditions), and collaboration with homeowners, representatives of special interest groups, and agency officials. In 2014 - 2015 an Updated Plan was revised through a similar area-wide planning effort that reviewed the plan, updated relevant sections, and refined priority actions.

The goal of the Plan is to reduce wildfire risks through increased education, hazardous fuel reduction, progressive fire code adoption, and increased inspection and enforcement of defensible space regulations to reduce structure ignitability and other recommendations to assist emergency preparedness and fire suppression efforts. Most importantly, it facilitates a coordinated effort between district residence and other various stakeholders.

Recommendations

The Moraga-Orinda Fire District Community Wildfire Protection Plan recommendations are organized into four categories of mitigation related to:

- Community Education/ Emergency Preparedness
- Fire Code Adoption, Defensible Space inspections (improving Structure Survivability)
- Fuel Mitigation/Treatments on small private parcels around homes
- Fuel Mitigation/Treatments on Public Lands and large private parcels

Lines of Efforts

MOFD's existing priority Lines of Effort are used to categorize ongoing efforts, which will be enhanced by the CWPP.

1. External fuels mitigation projects
2. Internal fuels mitigation projects
3. Wildfire preplanning
4. Evacuation planning
5. Building code updates
6. Community outreach and education
7. Early detection and notification systems

The Moraga-Orinda Fire District Community Wildfire Protection Plan is intended to be a multi-year document that will identify and organize efforts in a mutually supporting manner. It will further facilitate the implementation of present and future mitigation efforts through the presentation of an overarching list of priorities. It is important to note that the CWPP is a living document and will need to be updated on a tri-annual basis and after major events such as

wildfire, flood, insect infestation, tree mortality, and significant new home development, as well as the regional updates to Local Hazard Mitigation Plans or General Plan Safety Elements.



Introduction

Wildfire records for the Eastbay Hills document an active and damaging wildfire history. It is well understood that the area's unique ecology – particularly the topography, climate, and vegetation – provides the setting for recurrent catastrophic wildfires. While large-scale wildfires do not occur every year, wildfire incidents driven by extreme weather conditions have repeatedly been difficult to contain. Residential development in the wildland urban interface (WUI), the introduction and proliferation of exotic species, accumulated fuel as a result of the exclusion of naturally occurring fire, and climate change-driven compression of the historic rainy season exacerbates the fire problem. Taken together, these factors result in more people, property, critical infrastructure, and natural resources in harm's way on a more frequent basis. In order to reduce the risk of loss of life and property due to wildfire, MOFD and project partners have worked with residents, representatives of local agencies and community organizations to develop this focused Appendix to the Contra Costa County Community Wildfire Protection Plan.

Although the format of this plan is guided by the Healthy Forest Restoration Act (HFRA), the principles behind it are not new. The National and State Fire Plans, the Federal Emergency Management Agency Disaster Mitigation Act of 2000, and the Contra Costa Community Wildfire Protection Plan all mandate community-based planning efforts, coordination, project identification, prioritization, funding review, and multi-agency cooperation.

Scope and Purpose

SCOPE

This Community Wildfire Protection Plan focuses on the City of Orinda, Town of Moraga, and the unincorporated community of Canyon in Central Contra Costa County. The plan does the following:

1. Describes the fire environment of the area.
2. Identifies values at risk as defined by the stakeholders.
3. Provides maps that show Very High Fire Hazard, High Fire Hazard Zones, and Wildland Urban Interface Fire Areas, as defined by state and local authorities.
4. Establishes the rationale for prioritization of fuel management projects and treatment methods, as well as outlines principles for the selection of projects when funding is available.
5. Describes measures communities and homeowners can take to reduce the ignitability of structures.
6. Identifies sources for Best Management Practices for fuel reduction treatments included in the plan.

PURPOSE

The purpose of the Moraga-Orinda Community Wildfire Protection Plan is to protect human life and reduce the loss of property, critical infrastructure, and natural resources due to wildfire. The document builds on the Countywide CWPP and is intended to help agencies, communities, and local homeowners define, plan, and prioritize types of actions that will limit the damage associated with the inevitable wildfire event. This Plan can be used to reduce the risk of conflagration by the following actions:

1. Increased collaborative planning and cooperative actions that will build useful relationships between communities and agencies.
2. Reduction of hazardous fuels in the WUI.
3. Creation and maintenance of defensible space for structures and properties.
4. Reduction of structural ignitability hazards.
5. Planning of evacuation protocols and exercises.

The stakeholders in this effort believe that the work outlined above requires a collaborative approach that combines the following elements:

- Development and implementation of strategic, cost-effective, sustainable, and environmentally sensitive hazardous fuel management plans;
- Educational programs that explain fire risk, promote voluntary citizen involvement, and emphasize long-term strategies for creating and maintaining fire resilient communities.
- Application of resources to areas and projects where they will provide the greatest good at the lowest cost.

To that end, regular reviews are central to maintaining the ideas and priorities of the Community Wildfire Protection Plan in the future. The dynamic nature of the plan will reflect changes in practices, technology, and information available to prevent and minimize loss.

Moraga-Orinda Fire District Information

Section One

1.1 District Overview

The Moraga-Orinda Fire Protection District (MOFD) predecessor districts were county-dependent districts.

The Orinda Fire Protection District was formed in 1933 and was served by volunteers until 1940. It grew from one fire station with one piece of equipment staffed by volunteers to three fire stations by the 1940s. A five-person Board of Fire Commissioners was appointed to administer the affairs of the Fire District. The geographical area was described as the following: "...it encompassed the area from Tilden Park on the north to Del Rey School on the south and from the county line on the west to a point close to the Russell Tree Farm on the east..."

Services provided in the 1960s were firefighting, fire prevention, and fire education. The staffing for each station was a 2-person crew; each was trained in advanced first aid.

Total personnel on-duty was 6 firefighters. In the 1960s, the Orinda Fire Protection District needed to relocate its outdated fire station on Avenida De Orinda because it was often flooded during heavy rainstorms. In 1968, Orinda voters approved a \$400,000 bond issue, and the current 14,000 square foot fire station in the Orinda Village (Station-45) was commissioned in 1969.



Moraga was served by a volunteer unit of the Eastern Contra Costa County FPD from 1946 until 1968 when the Moraga Fire Protection District was formed. In 1970, Moraga voters rejected a proposal to annex the Contra Costa County Fire District.

The Moraga-Orinda Fire Protection District was formed on July 1, 1997, as a fully integrated, independent special district. It was formed through the consolidation of the Moraga Fire Protection District and the Orinda Fire Protection District to provide more efficient fire protection and emergency medical services to the communities of Moraga and Orinda and the surrounding unincorporated areas, including the communities of Canyon and Bollinger Canyon.

Today, the District is located nine (9) miles east of San Francisco in southwest Contra Costa County, CA. It is bordered by the Cities of Berkeley and Oakland to the west, the City of Lafayette to the east, and large open spaces, reservoirs, and regional parks to the

north and south. The District is a fully- paid, “all-risk” fire service agency with 64 regular employees, 6 temporary employees, and 20 volunteers, including the Board of Directors. It encompasses 42 square miles, protecting approximately 38,500 residents in a combination of urban city centers; consisting of a combination of metropolitan, urban, suburban, and rural residential housing-density areas; a major college campus; and a mix of large regional parks, open spaces, reservoirs, and recreation areas. The District responded to 3,119 incidents in 2020 from five fire stations, which housed four engine companies, one truck company, four ambulances (three cross-staffed), and one Battalion Chief.

**Response Summary By Stations & Incident Type
GroupCalendar 2020**

Stations	Hazardous Conditions	EMS/ Rescue	False Alarms Canceled	Fires All	Good Intent / PublicService	Special Call	Grand Total
41	29	541	96	13	13	63	755
42	10	323	116	26	11	76	562
43	19	316	122	22	3	35	517
44	20	256	76	12	7	73	444
45	35	504	200	45	12	45	841
Grand Total	113	1,940	610	118	46	292	3,119

The District protects significant critical infrastructure and several target hazards and high-risk parcels, including Saint Mary’s College of California, several senior assisted living facilities, four reservoirs, a major power grid, two large natural gas transmission lines, a major 8-10 lane freeway, six transportation tunnels (four vehicles and two trains), and thousands of high-value single-family homes. There are approximately 14,091 parcels within the District. The District has identified specific target hazard areas and occupancies within the Fire District boundaries. These areas and occupancies were selected based on the potential fire hazard level, risk potential, and the number of occupants that may require assistance during an emergency.

The far north end of the Fire District contains a large recreational area that includes boating access to a major reservoir. Other target hazards include the Orinda Senior Village Apartments (Orinda), the Monteverde Senior Apartments (Orinda), the Orinda Convalescent Hospital (Orinda), Moraga Royale Assisted Living (Moraga), Aegis Assisted Living (Moraga), and the Rheem Convalescent Hospital (Moraga).

Large areas to the north of Highway-24 are part of the Very High Fire Hazard Severity Zone (VHFHSZ). In 2020 the District designated High Fire Hazard Severity Zones as Wildland Urban Interface - Fire Area in recognition of the potential for fast-moving fires and the value for adoption of ember-resistant construction standards in additional portions of the district.

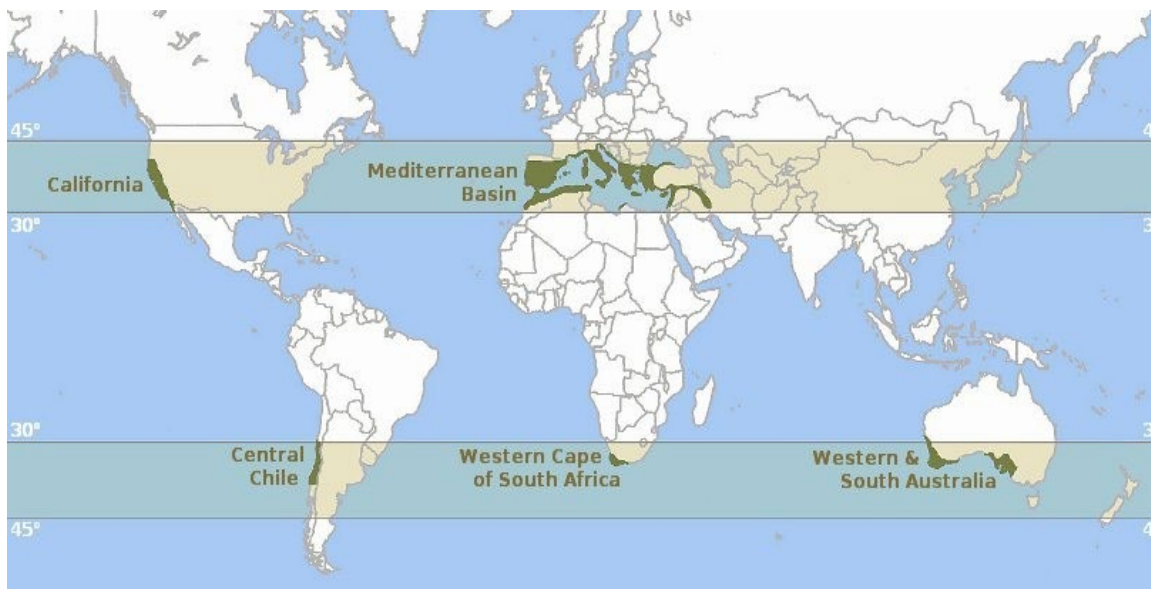
Note: The term “wildland-urban intermix” refers to a specific type of wildland-urban interface in which the homes or other structures are intermixed with wildland fuels, as opposed to a distinct area of wildland fuel adjacent to a developed area (wildland interface or “WUI”).

Climate, Topography, and Vegetation



The District lies in a Mediterranean Climate Zone characterized by hot, dry summers and wet winters, which make it prone to fires, primarily caused by human activity. During the summer months, morning fog is common, which typically dissipates by late morning or early afternoon. Afternoon winds are common when the marine layer lifts. Most of the annual rainfall occurs during the winter; snow is very rare. Annually, the District averages 26 days of 90 °F or higher temperatures, 40 nights of 32 °F or lower, and 59 days with measurable precipitation. Due to a prolonged drought (2013 to present), portions of the District remain vulnerable to a large vegetation fire because larger fuels, such as trees, remain dry and stressed.

Mediterranean Climate Zones



Topographical features also have a significant influence on fire spread. Valleys, drainages, chutes, saddles, and ridgetops all influence the rate of fire spread and are heavily affected by a fire originating below. Generally, fire naturally spreads upslope four (4) times faster than it does downslope (under equal conditions of fuel and wind).

Topography also has a considerable effect on wildland fire behavior and on the ability of firefighters to take action to contain and extinguish a fire. A fire starting in the bottom of a canyon or drainage may expand quickly to the ridgetop before first-arriving firefighters arrive. Rough topography greatly limits road construction and reduces accessibility by ground-based fire fighting equipment. The steep hills surrounding the District present a significant challenge for fire suppression forces.

The District is located in a "Chaparral Biome". In its natural state, chaparral is characterized by infrequent fires, with intervals ranging between 10–15 years to over a hundred years. Mature chaparral (stands that have been allowed greater intervals between fires) is characterized by nearly impenetrable, dense thickets. These plants are highly flammable. They grow as woody shrubs with hard and small leaves, are non-leaf-dropping (non-deciduous), and are drought-tolerant. After the first seasonal rains following a fire, the landscape is dominated by soft-leaved, non-woody annual plants, known as fire followers, which die back with the summer dry period.

The *California Interior Chaparral and Woodlands Eco-Region* cover 24,900 square miles in an elliptical ring around the California Central Valley. It occurs on hills and mountains ranging from 300 to 3,000- feet in elevation. It is part of the Mediterranean forests, woodlands, and scrub biome. Many of the plants are pyrophytes, or "fire-loving", adapted (or even depending on) fire for reproduction, recycling of nutrients, and the removal of dead or senescent vegetation. Many plant and animal species in this ecoregion are adapted to periodic fire.

The District's chaparral vegetation includes chamise, manzanita, buckeye, and ceanothus. Oak Woodlands is the most widespread, with blue oak dominating, but also includes scrub oak, coast live oak canyon live oak, valley oak, and interior oak. Open grasslands are the primary understory within the oak savannah woodlands. In areas with interlocking tree canopy, primarily North and East facing slopes, the understory is primarily tree duff and litter.

All vegetation in the District reaches some degree of combustibility during the dry summer months and, under certain conditions, during the winter months. For example, as chaparral and other brush species age, twigs and branches within the plants die and are held in place, increasing the decadent material component. A stand of 10 to 20-year-old brush typically contains enough dead material to produce rates of spread equivalent to fully cured grass. Due to the higher fuel load, fires in brush fields also yield much higher fireline intensity.

In severe drought years, additional plant material may die, contributing to the fuel load. There will normally be enough dead fuel load that has accumulated in 20 to 30-year old brush to give rates of spread about twice as fast as in a grass fire. Under moderate weather conditions that produce a spread rate of a one-half foot per second in grass, a 20- to 30-year old stand of brush may have a rate of fire spread of about one foot per second. Fire spread in old brush (40 years or older) has been measured at eight times faster than grass (4-feet per second). Under extreme weather conditions, the fastest fire spread rate in grass can be 12 feet per second or about eight miles per hour. Residential structures within the wildland intermix or interface near mature brush fields are thus at greater threat from a wildfire.

1.2 Area Overview

Public Lands Management

There are two public entities that manage large areas of lands in or adjacent to Moraga and Orinda for public access and recreation.

East Bay Regional Park Districts (EBRPD) is a special district that offers developed and dispersed recreation opportunities in over 120,931 acres in Alameda and Contra Costa Counties. Portions of the 2,789-acre Wildcat Canyon Regional Park, 740-acre Tilden Nature Area, and portions of Sibley Volcanic Regional Park and Tilden Regional Park are located within the district. Dispersed park activities include hiking, biking, horseback riding, and picnicking. The Nature Area includes the Tilden Little Farm and Environmental Education Center, regional destinations that offer interpretive programs for schools, organized groups as well as the general public. A seven-member elected Board of Directors oversees the Park District.

East Bay Municipal Utilities District (EBMUD): EBMUD manages numerous open space areas within MOFD to include the San Pablo Reservoir, Briones Reservoir, Upper San Leandro Reservoir, watershed lands, and one water treatment facility in Orinda. A seven-member elected Board of Directors oversees the Utility District.

Fire Protection Agencies

The Moraga-Orinda Fire District (MOFD) provides professional fire protection services to the communities of Moraga, Orinda, and Canyon. MOFD was formed on July 1, 1997, as a fully integrated, independent special district. The efforts of these local fire protection agencies are made even more effective through common training in the national incident management systems (NIMS), incident command system (ICS), and the California standardized emergency management system (SEMS) that are used to manage the response to multi-agency, multi-jurisdiction emergencies. Master mutual aid plans and automatic aid agreements also bring together resources from outside of the region.

California Forestry and Fire Protection Agency (CAL FIRE): Santa Clara Unit (SCU) provides fire protection for state responsibility areas (SRA). These include East Bay Regional Park District lands in Wildcat Canyon and Tilden Regional Parks located outside the City of Orinda. SCU also provides fire protection in the SRA of other portions of Contra Costa, Alameda, Santa Clara counties, and a portion of San Joaquin County. In the District, these areas include Bollinger Canyon and the Community of Canyon.

Defining MOFD's Wildfire Hazard and Risk in the Wildland Urban Interface

Section Two

2.1 Wildfire Environment

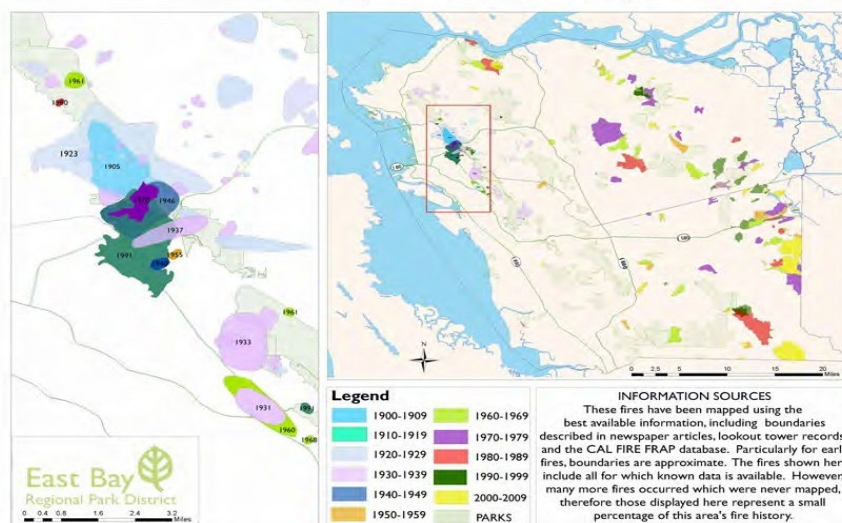
Wildfires are a part of the natural ecosystem in Moraga and Orinda. The Mediterranean climate, characterized by the lack of summer rain and the steep topography, and regular Diablo Wind events set the stage for periodic wildfires. Prior to European settlement, fire was a regular feature on the landscape with an estimated 3-5 year return interval. These recurring, low-intensity fires were an important element of the area's ecology before being excluded from the landscape starting in the 1800s. The exclusion of this fire set the stage for the accumulation of combustive vegetation.

The fire environment is made more dangerous by the abundant hazards and risks associated with a large population and dense pattern of development. The urban side of the wildland-urban interface brings new hazards into the equation with introduced vegetation, structures constructed of combustible materials, and many potential ignition sources.

Contra Costa County has a rich history of over 51 fires since the 1950s resulting in loss of lives, property, and natural resources. The most recent was the 3,111-acre Morgan Fire that started on September 8, 2013 (in the eastern part of the County near Clayton). The 1923 "Berkeley Hills Fire" began in Wildcat Canyon and spread through Berkeley, destroying 640 structures. The 1991 "Tunnel Fire" took place in the Berkeley and Oakland hills destroying 2,900 structures. Until recently, this was the state's second-deadliest fire with 25 fatalities. Historically, more frequent wildfires of lesser intensity were common.

Drought and human behaviors, particularly in the arenas of land-use and fire suppression,

Fire History in the East Bay



Historically fires in Contra Costa County have clustered in 3 areas: East Bay Hills and along the border with Alameda County; east areas of county around Mount Diablo and north areas of central county around Martinez.

have had a profound impact on the County's fire regime. This increases the possibility of catastrophic wildfire, especially as the hazards of vegetation, topography, structures, and fire weather are present.

Weather

Chief among fire hazards is the area weather. Despite efforts to improve neighborhood safety and firefighting capability, uncontrollable firestorms may occur under the extreme but periodic conditions of "Red Flag" days. The National Weather Service issues "Red Flag" warnings when weather elements such as low relative humidity and strong winds could lead to rapid fire growth.

"Red Flag" weather can mean the occurrence of strong, hot, dry offshore winds. These winds are known locally as "Diablo Winds," and they come from the North and Northeast. They carry extremely dry air at high velocity. They quickly desiccate vegetation and other combustible materials and can push a fire down or up a slope at very high speeds. These can occur at any time of year but are especially dangerous in the driest months of late summer and fall. During these times, controlling a fire becomes far more difficult.

Fuel – Structures and Vegetation

Due to the number and density of homes built in the Very High Fire Hazard Severity Zone and Wildland Urban Interface - Fire Areas and changes in the natural fire-cycle, Moraga and Orinda have areas of residential and other structures amongst an over-accumulation of combustible vegetation. Under certain conditions, homes themselves can become available as fuel and contribute to fire spread on a limited and localized basis. This massive fuel load of homes and vegetation combined with the area's steep topography makes fires very difficult to contain once they have achieved a certain size. In addition, non-native and invasive weedy vegetation has replaced the more fire resistive and ecologically stable native species in many places, adding to the threat. This is particularly true in the case of grass species.

Years of drought and associated pests and disease have increased tree mortality. The Contra Costa County region has seen a decline in tree health due to drought, pine beetles, and Sudden Oak Death. Ongoing tree mortality assessments will provide additional information on declining conditions.

Topography

The area's steep topography, with canyons, chimneys, and draws influence fire behavior and, in many instances, can intensify fire effects. Westward facing slopes are more arid (due to long exposure to the afternoon sun) and thus more combustible. North and East slopes retain moisture farther into the summer and support higher fuel loads due to increased vegetative growth. They are also exposed to the full effect of Diablo Winds in the fall. The narrow roads in the steep hillside areas of both Moraga and Orinda make ingress and egress difficult and may delay firefighter response times.

2.2 Wildland Urban Interface Risk & Hazard Assessments

The wildland-urban interface fire area (WUI) is defined by the California Fire Code as an area identified by the state as a "Fire Hazard Severity Zone" in accordance with the Public Resources Code, Sections 4201 through 4204, and Government Code, Sections 51175 through 51189, or other areas designated by the enforcing agency to be at significant risk

from wildfires. Nationally, the WUI has gained increasing importance as more Americans build homes in rural settings adjacent to public lands.

The housing density and geography of Moraga and Orinda are such that most of the developed areas not only border WUI areas but also include conditions within the urbanized areas that can fuel wildfires. The City of Orinda, Town of Moraga, and Community of Canyon contain areas that have been identified as being Very High Fire Hazard Severity Zones and Wildland Urban Interface – Fire Areas and are at significant risk for loss of life and property if a fire were to occur on an extreme weather day. This was recognized in 2001 and 2008 when Orinda, Moraga, and Canyon were added to the CalFire “Communities at Risk from Wildfire” list. For the purposes of this plan, the CAL FIRE Fire Hazard Severity maps were used as a starting point to determine where significant fire hazards exist both in the wildland and urban areas. Both Moraga, Orinda, the Community of Canyon, and the adjacent EBRPD parklands/EBMUD watershed have been identified as being exposed to significant risk from wildfire.

2.2.1. Potential for Wildfire to Occur

Factor 1 – Risk of Wildfire Occurrence

Fire History Locations

Contra Costa County has a history of fire. The map “*Fire History in the East Bay*” shows many fires throughout the county over the past century. Three areas show clusters of fire:

- East Bay Hills – Richmond, El Cerrito Kensington, and Alameda County boundary
- East areas of county around Mount Diablo, Walnut Creek, San Ramon
- North areas of central-county around Martinez

Fire History Patterns, Climate Change Impact, and Ignitions

There is limited detailed information on historic fires in the Moraga and Orinda area. However, a regional look at the 15 fires in the vicinity of the Caldecott Tunnel from 1923 – 1991 shows a common pattern of ignitions during critical Diablo Wind conditions in the Fall, occurring every 10 to 20 years.

Climate change has the potential to affect multiple elements, including fire behavior, ignitions, fire management, and vegetation fuels. Hot, dry spells may dry out fuels faster and increase disease and insect infestations resulting in higher fuel loads. Increased winds may result in more erratic fire behavior making fires harder to contain.

As a part of its fire management plan, EBMUD looked at causative agents for fires on its watershed from 1980-1997. Many ignitions were “unknown,” but known causes were primarily human and included arson, camping and picnic activities, power lines, fireworks, fuel reduction activities, smoking, children, automobiles, and rekindles. Only 2 out of the 174 fires analyzed were caused by lightning. EBMUD used this information to help identify high fire risk areas, including:

- All interface or intermix areas
- High use or recreational areas
- High travel transportation corridors with roadside grasslands.

EBRPD did a similar analysis of 1,900 fires over twelve years in Alameda and

Contra Costa Counties and reached similar conclusions. While there has been no specific fire history developed for the district, stakeholders, and fire personnel familiar with the communities' fire history felt that these causes and patterns could be extrapolated to this area.

While lightning is a significant causative factor for fire starts in the Sierra Nevada range, it is very rare in the Bay Area. In 2008 and 2020, significant lightning events started fires throughout the region; however, this is accepted as a once every 15-year weather phenomenon.

Fire Weather

Another factor that has been assessed is fire weather or periods of "Diablo winds" that bring low relative humidity and higher temperatures. Alameda and Contra Costa Counties have 11 remote automated weather stations (RAWS) that provide localized information on the weather. Many fire departments also take local weather readings to supplement these regional data. National Oceanic and Atmospheric Association's National Weather Service also provides "red flag warnings" and "Fire Weather Watch" of periods of high fire danger. www.wrh.noaa.gov/firewx/cafww/



Communities at Risk

In association with the development of the National Fire Plan, the Federal Register published a list of Communities at Risk in 2001. Twenty-five communities in Contra Costa County were identified, including Moraga and Orinda. In 2008 this list was updated to include the Community of Canyon.

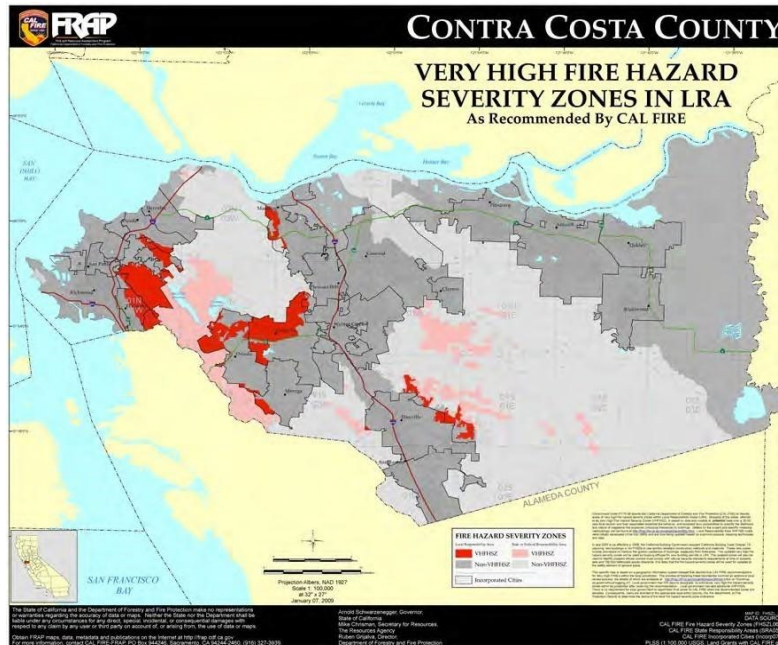
Factor 2 – Fuel Hazards

CAL FIRE Statewide Hazard Assessment Maps

The CAL FIRE statewide hazard assessment maps have served as the basis for much of the analysis in Contra Costa County. Very High and High Fire Hazard Severity Zones for State Responsibility Areas (SRA) and Local Responsibility Areas (LRA) are identified on these maps based on:

- Flame length modeled based on vegetation, topography and weather.
- Crown fire potential, ember production and ember movement
- Likelihood of burning based on fire history and other factors.

Portions of Orinda, Moraga, and the Community of Canyon (see detailed map in Appendix) were identified as very high wildfire hazard severity zones, as well as the adjacent EBRPD lands.



2.2.2. What to Protect - Values at Risk within the WUI

Factor 3 – Lives, homes, businesses, critical infrastructure and sensitive habitat

Millions of people are exposed to the destructive forces of wildfire by virtue of living, working, or visiting areas in the WUI. Much of what people value most highly – their lives, family, community, property, as well as cultural, economic, and ecological interests is at risk of loss in an uncontrolled wildfire.

During planning meetings, area stakeholders identified lives, homes, businesses, parklands, and protected watersheds among values at risk. Regional roads are at risk, as are power and water supply facilities and substations, and communications networks.

In addition to looking at fuel hazards, it is important to identify things that should be protected from the hazards. Some of the values at risk to protect include:

- Lives, homes, and businesses. The 2010 census shows a combined population of 38,500 with over 12,558 parcels in the district. Total monetary value of structures in the area is estimated at more than \$12 billion.
- Public Schools. Moraga includes three elementary schools, one middle school, one high school, and one private college. Orinda includes four elementary schools, one middle school, and one high school. The community of Canyon includes one elementary school (K-8) organized under an independent school district.
- Other public facilities. There are no hospitals or critical care facilities in Moraga or Orinda. Three urgent care facilities, two skilled nursing facilities, and other private residential care facilities are located in the district. Other public facilities include community centers and libraries.
- Infrastructure. The PG&E high voltage transmission lines that cross Orinda and Moraga to two sub-stations are part of the national electric grid, as well as providing power to the region. Similarly, the water

facilities operated by EBMUD are critical to the region, as well as for local water delivery. Telecommunication networks and public emergency communication systems also serve the region. A network of local roads maintained by the City of Orinda, Town of Moraga, Contra Costa County, the State of California, and private resident groups provide both emergency access and evacuation routes for residents. Many of these roads are narrow and steep, reflecting the topography.

- Other things to consider. Contra Costa County is seismically active with nearby faults, including the Hayward, San Andreas, and other related faults. Seismic activity could impact access, reliability of water supply, and result in potential ignitions from gas or fuel lines following an earthquake. The steep hillsides are also geologically unstable, with areas of slides located throughout the hills.

Significant recreation, scenic areas and areas of historical, economic, or cultural value

Moraga, Orinda, and Canyon contain publically-owned open spaces with significant values related to recreation and scenic areas. The communities also contain areas of economic and cultural value, both as documented historical and undocumented archeological sites.

2.2.3. Protection Capabilities

Factor 4 - Local Preparedness and Fire Fighting Capabilities

As identified in Section 1, local fire protection agencies leverage their resources through participation in emergency management systems and common incident command systems. Local preparedness and firefighting capabilities include community preparedness and emergency personnel response. During fire incidents, law enforcement is responsible for coordinating evacuation.

Volunteer resources, such as local resident groups, Lamorinda CERT, MOFD communications support, Contra Costa County CAER, and Office of the Sheriff Volunteers, also play critical roles in both preparedness and during the response to wildfires.

In November 2011, the County Office of Emergency Services produced an Emergency Operations Plan for the Contra Costa Operational Area “for effective and economical allocation of resources for protection of people and property in time of an emergency.” The plan establishes the emergency organization, assigns tasks, specifies policies and general procedures, and provides for the coordination of planning efforts of the various emergency staff and service elements utilizing the California Standardized Emergency Management System (SEMS) and National Incident Management System (NIMS).

To better prepare the community for wildfire, a series of full-scale and virtual evacuation exercises were held to increase public awareness, develop public safety agency inter-operability, and test systems under real-world conditions. These included a full scale evacuation exercise of the Moraga Country Club neighborhood in December 2018, a full scale evacuation exercise of North Orinda in January 2019, and virtual evacuation exercises of the entire Town of Moraga, City of Orinda, Community of Canyon, and unincorporated areas of Bollinger Canyon throughout the summer of 2020.

Strategies for Reducing Risk within the WUI

Wildfire is a natural part of the Contra Costa County ecosystem. The natural elements which contribute to the fire environment – weather, climate, topography and vegetation – all are immutable. However, attention to decreasing the human impacts and risk factors can reduce the incidence and severity of wildfire. The following strategies for reducing risk are organized to focus on each of the existing risk and hazard assessments.

Section Three

3.1 Collaborative Partners

Because fire does not recognize political boundaries, identifying and working with collaborative partners is critical to a comprehensive plan to reduce the risk of fire. Collaborative efforts within MOFD's jurisdiction should include:

- Engagement with large landowners surrounding the populated portions of the District. These are primarily EBMUD and EBRPD.
- Engagement with public utilities, specifically EBMUD and PG&E.
- Coordination with the City of Orinda, Town of Moraga, and Contra Costa County to ensure efforts are aligned and mutually supporting.
- Coordination with CalTrans and Contra Costa County Roads.
- Coordination with Moraga School District, Orinda Union School District, Canyon Elementary School District, Acalanes Union High School District, and St Mary's College.
- Coordination with large interior landowners. These include EBMUD, the Orinda and Moraga Country Clubs, HOAs, The John Muir Land Trust, developers, and private parcel owners.
- Information sharing through community organizations such as CERT and service clubs to increase outreach and community awareness.
- Sharing best practices related to wildfire prevention, hazardous fuel reduction, natural resource conservation and stewardship.

Electronic distribution allows for customization and distribution through existing partner networks. Communicating fire safety messages year-round and identifying and facilitating roles for residents working with agencies will foster collaborative partnerships.

3.2 Ignitions Source Reduction

Target key causes of ignitions in areas with ignition history, high equipment use, and people (arson or accidents) through:

- Ignition Prevention Education – A specific ignition prevention campaign targeting contractors and public works agencies may help reduce equipment-caused fires. Existing ignition campaigns include mowing guidelines and drought related information. Develop ignition prevention education aimed at both residents and visitors (recreation or trail users).

- Enforcement – enforce restrictions on fire causing activities through the MOFD burn ban.
- Engineering – equipment safety, fuel reduction activities. This could include expanded roadside clearance of vegetation or voluntary juniper removal campaigns in advance of the pending fire code requirements.

3.3 Fire Weather Mitigation Measures

- Improve communication of hazardous weather conditions (red flag weather) through awareness of hazard conditions and what to do/ not do – red flag program flags, fire danger signs, social media, and website updates education.
- Restrictions on specific uses, certain activities, specific operations or equipment (abatement work) during periods of high fire danger weather after 10:00am. Allow for work throughout the day for professional crews with a MOFD permit.
- Local media alerts during red flag weather utilizing social media, city and town websites, and Nixle alerts.
- Increased awareness of the MOFD/Rescue One RAWs weather feed.

3.4 Community Hazard Reduction

- Monitor increases in tree mortality due to drought, disease (e.g., Sudden Oak Death or Turpentine Beetle), or pest infestation.
- Increase enforcement of the disavowed plant list for new plantings to reduce the prevalence of highly combustive vegetation.
- Public education and exterior hazard abatement:
 - Reduce surrounding fuels and ignitability of existing homes and structures – from the house out.
 - Focus on dense vegetation directly adjacent to homes and homes themselves.
 - Weed abatement/defensible space inspections and enforcement.
 - Best practice home ignition zone improvements (beyond weed abatement or fire code requirements).
 - Reduce structure ignitability through the replacement of wood shake roofs and non-ember resistant vent screens.
 - Evacuation route planning and targeted fuel reduction efforts along primary corridors.

3.5 Defensible Space Programs

- Increased outreach and education to both explain the threat of wildfire and specific, actionable steps residents can take to reduce the risk of home ignition.
- Showcase successful treatments of private properties where habitat values, aesthetics, and fuel reduction (defensible space) goals have been met.
- Funding and incentives for private property owners. Microgrants for neighborhood-level projects.
- Encourage the use of no-cost waste management company green waste

collection programs.

- Continued access to the community chipping program.
- Inspections, enforcement and abatement, including on vacant lots where no structures are present.

3.6 Improve Structure Survivability

- Education regarding home ignition, WUI building standards, and existing code requirements. Local building and remodeling standards were adopted under the 2019 code update cycle.
- Suggest practical retrofit techniques and building materials for roofs, gutters, vents, decks, outbuildings, especially information regarding what can be done without major remodels.
- Exterior under-eave sprinkler systems are required for new homes or major remodels.

3.7 Fuel Management on Public and Large Scale Private Lands

Hazardous fuel management, ideally a subset of sound vegetation and ecosystem management, is the practice of removing or modifying vegetation in order to reduce wildfire ignitions, rate of spread and intensity. Fuel management requirements depend on the vegetation type, location, condition and configuration. Given the dynamic nature of the fuels in and around MOFD's jurisdiction, a single treatment type or prescription is neither effective nor practical. Further, projects require maintenance as fuels regrow on a 1-5 year cycle depending on vegetation type. Rigorous oversight, active management and an adaptive approach are required to achieve fuel management goals with a positive by-product of ecosystem improvement. These approaches must also align with established habitat management plans and fire management and conservation plans in effect on EBMUD and EBRPD lands. The intended end state is the creation and maintenance of a varied fuel mosaic which mimics the historic natural state and will not support high intensity fire.

Generally, five fuel management methods are available and used within the WUI:

- Manual (hand labor such as pulling or cutting)
- Mechanical treatment (equipment used for mowing, selective cutting of trees, and masticating)
- Prescribed herbivory (targeted grazing by sheep, goats or cattle)
- Chemical treatment
- Prescribed fire

Specific fuel management treatment goals and methods are addressed more fully in the *Best Management Practices Guidebook for Hazardous Fuel Treatments in Contra Costa County*. This best management practice guidebook will continue to be refined based on environmental compliance documents, adaptive management practices and other lessons learned by the various stakeholders.

The sustainability of fuel management is an on-going challenge at all landscape scales – from the single residence, neighborhoods, public open space, watershed and parklands. Existing residential areas typically depend upon private property owners and their fire agency's fire prevention programs to reduce fuel loads. MOFD has the ability to enforce compliance with the local fire code; however, enforcement is limited to code requirements and does not include additional best practices.

New or in-fill residential development requires not only a plan for fire hazard reduction, but also must include funding mechanisms for long term vegetation management of any commonly held open space. Funding must include not only initial treatments, but also ongoing maintenance on an annual or multi-year cycle dependent on vegetation type and topography. For new projects, the following elements should be followed in accordance with the Fire Code:

- Pre-fire hazardous fuel management program and plans.
- Integrating fire planning with scientifically based resource and vegetation management that protects and improves native habitat values. Balance protection of biological resources with hazardous fuel removal to include consideration of riparian areas, bird nesting, and special status species
- Share project implementation resources (contractors, equipment, specifications), best management practices (BMP) and lessons learned. Use of goats, cattle, control burns, disk or mow fire containment lines, understory maintenance, as captured in a Wildfire Hazard Assessment and Plan (WHAP)
- Provide project support for both the individual large property owner and for homeowner associations with private open space.
- Ensure access for firefighters and equipment.
- Include enforcement of Fire Code requirements on public lands and open space.

3.8 Protecting Lives, Homes, Businesses, other Facilities & Essential Infrastructure at Risk

- Identify areas where lives are at risk from wildfire in homes.
- Identify areas where lives are at risk from wildfire along evacuation routes.
- Identify infrastructure to protect: roads, power grid, water treatment facilities, communications and utilities. Support and encourage hazardous fuel reduction projects which protect critical infrastructure.
- Identify network of roads for simultaneous fire response and resident evacuation.
- Identify areas where sensitive habitat and open space is at risk.

3.9 Ensure access to water for firefighting, including public and private sources. Local Preparedness and Firefighting Capability

- Develop local evacuation plans and educate residents on preparedness, including special needs communities and animal rescue and sheltering.
- Recognize that parking on narrow roads further limits fire access and evacuation and encourage the City and Town to review further Red Flag day parking restrictions.
- Support local volunteers and community readiness. Participate in and enhance existing CERT/ Neighborhood Watch programs and encourage participation in FIREWISE USA.
- Continue to support fire district response improvements: expanded mutual aid, wildland fire training, and equipment with an emphasis on coordination between regional fire agencies and land managers.
- Continue to support public notifications systems –community warning system, Nixel, and emerging technologies.

Action Plan Priorities

Section Four

4.1 Recommended Priorities for MOFD

The Moraga-Orinda Fire District Community Wildfire Protection Plan was developed through the collaboration of MOFD staff and various stakeholders. The following recommended priorities are based on this collaboration, as well as the Countywide CWPP, staff analysis, and the recommended strategies for reducing the risk with the WUI detailed in Section 3.

Each of the following topics outlines specific recommendations and associated actions. It is anticipated that additional opportunities for actions will be identified as the Community Wildfire Protection Plan is implemented. These opportunities should be incorporated in future updates to the CWPP. Projects, workshops, demonstrations and education efforts are recommended for implementation and funding based on the following attributes:

- Protects life, property and infrastructure in areas where the risk of catastrophic wildfire is most severe.
- Reduces risk of fire spreading from public wilderness lands to developed private parcels or other areas where significant natural or cultural resources are at risk.
- Seeks to create a detailed implementation plan for fire prevention or mitigation at the local level in the areas identified as at risk.
- Involves stakeholders at all levels in order to develop strong community support, as well as support from applicable agencies and landowners. Local support will be a significant factor to the plan's success.
- Demonstrates the capacity to continue to manage and maintain the project effectively and/or supports ongoing, previously planned efforts.
- Projects that will improve firefighting response, wildfire control capabilities, and residential evacuation plans and operational programs.
- Seeks innovation and grassroots feedback to provide the highest level of community safety.
- Prioritizes limited resources to the areas and treatment types with the greatest return on investment. High impact, low cost projects which can be carried out at scale should be prioritized.

Many of the recommended actions will take a multi-year commitment to address the complex hazards present in the community. Some actions have current funding, but additional funding and efforts are needed to continue to address the issue.

Moraga-Orinda Fire District Wildfire Action Plan

Section Five

Based on the fire environment and fire history of the area, it is clear that wildfires are inevitable; however, we do not have to accept catastrophic loss of life, homes, infrastructure, businesses, and cultural and natural resources in the community. Since the question is not if but when wildfires will occur, a strategy to reduce the wildfire threat to the community must be developed. Equipped with the wildfire assessments and the risk mitigation strategies described above, the next step is to develop appropriate actions to mitigate the hazards, thereby reducing the wildfire threat to the District.

It is important to note that despite our best efforts, wildfire is a natural element of the California landscape and will continue to be a threat to the District. Whether these inevitable wildfires are catastrophic or not depends on the efforts of all stakeholders – residents, local organizations, businesses, surrounding landowners, the City and Town, and MOFD. Fires will occur; however, the steps in this action plan may result in lower intensity fires which can be rapidly contained.

Recognizing the importance of reducing both the potential and intensity of uncontrolled wildfire in this jurisdiction, in February 2019, the fire district published the MOFD Wildfire Prevention Strategic Plan. This plan is available on the MOFD website <https://www.mofd.org/home/showpublisheddocument?id=526> and identifies seven mutually supporting lines of effort (LOE). These include:

- LOE 1 External fuels mitigation projects
- LOE 2 Internal fuels mitigation projects
- LOE 3 Wildfire preplanning
- LOE 4 Evacuation planning
- LOE 5 Building code updates
- LOE 6 Community outreach and education
- LOE 7 Early detection and notification systems

The plan draws upon an “all of the above” approach to wildfire risk reduction and requires action at all levels of the government and from residents to rapidly achieve the goal of reduced risk of destructive wildfire.

5.1 Community Preparedness

Community preparedness is the ability of communities to prepare for, withstand, and recover from wildfire. Current land use planning, zoning regulations, and municipal codes adopted by

the State of California, Contra Costa County and MOFD provide the regulatory basis for preparedness, but these alone will not protect the District's values – preparedness requires participation by all stakeholders, at all levels.

Community Programs

Contra Costa County and Lamorinda (Lafayette, Moraga, and Orinda) have implemented several programs to prepare the community.

These include:

5.1.1 Community Warning System

The Contra Costa County Community Warning System (CWS) is recognized as a modern and effective all-hazard public warning system. The CWS is a partnership of the Office of the Sheriff, the Health Services Department, other government agencies, industry, news media and the non-profit Community Awareness & Emergency Response (CAER) organization, all striving to deliver time-sensitive and potentially life-saving information to the residents of Contra Costa County.

MOFD residents should register to receive voice, text and email alerts. To speed the notification system, pre-established evacuation zones have been entered into the CWS system. This allows the rapid sharing of evacuation information during an emergency.

CWS can alert residents and businesses within Contra Costa County that are impacted by or are in danger of being impacted by an emergency. The CWS message will include basic information about the incident and what specific protective actions (shelter in place, lockdown, evacuate, avoid the area, etc.) are necessary to protect life and health. CWS is generally not used for traffic notifications or other non-life threatening incidents.

5.1.2 Community Emergency Response Team

The Community Emergency Response Team (CERT) began in 1985 to train civilians to meet their own immediate needs following a disaster. FEMA recognizes the importance of preparing citizens and the Emergency Management Institute (EMI) and the National Fire Academy adopted and expanded the CERT materials believing them applicable to all hazards. Since 1993 when this training was made available nationally by FEMA, communities in 28 States and Puerto Rico have conducted CERT training. A community can supplement its response capability after a disaster with civilians who can be auxiliary responders.

The Moraga-Orinda Fire District, in conjunction with the City of Lafayette, offers free CERT training to residents within the Lamorinda area. The CERT training program prepares community members to take a more active role in emergency preparedness and in the critical period immediately following a catastrophic event. Members train to work as part of a neighborhood or workplace response teams in the event of a major disaster, when emergency services may not be available and when residents may have to rely on each other for life-saving and life-sustaining needs.

This training covers basic skills in disaster preparedness, fire safety, disaster medical operations, light search and rescue operations, CERT organization,

disaster psychology, terrorism and CERT, and an evaluation and disaster simulation.

LAMORINDA CERT conducts regular preparedness training events to include monthly meetings and semi-annual water drum sales. Additional events are held on a regular basis to establish a shortwave radio net for post disaster communications.

Additional information on all of the above programs is available at:

- Moraga-Orinda Fire District – www.mofd.org
- Lamorinda CERT Program - www.lamorindacert.org

5.1.3 Contra Costa County Office of Emergency Services (CCC OES)

CCC OES is a department within the County Executive Office and is responsible for emergency planning and coordination for the Contra Costa County Operational Area. OES is responsible for emergency planning and coordination among the Contra Costa County Operational Area entities, which include:

Cities: Antioch, Lafayette, Pleasant Hill, Brentwood, Martinez, Richmond, Clayton, Town of Moraga, San Pablo, Concord, Oakley, San Ramon, Town of Danville, Orinda, Walnut Creek, El Cerrito, Pinole, Hercules, Pittsburg, Special Districts: Air Pollution Control District, Fire Districts, Sanitary Districts, School Districts, Vector Control Districts, and Water Districts

- Volunteer Organizations: American Red Cross, Amateur Radio Emergency Services
- Industry Groups: CAER-Community Awareness and Emergency Response, and Petroleum industry mutual aid group
- County Coordination: Contra Costa County OES also coordinates with adjoining offices of emergency services in adjacent counties.
- CCC OES responsibilities include:
 - ✓ Maintain the Contra Costa County Operational Area Multi-Hazard Functional Plan.
 - ✓ Maintain the County Emergency Operations Center (EOC) in a state of operational readiness.
 - ✓ Maintain a trained cadre of EOC team members.
 - ✓ Provide ongoing leadership and coordinate disaster plans and exercises throughout the County.
 - ✓ Assist County departments in developing department emergency plans, which address how they will perform during disasters.
 - ✓ Assist County departments with development of facility emergency plans for every occupied County facility.
 - ✓ Provide ongoing training for County department emergency coordinators.
 - ✓ Participate in an ever-expanding public education campaign for all hazards

5.1.4 Diablo Fire Safe Council

The Diablo Fire Safe Council (DFSC) is a non-profit community organization. DFSC's role in Alameda and Contra Costa Counties is to serve as a catalyst for bringing together people, agencies and the means to substantially reduce the impact of wildland fire on our communities. Their by-laws include a

mission statement: "This website made possible in part through a grant from the USDA Forest Service through the California Fire Safe Council.

The DFSC and the community provide education, evacuation planning, community vegetation management projects, fundraising, and neighborhood assistance. Additional information on Fire Safe Councils is available at <http://www.diablofiresafe.org/index.html>

5.1.5 Red Cross

The American Red Cross, a humanitarian organization, led by volunteers and guided by its Congressional Charter and the Fundamental Principles of the International Red Cross Movement. The Red Cross will provide relief to victims of disasters and help people prevent, prepare for, and respond to emergencies. The vision of the American Red Cross is to provide relief to victims of disasters and help people prevent, prepare for, and respond to emergencies.

5.1.6 Miscellaneous Programs

In addition to the fire protection activities, MOFD has other programs to assist in community planning and preparedness, including:

"Defensible Space and Hazard Reduction Pages". These links provide excellent information to assist homeowners in preparing their homes for wildfire.

Other helpful links include:

- National Fire Protection Association (www.nfpa.org) – This site contains information on an educational program 'Risk Watch' for children ages 14 and under. Risk Watch is a school-based curriculum that links teachers with the community, safety, experts, and parents. The curriculum is divided into four age-appropriate teaching modules.
- Federal Emergency Management Agency and the U.S. Fire Administration (www.usfa.dhs.gov/citizens) - Contains a full suite of awareness and educational information for all fire types, their inherent hazards and preventative actions.
- Sparky (www.sparky.org) – This link brings up a fun, interactive cartoon type learning program for kids.

There are countless other sources on the world-wide web, accessing a whole myriad of educational tools and reference material on potential wildland fire impacts in communities or WUI. The knowledge gained from this information can guide a homeowner on basic yet essential safety measures that could save lives, property and resources. Recommended groups or forums include:

- Fire Safe Council - www.firesafecouncil.org
- California Fire Alliance - www.cafirealliance.org
- FireWise - www.firewisesa.org.za/index.php

5.2 Fire District

- 5.2.1** Based on the finding of fact, MOFD has the following programs to assist in community planning and preparedness:

Finding of Fact:

Pursuant to Sections 17958.5 and 18941.5 of the California Health and Safety Code, the Moraga-Orinda Fire District (Fire District) finds that amendments to the California Fire Code, 2019 Edition are necessary due to the climatic, geologic and topographical conditions (the "Conditions") which exist in the Fire District. Under the adoptions of the California Fire Code, 2019 Edition, and specific amendments have been established which are more restrictive in nature than those adopted by the State of California and State Fire Marshal.

The local amendments to the California Fire Code, 2019 Edition, have been evaluated by the Fire District as a tool for addressing the fire problem and concerns within the Fire District, which will establish and maintain an environment for a high level of fire and life safety to all persons who work and live within the Fire District boundaries.

The following conditions establish a fire hazard within the Fire District, which requires specific amendments to the California Fire Code, 2019 Edition.

1. Climatic Conditions

The ever-changing climatic conditions have increased the risk and severity of fires in the Fire District. Local climatic conditions of limited rainfall, low humidity, high temperatures, and high winds along with existing building construction and landscaping create extremely hazardous fire conditions that adversely affect the potential fire line intensity, spread rates, and size of fires in the Fire District. The same climatic conditions may result in the concurrent occurrence of multiple fires in the Fire District throughout the region resulting in inadequate fire district personnel to protect against and control these fires.

The Fire District is the gateway to central Contra Costa County. It is located amongst rolling hills and valleys created by the Berkeley/Oakland hills to the west and open plains of central Contra Costa County to the east. Due to its location, the Fire District's climate is more varied than that of its neighbors. The Fire District receives slightly more rainfall than areas further inland, and often, during the summer months, portions of the Fire District are enveloped in fog as the heat in the Central Valley draws cool air in from the San Francisco Bay. However, the Fire District also experiences the hot, dry summer weather that is characteristic of central Contra Costa County. This climate promoted the growth of grasslands, chaparral, oaks, and other plant species indigenous to the area. The climate has encouraged development in the Fire District, with the addition of primarily residential areas surrounded by large numbers of non-indigenous plant species. Due to the systematic exclusion of naturally occurring fire for over 100 hundred years and a reduction in historical grazing activity as pasture has been developed, these indigenous and non-indigenous plant species have created significant fuel loads throughout the Fire District. Due to the location of the Fire District in proximity to the Oakland/Berkeley Hills, in the fall, the hot dry summer weather gives way to Diablo Wind events characterized by high winds and very low relative humidity. These conditions

have contributed to major fire loss in the region and throughout the state, with 17 of the 20 most destructive fires in California history occurring in the fall. The Fire District is exposed to more of these wind events as climate change has delayed the onset of the rainy season, thus increasing the risk of major fires.

In September 1923, during critical climatic fire conditions, a fire started in the wilderness lands of the Fire District's northern area. This fire spread into the city of Berkeley and, within two hours, was attacking houses within the City limits. A total of 130 acres of built-up territory burned. 584 buildings were wholly destroyed, with roughly 30 others seriously damaged. At this time, this was the most destructive fire in California history.

In September 1970, during critical climatic fire conditions characterized by hot, dry winds out of the northeast, a fire started along Fish Ranch Road and Grizzly Peak. This fire rapidly spread into the surrounding neighborhoods of Oakland, burning 400 acres and destroying 37 homes. An additional 18 homes were badly damaged before the fire was brought under control.

In August 1988, during critical climatic fire conditions, a small fire started near Crestview in Lost Valley and within minutes destroyed 5 homes. This fire's spread rate was increased by the prevalence of light flashy fuels, and steep slopes in alignment with strong winds.

In October 1991, a disastrous firestorm burned through the Oakland hills from an ignition point just west of the Fire District's border. Within the first few hours, thousands of people were evacuated. Ultimately over 3,000 dwelling units were destroyed in what replaced the 1923 fire as the most destructive fire in California history.

On October 27, 2019, sustained single-digit relative humidity and 30+ mph winds created explosive fire conditions throughout the region. On the same day that the Kincadee fire burned in Sonoma County, five major fires broke out in Contra Costa County. Three of these fires burned in proximity to the Fire District in Lafayette, Crockett, and Martinez and resulted in the depletion of available mutual aid resources as available firefighting units were committed to each new fire.

Throughout the Fire District, homes are surrounded by heavy vegetation with interspersed open areas, creating a semi-rural character. The resulting exposure to wildfire risk is increased by the negative effects of high wind conditions during the fire season. During May to October, critical climatic fire conditions regularly occur when the temperature exceeds 80F; wind speed is greater than 15 mph, fuel moisture is less than or equal to 10 percent, wind direction is from north to the east-southeast, and the ignition component is 65 or greater. These conditions occur more frequently during the fire season, but this does not preclude the possibility that a serious fire could occur during other months of the year.

The critical climate fire conditions create a situation conducive to rapidly moving, high-intensity fires. Fires starting in the wildland areas along the northern border are likely to move rapidly southward into the populated areas creating the potential for significant property loss and a very challenging evacuation problem.

2. Geological Conditions

Local geological conditions include high potential for seismic activity. The Fire District is made up of built-up suburban areas having buildings and structures constructed near three major fault systems capable of producing major earthquakes, the modifications cited herein are intended to better limit life safety hazards and property damage in the aftermath of seismic activity.

The Fire District is in a region of high seismic activity with the Hayward fault running just west of its border. The San Andreas Fault is farther to the west and the Calaveras Fault to the east. All three faults are known to be active, as evidenced by the damaging earthquakes they have produced in the last 100 years and can, therefore, be expected to do the same in the future. Of primary concern to the Fire District is the Hayward Fault, which has been estimated to be capable of earthquakes exceeding a magnitude of 7.0 on the Richter scale. A large number of underground utilities cross the fault, including major water supply lines. Intensified damage during an earthquake may be expected in slide areas, as well as residential hillside areas located within or near the fault zone; some areas are steep and have previously been subjected to slides.

Additional potential events following an earthquake include broken natural gas mains and ensuing fires in the streets; building fires, as the result of broken service connection, trapped occupants in collapsed structures; and requirements to render first aid and other medical attention to a large number of residents.

3. Topographical Condition

Local topographical conditions include hillside housing with many narrow and winding streets with slide potential for blockage and limited firefighting water supply. These conditions create the potential for delays in responding when a major fire or earthquake occurs. Many situations will result in limiting or total blockage of fire district emergency vehicular traffic, overtaxed fire district personnel, and a lack of resources for the suppression of fire in both structures and vegetated areas in the Fire District. In order to mitigate the conditions that hinder the rapid response of suppression resources to a fire, automatic fire-extinguishing systems, and enhanced fuel mitigation requirements are required over and above state code requirements. These requirements will buy time for residents to execute an orderly evacuation while allowing for access by firefighting resources.

The Fire District has many homes that are reached by narrow and winding paved streets, which hamper access for fire apparatus and provided limited evacuation routes for residents. In addition, many of the hillside homes are in outlying areas that require longer response times for the total required firefighting force. El Toyonal, Sleepy Hollow, the Downs, Canyon, and other areas with limited access via narrow and winding streets may face the problem of isolation from the rest of the Fire District and will suffer from the need for two-way traffic as evacuation and suppression response travel in opposite directions over limited roadways.

Effective road widths are further reduced by encroaching vegetation and mid-slope roads built without shoulders. This is particularly pronounced in older

neighborhoods of North Orinda, some of which were laid out in the 1920s when vehicles were smaller, codes less stringent, and population density much lower.

Due to steep slopes that characterize many areas of the Fire District, the establishment of infrastructure to support adequate fire protection needs is not feasible. It is difficult to widen existing streets to meet present standards for emergency operations, and fire hydrants, especially in the hillside areas, often have less than optimum water pressure levels.

In summary, portions of the Fire District have limited water supplies or roadways that delay the response of emergency equipment to carry out the extinguishment of a fire allowing the fire to increase in area. In order to mitigate the above situation that hinders the quick response to a fire, built-in automatic fire-extinguishing systems are required over and above state code requirements. The requirement and installation of such a system will allow for occupants to evacuate and allow the fire to be controlled before the Fire District arrives. This control of the fire also eliminates the potential for fire to spread beyond the structure into the vegetation.

5.2.2 California Fire Code - Ordinance NO. 20-01

An Ordinance of the Moraga-Orinda Fire District of Contra Costa County, California, adopting, the 2019 edition of the California Fire Code with certain amendments, and by reference, the International Fire Code, 2018 edition, published by the International Code Council. The Moraga-Orinda Fire District completed the ratification process for Ordinance 20-01 Fire Code adoption on September 22, 2020. The new fire code requirements took effect October 7, 2020.

As pertaining to the risk of wildfire in the district, Chapter 3, section 304.1.2 is amended to read:

304.1.2. Hazardous Vegetation and Combustible Material. Weeds, grass, vines, leaves, brush, diseased or dead trees, combustible growth, debris, or rubbish capable of being ignited and endangering property shall be cut down by the owner or occupant of the premises. Clearance of combustibles upon default of the owner or occupant shall be in accordance with Section 325

Chapter 3, is amended to add Section 325 as follows:

325 EXTERIOR FIRE HAZARD CONTROL

325.1 Scope. This section provides provisions intended to identify hazard areas and mitigate the risk to life and structures from wildland fire exposures and fire exposures from adjacent structures and to mitigate fires from spreading to or from wildland fuels that may threaten life, overwhelm fire suppression capabilities, or result in property loss. Section 325 applies to structures with roofs, intended for living, storage or commercial activity. Private sheds or other utility buildings less than 120 square feet which are located more than 30 feet from a habitable structure are exempt. Also exempt are non-habitable structures such as fences, retaining walls, decks, and arbors. Fuel mitigation and defensible space work shall be conducted in a manner that the activities will not result in the taking of endangered, rare or threatened plant or animal species or cause significant erosion and sedimentation of surface waters in accordance with California Environmental Quality Guidelines Section 15304.

325.1.1 Purpose. The purpose of this section is to establish minimum requirements in wildland-urban interface areas that will increase the ability of a building to resist the intrusion of flame or burning embers by a vegetation fire, including the identification of hazardous fire areas that require applicable defensible space provisions as set forth by and enforced by the fire code official and applicable state and local fire resistive building standards that are enforced by the local building official and fire code official.

325.1.2 Jurisdictional authority. The Board of Directors as the supervising, legislative and executive authority of this jurisdiction has the authority to act pursuant to Part 5 (commencing with Section §14875), Division 12, of the State of California Health and Safety Code, to clear or order the clearing of rubbish, litter or other combustible material where such combustible material endangers the public the safety by creating a fire hazard. Such fire hazard abatement shall be conducted in accordance with the provisions of Part 5 and/or this code. In the application of the provisions of Part 5 to fire hazard abatement proceeding under this code and the Fire Protection District Law of 1961, the terms "Board of Directors" or "Board" when used in Part 5, shall mean the Board of Directors of this jurisdiction under this article; and the officer designated in Section §14890 of Part 5 shall mean the Fire Chief.

325.1.3 Contract for services. The Board of Directors reserves and retains the power to award a contract for such fire hazard abatement work where the employees of this jurisdiction are not used to perform such abatement work.

325.3 Public nuisance. The Board of Directors, or fire code official may declare that hazardous fire areas, including combustible materials, and hazardous vegetation, upon private property are a public nuisance.

325.3.1 Seasonal and recurrent nuisance. If the nuisance is seasonal and recurrent, the Board of Directors shall so declare. Thereafter, such seasonable and recurring weeds shall be abated every year but must be maintained year-round as determined by the fire code official without any further hearing.

325.4 Unlawful disposal. Any person who places, deposits or dumps combustible material or hazardous vegetation on a parcel whether or not he/she owns such parcel, is subject to the criminal sanctions set forth in Health and Safety Code Section 13871.

325.5.1 Hazardous Vegetation and Combustible Material to be removed. Parcels are to be maintained free of hazardous vegetation and combustible material.

325.5.2 Prohibition. No person who has any ownership or possessory interest in or control of parcel of land shall allow to exist thereon any hazardous vegetation or combustible material which constitutes a fire hazard as determined by the fire code official.

325.6 General abatement requirements. The provisions of this section shall govern the abatement of combustible materials and hazardous vegetation creating a fire hazard upon premises (reference Government Code 51175-51189 and Public Resources Code 4291). The District shall develop minimum abatement standards for land in residential or business, areas, or improved or unimproved parcels of any size, including vacant parcels of any type. Such standards shall be approved by the Board of Directors and may be modified periodically as circumstances dictate.

325.6.1 Clearance of hazardous vegetation or combustible materials

from fire apparatus access roads. The fire code official is authorized to require areas within 3 feet on each side and 15 feet in height of the paved edge on fire apparatus access roads to be abated of hazardous vegetation and combustible material. On unpaved fire apparatus access roads, the measurement will be from the edge of the improved roadway surface.

325.6.2 Clearance of Hazardous Vegetation Combustible material from parcels. All improved and unimproved parcels declared a public nuisance by the Board of Directors shall be abated as determined by the fire code official.

325.6.2.1 Remove from improved and unimproved parcels all hazardous vegetation and combustible material that are deemed a fire hazard.

325.6.2.2 Parcels one acre or less (43,560 square feet) shall require abatement of the entire parcel.

325.6.2.3 Parcels over one acre (43,560 square feet) may be required to comply with the following requirements:

- Parcels shall provide 30-foot fuel breaks along the perimeter of the property line.
- Parcels 10 acres or more shall provide a 30-foot cross breaks to divide the parcel into approximately 5-acre sections.
- Eliminate any ladder fuels that can readily transmit fire in fuel breaks and cross breaks.
- Provide 100 feet clearance from unimproved parcels to property line of improved adjacent parcels.
- Provide 100 feet clearance around structures in accordance with 325.6.3.

325.6.3 Clearance of brush or vegetative growth from structures. Any person owning, leasing, controlling, operating or maintaining any structure in, upon, or adjoining any hazardous fire area shall at all times maintain defensible space around and adjacent to such structure by removing and clearing away all combustible material for a distance not less than 100 feet from all portions of the structure. Distances may be increased or decreased by the fire code official based on site specific analysis of local conditions.

Exception: Single specimens of trees ornamental vegetative fuels or cultivated ground cover, such as green grass, ivy succulents or similar plants used as ground cover, provided that they do not form a means of readily transmitting fire as determined by the fire code official.

325.6.3.1 Remove that portion of any tree that extends within 10 feet of the outlet of any chimney or stovepipe.

325.6.3.1.1 Remove hazardous vegetation and combustible material around any outdoor wood burning fire pit, heating or cooking appliance.

325.6.3.1.2 Annual grasses must be removed or cut to less than 3 inches.

325.6.3.2 Maintain any tree, shrub, or other plant adjacent to or overhanging any structure free of dead limbs, branches or other combustible material that is determined to be a fire hazard.

325.6.3.3 Maintain the roof of any structure and roof gutters free of leaves, needles, or hazardous vegetation and other combustible materials.

325.6.3.4 Maintain trees to remove ladder fuels so that foliage, twigs or

branches are greater than 6 feet above the ground or surface fuels within 100 feet of any structure, or within 10 feet of the paved edge of any fire apparatus access road. On unpaved fire apparatus access roads, the measurement will be from the edge of the improved roadway surface.

325.6.3.5 Maintain 6 feet of vertical clearance between roof surfaces and portions of trees overhanging any structure.

325.6.3.5.1 All Monterey Pines (*Pinus radiata*) and Eucalyptus (Genus *Eucalyptus*) must be 6 feet or greater, measured horizontally or vertically from any habitable structure.

325.6.3.6 Maintain all ground areas within 2 feet of the exterior walls of any habitable structure free of combustible ground cover including combustible mulch and barks.

Exception: Ornamental vegetative fuels or cultivated ground cover, such as green grass, ivy succulents or similar plants used a ground cover, provided that they do not form a means of readily transmitting fire as determined by the fire code official. MOFD will maintain a list of approved plant species that may be used as ground cover.

325.6.3.6.1 All native and nonnative plant species next to a habitable structure must be maintained in a manner that removes combustible material within a 2-foot horizontal and 1- foot vertical area, measured from the base of the structure.

Exception: Ornamental vegetative species used as ground cover that are irrigated and have a high moisture content and configuration that would not promote or cause a fire to spread from the vegetation to the structure. Brush and other ornamental species may be planted within 2-feet of a structure provided foliage, twigs, and small branches are maintained in such a manner to create a minimum of 1-foot clearance above the ground or ground cover. MOFD will maintain a list of approved plant species that may be used as ground cover.

325.6.3.7 Remove all Junipers (genus *juniperus*) and Bamboo (genus *bambusa*) within 10 feet of the paved edge of all public and private roads by December 31, 2023.

325.7 Fire Protection Plan. A fire protection plan shall be prepared by the applicant when required by the fire code official. All Fire Protection Plans require approval by the Fire Code Official.

325.9.1.7 Immediate hazard. When, in the opinion of the fire code official, an extreme fire hazard exists which constitutes an immediate threat to public, safety, and welfare, and it is deemed necessary to abate such hazard as promptly as possible, said fire hazard shall be removed or abated within five (5) days. Notice of the violations and abatement action taken shall be provided within seven (7) business days after such emergency abatement.

325.9.1.12 Fuel breaks. In lieu of ordering complete abatement, the fire code official of this jurisdiction may order the preparation of fuel breaks around parcels of property where hazardous vegetation and combustible material are present. In determining the proper width for fuel breaks, the fire code official shall consider the height and type of fuels, weather conditions, topography, and accessibility to the property of fire protection equipment.

325.9.10 Sale or transfer of property. Before the close of escrow, the seller shall provide to the buyer documentation from the Fire Chief, Fire Code Official or his/ her designee stating that the property is currently in compliance with the exterior hazard abatement section of the Moraga Orinda Fire Code. The fire code official shall have discretion to accept alternate means and measures in the event completion of the required work will delay the sale or transfer of property.

5.2.3 Burn Ban Ordinance NO. 20-03

An Ordinance of the Moraga-Orinda Fire District of Contra Costa County, California, Setting Forth the Requirements and/or Restrictions Pertaining to Banning Open Burning and Recreational Fires during High Fire Conditions and Providing for Enforcement Options and Penalties.

Every year open burning, camp fires, bonfires, and recreational fires escape control and require an emergency response from fire agencies. By restricting the time of year that open burning is allowed, the threat to our community posed by uncontrolled wildfire is reduced.

The Burn Ban places restrictions on Fires During Hazardous Fire Conditions. Open Burning on all lands within the jurisdiction of the Moraga Orinda Fire District ("MOFD"), including the local response area (LRA), is prohibited when the California Department of Forestry and Fire Protection (CalFire) issues a burn suspension in the state responsibility area (SRA). Open Burning is also prohibited on all lands within the jurisdiction of the MOFD at any time the Fire Chief or his or her designee finds that atmospheric conditions or other local circumstances make such fires hazardous, including when factors, such as high winds, low fuel moistures, fire weather, the issuance of red flag warnings, or severe threat of wildland fire, present the risk of destruction by wildfire to life, wildlife, property or natural resources.

The Fire Chief shall provide notice of the suspension on Open Burning by posting the suspension on the District's website and mailing notice to those residents on its mailing list. This prohibition shall be made effective 24 hours following its declaration. Any person who fails to comply with this section may be subject to a fine of \$500.00 per each day of violation. The prohibition on Open Burning applies to Open Burning, Campfires, Bonfires, Portable Outdoor Fireplaces, Ceremonial Fires, and Recreational Fires, as defined in the 2019 California Fire Code. Campfires on private lands, with a MOFD, issued fire permits and any additional restrictions as determined by MOFD staff. Ordinance 20-03 was passed, approved, and adopted by the Moraga-Orinda Board of Directors on July 15, 2020.

5.2.4 CEQA Notice Of Exemption

The Moraga-Orinda Fire District filed a CEQA Notice of Exemption with the Contra Costa County on July 14, 2020, to extend CEQA exemptions for fuel management activities from 30' to 100' from structures to increase defensible space adjacent to structures in Wildland-Urban Interface Fire Areas to promote Fire Prevention and firefighting. Areas of the Moraga-Orinda Fire District have been designated as Fire Hazard Severity Zones and are listed as Wildland-Urban interface communities and Communities at Risk by CAL FIRE.

Properties within a Fire Hazard Severity Zone and areas designated as Communities at Risk are required to maintain 100 feet of defensible space. This requirement can be found in Public Resources Code sections 4290, and Government Code sections 51175-51189.

The Notice of Exemption allows the Moraga-Orinda Fire District to designate areas of the jurisdiction as a CEQA exemption for all fuel mitigation hazard reduction done within 30 feet of structures unless the fire jurisdiction declares the need (supported by findings and evidence) to declare the need to move that to 100 feet. The Notice of Exemption exempts all fuel mitigation work occurring within 100 feet of a structure so long as it does not result in the taking of endangered rare or threatened plants or animal species or significant erosion or sedimentation of surface waters.

5.2.5 Wildland Urban Interface - Fire Area Ordinance NO. 20-02

An Ordinance of the Moraga-Orinda Fire District of Contra Costa County, California, Designating Certain Identified Areas Within The District As A Wildland Urban Interface Fire Area. "Wildland-Urban Interface Fire Area" means a geographical area identified by the state as a "Fire Hazard Severity Zone" in accordance with the Public Resources Code section 4201 through 4204 and Government Code sections 51175 through 51189, or other areas designated by the Moraga-Orinda Fire District as the enforcing agency to be at significant risk from wildfires. Pursuant to Public Resources Code Sections 4201 through 4204 and Government Code Sections 51175 through 51189, and based on the findings in Section 2 of the Ordinance and the substantial evidence supporting those findings, those areas identified by CAL FIRE as Very High Fire Hazard Severity and High Fire Hazard Severity Zones on FRAP map fhszl06_1 map are hereby designated as a Wildland-Urban Interface Fire Area. Designation of Local Response Areas of the District as Wildland Urban Interface Area requires the use of ember resistant construction for new buildings. State law currently requires the use of ember resistant construction for new buildings in all State Response Areas within Moraga-Orinda Fire District's jurisdiction outside of the City and Town limits. Ordinance 20-02 was passed, approved, and adopted by the Moraga-Orinda Board of Directors on June 17, 2020.

5.2.6 Red Flag Warning Plan

A Red Flag Warning means that the combination of weather and fuel moisture are at hazardous levels and could lead to rapid or dramatic increases in wildfire activity. The Red Flag Warning Plan utilizes available MOFD personnel, cooperating fire agencies, resident groups, and the news media to inform the public of high fire danger, the potential for a major wildfire, and the need to be aware of and exercise fire safe practices during these periods. Additional information is available at <http://www.mofd.org>

5.2.7 Public Education

MOFD's "Ready, Set, Go" program is an important educational tool developed in May of 2009 as a new approach for educating Southern California residents

about the year-round threat of wildfire. This educational program seeks to gain public involvement towards the goal of reducing the loss of life caused by delays in evacuation. The program is taught by the LAMORINDA CERT program and is featured in Resident’s Guide to Wildfire.

The fire district provides additional information and programs related to wildfire safety, including:

- FIREWISE USA program which provides a comprehensive list of life and safety information regarding measures that can be taken to provide home defensible space tactics as well as a program for neighborhood recognition. This fire district supports this program through education and neighborhood assessments.
- Fire Safety education program is offered in conjunction with elementary school programs.
- Fire Prevention and regional fire history presentations which are available on the Fire District’s home page and given in person several times per year. This presentation provides an overview of regional fire history, a fire science primer, and best practices for the creation of defensible space and home hardening.

5.3 RECOMMENDATIONS – Community/District Preparedness:

Education is viewed as a force multiplier and a critical component to the transition of our community to a fire safe future. Due to the size of the community and the inherent limitations to a program based on enforcement, voluntary compliance continues to be the fire district’s goal. Education addressing both the importance and best practices will continue to be the foundation upon which all other programs are built. A key recommendation is working with potential partners to find common ground, share ideas and develop joint implementation of local projects. These partners may expand beyond the traditional agency partners to include volunteer groups who have an interest in neighborhood or nearby open spaces. Recommendations include:

Project	Description	Priority
<p>Community Outreach and Education</p>	<p>Recognizing the community’s interest in addressing the wildfire threat and the tremendous capacity latent within our population, the district will invest heavily in outreach and education to inform the populace of both the overarching plan and their role in its implementation. New and creative methods will be employed in recognition of the diverse nature of the community and varieties of ways they receive and process information. The overarching intent of this LOE is that no resident will be cited until the district can demonstrate that they were aware of the requirements and given adequate time to bring their parcel into compliance. Education will be the primary driver of internal fuels mitigation efforts.</p>	<p>High</p>

Evacuation Planning	Building upon the work done in partnership with Moraga and Orinda PD, MOFD will continue to refine evacuation plans to include notification, time phased evacuation orders, surface street capacity, and the identification of Temporary Refuge Areas in both North Orinda and Moraga. These plans will be captured in automated tools that will make near real time recommendations in the event of an evacuation. These efforts will be aided by LOE #7	High
Evacuation Notification	Recognizing the limitations of the current landline and cellular based evacuation notification system, particularly during public safety power shut offs, the fire district will continue to work with the CWS and County OES to develop new systems to ensure all residents have reliable access to evacuation orders.	High

5.4 Enhanced Fire Suppression Capabilities

5.4.1 Automatic and Mutual aid Partnerships

MOFD deploys units for Rescue, Fire Suppression (structural and vegetation) and Emergency Medical Services. In addition to its own resources, the District also has automatic and mutual-aid agreements in place with neighboring agencies, including Contra Costa Fire Protection District, Berkeley Fire Department, Oakland Fire Department, the El Cerrito-Kensington Fire Department, and CAL Fire.

5.4.2 Water Sources

Reliable water supply is a critical element to wildfire suppression. There are almost 700 fire hydrants within the district, with most areas having adequate coverage; however, there are areas of the district with fewer hydrants. In these areas alternate water supplies such as water tenders, fire engines using their onboard water tanks to establish a water shuttle, as well as static water sources such as pools, lakes, and other water bodies can be used to supplement areas with fewer hydrants. However, fewer available water sources in some areas may hinder fire suppression efforts and affect how quickly a wildfire is controlled. Per 10 CCR § 260.140.71.8

§ 260.140.71.8, fire hydrant maintenance, repair, replacement, and annual flow tests are the responsibility of the mutual water company. As a reliable water supply is a critical component of firefighting, it is recommended that steps be taken to ensure required maintenance and flow testing is occurring within the fire district.

5.5 RECOMMENDATIONS - Fire Suppression Capability:

Project	Description	Priority
Wildfire Preplanning	Given MOFD's small size and the potential for a large scale event that exceeds the capacity of on-duty resources, the district must be prepared to request and employ large numbers of mutual aid suppression. Resources during	High

	<p>the first operational period. In order to meet the command and control requirements, MOFD will recruit, train, qualify, and maintain interested members to become CICC recognized Division Supervisors. These members will gain valuable experience through OCMA deployments that will build the requisite skills to rapidly employ mutual aid resources for a future fire in the MOFD jurisdiction.</p> <p>The preplanning process will include the designation of identified and marked division boundaries, associated communications plan, water supply, suppression objectives, and evacuation considerations.</p> <p>Understanding that responding agencies will not be familiar with MOFD's operational area, this LOE will focus on the development of internal leaders who will be able to direct incoming units to make the most efficient use of these resources.</p>	
<p>Early Detection and Notification Systems</p>	<p>In an effort to leverage available technologies to reduce delays in wildfire reporting, increase location certainty, and automate the processing of evacuation decisions, the district is currently developing a Wildfire Information Processor (WIP) that includes the following components:</p> <ol style="list-style-type: none"> 1. Early wildfire detection 2. Autonomous wildfire confirmation 3. Near real time wildfire spread modeling 4. Evacuation Decision Support Tool <ol style="list-style-type: none"> a. Time phased evacuation recommendations shared via a common operating picture b. Dynamic surface street capacity modeling c. Google/Apple maps integration d. Traffic optimization via contraflow traffic systems and traffic control recommendations 5. API integration with CWS to speed the development of a common operating picture 	<p>High</p>
<p>Type 6 Brush Truck</p>	<p>Deploy a Type 6 Brush Truck to address wildland firefighting access for members assigned to Station 44 and increase access to wilderness areas. Consider deployment of a single rear axle, lightweight water tender to enhance wildland water supply in areas with limited access. Future evaluation is required to determine if additional Type VI apparatus meet</p>	<p>Moderate</p>

	the District's needs.	
TRA Water Trailer Pumps	Recognizing the difficulties inherent to accessing non-standard water supplies such as pools in a suburban environment, the fire district has outfitted two pump trailers to provide access to large in-ground water sources and equipped all apparatus with smaller trash pumps for the same purpose.	Moderate

5.6 Protecting Values

During a WUI fire, the protection of human life safety for both firefighters and civilians is the first priority, with property (i.e., homes, businesses, historic sites, infrastructure, etc.) and resource values secondary. Many citizens incorrectly assume that there will be firefighters available to protect their homes or structures during a WUI fire; however, with the thousands of structures in MOFD, there are simply not enough fire personnel or fire equipment to defend each structure or value. Often in extreme wildfire situations, such as Diablo Wind events, it is extremely unsafe and impossible for firefighters or citizens to make an effective defensive stand, so these structures and values must be able to survive on their own. This survival is made possible through passive measures, completed in advance of a fire's arrival, which disrupt the continuity of the fuel bed and reduce a fire's intensity and spread rate.

The ability of firefighters to protect values at risk depends on many factors. Firefighters arriving on scene will perform a rapid triage to determine whether a structure is defensible. They assess access/egress issues, vulnerability characteristics, hazardous material issues, adequate water sources, pre-established defensible space, and whether the defensible space provides them safe operational space. The defensible space includes both wildland vegetation as well as ornamental vegetation used in landscaping. Often, ornamental vegetation poses a greater threat than wildland vegetation due to its proximity to structures.

In addition to defensible space requirements included in the Public Resources Code and MOFD Fire Code, firefighters must consider whether the pre-established defensible space are sufficient to provide a safe operational space under the current and anticipated fire behavior. Depending on fire behavior, 100-feet of defensible space may not be sufficient for safety when defending structures and other values. Safety zone guidelines provide safe operational space for firefighters protecting structures. Firefighters require a minimum distance of 4 times the height of observed or anticipated flame lengths; however, these distances are a minimum and will likely require greater distances if the fire behavior dictates it. The safety zone guidelines assume that there is no wind or slope and convective heat from wind and/or terrain influences. Areas with these influences will need greater distances than those recommended in this analysis to provide for firefighter safety. Observations have shown that flame lengths exceeding 70-feet may occur during wildfires in this area, so depending on the slope or wind components, defensible space distances greater than 100-feet may be needed depending on slope and fuel type.

When defensible space, fuel breaks, and area treatments are coordinated, the community's natural resources are afforded an enhanced level of protection from wildfire that may originate from a structure or home. These fuel treatments moderate fire behavior, improve access for firefighters, and provide a safer working environment allowing them to protect the community's natural resource values and suppress the

wildfire. Simply put, defensible space works both ways, both protecting the home and protecting surrounding homes and vegetation from the home.

5.6.1 Reducing Structure Ignitability

The ability of a structure to survive wildfire depends on the material used for construction, the type of vents, condition of the roof, and the quality of the defensible space surrounding it. Windblown burning embers from a wildfire will find access to void spaces through vents and open joints or ignite combustible material on the roof. However, there are measures that can be taken to safeguard structures from wildfire. If a structure's vulnerability to ignition can be mitigated, then the catastrophic loss of structures can be minimized. The exterior construction material, structure design, maintenance of the material, and defensible space will determine whether a structure will survive or not. Most actions to reduce the ignition potential of a structure are with the structure itself and the immediate area directly adjacent to the structure within 100 feet. Under some circumstances reducing fire intensity, and therefore the structure ignition risk may involve extending the zone further depending on the steepness of slopes and typical fire weather wind events (i.e. Diablo winds), however the greatest benefit from fuel reduction and home hardening work will occur closest to the structure.

Key Ignition Resistance Factor

The key to ignition resistance is the design of the structure, the materials used in its construction and the presence of defensible space. Research points to basic factors that affect the risk of a structure burning in a wildfire. A weakness in any of these areas can lead to a similar result – a destroyed or severely damaged home or building. The following information is adapted from several sources, including the Insurance Institute for Building and Home Safety. Additional information can be found at their website <https://disastersafety.org/ibhs-risks-wildfire/>

Combustibility of the Roof

Research shows that homes with a non-combustible roof and defensible space of at least 30 to 60 feet around the structure have an 85-95% chance of survival in a wildfire. At a minimum, a home structure should have a Class A-rated, fire-resistant roof cover or assembly, and preferably one that is self-extinguishing once a falling ember burns out. Self-extinguishing means that the firebrand will not burn through to the roof deck and flames will not spread to other parts of the roof. Without a fire-resistant roof, other approaches toward mitigation will fall short of protecting the home as windblown embers can travel miles in advance of the flaming front.

Roof shape also plays an important role. If the roof has a lot of ridges and valleys or roof segments that intersect with vertical walls, the house is more vulnerable to wildfire unless regularly maintained. Even a Class-A roof is more vulnerable because vegetative debris and wind-blown embers readily accumulate at these intersections and can expose combustible siding, vents or windows as well as the roof assembly to fire.

Wind-blown debris and overhanging trees can lead to gutters full of leaves and needles on your roof and gutter. Research has shown that a home with a gutter full of leaves has enough fuel to ignite a roof, especially if there is a

path for the fire to reach any exposed combustible surfaces such as the edges of the roof structure or through vents. Keeping gutters clean of debris is especially important if you have a multi-story building or dormer windows where exterior siding would be exposed to flames from debris in gutters.

Structure Openings – Vents, Doors and Windows

Many post-fire surveys of damaged buildings have shown that the attic/roof and foundation vents are key entry points for embers and flames. Areas where there are direct pathways to the attic, house or crawl space provide an easy entry point. This can include vents, soffits or windows prone to breaking when exposed to wildfire conditions (usually unprotected, single pane windows). Window fans, pet doors, and fireplace chimneys can allow firebrands to enter if left open or unscreened.

Recent fires have shown that screened vents alone may fail to keep embers out of attics or other spaces. Pre-cut fire-resistive covers are one solution. New technology combines several features that increase the effectiveness of preventing embers from entering these flammable spaces; however, maintenance issues need to be evaluated when these products are considered.

Siding

Siding can be vulnerable for several reasons. If ignited, combustible siding can provide a path for flames to reach other vulnerable components such as windows or eaves. Second, a horizontal or vertical joint in the siding (or at the top or bottom of the material) can provide access for embers or flames into the house. Some materials, such as vinyl siding, will deform and fall off the wall at relatively low heat or flame exposure. If this happens, protection of the structure will depend on the underlying sheathing in the wall assembly.

Walls need to resist heat and flames, as well as embers. Non-combustible materials like three-coat stucco, fiber cement, brick and tile resist flames but don't always resist heat and embers. Therefore, incorporating sheet-rock or other non-combustible sheathing material into the wall assembly underneath the exterior material will improve performance.

Regardless of wall material choice, all gaps at the top or bottom edges or at lap joints must be sealed or caulked to reduce the potential for ember intrusion. Embers can also accumulate at the foundation if the lower edges of the siding material are left unsealed. The more complicated the lap joint, such as tongue-and-groove or shiplap, the better the resistance from flame or embers. Attention to construction detail, such as the use of a metal flashing where fences or decks attached to walls can prevent the accumulation of debris and slow ignition.

Overhanging Structures

Eaves, alcoves, entryways, patio covers, decks, porches, and exterior stairways all have the potential to "trap" heat under them or create areas where burning embers can accumulate. Openings or gaps in blocking also

result in areas where wind-blown embers can become lodged and ignite debris or wood.

Decking

Decks, patios, and porches can become a pathway for fire into a home. Most are attached to a home and adjacent to doors, windows, sliding glass doors or other openings and combustible siding. Materials used to build the deck, the furniture or other items on top of the deck, as well as the items stored beneath them; all can increase the ease of structure ignition. Decks and porches can be particularly vulnerable when the home is sited on a slope or surrounded by vegetation where flame lengths can reach more than 30 feet, exposing even elevated decks.

The combustibility of wood deck boards is common knowledge; however, the performance of plastic composite decking products is less well known. Some manufacturers are incorporating fire retardant chemicals into these products. Information can be found on the California State Fire Marshal Wildfire Protection Building Construction website.

5.6.2 Adoption of California Building Code Chapter 7A Standards

The presence of structures within the WUI exposes both the natural and developed environments to increased risk of destruction by wildfire. In areas where the accumulation of flammable vegetation coexists with residential development, an ignition can lead to catastrophic fire. Mitigation of hazards that contribute to ignitability can reduce the potential of fire loss.

Adoption and enforcement of fire and building codes are an essential part of managing the risk in the WUI. The California State Fire Marshal's Office developed state of the art building standards known as "Chapter 7A" effective January 1, 2008, for use on new building construction within LRA Very High Hazard Severity Zones. Other pertinent codes are included in California Code of Regulations (CCR) Title 24, such as the California Building Code (CBC) Part 2, California Residential Code (CRC) Part 2.5, California Fire Code (CFC) Part 9, and California Reference Standards Code (CRSC) Part 12. More detail about these codes, code compliance policies and accepted products can be found on the Office of the State Fire Marshal's Office website <https://osfm.fire.ca.gov/>.

The City of Orinda and Town of Moraga Building Codes meet the Chapter 7A standard for the very high fire hazard areas and Wildland Urban Interface Fire Areas. These standards are in effect on SRA lands for all areas with Wildfire Hazard Severity Zone rating.

For communities such as Moraga and Orinda that have limited room for new development, it is critical to incorporate fire safety in the general plan safety elements. In 2012, Senate Bill 1241 was signed into law creating new wildfire safety requirements related to land use planning and updates to the Housing and Safety Elements. The Board of Forestry and CAL FIRE will now sign off on these plans for compliance.

No fire department can be expected to prevent all home losses in a WUI setting. The potential for a wildfire to outpace suppression efforts means that all homeowners in WUI areas must accept a high degree of risk, as well as

responsibility.

5.6.3 Fuel Hazard Reduction

Any fuel source that will bring flames close to the structure can be a hazard. Examples of fuel hazards include:

- Combustible plants close to a wall
- Dead foliage that builds up underneath succulents or other normally fire-resistant plants
- Certain types of mulch
- Combustible fencing located close enough to allow flames to contact an overhanging roof or eave.

Fuel sources within the “defensible space” area that support a high-intensity spot fire are especially problematic. These include any trees that can quickly become a fire torch (such as an untrimmed palm tree), a wooden trellis made of small lumber sizes, playground equipment made with wood pieces, or a pile of firewood on the ground or in a wheelbarrow.

Access to the property

If firefighters and their equipment cannot gain access to the property and a water source, there is little chance they can protect the home. Access also affects the ability of the homeowner to evacuate the site should the need arise. In some areas, these narrow roads can become constricted with on-street parking, temporary lane closures, and encroachment into the road right of way by construction or by overgrown roadside vegetation. Portions of the community served by only one road are at increased risk.

Surrounding topography and location of structures

Adjacent steep slopes and topographic features, such as natural chimneys or chutes, can intensify fire behavior. Structures located mid-slope or at the top of a steep slope are more likely to be damaged. A steeper slope will result in a faster moving fire, with longer flame lengths. A home with little setback from the slope will need to be more aggressive with vegetation treatment and maintenance.

Weather and “Red Flag” Conditions

Strong North and North East winds blowing a fire toward a house will have the same effect as being located on a slope. The fire will move faster and burn more intensely with taller flame lengths, blowing embers in front of the fire during periods of high winds. These high winds are often accompanied by a decrease in relative humidity creating “Red Flag” conditions that further dry vegetation and wood building materials. Local topography often funnels wind and multiplies regional weather patterns.

Websites with additional information include:

- Moraga Orinda Fire District - www.mofd.org
- Center for Fire Research and Outreach - <http://firecenter.berkeley.edu>
- Homeowner’s Wildfire Mitigation Guide -

<http://groups.ucanr.org/HWMMG>

- Firesafe Landscape - <http://ucanr.org/safelandscapes>

5.6.4 Development Standards

Development Standards to ensure that new developments incorporate wildfire protection measures to reduce structure loss include:

- Private Roads and Driveways – requirements for driveways and private road width, turnouts, grade/slope, switchbacks, construction, curve radius, signing, building addresses, and vegetation clearance.
- Stored Water Fire Protection Systems – requirements for capacity, tank setting, vegetation clearances, outlets, location of outlets, pipe material, standpipes, and pipe sizes.
- Defensible Space Standards – MOFD enforces requirements for all buildings, structures, and road systems to ensure they maintain the minimum defensible space requirement from Resolution 20-01.
- Access Gates – requirements for emergency access to locked gates, types of gates, locking devices, locations, distance from roads, open gate width for ingress and egress, and “fail safe” mechanisms for electric gates.
- Fire Hydrant Spacing and Flow Rates – requirements for hydrant spacing, locations, numbers required, valves, outlets, types, clearance for objects, and flow rates for commercial, residential, and rural use.

5.6.5 Improving Structure Survivability within the WUI

In concept, protecting structures exposed to wildfires is a relatively simple matter. Structures can ignite due to direct exposure to flames, from radiated heat or from embers. While all three sources must be addressed in order to improve the survivability of structures within the WUI, the steps to do so are well understood. It is recommended that the following measures be taken:

1. Reduce the amount of heat the structure will be exposed to through steps to reduce fuel loading near the structure and disruption of the continuity of fuel beds by creating and maintaining defensible space.
2. Limit the time the structure is exposed to direct flame impingement through vegetation management. Establishing a no fuel “home ignition zone” immediately adjacent to structures and creating “defensible space” in the first 30 - 100 feet from the house is critical.
3. Use fire resistant building materials and construction methods to increase the structure’s resistance to heat and flame.
4. Remove non-vegetative combustible materials stored near structures.

Creating an effective defensible space around the structure and maintaining

a fire safe landscape is critical to minimizing the threat of ignition. The homes in the Fire District are subject to existing regulations that require compliance with defensible space standards.

The selection of a building’s site and materials has a direct relationship to its survivability. New structures need to be located to reduce their exposure to the most intense part of a wildfire that might sweep across the site. There also are many non-combustible and fire resistive materials and treatments available to better protect structures and inhibit fire spread. While these have limited application to MOFD since there is little new construction in these communities, it is imperative that any new construction be built in compliance with existing codes and best practices.

5.6.6 Retrofitting an Existing Structure for Survivability

The areas at highest risk from wildfire in the Fire District are largely built out. In these communities, new construction will occur as limited infill between existing homes or major remodels. As a result, new, more stringent building codes offer limited opportunities to increase structure survivability. In these areas, identifying low cost, high return opportunities to retrofit existing homes and businesses is key to reducing losses due to wildfire. Outreach and education were again identified as priorities, as retrofits of existing structures are not required by the fire code.

Funding assistance for retrofit of existing structures has been non-existent in the past. In 2011, FEMA provided two grants to assist with wood shake roof replacement (Lake Tahoe Basin FEMA shake roof program and San Bernardino Mountains FEMA wood shake roof replacement assistance); however, these programs have not been extended or expanded.

The Insurance Institute for Building and Home Safety (IBHS) continues to sponsor building safety research that leads to real-world solutions. They have identified key areas at risk and offer retrofit ideas. The following table has been adapted from IBHS Wildfire Home Assessment and Checklist: See disastersafety.org/wp-content/uploads/wildfire-checklist_IBHS.pdf for additional detailed information. The information has been generalized for planning purposes. Consult building professionals and local building departments for more detail related to your structure.

Retrofitting Existing Structures to Increase Wildfire Survivability		
<i>Survivability Threat</i>	<i>Retrofit</i>	<i>Relative Cost/ Ease</i>
Roof - the most vulnerable part of your home		
Combustible roof.	Professional roof inspection to determine if covering and assembly are not "Class A." Need to remove old roofs.	\$\$\$\$ Contractor
Gaps at edges or ridges or other openings in tile (clay) or metal roof	Install bird stops in gaps at edges or ridges. Plug any roof openings that are not functioning as vents	\$-\$-\$ Contractor or Experienced

Combustible siding where lower level roof (first floor) meets upper wall or upper level roof (second floor)	Replace siding with more fire resistant material and underlayment	\$\$-\$\$\$\$ Contractor or Experienced
Vegetative debris accumulated on roof and gutters	Routinely remove from roof. For complex steep, roofs may consider hiring professional.	Free - \$ Agile homeowner
Vents - vulnerable to wind-blown embers and flames		
Unscreened or unprotected vents (in foundations, crawl spaces, wall, dryer vents or gable end vents)	Attach screens (1/8" opening) or prepare solid covers to install when a wildfire is approaching. Use caution when installing or removing covers on upper story vents.	\$ Agile homeowner
Ember resistant vent retrofit	Several types of new vent covers on market designed to reduce risk of wind-blown embers.	\$\$ Experienced DiY
Gutters - fuel for falling embers could lead to fire in attic		
Vegetative debris accumulated in gutters	Clean gutters on regular gutters. For complex steep, roofs may consider hiring professional.	Free - \$ Agile homeowner
Gutter screen installation	Gutter covers help manage debris build up. Can result in accumulation of debris on roof behind gutter – so some maintenance may still be required.	\$\$
Open Eaves or Projections - vulnerable to flame or embers could lead to fire in attic		
Open eave construction or visible gaps between blocking and rafter tails.	Plug openings with durable caulk or install non-combustible covering over blocking to eliminate openings. Alternatively box in eaves. This method may require vents to remove excess moisture.	\$\$-\$\$\$ Contractor or Experienced DIY
Combustible soffit material or materials used to box in eaves (such as wood boards, untreated plywood).	Replace with non-combustible material such as fiber cement product or exterior fire retardant treated plywood. Vinyl soffit material not recommended as it will deform and sag causing gaps.	\$\$-\$\$\$\$ Contractor or Experienced DIY

Retrofitting Existing Structures to Increase Wildfire Survivability

<i>Survivability Threat</i>	<i>Retrofit</i>	<i>Relative Cost/ Ease</i>
Windows - open windows are most vulnerable. The vulnerable part of a closed window is the glass.		
Single pane windows	Install dual pane windows. Preferred are multi-pane, insulated glass with added benefit of greater energy conservation Multi-pane (double or triple), tempered glass is 4 times more resistant to breaking in wildfire. Cost increases are relative to the opening size.	\$\$\$ - \$\$\$\$ Contractor
No window coverings to protect from glass breakage	Screens, shutters or pre-made covers will protect window from embers, debris and radiant heat exposure. Covers would be installed prior to evacuation. Least expensive alternative is 1/2 plywood but need to clear area of combustible material that could ignite plywood.	\$\$-\$\$ Contractor or Experienced DIY
Dome type skylights vulnerable to breakage	Replace with flat, tempered glass skylight. Remove vegetation and accumulated debris next to and around skylight	\$\$-\$\$ Contractor or Experienced DIY
Siding - fire from ignited siding can spread into stud cavity and up wall into eave, soffit or attic as well as expose window to flames		

Combustible siding	Re-siding is expensive but can be worthwhile if the building is 15 feet or closer to adjacent properties or inadequate defensible space. Replace with non-combustible siding so vertical flame spread will not be a problem unless you have other combustible materials of highly flammable plants adjacent to wall.	\$\$\$\$ Contractor
Gaps in joints of siding panels or simple laps joint or plain bevel joint	Panel products have fewer lap joints and can be considered less vulnerable. Wood siding shingles and plain bevel lap joints are most vulnerable.	\$\$\$\$ Contractor
Foundations - post and beam style foundation can result in vulnerable crawl spaces		
Open crawl space and post and beam style foundations	Enclose foundation area with non-combustible skirting material. Be sure to address moisture management issues through drainage and ventilation. Remove combustible materials stored in the crawl space or under the building.	\$-\$\$\$ Contractor or Experienced DIY

Retrofitting Existing Structures to Increase Wildfire Survivability

<i>Survivability Threat</i>	<i>Retrofit</i>	<i>Relative Cost/ Ease</i>
Decks can lead a wildfire directly into you home		
Deck boards of combustible material	Replace deck boards with fire or ignition resistant material.	\$\$\$-\$\$\$\$ Contractor or Experienced DIY
Combustible materials stored under or on top of deck	Move material to an enclosed area away from structure. If you choose to enclose underside of deck be sure to address moisture management issues through drainage and ventilation	Free-\$\$ Experienced DIY
Enclose area below deck to reduce	Use solid non-flammable material (fiber cement product or	\$-\$\$\$ Experienced

5.7 RECOMMENDATION - Protecting Values:

Project	Description	Priority
Building Code Updates	In partnership with Orinda, Moraga, and County, the Fire Marshal will develop a model code update for the next code adoption cycle to further address the new reality of wildfire threat and build upon the enhancements put in place during the 2019 code cycle. This next code cycle will include recommendations to increase use of ember resistant vents, expansion of fire resistant zones around structures to comply with best practices, and expansion of ember resistant construction standards to areas currently exempt as well as other items currently under development.	High

5.8 Fuels Mitigation Strategy

The critical role of wildfire and fuels management in California’s ecosystems has long been recognized. Two renowned wildland fire researchers portray the critical role of wildfire/fuels management in the California ecosystem. Their concepts remain the same and apply to the wildfire environment in MOFD today.

The recommendations for hazard mitigation projects such as hazardous fuel treatments are general in nature, meaning site-specific planning addressing location, access, land ownership, biological concerns, archaeological and historical site concerns, topography, soils, and fuels are required prior to implementation. This CWPP does not require implementation of any of the recommendations, but these recommendations can serve as guidelines for the implementation process if funding opportunities become available.

As a society, we recognize the necessity of managing the effects of wildfire on both humans and natural resources, and in the last 20 years, fuels management has come to play a leading role in managing ecosystems and natural resources. To effectively protect social values and natural resources, California land managers have focused attention on the manipulation of wildland fuel. Fuels management and fire prevention have joined fire suppression as key components of fire management programs.

A fuels management strategy provides guidance for actions involving the manipulation of fuels to accomplish the overall goal of reducing or mitigating destructive wildfire hazards to the community. The tactics developed to implement this strategy consist of fuel treatment prescriptions that are grounded in wildfire science and follow a prioritization process based on protection of life, property and natural resources. Development of fuel treatment prescriptions and parameters draw on wildfire modeling outputs, specific fuel types, topography and location relative to structures, values at risk, and protected habitat.

The goal of a fuel treatment plan and program is to modify potential fire behavior or fire effects to achieve a defined condition. The fuel treatment plan for MOFD follows federal and state programs, with a primary purpose of reducing risks to human communities and improving ecosystem health. Common objectives include reducing potential fire intensity, rate of spread, and severity of fire effects. Achieving these objectives can provide dual benefits - reducing the likelihood of damaging wildfire spreading from undeveloped areas to structures or from human development into undeveloped, valuable habitat areas. This fuels treatment plan is a set of site-specific tactics developed for MOFD’s areas of concern, including open spaces, undeveloped lands, and parks.

5.8.1 Existing Fuel Treatment Activities

MOFD fuels program includes a manager who oversees the day to day scheduling of the community chipping program, inspections, and neighborhood assessments. The Fuels Mitigation Manager, in conjunction with the Fire Marshal and Fire Chief, also coordinates with the major landowners to ensure required work and best practices are being followed. These include the City of Orinda, the Town of Moraga, EBMUD, EBRPD, Central Sanitation District, St Mary's College, John Muir Landtrust, and HOAs. This program involves several types of fuel treatment activities depending on the type of site, vegetation, and treatment objectives. The focus areas generally fall into two categories:

- Neighborhood Open Spaces
- Regional Open Spaces

The application of open space treatments is dependent on the amount of development of the area. The following list captures a summary of current and most commonly applied fuel treatments by the four categories:

- Neighborhood Open Spaces (as specified)
 - Mowing – mechanical mower equipment on annual herbaceous growth
 - Weed whacking
 - Shrub and tree maintenance – limbing, pruning, removal of dead/damaged vegetation
 - Handcrew work to reduce encroaching brush
 - Prescribed fire
- Regional Open Space
 - Mowing – mechanical mower equipment on annual herbaceous growth
 - Shrub and tree maintenance – limbing, pruning, removal of dead/damaged vegetation in critical areas
 - Invasive vegetation removal
 - Removal of decadent/dead shrubs/tree stumps
 - Chipping of dead/downed material
 - Tree pruning
 - Grazing
 - Prescribed fire

The timing and interval for fuel treatments generally vary by site type and vegetation type. Fuel treatments in the open space areas usually occur once a year in the spring, with an emphasis on perimeter areas in close proximity to developed lots. Larger projects in sensitive habitat areas are completed based on funding availability and existing regulatory standards.

5.8.2 Private Ownership Lands

The majority of the land within the district is comprised of small privately owned lots. These lands are subject to the defensible space requirements included in the Public Resource Code and the California Fire Code as adopted and amended by MOFD Resolution 20-01. In the open undeveloped land expanses of private ownership, there may be situations where the fuel conditions on the private land pose a wildfire threat to surrounding community values. Clearly, an active

wildfire will not stop or change direction due to a designated administrative boundary, so the fuel treatment recommendations presented in this CWPP are recommended for the entire land-base with additional emphasis in high risk areas.

5.8.3 Prioritization of Fuel Treatments

The fuels management program strategy provides the groundwork for treatment prioritization. As in the case of emergency response program planning, wildfire, or fuels treatment planning should follow the same priorities in protection, which are:

1. Life Safety
2. Property
3. Resources

Priority projects are identified by close proximity to dwellings or critical infrastructure and given a higher priority classification than those areas that are further from human developments. Recognizing the limited surface street capacity which defines many parts of the community, major evacuation routes and roadside fuel accumulations which may support direct flame impingement negatively impacting roadways during a major fire, evacuation roadside vegetation is given the same priority as fuel in the home ignition zone surrounding structures. Further priority is given to projects in and around the interface between wilderness lands and developed areas in alignment with modeled fire spread during Diablo Wind events. These areas are prioritized in an effort to prevent a wildfire from becoming established in the built up areas of the community. Lastly, projects are assessed for their suitability for low cost, high impact treatment measures. Due to the limited resources, measured in staff, funds, and time available, the prioritization of fuel treatments is a valuable tool to help guide MOFD staff and community decision makers through the implementation of hazard mitigation actions across the community.

The prioritization ranking consists of qualitative designators - High, Moderate, or Low for each site within a VMU. In all cases, 3 dimensional fire spread propagated by embercast can still pose a serious threat to downwind values. Following protocol described previously, the primary attributes defining the three designators involve fuels and fire behavior characteristics and proximity to values. These designators are coarsely defined as follows:

- HIGH – Severe fire behavior characteristics are expected with significant threat to values by extreme temperatures from radiant and/or convective heat within 100 feet of values.
- MODERATE – Fire behavior is expected to pose a serious threat to values; values that are combustible can ignite from extreme temperatures from radiant and/or convective heat at distances greater than 100 feet from values.
- LOW – Low fire behavior characteristics are likely with minimal threat from radiant and convective heat to at risk values.

In a majority of the open space areas of the district, the current requirements

for perimeter mowing/discing or grazing of grass lands and perimeter shaded fuel break construction for wooded areas are effective for keeping the potential for fire spread low on those sites. The fuels treatment prioritization information shows grazed areas in the "low" priority category due to low fuel loading and absence of encroaching brush. It is important to continue the current treatment program to keep these undeveloped, low use areas in their low-hazard category.

It is also important to emphasize small parcel fuel reduction work to eliminate receptive fuel beds which will support downwind fire spread via embercast.

5.8.4 Fuel Treatment Levels and Treatment Types

In a typical fuel treatment prescription, the amount of fuel removed can vary due to a number of contributing factors in a given location. This variation in the amount of fuel removed is also referred to as intensive fuel treatment level. The more intense the treatment, the more fuel is removed, making less fuel available to burn. Less fuel available to burn means fire behavior is reduced or moderated. While removing more fuel decreases the potential for fire spread, it also increases cost and environmental disruption. As a result, best practice is to apply the minimum amount of fuel reduction required to effectively reduce the risk of uncontrolled wildfire to any given parcel.

The fuel treatment types take on a wide assortment of forms but can generally be divided broadly into five categories – mechanical treatments, manual treatments, fire treatments, biological treatments and herbicide treatments. The fuel treatment plan for MOFD will primarily focus on mechanical and manual treatments since the amount of biomass material removed is more controllable. Mechanical and manual treatments rely on a variety of methods to physically modify or remove fuel with more precision in application than prescribed fire and avoid smoke impacts and possible damage from the effects of scorching.

Prescribed fire will be used in conjunction with these treatments for both maintenance of previously completed work and, with winter pile burning, to enable cut and stack efforts in brush fields.

The following are brief descriptions of the more common types of mechanical and manual treatments:

Mowing

Mowing of grasses, weeds and low-shrubs is likely a familiar treatment activity to those that care for lawns and yards. Mowing in this setting is usually done using a larger commercial size mower where the operator rides atop the equipment; it may also be a mower that is dragged behind a tractor-like vehicle.

Mastication

Mastication is the mechanical grinding, crushing, shredding, chipping and chopping of fuel that reduces fire intensity and rate of spread. There are many types of machinery that have the capacity to do the mastication work. Examples include feller-bunchers or skidders modified with a masticating head, tractors

pulling a mower/masticating head, excavators with a masticating head on their boom, dozers with masticator-type capability and innovative or custom machines with masticating capabilities.

Manual Fuel Treatment

Manual work to accomplish fuels reduction work is likely to be a slower process, is the most expensive but is also the most precise method. The types of manual treatments often utilized include hand- thinning or removal of small understory brush and trees, limbing of larger trees, raking and hand-piling of surface debris, and weed-whacking grasses or low- growing shrubs. In suitable areas, manual fuel work can be used to set conditions for winter pile burning, increasing efficiency by reducing the need to move and chip material.

Thinning

Tree and shrub thinning are used as a treatment to modify the fuel structure in stands of trees and shrubs/brush that has become more dense. Thinning a stand reduces ladder fuel or crown fuel continuity and effectively moderates crown fire behavior. A thinning treatment can provide economic returns, possibly producing some commercial products. In most cases, thinning is only effective as a fuel management technique when the fine surface fuels are also reduced (Agee, J., Skinner, C., 2005). Thinning is an effective fuels management method if it reduces the likelihood that a surface fire will transition into a crown fire by the break-up of vertical and horizontal fuel continuity (Further information on the design of thinning prescriptions are in Chapter 6.3.4).

Biological Treatment

Biological treatment involves the use of domestic livestock grazing or browsing to reduce surface fuel loads. This treatment can be very effective in treating fuels. This method is applied primarily within the WUI in shrublands or grasslands. Grazing can reduce the need and costs of mechanical treatments such as mowing or disking and also eliminates the fire hazard aspect of equipment used in high fire hazard areas. A few limitations include strategic limitations to narrow strips of land along roads due to fencing and transportation costs, required access to water sources or transportation of water to the site, and the animal's indiscriminate fuel reduction as compared to manual or mechanical treatments. Of the available ruminants, cattle are preferred due to the lack of predators and the potential to generate annual grazing revenue.

5.8.5 Fuel Treatment Prescriptions

The fuel management prescriptions were developed to guide treatments to achieve a less hazardous fuel profile. Treatment types will vary based on vegetation type, site topography, project objectives and may have limitations due to sensitive habitat, archaeological concerns, soil, water courses, and proximity to structures. It is important to understand that the work can be

costly and prone to resource limitations as well as environmental constraints when working in sensitive habitat and watershed areas. As a result, the implementation of these projects will likely be in a staged approach over a multi-year period. The CWPP is intended to serve as a foundational tool that will help MOFD managers and other stakeholders work with the community to mindfully apply a fuel management strategy.

5.8.6 Fuel Treatments and Firefighter Safety

Adequate defensible space provides a safer environment for firefighters when protecting structures. Safe operational space for firefighting personnel was used as the criterion to validate clearance requirements and applies to guidelines used for a wildland fire safety zone.

5.8.7 Fuel Treatment Tactics

The fuel prescription for a given site may identify a specific fuel treatment tactic that is a best fit or design for hazard reduction on the site. The fuel treatment types are methods utilized to implement recommended tactical treatment designs. In any treatment design/tactic, the goal is to create and maintain a fire resilient area by implementing a three-part objective: reduce surface fuels, reduce ladder fuels, and reduce decadent crown density. Commonly applied fuel treatment tactics include fuelbreaks, shaded fuelbreaks, area treatments, a feathered edge effect, and gradient thinning or fuel removal.

- **Fuelbreak**

A strategically located wide block, or strip, on which a cover of dense, heavy or flammable vegetation has been permanently changed to one of lower fuel volume or reduced flammability. Recent interest in fuelbreaks and similar concepts has spawned new names such as defensible fuel profile zones and community protection zones. Fuelbreak prescriptions, including width, amount of fuel reduction, and maintenance standards, will vary depending on fuel type, slope and location on the land, and many other environmental factors.

- **Shaded Fuelbreak**

Is a type of fuelbreak in stands of trees. A shaded fuelbreak is created by altering surface fuels, increasing the height to the base of the live crown of trees, and in heavy stands of non-native trees, opening the canopy by removing or thinning a limited number of trees. The thinning prescriptions will vary based on many site-specific variables including, but not limited to: tree species and size, stand density, site location, and area objectives (further information on thinning is provided later in this section). Shaded fuel breaks are particularly well suited to this region as the tree canopy reduces regrowth of ground fuels and the topography and tree species in this area are not conducive to crown fire runs.

- **Area Treatments**

Rather than being an alternative to fuelbreaks, area treatments are an expansion of the fuelbreak concept to other areas of the landscape. An area treatment may be necessary due to the fuel condition on the site and proximity to values at risk.

□ ***Feathered Edge***

A treatment design tactic is utilized to create a less visually obtrusive treatment boundary. This is done by allowing some variance in the distance parameters of a treatment zone's horizontal distance such that the final results are not a straight-line or linear hedge appearance. This feathering technique can be used in either timber or brush vegetation type and is often an important consideration in high visibility areas in proximity to valuable natural features.

□ ***Gradient Fuel Removal***

Describes the treatment resulting from a variation in the intensive level of fuel removal on a site. This technique is used in locations or zones where a more intensive treatment close to homes, structures, or other values is used, graduating out to less intensive as distance to the value at risk increases.

□ ***Thinning***

Generally prescribed by a spatial distance between crowns or stems/boles of larger or "leave" trees and a diameter limit for trees removed. This is also described in terms of a desired percentage of canopy cover to remain after thinning. Another prescription method (more often utilized in commercial timber sale activity) is by specified basal area (the total cross-sectional area of the trees in a stand, at breast height of 4.5 feet above the ground measured in square feet per acre). A prescribed thinning treatment tactic may be part of a recommended prescription for on-site trees in any of the spatial design treatments described in this section. In any thinning treatment application, the thinned material must be treated; methods may include removal, chipping, mastication, or piling and burning. Recommend a Registered Professional Forester to develop thinning guidelines. NOTE: There are specified techniques required in trimming/removal of eucalyptus that will minimize stump sprouting.

□ ***Roadside Fuel Treatment***

A critical feature that provides safe access/egress routes for both public and fire personnel during a wildfire event. The roadside clearance protocol for MOFD follows the standards adopted by the fire code.

The primary clearance considerations are as follows:

- Vertical clearance of 15-feet.
- Horizontal clearance of at least 3 feet on each side of driveways and roads. Best practice recommends

- extending this clearance to 10' to reduce the potential for flame impingement to roadways.
- Exclusion of Juniper and Bamboo within 10' of the roadside by 2023

5.8.8 Fuel Treatment Implementation Timing - Seasonality

Once a site's prescription has been identified (including fuel treatment type and design tactics as well as knowledge of the priority ranking), the next consideration is the timing of implementation.

Seasonal limitations include rainy weather, which causes soil/site conditions that are not conducive to mechanical work. Some limited manual work to address brush, trees, and accumulations of decadent combustible material may be an option during these wet conditions on a site-by-site basis. During the hot and dry periods during the late summer and fall, mechanical work should be limited due to the potential for hot machinery (i.e., exhaust systems) causing a wildfire ignition in dry grass or metal scraping on a rock and producing sparks in dry herbaceous fuels potentially igniting a wildfire. In some cases, due to late rains and regrowth, additional mowing type work may be required to reduce annual grass and weeds. Mowing after the District's **June 1st compliance deadline** requires careful consideration on a case-by-case basis depending on the growth, fire danger, and site conditions.

5.8.9 Environmental Review and Permitting

The Moraga-Orinda Fire District Action Plan, an Appendix to the Contra Costa Countywide CWPP, is an advisory document. The Plan was prepared by MOFD staff in collaboration with public agencies and other interested stakeholders pursuant to the Healthy Forests Restoration Act, and the contents of this CWPP are opinions of these stakeholders following the procedures outlined in The Wildland Fire Leadership Council's handbook, "*Preparing a Community Wildfire Protection Plan, A Handbook for Wildland Urban Interface Communities.*" More specifically, landscape and fire science discussions, WUI designation, priority of at-risk communities, regulatory interpretation, and other discussions set forth in this Plan are findings and recommendations by these stakeholders to help protect the community from wildfires. Because this Plan is an advisory document, the Plan does not legally commit any public agency to a specific course of action or conduct and thus, is not a project subject to CEQA or NEPA. At least twelve counties in California have signed CWPPs without considering the CWPP as a project subject to CEQA.

However, if and once funding is received from local, state, or federal agencies and prior to work performed, or prior to issuance of discretionary permits or other entitlements by any public agencies to which CEQA or NEPA may apply, the lead agency must consider whether the proposed activity is a project under CEQA or NEPA. If the lead agency makes a determination that the proposed activity is a project subject to CEQA or NEPA, the lead agency must perform an environmental review.

In addition to NEPA or CEQA, it is recognized there are a number of permits that may need to be obtained prior to fuel reduction work, including:

- US Army Corps of Engineers: Clean Water Act Section 404 or Rivers and Harbors Act Section 10 Nationwide Permit or Individual Permit

- US Fish and Wildlife Service or National Marine Fisheries Service: Section 7 or Section 10 Consultation
- Regional Water Quality Control Board: Clean Water Act Section 401 or Porter Cologne Act 401 Certification or Water Discharge Requirement
- California Department of Fish and Game: Section 1600 Streambed Alteration Agreement; Fish and Game Code and California Endangered Species Act Streambed Alteration Agreement, CESA 2081 or CESA 2080.1 Permit

Other activities may not require specific agency permits, but may require additional review or specific mitigation measures to comply with:

- Migratory Bird Treaty Act
- National Historic Preservation Act (Advisory Council on Historic Preservation Section 106 review; State Historic Preservation Office)
- Bay Area Air Quality Management District Regulation 5. Open Burning.
- County Agricultural Commission, CAL EPA and Federal EPA on use of herbicides
- Local tree ordinances
- Local stream protection regulations
- Local noise ordinances
- City or county road encroachment

5.9 RECOMMENDATION - Fuel Reduction Treatments

5.9.1 Geographically Based Projects

Public agencies, private landowners, and fire districts establish hazardous fuel reduction treatment priorities on a regular basis as a part of their long-range planning or annual budgeting procedures. Many public land managers have detailed plans that incorporate fuel reduction treatments. Regionally such plans have not only identified geographically based projects, but also have developed best management practices and mitigation measures that should be incorporated into projects to reduce the impact of fuel reduction treatments on the environment.

Typically, fuel treatment is done around structures, by roadways and in areas of extreme fire behavior. Treatments addressed in the *Best Management Practices Guidebook for Hazardous Fuel Treatments in Contra Costa County* are organized by zone as follows:

- From the Home: 0-30', 30-100'
- Critical Infrastructure: 0-300'
- Emergency Access Roads: 0-30', 30-100'
- Community Protection: 100-300'
- Community Wildland Interface: 1.5-mile area around a community unless otherwise designated.

Further, in the current fire code, an additional area within 2' of structures in the District is identified for additional fuel reduction work to eliminate the presence of combustible ground fuels.

Regionally, stakeholders in Contra Costa County have further refined this list with

the following areas as appropriate for fuel management, which is supported in this Fire Action Plan:

- Wilderness areas within 100 feet of property lines in the wildland urban interface (WUI).
- Areas within 200 feet of high-value or irreplaceable public facilities in the WUI with excessively flammable vegetation that would produce greater than 8-foot flame lengths.
- Areas within 30 foot to 100 foot of private residences in the WUI with excessively combustible vegetation that exceeds state and/or local defensible space codes.
- Areas with excessively combustible vegetation due to extreme amounts of litter or ground fuel levels. These may be areas where ground fuels exceed six-inches deep with occasional jackpots of fine material up to three-inch diameter. It may be with greater than two to six tons per acre with ribbon bark and understory fuel ladders in identified high risk forest like eucalyptus or Monterey pine that are subject to torching with potential high ember flight rates into residential areas.
- Areas critical to strategic firefighting operations in the event of a wildfire with excessively combustible vegetation.
- Areas with excessive accumulations of combustible vegetation within 30 feet of wildfire evacuation and firefighting access along paved roads and strategic fire trails.
- Areas of invasive plants that will increase the threat of adjacent natural plant communities or displace more fire safe and fire adapted native species.

When funding is available, fuel reduction treatment projects with the following attributes should be given the highest priority:

- Project reduces hazardous fuels that, if left untreated, would generate high intensity fire adjacent to structures or, or produce large quantities of airborne burning embers upwind of developed areas.
- Project reduces hazards along strategic emergency access and evacuation routes, or other critical infrastructure.
- Project includes vegetation modification treatments that will reduce the threat of unacceptable impacts of high intensity fire to high value ecosystems, sensitive watersheds and high concentration recreation areas, including regional parklands or state lands. Projects to include strategies and funding for on-going maintenance, especially follow-up management of non-native invasive species that could create hazardous fire conditions.
- Projects which encourage participation in small private parcel fuel reduction efforts in a partnership model. Examples include community chipping programs and HOA and neighborhood efforts to limb and trim trees overhanging roadways.

The list of current geographically based priority projects follows below. An intended outcome of the Fire Action Plan is for this list to be updated annually to ensure that efforts are coordinated whenever possible. Past hazardous fuel reduction projects have included working on public lands, with special interest groups and small

groups of homeowners on private property, including:

VMU:	Values at Risk	Proposed Activities	Treatment Priority
Orinda			
Bear Creek Road, Wildcat Canyon Road	Residences/ Evacuation Routes	Shaded fuel break maintenance, fuels reduction adjacent to residences and evacuation routes; thin, prune, mow	High
Orinda View	Residences	Shaded fuel break maintenance and expansion	High
Highway 24 Roadside	Evacuation route, Residences	Roadside fuel reduction on state owned lands	High
El Toyonal	Residences	Increase small private lot clearance	High
South of Lauterwasser Creek	Residences	Increase private lot clearance	Moderate
Orinda Oaks Park	Residences	Address heavy accumulations of annual grass thatch and encroaching brush. Expand work to North facing slopes.	Moderate
North Facing Slope South of Moraga Way/Glorietta	Residences	Ladder fuels and ground litter	Moderate
Orinda Woods	Residences	Ladder fuels and ground litter	Moderate
Evacuation Route Roadside	Evacuation routes	Property owner fuel reduction efforts supported by outreach/ education and community chipping program	Moderate
Moraga			
Painted Rock	Open space	Continued prescribed fire and reintroduction of grazing animals	Moderate
Campolindo Ridge/ Rheem	Open space	Continued prescribed fire, ongoing brush reduction, and reintroduction of grazing animals	Moderate
Sanders Ranch Open Space	Residences, open space	Further development of defensible space and reduction of encroaching brush	Moderate
Canyon			
Community of Canyon	Residence	Fuels reduction adjacent to residences and evacuation routes; thin, prune, mow	High
West and South Perimeter Fuel Break			
Open Space	Residence	Fuel reduction along roads and fire trails to create a fuel break along the fire prone areas West and South of the Fire District in the form of a shaded fuel break extending the North Orinda Shaded Fuel Break.	High

North Orinda Shaded Fuel Break			
Open Space	Residence	Maintenance of the shaded fuel break through the recurring use of Rx fire.	High

Sustaining the Plan

Section Six

6.1 Updates of the Wildfire Action Plan

To ensure long-term success, the Moraga-Orinda Community Wildfire Protection Plan must include a method for changing, updating and revising the plan. As partners learn from successes and challenges, they may identify new actions or propose a shift in how decisions are made or actions accomplished.

Project partners agree to the following roles in sustaining the Plan:

- Moraga-Orinda Fire District: Communicate electronically with stakeholders and other partner agencies collecting information for annual status of the plan. Annual information will include an update of the status of geographically based fuel reduction projects and prevention strategies listed in Section 5.9 Prioritizing Fuel Reduction Treatments and of the priority action projects identified in Sections 5.3, 5.5, 5.7. Updated information will be posted on the DFSC website and sent electronically to Fire Action Plan planning participants and other interested stakeholders.
- Contra Costa County Association of Fire Chiefs: The Contra Costa County Association of Fire Chiefs provides a forum for interagency information sharing across the many fire jurisdictions. They are in the unique position to continue to foster inter-jurisdictional cooperation on WUI issues and emergency response.
- East Bay Regional Park District: As part of the annual budget development process EBRPD reports the prior year's fuels management accomplishments and present the proposed program of work for the next year. EBRPD works with cooperators to plan and conduct work in a way that improves fire protection and program efficiencies for both EBRPD and the cooperator. Information will be shared with MOFD, which will incorporate the information into the Fire Action Plan updates. EBRPD agrees with the Fire Code requirement to create 100' of fuel mitigated area where park lands share a border with developed parcels.
- East Bay Municipal Utility District: As part of the annual budget development process EBMUD reports the prior year's fuels management accomplishments and present the proposed program of work for the next year. Information will be shared with MOFD, which will incorporate the information into the Fire Action Plan updates. EBMUD agrees with the Fire Code requirement to create 100' of fuel mitigated area where park lands share a border with developed parcels.
- CAL FIRE: The Santa Clara Unit Strategic Plan updates provide opportunity to view wildfire protection for Contra Costa County in context with neighboring Alameda, Santa Clara and San Joaquin Counties. Contra Costa County is Battalion 6 of seven geographically based battalions in CAL FIRE's Santa Clara Unit. The Santa Clara Unit collects information from the various stakeholders to update their unit plan. The most recent plan was completed in May 2016. Each update of the unit plan will be shared with DFSC, which will incorporate the information into the Fire Action Plan updates.

6.2 Monitoring, Evaluating and Adapting Strategies

The following framework offers strategies to monitor, evaluate and adapt the elements of the Fire Action Plan. Strategies might include:

- Only monitor what matters. Partners should identify key goals and objectives and make decisions to monitor what is most important to the long-term sustainability of their Fire Action Plan.
- Tracking accomplishments and identifying the extent to which Plan goals have been met. This will include an annual report to the MOFD board.
- Examining collaborative relationships and their contributions to Fire Action Plan implementation, including existing participants and potential new partners.
- Identifying actions and priority fuels reduction projects that have not been implemented and determining why.
- Setting a course for future actions and updating the plan.
- Evaluating the resources necessary for successful Plan implementation. Identifying needed community and homeowner outreach and education programs.
- Evaluate surface fuel and ladder fuel inventories on an annual basis to assess the impact of prior year fuel reduction efforts as well as growth/die off of existing vegetation.

In conducting an evaluation, it is important to think critically about the kind of information that is accessible, what is most important to evaluate and how it might influence future priority activities. For example, the number of homes in a community with an evacuation plan provides insight into the level of preparedness among the general public, but may be difficult to obtain. Each action team should adapt the evaluation process; how information and results are documented with an eye toward refinements of the Wildfire Fire Action Plan to meet their own needs. The following ideas for monitoring and evaluation are provided as suggestions.

6.2.1 Evaluating Information, Education and Collaborative Planning

Programs: What kind of information, education and public involvement has the Plan or its implementation fostered? Public meetings, trainings, field trips, demonstration projects, household visits, youth engagement, community events, clean up days.

Public Awareness: What kind of change in public awareness about wildfire has resulted from the plan or implementation actions? Knowledge of fire policies and regulations; change in number and type of human-caused wildfires; awareness of local efforts to increase emergency preparedness; outreach efforts or techniques.

Activities: What kinds of activities have citizens taken to reduce wildfire risks as a result of the plan? Defensible space, fuel reduction, household emergency plans, woody debris disposal.

New information: Are there new or updated data sources that might change the risk assessment and influence priorities? Changes to process used to identify fuels treatment priorities? New wildfire related policies or ordinances? Index to access specific information?

Involvement: Who has been involved with the Fire Action Plan development and implementation? How have relationships changed or grown? What

expertise or resources did partners bring? Numbers and types of partners (local, regional, state)? Accomplishments or challenges?

Implementation Capacity: How has the collaborative process assisted in implementing the Fire Action Plan and building capacity for the community to reduce wildfire risk? More partnerships, increased financial resources, increases in programs or activities.

Engagement: Have the partners involved in the planning process remained engaged in the implementation? Have new partners become involved?

6.2.2 Evaluating Suppression Capability and Emergency Preparedness

Comprehensive emergency management plays a key role in reducing a community's risk from wildfire and other hazards. Integrating federal requirements for multi-hazard mitigation within the Fire Action Plan efforts can help access federal funds through FEMA and Department of Homeland Security.

Alignment: Is the Plan aligned with emergency operations plans and other hazard mitigation plans? Addressing National Incident Management System (NIMS), State Emergency Management Plan (SEMS) and Incident Command Training (ICS).

Evacuation Planning: Does the Plan include an evacuation plan? Has the plan been tested? Are there local neighborhood evacuation plans, information about special population needs, animal and livestock preparedness, communication systems, resources list?

6.2.3 Evaluating Fuel Reduction

Monitoring hazardous fuels reduction projects on private and public lands will assist stakeholders in understanding the extent to which risk reduction goals and native habitat preservation goals are being accomplished. Monitoring these projects allows stakeholders to better understand the extent of resources needed to accomplish and maintain goals, as well as to help in identifying future priorities.

Fuel Reduction on Public Lands: How many acres have been treated on public land that had been identified as high priority projects? Total number of acres treated; number and percentage in WUI, number and percentage within Fire Action Plan priority area; treatment types.

Fuel Reduction on Private Lands: How many acres have been treated on private land that had been identified as high priority projects? Total number of acres treated; treatment types; number of homes with defensible space; number and percentage treated in low income communities/ vulnerable populations.

Compliance: How many homes are in compliance with local fuel reduction requirements?

Joint Projects: How many projects have spanned ownership boundaries, including public and private lands?

6.2.4 Evaluating Reducing Structure Ignitability

Monitoring structure survivability of existing structures and new developments span a wide range of actions, including retrofit, codes, public knowledge and emergency response capability.

Fire Statistics: Wildfire loss in year reporting on the number of fire starts within high hazard areas. The number of human-caused fires. The number of homes damaged/lost to wildfire.

Codes and Regulations: Current codes and regulations for wildfire hazards. Building codes (Chapter 7A or better). How is new development increasing in high hazard areas? Requirements for new developments. Mechanism for long-term open space fuel management. Infill requirements. Infrastructure design requirements (roads, sprinklers, utilities = NFPA standards).

Public Education: Public knowledge and understanding about structure ignitability. Homeowner education on how to reduce ignitability. How many homes have been retrofitted? Number and percentage of homes in high hazard areas included in fire district.

Response Capabilities: Changes of local fire agency response capability. Increase in certified firefighters/wildfire training. Upgraded or new fire suppression equipment. Changes in response time, infrastructure, access routes.

6.3 Fiscal Resources and Constraints

The district is currently offering fuel mitigation support to small private parcel owners in the form of the community chipping program and to large landowners in the form of advice and prescribed fire where appropriate. MOFD will continue to seek external funding sources (i.e., grants, stewardships, etc.) to assist in implementation of required fire treatments when available.

Budgetary constraints and uncertainty make it unrealistic to reach the desired outcomes in a fuels management program with government funded programs alone. The prescriptions recommended in the larger undeveloped areas are critical additions to this program and MOFD will work with landowners to ensure appropriate resources are allocated to bringing these areas into compliance. Phasing fuel treatments may be an approach that would allow progression toward the desired outcome, even in a limited budget situation. This phased approach will require working in high-priority areas first.

Small parcel owners are responsible for the maintenance of their property; however, MOFD and other stakeholders are committed to supporting these efforts through education and augmentation efforts such as the community chipping program.

6.4 Grant and Stewardship Opportunities

Although limited, grant opportunities exist for communities to implement CWPP projects. The California Fire Safe Council grants include wildfire prevention grant funds through

the U.S. Forest Service, the Bureau of Land Management, the U.S. Fish and Wildlife Service and the National Parks Service. Grant funding may be used for hazardous fuels reduction and maintenance projects on non-federal land, develop community risk assessments and CWPPs, and provide education and outreach opportunities for landowners and residents in at-risk communities. MOFD will continue to seek these funds for both internal and external fuel reduction projects.



Signature Page

Moraga-Orinda Fire District Wildfire Action Plan An Appendix to the Contra Costa Countywide Community Wildfire Protection Plan

Mutual Agreement

This Fire Action Plan developed for the Moraga-Orinda Fire District as an Appendix to the Contra Costa Countywide Community Wildfire Protection Plan:

- Identifies and prioritizes areas for hazardous fuels reduction treatments and recommends types and methods of treatments that will protect community members and values at risk.
- Recommends measures to reduce ignitability of structures throughout the area addressed by the plan.

The following letters are from the entities that mutually agree with the contents of this Fire Action Plan.

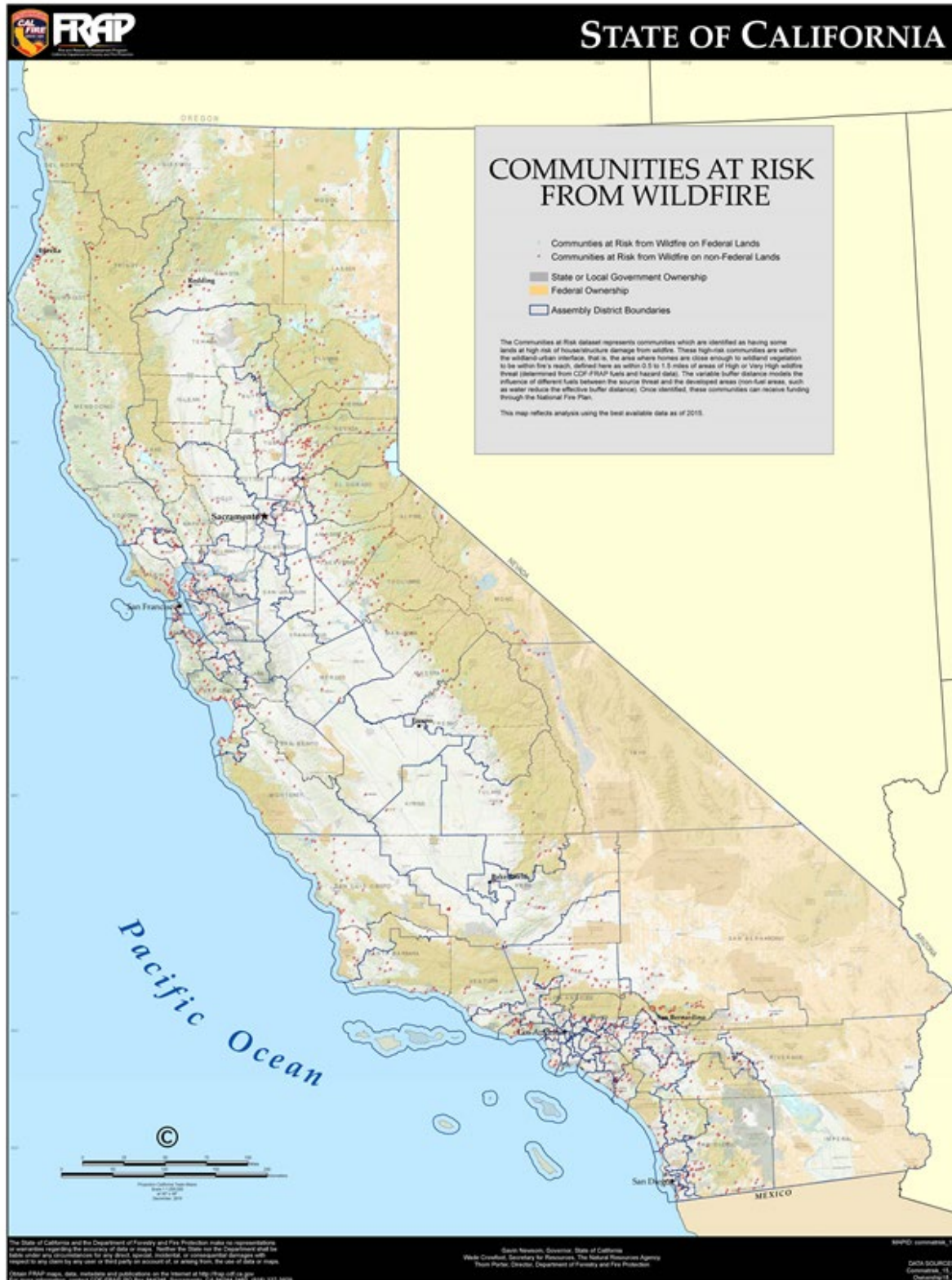
Approved by Resolution
Contra Costa County Board of Supervisors X- X- X

Moraga-Orinda Fire District Board of Directors X - X-X

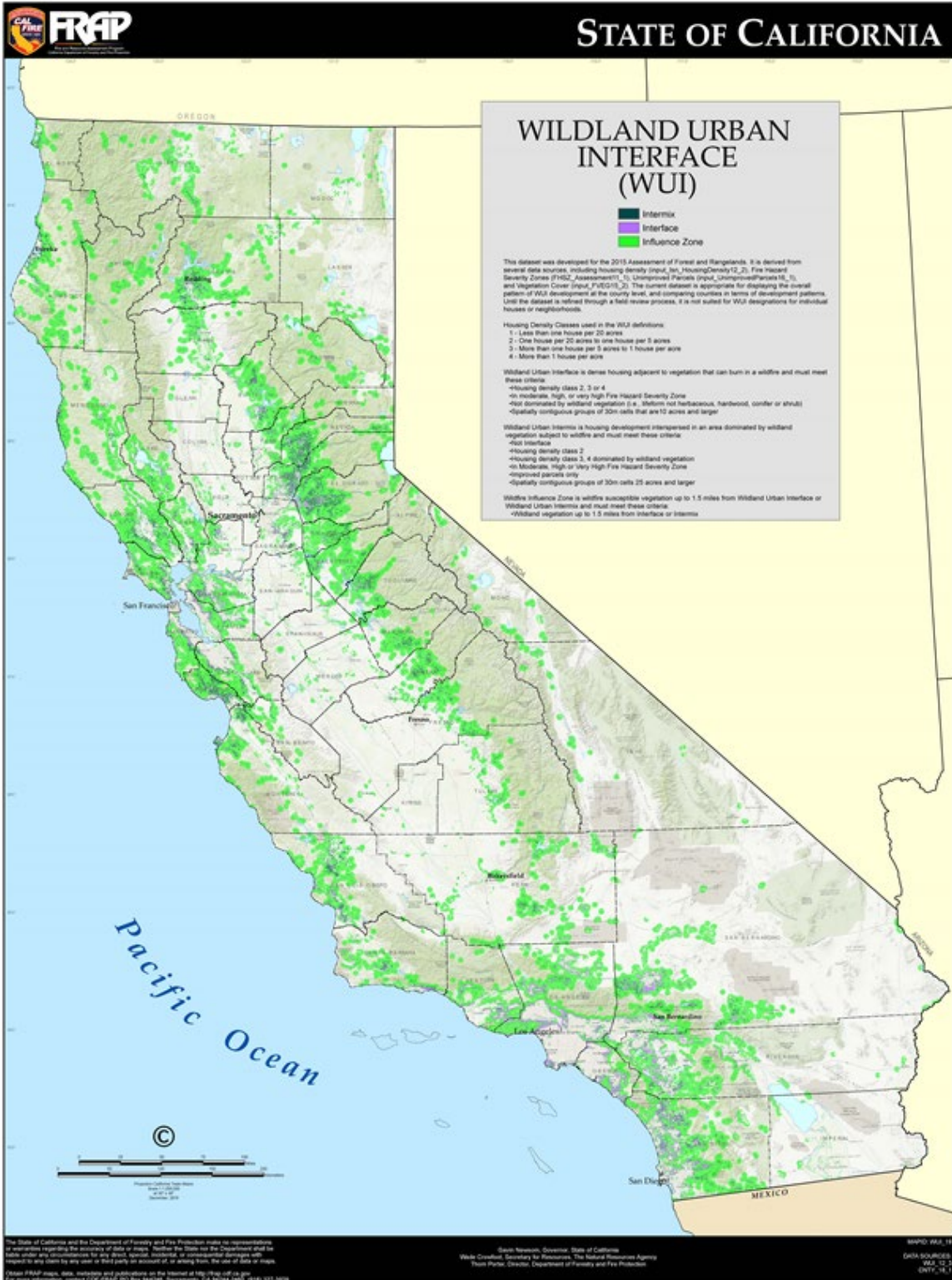
APPENDIX - MAPS

COMMUNITIES AT RISK FROM WILDFIRE

https://frap.fire.ca.gov/media/10291/commatrisk_19_ada.pdf



WILDLAND URBAN INTERFACE (WUI)
https://frap.fire.ca.gov/media/10300/wui_19_ada.pdf



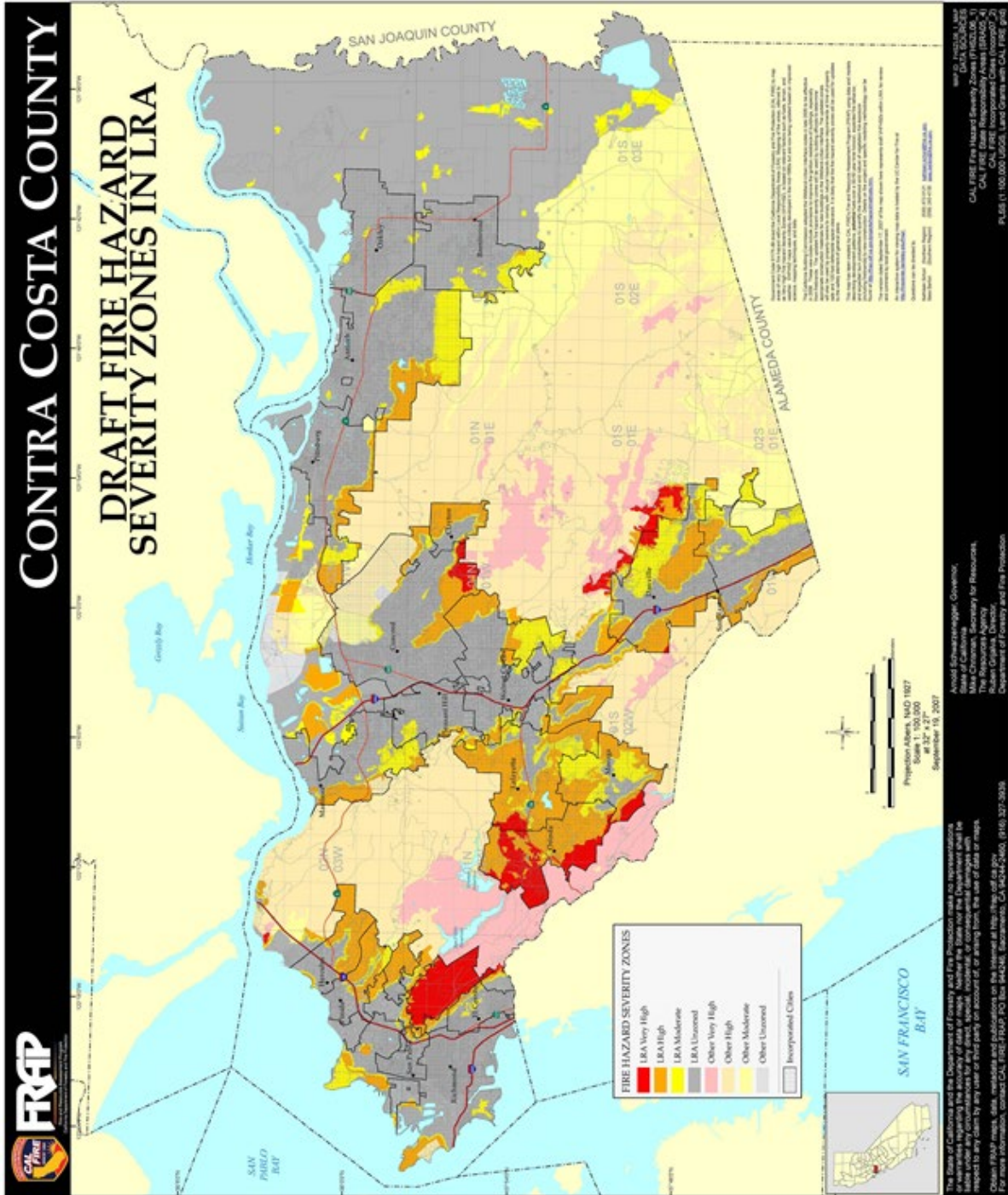
FIRE THREAT

https://frap.fire.ca.gov/media/10315/firethreat_19_ada.pdf

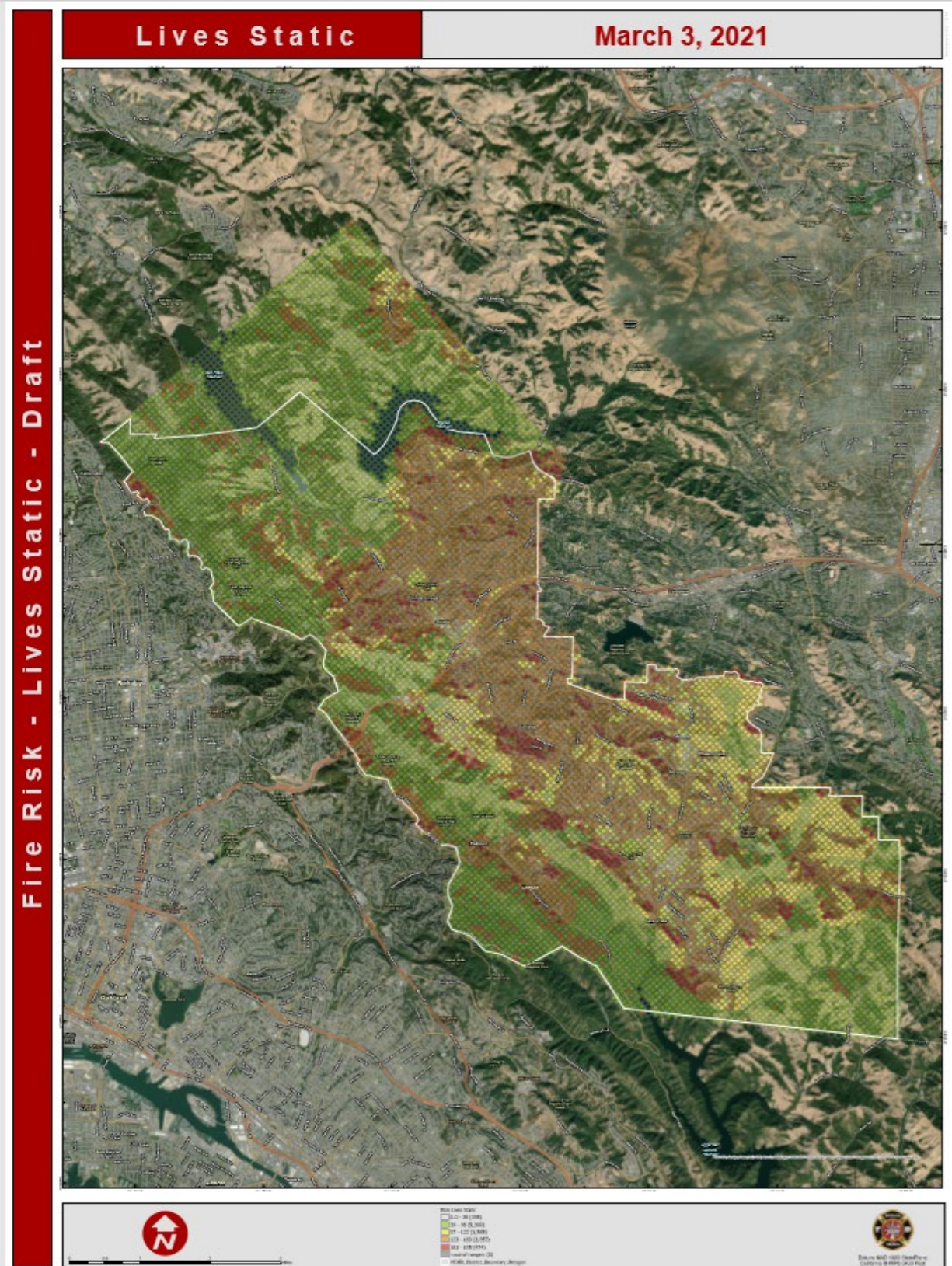


DRAFT FIRE HAZARD SEVERITY ZONES IN LRA

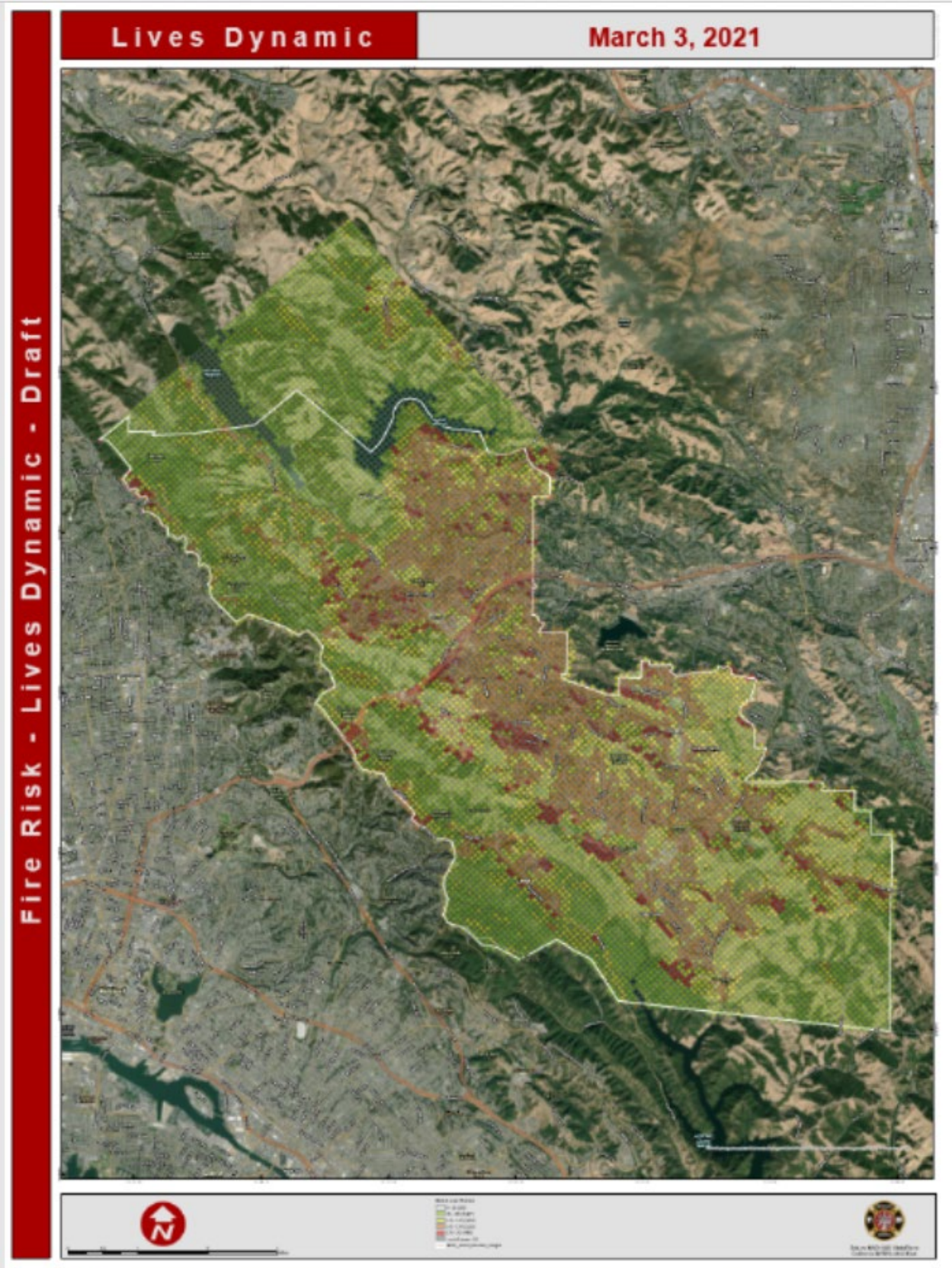
https://osfm.fire.ca.gov/media/6661/fhszl06_1_map7.pdf



WILDFIRE RISK TO LIVES IN HOMES



WILDFIRE RISK TO LIVES ON EVACUATION ROUTES



Community Wildfire Protection Plan - Public Input

The Moraga-Orinda Fire District is seeking public input for the Draft Community Wildfire Protection Plan (CWPP). Please [click here](#) to submit your comments. CWPP is designed to serve our community residents, and therefore we encourage your interest and engagement. Please see our website for upcoming CWPP community meetings. If you have questions regarding the form, you can contact Marcia Holbrook by email at mholbrook@mofd.org or by phone at (925) 258-4501.