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QUESTHAVEN
FIRE PROTECTION PLAN

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ACRONYMS AND ABBREVIATIONS

Acronym/Abbreviation	Definition
amsl	above mean sea level
APN	Assessor's Parcel Number
CAL FIRE	California Department and Forestry and Fire Protection
CAD	Computer Aided Dispatch
CWEP	Conceptual Wildfire Evacuation Plan
DPW	Department of Public Works (San Diego County)
EMD	Emergency Medical Dispatch
FMZ	fuel modification zone
FPP	Fire Protection Plan
gpm	Gallons per minute
HOA	Homeowner's Association
I-5	Interstate 5
ISO	Insurance Services Office
LPG	liquid propane gas
MSCP	Multiple Species Conservation Program
NCJPA	North County Joint Powers Agency
NFPA	National Fire Protection Association
psi	per square inch
RSFFPD	Rancho Santa Fe Fire Protection District
SDGE	San Diego Gas and Electric
WUI	wildland/urban interface

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EXECUTIVE SUMMARY

This Fire Protection Plan (FPP) is for Questhaven (Project), in San Diego County. This FPP provides measures for fire protection that meet the current San Diego County Consolidated Fire Code (Consolidated Fire Code), however the Project will be required to comply with the code edition in effect at the time of building permit submittal. The Project would be required to meet the adopted codes at the time of construction. This FPP also identifies the fire risk associated with the Project's planned land uses, and identifies requirements for fuel modification, building design and construction, and other pertinent development infrastructure criteria for fire protection. The primary focus of this FPP is to provide an implementable framework for suitable protection of the planned structures and the people living there. Tasks completed in preparation of this FPP include data review, code review, site fire risk analysis, land use plan review, fire behavior modeling, and site-specific recommendations.

The Project site consists of approximately 89.23 acres in the western portion of unincorporated San Diego County within the San Dieguito Community Plan Area, which is located immediately south and west of the City of San Marcos and east of the City of Carlsbad. Specifically, the Project site is located south of San Elijo Road and east of Denning Drive. The Project site encompasses Assessor's Parcel Numbers (APNs) 223-080-46-00; 223-070-07-00; and 223-070-08-00.

The Project would provide for the development of 76 single-family residential homes on 18.27 acres, recreation uses on 0.31 acres, open space uses on 63.90 acres, and water quality detention basins on 2.40 acres. The Project open space uses would provide for biological open space and a wildlife corridor that would connect to adjacent open space lands south and west of the Project site. The Project is designed to cluster the development of residential uses in the northern portion of the site in order to preserve biological open space in the southern portion of the site.

While the Project site is within the Rancho Santa Fe Fire Protection District (RSFFPD), per the exiting North County Boundary Drop Program, which is based on the closest available unit concept, Carlsbad Fire Department (CFD) Station 6 would typically be the unit selected for response to the Project site. CFD Station 6 is located approximately 1.55 miles west of the Project site. The County General Plan Safety Element requires new development demonstrate that fire protection services can be provided that meet the minimum travel time of five (5) minutes. Given that the Project site is located 1.55 miles away from the nearest fire station, the travel time would be within the minimum five (5) minute travel time required by the County. The Rancho Santa Fe Fire Protection District is a party to the North County Joint Powers Agency (NCJPA), which is the emergency dispatching organization for the RSFFPD and eight other local fire agencies. The NCJPA provides services including answering 911 emergency and business phone calls, providing Emergency Medical Dispatch (EMD), assigning and monitoring field

units via Computer Aided Dispatch (CAD), and mobile technical support for the member agencies. The structures in the Project would be built using ignition-resistant materials pursuant to the then current County of San Diego Fire and Building Codes (Chapter 7A – focusing on structure ignition resistance from flame impingement and flying embers in designated high fire hazard areas), which are the amended California Fire and Building Codes. Additionally, as required in the current Consolidated Fire Code, from the exterior wall surface of the building extending five feet on a horizontal plane will be constructed of continuous hardscape and shall be free of combustible materials and the use of mulch is prohibited. This would be complemented by an improved water availability, capacity, and delivery system; Project area firefighting resources; fire department access throughout the developed areas; monitored defensible space/fuel modification areas; interior, automatic fire sprinkler systems in all structures; monitored interior sprinklers in applicable structures; and other components that would provide properly equipped and maintained structures with a high level of fire ignition resistance.

The site fire risk analysis resulted in the determination that wildfire has occurred and will likely occur near the Project Area, but the Project would provide ignition-resistant landscape and structures, and defensible space with implementation of specified safety measures. Based on modeling and analysis of the Project Area to assess its unique fire risk and fire behavior, it was determined that the California and San Diego County standard of 100-foot-wide fuel modification zones (FMZs) would be suitable to protect the Project from an anticipated wildfire that may burn in areas adjacent to developed areas; however the Project will achieve an approximately 105-foot-wide FMZ, which includes the rear yard of Lots 19-45. This 105-foot-wide FMZ, when properly maintained, has proven effective at minimizing structure ignition from direct flame impingement or radiant heat, especially for structures constructed using the latest ignition-resistant codes. The fire resistive landscaping, as approved by the RSFFPD, for the Project would be maintained in perpetuity by the Homeowner's Association (HOA). In addition, the landscaping plans shall be reviewed by RSFFPD, and a bond shall be provided that will not be released until RSFFPD has inspected the installed landscaping and provided final approval. The Community Facilities District would also fund any fees required by RSFFPD for annual inspection services.

This FPP provides a detailed analysis of the Project, the potential risk from wildfire, and potential impacts on the RSFFPD and Carlsbad Fire Department, as well as an analysis of meeting or exceeding the requirements of the County of San Diego. Further, this FPP provides requirements, recommendations, and measures to reduce the risk and potential impacts to acceptable levels, as determined by the RSFFPD.

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1 INTRODUCTION

This Fire Protection Plan (FPP) was prepared for Questhaven (Project). The purpose of this FPP is to evaluate the potential impacts resulting from wildland fire hazards and identify measures necessary to adequately mitigate those risks to a level consistent with County of San Diego (County) thresholds. Additionally, this FPP develops and memorializes the fire safety requirements of the fire authority having jurisdiction, which is the Rancho Santa Fe Fire Protection District (RSFFPD). Requirements and recommendations detailed in this FPP are based on site-specific characteristics, applicable code requirements, and input from the Project's applicant and the fire authority having jurisdiction.

As part of the assessment, this FPP includes the evaluation of, among other site factors, property location, topography (including saddles, chutes, chimneys), geology, combustible vegetation (fuel types), climatic conditions, and fire history. This FPP addresses water supply, fire department and emergency access (including secondary access, where applicable), structural ignitability and ignition-resistive building features, fire protection systems and equipment, potential impacts to existing emergency services, defensible space, and vegetation management. It also identifies and prioritizes areas for potentially hazardous fuel reduction treatments and recommends the types and methods of treatment to protect the community and essential infrastructure. This FPP also recommends measures that property owners and the HOA could take to reduce the probability of structure ignition throughout the area.

The Project is located within the boundaries of the RSFFPD in the unincorporated portion of San Diego County. This FPP addresses RSFFPD's and California Department of Forestry and Fire Protection's (CAL FIRE) response capabilities and response travel time within the Project Area, along with projected funding for facility improvements and fire service maintenance.

The following tasks were performed to complete this FPP:

- Gathered site specific climate, terrain, and fuel data.
- Processed and analyzed the data using the latest GIS technology.
- Predicted fire behavior using scientifically based fire behavior models, comparisons with actual wildfires in similar terrain and fuels, and experienced judgment.
- Analyzed and guided design of proposed infrastructure.
- Analyzed the existing emergency response capabilities.
- Assessed the risk associated with the Project.

- Collected site photographs and mapped fuel conditions using 200-scale aerial images. Field observations were used to augment existing digital site data in generating the fire behavior models and formulating the recommendations presented in this FPP. (Refer to Appendix A for site photographs of existing site conditions.)
- Evaluated nearby firefighting and emergency medical resources.
- Prepared this FPP detailing how fire risk would be mitigated through a system of fuel modification, structural ignition resistance enhancements, and fire protection delivery system upgrades.

1.1 Intent

The intent of this FPP is to provide fire planning guidance and requirements for reducing fire risk and demand for fire protection services associated with the Project. To that end, the fire protection "system" detailed in this FPP includes redundant layering of measures, including pre-planning, fire prevention, fire protection, passive and active suppression, and related measures proven to reduce fire risk. The fire protection system planned for the Project has proven, through real-life wildfire encroachment examples throughout Southern California, to reduce the fire risk associated with this type of residential community.

1.2 Applicable Codes/Existing Regulations

This FPP demonstrates that the Project would comply with applicable portions of the current Consolidated Fire Code, California Building Code, Chapter 7A; California Fire Code, Chapter 49; California Code of Regulations, Title 14; and the California Residential Code, Section 237 as adopted by San Diego County. Chapter 7A of the California Building Code addresses reducing ember penetration into structures, a leading cause of structure loss from wildfires (California Building Standards Commission 2022). However, the Project should meet all applicable codes at the time of building permit submittal.

Code compliance is an important component of the requirements of this FPP, given the Project's wildland/urban interface (WUI) location that is within an area statutorily designated as a Very High Fire Hazard Severity Zone by CAL FIRE (FRAP 2024). Fire hazard designations are based on topography, vegetation, and weather, among other factors with more hazardous sites, including steep terrain, unmaintained fuels/vegetation, and WUI locations. Projects situated in Very High Fire Hazard Severity Zones require fire hazard analysis and application of fire protection measures to create defensible communities within these WUI locations. As described in this FPP, the Project would meet applicable code requirements for building in these higher fire hazard areas. These codes have been developed through decades of wildfire structure save and loss evaluations to

determine the causes of structure loss during wildfires. The resulting fire codes now focus on mitigating former structural vulnerabilities through construction techniques and materials so that the buildings are resistant to ignitions from direct flames, heat, and embers, as indicated in the 2022 California Building Code (Chapter 7A, Section 701A Scope, Purpose, and Application) (California Building Standards Commission 2022).

1.3 Project Summary

1.3.1 Location

The Project site consists of approximately 89.23 acres in the western portion of unincorporated San Diego County within the San Dieguito Community Plan Area. From a regional perspective, the Project site is located immediately south and west of the City of San Marcos and east of the City of Carlsbad. Interstate 5 (I-5) is located approximately 5.3 miles west of the Project site. Specifically, the Project site is located south of San Elijo Road and east of Rancho Santa Fe Road. The Project site encompasses Assessor's Parcel Numbers (APNs) 223-080-46-00; 223-070-07-00; and 223-070-08-00. The property is located in the west half of the northwest quarter of Section 33, Township 12 South, Range 3 West, San Bernardino Meridian. (Figure 1, Project Location).

The Project site is undeveloped and includes several unimproved dirt roads and trails. Historically, the northern portion of the site has been subject to disturbance and was used as a laydown yard for construction equipment associated with the adjacent former recycling facilities. Additionally, a portion of the western area of the site was used for agricultural uses. The southern portion of the Project site contains a large area of steep hills that transition into a relatively flat area in the northern and central portion of the site. Elevations range between approximately 830 feet above mean sea level (amsl) in the southwest corner to 500 feet amsl along the eastern boundary.

1.3.2 Vicinity Land Use

Existing land uses surrounding the Project vary from highly urbanized areas to open space lands. To the west and south of the Project site is open space associated with the Rancho La Costa Habitat Conservation Area, beyond which is existing residential development. North of the Project site is land designated for open space, beyond which are existing residential uses. East of the Project site is a former recycling facility that is currently used as an indoor sports complex known as "Edenpark" which is proposed for additional sports complex and commercial uses.

Given that the Project site is adjacent to open space preserves to the west and south, the Project proposes a design to cluster in the north in order to preserve a viable wildlife corridor in the more constrained land on the southern edge of the Project site and establish a level of compatibility with these adjacent preserves.

1.3.3 Project Description

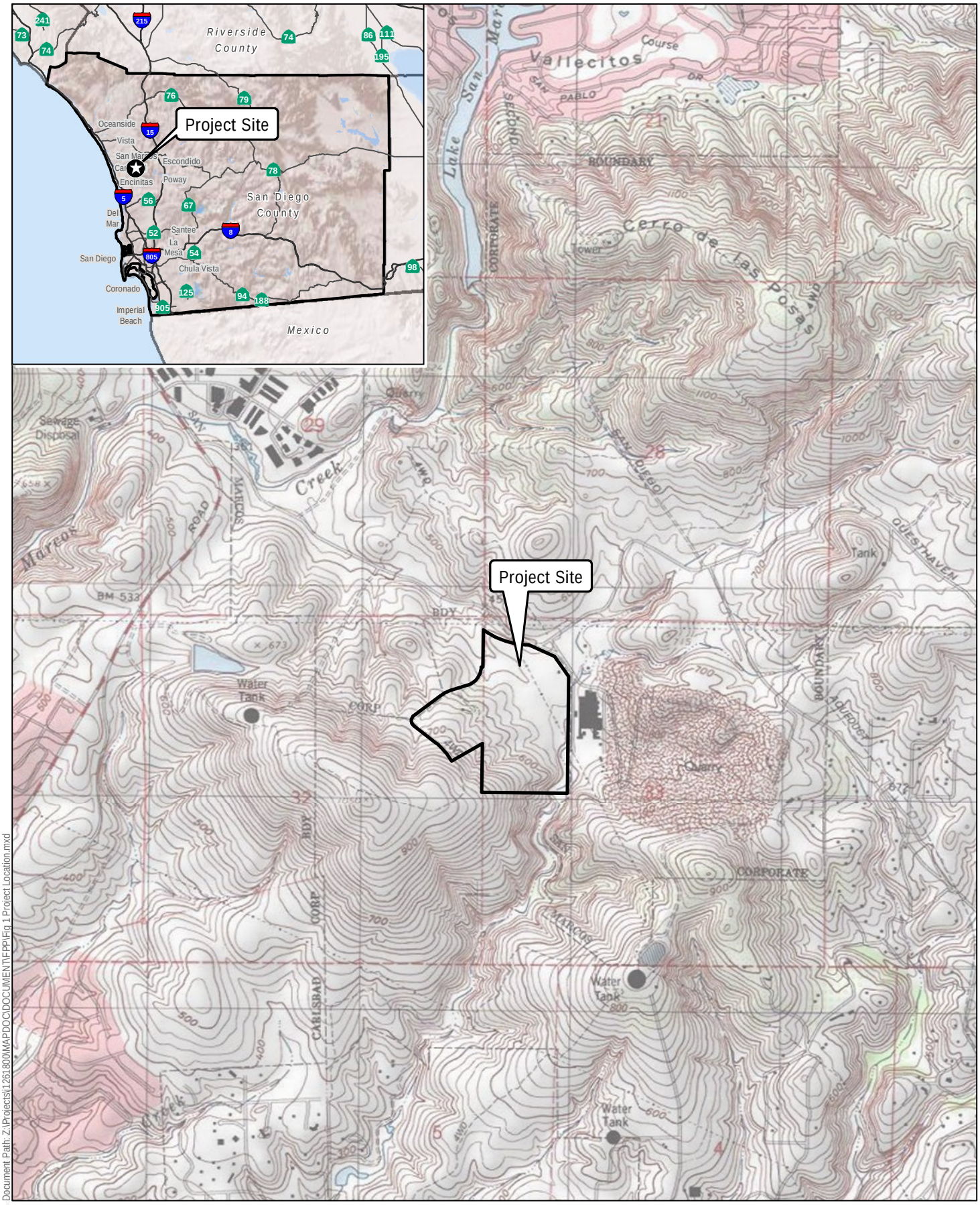
1.3.3.1 Overview and Background

The Project (defined below) addressed by this technical report is located within the San Dieguito Community Plan Area. The Project consists of a Tentative Map and an Administrative Permit of an 89.23-acre site. As shown in Table 1, the Project would provide for development of 76 single-family residential homes on 18.27 acres, recreation uses on 0.31 acres, open space uses on 63.90 acres, and water quality detention basins on 2.40 acres. The 63.90 acres of proposed open space would provide for biological open space and a wildlife corridor that would connect to adjacent open space lands south and west of the Project site. The Project is designed to cluster residential development in the northern portion of the site, reducing the wildland urban interface and creating a more defensible community (Figure 2, Site Plan). The Project would connect to existing utilities within San Elijo Road and existing facilities that occupy existing easements along the project's easterly boundary. Access to the Project would be provided via two (2) full access connections to San Elijo Road (via proposed Street "D" and Street "E") which abuts the northern boundary of the property. Primary access to the western portion of the site would be provided via Street D at San Elijo Road. Primary access to the eastern portion of the site would be from Street E via San Elijo Road. San Elijo Road is not designated as a County Mobility Element roadway.

Table 1
Questhaven Site Utilization Plan Summary

Description	Questhaven	
	Gross	*Target*
	Acres	*Units*
Residential Uses	*18.27*	*76*
Non-Residential Uses		
Recreation	0.31	—
Detention Basins	2.40	—
Fuel Modification Zone (FMZ) (Lot R)	3.85	—
Biological Open Space	60.05	—
Circulation	4.34	—
Non-Residential Uses Subtotal	*68.34*	—
Total Project	**89.23**	**76**

Source: Excel Engineering, 2020



Document Path: Z:\Projects\j126180\MAPDOC\DOCUMENT\FPP\Fig 1 Project Location.mxd

SOURCE: USGS 7.5 MINUTE SERIES, RANCHO SANTA FE QUADRANGLE
TOWNSHIP 12 SOUTH, RANGE 3 WEST, SECTIONS 32 AND 33

DUDEK

0 1,000 2,000 Feet

FIGURE 1
Project Location
Questhaven Fire Protection Plan

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Path: Z:\Projects\5261800\MAPDOC\DOCUMENT\FPP\Fig 2 Site Plan 2021.03.26.mxd

SOURCE: AERIAL-BING MAPPING SERVICE; DEVELOPMENT-HUNSAKER & ASSOCIATES 2021

DUDEK

0 125 250 500 Feet

FIGURE 2
Site Plan
Questhaven Fire Protection Plan

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2 PROJECT STUDY AREA RISK ANALYSIS

2.1 Field Assessment

Following review of available digital Study Area information, including topography, vegetation types, fire history, and the Project's Development Footprint, Dudek fire protection planners conducted a field assessment of the Study Area on April 21, 2020. Dudek's assessment was aided by the Biology Letter Report which was conducted in July 2014 and provided a comprehensive vegetation mapping for the Project Area (Alden Environmental 2014).

Among the field tasks completed were the following:

- Fuel load analysis
- Topographic features documentation
- Photographic documentation
- Confirmation/verification of hazard assumptions
- Ingress/egress documentation

Study Area photographs were collected (Appendix A), and fuel conditions were mapped using aerial images. Field observations augmented existing Study Area data in generating the fire behavior models and formulating the requirements provided in this FPP.

2.2 Study Area Characteristics and Fire Environment

The following sections discuss the characteristics of the Study Area at a regional scale. Evaluating conditions at this macro-scale provides a better understanding of the regional fire environment, which represents the fuel bed for wildfires that may ignite in the vicinity of, and burn toward, the Project's planned and maintained fire buffers, landscapes, and ignition-resistant structures.

2.2.1 Topography

Topography influences fire risk by affecting fire spread rates. Typically, steep terrain results in faster fire spread up-slope and slower spread downslope. Terrain that forms a funneling effect, such as chimneys, chutes, or saddles on the landscape can result in especially intense fire behavior. Conversely, flat terrain tends to have little effect on fire spread, resulting in fires that are driven by vegetation and wind.

The Project's topography in its current condition is characterized by a large area of steep hills in the southwest that transition into a relatively flat area in the northern and central portions of the Project Site, with terrain sloping up and away from the Project. Areas outside this Development Footprint include similar terrain. The Project Site is bordered by the Rancho La Costa Reserve to the west and south. Additionally, a portion of Copper Creek crosses the southeast corner of the site.

Elevations of the Study Area range from approximately 500 feet above mean sea level (amsl) at the eastern boundary of the property to approximately 830 feet amsl in the southwest corner of the Project Site. Slope is important relative to wildfire because steeper slopes typically facilitate more rapid fire spread up slope, which can range from 9% to 23% within the Study Area. In the case of the Study Area, the steeper slopes are primarily within the areas designated as open space and would not be developed. The Study Area's steeper slopes ascend away from the developed areas of the Project (versus situations where development occurs at top of slope and the terrain descends away from the developed areas). The Study Area's topography is generally in alignment with the extreme Santa Ana wind events, which can influence fire spread by creating wind-driven fires, especially when moving upslope.

2.2.2 Climate

North San Diego County, including the Project Area, is influenced by the Pacific Ocean and frequently under the influence of a seasonal, migratory subtropical high-pressure cell known as the "Pacific High" (WRCC 2010). Wet winters and dry summers with mild seasonal changes characterize the Southern California climate. Local climate, which has a large influence on fire risk, is typical of a Mediterranean area. The climate pattern is occasionally interrupted by extreme periods of hot weather, winter storms, or dry, northeasterly Santa Ana winds (WRCC 2010). The average high temperature for the Study Area during fire season is approximately 81°F, though the temperature often exceeds that, reaching into the high 90°F range in the event of a heatwave. Temperature in summer and early fall months (July–October) have reached up to 108°F. Precipitation typically occurs November through April, with annual rainfall averaging 13 inches (WRCC 2010). The prevailing wind is an onshore flow from the Pacific Ocean, which is approximately 6.25 miles to the west. Hot, dry (Santa Ana) winds, which typically occur in the fall and are usually from the northeast, can gust to 50 mph or higher. The Santa Ana winds are due to the pressure gradient between high pressure in the plateaus of the Great Basin and lower pressure gradient over the Pacific Ocean (NOAA 2007). Drying vegetation (fuel moisture of less than 5% for 1-hour fuels is possible) during the summer months becomes fuel available to advancing flames should an ignition occur. Extreme conditions, used in fire modeling for this Project, include 81°F temperatures in summer and winds of up to 50 mph during the fall. Relative humidity of 13% or less is possible during fire season (Weather Spark 2020).

2.2.3 Fuels (Vegetation)

The Project Area includes both developed areas, to the north, northeast, east, and west, and open space areas to the north, south and east. The Project Site is currently undeveloped and is composed of a variety of vegetation types that were mapped by Alden Environmental (Alden Environmental 2014). Extensive vegetation type mapping is useful for fire planning because it enables each vegetation community to be assigned a fuel model, which is used by a software program to predict fire characteristics, as discussed in Section 4.1, Fire Behavior Modeling. As shown in Table 2, the Project Site's vegetative fuels are primarily Diegan coastal sage scrub/chaparral ecotone, non-native grassland, Diegan coastal sage scrub, and chamise chaparral, although smaller pockets of native grassland, riparian scrub, eucalyptus woodland, and southern mixed chaparral vegetation types are present. This vegetation is adapted to periodic wildfire events. Fire history data described in Section 2.2.6, Fire History, indicates that the vegetation last burned in 1996 over the entirety of the Project Area. Small areas of disturbed habitat and urban/developed land cover types are also present within the Study Area. More detailed information regarding the plant communities within the Study Area is provided in the Biological Resources Letter Report for the Project (Alden Environmental 2014). Vegetation is important relative to wildfire, as some vegetation such as coastal sage scrub and grassland habitats are highly flammable, and other vegetation such as chamise chaparral is less flammable due to its higher moisture content, but will burn under certain, more intense fire conditions.

Table 2
Vegetation Communities On-Site

Vegetation Community	Acres
Uplands	
Diegan Coastal Sage Scrub/chaparral ecotone	29.0
Non-native Grassland	19.3
Diegan Coastal Sage Scrub	13.6
Chamise chaparral	2.3
Disturbed/Developed Habitat	2.0
Native Grassland	1.1
Eucalyptus Woodland	0.3
Southern mixed chaparral	0.2
Wetlands	
Riparian Scrub	1.1
TOTAL	68.9

Source: Alden Environmental, 2014

The Development Footprint would be converted to roads, structures, and landscape vegetation following the Project's completion. Any native vegetative fuels within FMZs would also be

modified as a result of development, altering their current densities, distributions, and species composition. Areas that would have the most influence on development related to direct fire impacts (approximately 300 feet outside of proposed development) and FMZs would continue to be dominated by chamise-chaparral, Diegan coastal sage scrub, and non-native grassland fuel beds. These vegetation types were confirmed by Dudek fire protection planners in the field and assigned fuel models for use during fire behavior modeling (see Section 4.1.1). These fuels are anticipated to remain in the areas adjacent to the Development Footprint (just outside the FMZs) but have been planned and compensated for through a system of fire protection described throughout this FPP.

2.2.4 Fuel Loads

The vegetation along the perimeter of the development and within approximately 300 feet of the FMZs is the area of highest concern for determining what effects wildfire may have on the Project's landscape and structures. It is these fuels that, if ignited, would burn adjacent to the proposed FMZs and alternative protections, designed to reduce flame length, spread, and intensity as it gets closer to the built portions of the Project. Vegetation types in these areas have been classified into fuel models used for fire behavior modeling, discussed in Section 4, Anticipated Fire Behavior.

The importance of vegetative cover on fire suppression efforts is its role in affecting fire behavior. For example, although fires burning in grasslands may exhibit lower flame lengths than those burning in chaparral fuels, fire spread rates in grasslands are often much more rapid than those in other vegetation types.

Fuel loading in non-native grassland is estimated to be 0.4 tons per acre, and in chaparral-sage scrub it is estimated to be between 8.4 and 8.6 tons per acre (Brown 1982; Scott and Burgan 2005; Weise and Regelbrugge 1997). The fuel load is the total amount of combustible material in a defined area. Shrub-dominated plant communities tend to include higher fuel loads than grass-dominated plant communities. Tree-dominated communities may include higher fuel loads than shrub-dominated landscapes. However, there are many other facets of fire behavior that govern fire ignition and spread. Therefore, because an area may include higher fuel loads, it does not necessarily mean that it presents a higher fire risk.

2.2.5 Vegetation Dynamics

Variations in vegetative cover type and species composition have a direct effect on fire behavior. Some plant communities and their associated plant species have increased flammability based on plant physiology (resin content), biological function (flowering, retention of dead plant material),

physical structure (bark thickness, leaf size, branching patterns), and overall fuel loading. For example, the native shrub species that comprise the chaparral communities in the Study Area are considered to be less likely to ignite but would exhibit higher potential hazard (higher-intensity heat and flame length) than grass-dominated plant communities (fast moving, but lower intensity) if ignition occurred. The corresponding fuel models for each of these vegetation types are designed to capture these differences. Additionally, vegetative cover influences fire suppression efforts through its effect on fire behavior. For example, although fires burning in grasslands may exhibit lower flame lengths and heat outputs than those burning in native shrub habitats, fire spread rates in grasslands are often more rapid.

As described, vegetation plays a significant role in fire behavior and is an important component to the fire behavior models discussed in this plan. A critical factor to consider is the dynamic ecologic nature of vegetation communities. Fire presence and absence at varying cycles or regimes (fire return interval) disrupts plant succession, setting plant communities to an earlier state where less fuel is present for a period of time as the plant community begins its succession again.

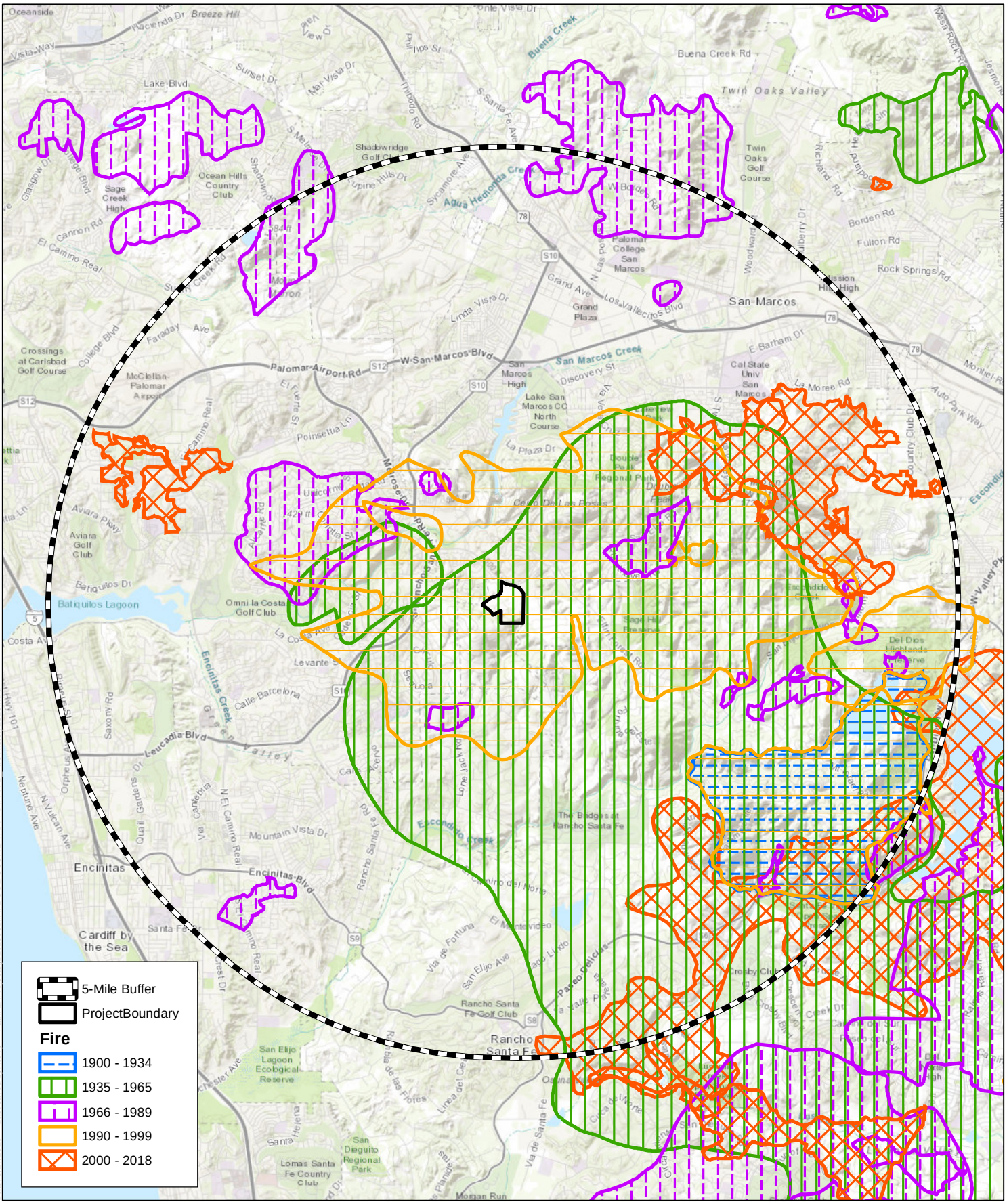
In summary, high-frequency fires tend to convert shrublands to grasslands or maintain grasslands, and fire exclusion tends to convert grasslands to shrublands over time, as shrubs sprout back or establish and are not disturbed by repeated fires. In general, biomass and associated fuel loading will increase over time, assuming that disturbance (fire, grazing) or fuel reduction efforts are not regularly implemented. It is possible to alter successional pathways for varying plant communities through manual alteration. This concept is a key component in the overall establishment and maintenance of the proposed FMZs. The FMZs would consist of irrigated and maintained landscapes and thinned native fuel zones that would be subject to regular "disturbance" in the form of maintenance and would not be allowed to accumulate excessive biomass over time, which results in reduced fire ignition, spread rates, and intensity.

Conditions adjacent to the Project's footprint (outside the FMZs), where the wildfire threat would exist post-development, are currently classified as low to moderate fuel loads due to the higher percentage of grasslands intermixed with sparse stands of chamise chaparral and coastal sage scrub fuels. However, the climax vegetation state (undisturbed brush stands that are not disturbed for an extended period of 50 years or more) includes more uniform and dense stands of sage scrub-chaparral fuels, which were employed for a conservative modeling approach to represent worst-case (i.e., max fuels) wildfire scenarios around the perimeter of the Project Area.

2.2.6 Fire History

Fire history is an important component of preparing and designing FPPs. Fire history data provides valuable information, including fire spread, fire frequency, most vulnerable areas, and significant

ignition sources. In turn, this understanding of why fires occur in an area and how they typically spread can then be used for pre-planning and designing defensible communities. As represented in Figure 3, there have been 28 fires recorded by CAL FIRE since 1919 on the Fire and Resource Assessment Program database within five miles of the Project (FRAP 2015). The total of 28 fires in this area over the last 101 years within five miles of the Project is not considered a high number for Southern California. On average, CAL FIRE annually responds to 5,000 wildfires of more than 10 acres (CAL FIRE 2015). Of the 28 fires that have burned within five miles of the Project, there have been two fires that burned across the Project property. The most notable fire (Witch Fire) occurred in October 2007 and burned approximately 162,070 acres in the northern portion of the County; however, it did not burn any portion of the Project Area. RSFFPD may have data regarding other smaller, undocumented fires that have occurred on the Project Area and within the Study Area that have not been included herein because fires under 10 acres are not recorded by CAL FIRE. Appendix B, Fire History Exhibit, presents fire history within five miles of the Project Area and provides a graphical representation of the quantity of times the landscape has burned in the area. Recorded fires since 1900 that have burned onto the Project Area are listed in Table 3.



SOURCE: BASE-ESRI MAPPING SERVICE; FIRE DATA-CALFIRE 2018

DUDEK

0 1 2 Miles

FIGURE 3

Fire History Map

Questhaven Fire Protection Plan

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Table 3
Fire History in the Project Area

Fire Year[a]	Fire Name	Total Area Burned (acres)
1919	Unnamed	6,693
1935	Unnamed	939
1943	Unnamed	40,247
1970	Unnamed	126
1970	Theater	1,191
1970	Unnamed	1,916
1980	Elfin	46
1980	Outside Origin #2	74
1982	Assist #16	654
1982	Local Assist #12	39
1984	Questhaven	28
1985	Outside Origin #5	35
1985	Israel	28
1986	Harmony	41
1987	Del Dios	217
1988	Del Dios #2	36
1988	Outside Origin #11	246
1989	Harmony	142
1990	Paint	2,760
1994	Questhaven	65
1996	Harmony	9,359
1996	Harmony	79
1997	Del Dios	1,072
2007	Coronado Hills	58
2007	Witch	162,070
2014	Cocos	1,994
2014	Bernardo	1,331
2014	Poinsettia	376

[a] Based on polygon GIS data from CAL FIRE's Fire and Resource Assessment Program, which includes data from CAL FIRE, U.S. Department of Agriculture Forest Service Region 5, Bureau of Land Management, National Park Service, contract counties, and other agencies. The data set is a comprehensive fire perimeter GIS layer for public and private lands throughout the state and covers fires 10 acres and greater between 1878–2013.

Based on fire history data for the vicinity, fire return intervals range between 0 and 27 years, indicating the wildfire potential in the region and the potential for the Project Area to be subject to occasional wildfire encroachment, most likely from the large expanses of open space to the south and east. Note that once the Project is built out, the fire spread patterns would be modified within the Project Site, as the Project would establish fuel breaks of maintained and irrigated landscapes, which fire may encroach upon and burn around, but would not burn through the Project Site with the same spread patterns as it has in the past.

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3 DETERMINATION OF PROJECT EFFECTS

A FPP provides an evaluation of the adverse environmental effects a project may have from wildland fire. The FPP must identify mitigation for identified impacts to ensure development does not unnecessarily expose people or structures to a significant loss, injury, or death involving wildland fires. Significance is determined by answering the following guidelines:

Would the project expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildland?

The wildland fire risk in the vicinity of the Project Area has been analyzed according to San Diego County Guidelines for Determining Significance – Wildland Fire and Fire Protection (County of San Diego 2010). It has been determined that wildfires may occur in wildland areas that surround the Project Area but would not be significantly increased in frequency, duration, or size with the construction of the Project. The Project would include conversion of fuels to maintained development with designated RSFFPD review of landscaping, FMZs, and highly ignition-resistant structures; a funded entity to manage and maintain the FMZ; and third-party annual FMZ inspections to confirm the FMZ areas are maintained as designed and, therefore, would function as intended. As such, the Development Footprint would be largely converted from readily ignited fuels to ignition-resistant landscape and structures that are provided defensible space consistent with State of California and County standards, access for firefighters and early evacuations, water and fire flow to code, and other fire protection features, as described throughout this FPP.

Ignition-Resistant Structures

The ignition-resistant requirements for new structures built in high or very high fire hazard severity zones have been determined by state and local fire agencies to provide acceptable resistance to ignition from the types of wildland fires produced by the County's wildland fuels, terrain, and weather. San Diego County conducted after-fire assessments that strongly indicate the building codes and the coordinated landscape and infrastructure requirements are successfully contributing to the prevention of houses being damaged or destroyed due to wildland fire. Of the 15,000 structures within the 2003 Cedar Fire perimeter, 17% (1,050) were damaged or destroyed. However, of the 400 structures built to the 2001 building and fire codes (the most recent at the time), only 4% (16) were damaged or destroyed. Further, of the 8,300 homes that were within the 2007 Witch Creek Fire perimeter, 17% were damaged or destroyed. Only 3% of the 789 homes that were built to 2001 codes were impacted, and only 2% of the 1,218 structures built to the 2004 codes were impacted (IBHS 2008). Many of the newer structures that were damaged or destroyed

were due to human error. Similarly, of 194 structures damaged or destroyed in the Orange County Freeway Complex Fire (2008), there were no structures within the fire perimeter damaged or destroyed that were built to at least the 1996 special fire area codes (similar to the CBC Chapter 7A requirements) enacted by the City of Yorba Linda (Orange County Fire Authority 2008). Those codes required structure hardening against wildfire, but were less restrictive and resulted in less ignition-resistant structures than current San Diego County Building and Fire Code requirements. Structures built to the 2016 Fire and Building Codes result in highly ignition and ember resistant structures. When combined with maintained FMZs, compliant fire apparatus access, adequate water (fire flow), and an equipped and trained responding fire agency, the result is a defensible project.

Effective Fuel Modification Zones

Provisions for modified fuel areas of at least 100 feet separating wildland fuels from structures have also reduced the number of fuel-related structure losses by providing separation between structures and radiant heat generated by wildland fuels. FMZs of 100 feet in width that are correctly designed, installed, and maintained over time have been shown to provide effective defensible space.

As such, most of the primary components of the layered fire protection system provided for the Project are required by RSFFPD. However, they are worth listing because they have been proven effective for minimizing structural vulnerability to wildfire. In addition, interior fire sprinklers, which would be provided in all structures (now required by code), have a track record of extremely high reliability (Bukowski et al. no date) approaching 98%, and statistics indicate that fires in homes with sprinklers resulted in 82% lower property damage and 68% lower loss of life (Hall 2013). Although not designed for wildland fire defense, should embers succeed in entering a structure, sprinklers provide an additional layer of life safety and structure protection.

Even though current Building and Fire Codes require these measures, at one time, they were used as mitigation measures for buildings in WUI areas, because they were known to reduce structure vulnerability to wildfire. These measures performed so well, they were adopted into the 2007 California Building Code and have been retained and enhanced in code updates since then. The following Project features are required for new development in WUI areas and would form the basis of the system to provide adequate access by emergency responders and provide the protection necessary to minimize structural ignitions:

- Application of the latest adopted ignition-resistant building codes;
- Exterior wall coverings are to be non-combustible or ignition resistant;
- Multipane glazing with a minimum of one tempered pane;

- Ember-resistant vents (recommend BrandGuard, O'Hagin, or similar vents);
- Interior, automatic fire sprinklers to code for occupancy type;
- Modern infrastructure, access roads, and water delivery system;
- Maintained FMZs; and
- Fire apparatus access roads throughout the Project Area's developed areas.

Ignition Sources

The types of potential ignition sources that currently exist in the area include overhead power lines, vehicles, roadways, and neighboring residential neighborhoods. The Project would introduce potential ignition sources, particularly more people in the area. However, as mitigating factors for this increase in potential ignition sources, the Project would convert more than 87 acres of ignitable fuels to lower flammability landscape and include better access throughout the Development Footprint, managed and maintained landscapes, and consistent human presence in the area, which would reduce the likelihood of arson, off-road vehicles, or shooting-related fires.

The FMZs are designed to not only minimize wildfire encroaching upon the community, but also to minimize the likelihood that an ignition from the developed area spreads into the Rancho La Costa Reserve by separating the natural vegetation occurring outside the FMZs with that in the FMZs. Vegetation within the FMZs would be maintained as prescribed and the first 50 feet irrigated, resulting in high fuel moisture, which is more difficult to ignite (USFS 2015); reduced fuel densities; lack of fuel continuity; and a reduction in the receptiveness of the landscape to ignition and fire spread. Fires from off site would not have continuous fuels across the Development Footprint and would, therefore, be expected to burn around and/or over the developed landscape via spotting. Burning vegetation embers may land on Project structures but are not likely to result in ignition based on ember decay rates and the types of non-combustible and ignition-resistant materials and venting that would be used within the Project, and the ongoing inspections and maintenance that would occur in the Project's landscaped areas and FMZs.

The Project would comply with the applicable fire and building codes and would include a layered fire protection system designed to current codes. Project Area-specific measures would result in a Project that is less susceptible to wildfire than surrounding landscapes and would facilitate firefighter and medical aid response. These features combined with the ignition resistance construction required result in consistency with San Diego County Guidelines and an acceptable fire hazard risk.

Would the project result in inadequate emergency access?

The Project would not result in inadequate emergency access. The proposed internal looped roadways meet County standards and provide emergency access over the roadways that include a minimum width of 24 feet (two 12-foot-wide, unobstructed travel lanes) and additional width for parking. Further, 'No Parking' signs shall be placed throughout the community along the roads that are 24 feet wide and cannot accommodate on-street parking. These signs shall be posted on both side of the street, with 150-feet spacing in between each sign. The signs on each side will be offset by 75 feet to achieve a staggered placement. Additionally, the roads would provide residents the option to evacuate from at least two egress access points in two different directions from the Project Site. Depending on the nature of the emergency, residents can exit at the north or south end of the development and head east (toward Carlsbad and I-5) or the west (toward San Elijo Hills and SR-76) on San Elijo Road. In emergencies where evacuation was considered unsafe and it would be safer to remain within the developed portions of the Project Area, temporary refuge within Edenpark, the neighboring shopping center, or San Elijo Elementary School would be possible as an alternative. The internal roadways from the residences to San Elijo Road would be provided fuel modified passageways.

If necessary, evacuation would be focused on early evacuations, long before fire was in the area, following the "Ready, Set, Go!" model. Contingency options available to this Project may be determined to be safer than evacuating by responding fire and law enforcement personnel. A Wildfire Evacuation Plan was prepared for the Project and would be provided by the HOA to the residents so that all residents are aware of the evacuation routes, the fluidity of wildfire events, and the options that may be presented to them by responding law enforcement and/or fire personnel, Reverse 911, or other officials. An annual evacuation awareness program would be conducted by the HOA, and online access to fire awareness educational material would be provided on the community's website.

Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance service ratios, response times or other performance objectives for fire protection?

The Project is projected by call volume analysis (using San Diego County per-capita call generation factor of 82 calls per 1,000 persons) to add approximately 18 calls per year to the Carlsbad Fire Department's existing call load. This call volume (0.05 calls per day) is not considered enough of an increase to require additional resources.

Fire protection during construction and operation would be provided by the closest available unit, which would likely be Carlsbad Fire Department Station 6, located at 7201 Rancho Santa Fe Road, Carlsbad, CA, approximately 1.55 miles from the Project Site. This station would be able to provide first engine response to all Project lots in under five minutes, consistent with the San Diego County General Plan Safety Element for village and limited semi-rural residential areas. It would be able to reach the furthest lots within 3.71 minutes. The next closest fire station is San Marcos Fire Department Station 4, located at 204 San Elijo Road, San Marcos, CA, approximately 2.29 miles from the Project site along San Elijo Road. Carlsbad Fire Department Station 6 averages roughly 87 calls per month within its response area. City of Carlsbad Fire Station 6 would provide first engine response to the Project Site, with a response time of under 4 minutes to the furthest parcels, the County's five-minute travel standard would be satisfied. Further, City of San Marcos Fire Station 4 is located approximately 2.29 miles east of the Project Site, and could provide additional resources, if necessary.

Would the project have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?

The Project would be served by Olivenhain Municipal Water District (OMWD) and sufficient water supplies would be available to serve the Project from existing entitlements and resources without requiring a connection to the Vallecitos Water District. RSFFPD requires new development to meet a minimum 2,500 gallons per minute (gpm) fire flow with a duration of flow for a minimum of two hours, while maintaining a minimum residual pressure of 20 PSI in the surrounding area. The Project is located within the OMWD boundary and already accommodated as part of future development projections in the Olivenhain Municipal Water District 2015 Potable Water and Recycled Water Master Plan. The OMWD has provided a water availability/will serve form to the Project (Appendix C).

The measures described in the responses to these significance questions are provided in more detail in the following sections.

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4 ANTICIPATED FIRE BEHAVIOR

4.1 Fire Behavior Modeling

Following field data collection efforts and available data analysis, fire behavior modeling was conducted to document the type and intensity of fire that would be expected adjacent to the project site given characteristic site features such as topography, vegetation, and weather. Dudek utilized BehavePlus software package version 6 (Andrews, Bevins, and Seli 2008) to analyze potential fire behavior for the northern, eastern, southern, and western edges of the project site, with assumptions made for the pre- and post-project slope and fuel conditions. Results are provided below and a more detailed presentation of the BehavePlus analysis, including fuel moisture and weather input variables, is provided in Appendix D.

4.1.1 BehavePlus Fire Behavior Modeling Analysis

An analysis utilizing the BehavePlus software package was conducted to evaluate fire behavior variables and to objectively predict flame lengths, intensities, and spread rates for four modeling scenarios. These fire scenarios incorporated observed fuel types representing the dominant vegetation on-site and off-site on vacant land to the north, east, south and west, in addition to slope gradients, and wind and fuel moisture values for both the summer, on-shore winds, and the fall, off-shore winds. Modeling scenario locations were selected to better understand different fire behavior that may be experienced on or adjacent to the site.

Vegetation types, which were derived from available resource materials and confirmed during the field assessment for the project site, were classified into a fuel model. Fuel models are selected by their vegetation type; fuel stratum most likely to carry the fire; and depth and compactness of the fuels. Fire behavior modeling was conducted for vegetative types that surround the proposed development. Fuel models were also assigned to the perimeter fuel management areas to illustrate post-project fire behavior changes. Based on the anticipated pre- and post-project vegetation conditions, three different fuel models were used in the fire behavior modeling effort presented herein. Fuel models are summarized in Table 4.

Table 4. Fuel Models used for Fire Behavior Modeling

Observed Vegetation type(s)	Fuel Model selection	Fuel Model description
Existing conditions		
Mixture of native and non-native grasslands intermixed with coastal sage scrub/mixed chaparral	Gs2	Moderate Load Dry-Climate Grass/Shrub
Moderate density coastal sage scrub/mixed chaparral	Sh2	Moderate load, Dry-climate shrub
High density coastal sage scrub/mixed chaparral	Sh5	High load, Dry-climate scrub
Eucalyptus woodland	Sh4	Chaparral
Post-project		
Fuel modification zone 1 – irrigated landscaping	FM8	Closed canopy with compact litter layer (needles, leaves, twigs)
Fuel modification zone 2 – fuel treatments	Sh1	Low load dry climate shrub
Fuel modification zone 2 – cut grasses	Gs1	Low load dry climate grass-shrub

The results of fire behavior modeling analysis for pre- and post-project conditions are presented in Tables 5 and 6, respectively. Identification of modeling run (fire scenarios) locations is presented graphically in Figure 4, Fire Behavior Analysis Map.

Table 5. Fire Behavior Model Results Existing Conditions for Questhaven Project

Fire Scenario Fuel Model(s)	Flame Length[1] (ft)	Spread Rate[1] (mph)	Fireline Intensity[1] (Btu/ft/s)	Spot Fire[1] (mi)	Surface Fire to Tree Crown Fire
Extreme Fall Weather Scenarios (97th percentile)					
Scenario 1: from the East; 9% slope; Offshore 19 mph sustained; 52 mph gusts *(in parentheses)*					
Moderate Load Dry-Climate Grass/Shrub (Gs2)	10.8 (20.9)[5]	1.0 (4.4)	992 (4,219)	0.5 (1.5)	Crowning [4]
Moderate load, Dry-climate shrub (Sh2)	8.6 (16.1)	0.3 (1.0)	608 (2,376)	0.4 (1.2)	Crowning [4]
Eucalyptus and Pine Forest[2,3] (Sh4)	12.9 (24.3)	1.1 (4.4)	1,468 (5,861)	0.5 (1.6)	Crowning [4]
High load, Dry-climate scrub (Sh5)	26.2 (45.0)	2.1 (7.0)	6,848 (22,293)	0.9 (2.5)	Crowning [4]
Scenario 2: from the Southeast; 16% slope; Offshore 19 mph sustained; 52 mph gusts *(in parentheses)*					
Moderate load, Dry-climate shrub (Sh2)	8.5 (16.0)	0.3 (1.0)	594 (2,362)	0.4 (1.2)	No
High load, Dry-climate scrub (Sh5)	25.9 (44.9)	2.1 (7.0)	6,712 (22,157)	0.9 (2.5)	No
Summer On-shore wind Scenarios (50th percentile)					
Scenario 3: from the Southwest; 23% slope; 18 mph sustained					
Moderate load, Dry-climate shrub (Sh2)	1.7	0.0	19	0.1	No
High load, Dry-climate scrub (Sh5)	14.5	0.8	1,899	0.6	No
Scenario 4: from the North; 12% slope; 18 mph sustained					
Moderate Load Dry-Climate Grass/Shrub (Gs2)	5.7	0.4	249	0.3	No
Moderate load, Dry-climate shrub (Sh2)	1.8	0.0	20	0.1	No

Note:

1. Wind-driven surface fire.
2. Eucalyptus and Pine Forest overstory torching increases fire intensity. Modeling included canopy fuel over Sh4, which represents surface fuels beneath the tree canopies.
3. A surface fire in the Eucalyptus and Pine Forest would transition into the tree canopies generating flame lengths higher than the average tree height (35 feet). Viable airborne embers could be carried downwind for approximately 1.0 mile and ignite receptive fuels.
4. Crowning= fire is spreading through the overstory crowns.
5. Parentheses = 52 mph gusts of wind

Table 6. Fire Behavior Modeling Results for Post-Project Conditions

Scenario	Flame Length (feet)	Fireline Intensity (BTU/feet/second)	Spread Rate (mph)	Spotting Distance (miles)
Extreme Fall Weather Scenarios (97th percentile)				
Scenario 1: from the East; 9% slope; Offshore 19 mph sustained; 52 mph gusts *(in parentheses)*				
Fuel modification zone 1 (FM8)	2.1 (2.9)	28 (59)	0.1 (0.2)	0.2 (0.4)
Fuel modification zone 2 (Sh1)	5.8 (10.4)	255 (930)	0.4 (1.4)	0.3 (0.9)
Fuel modification zone 2 (Gs1)	7.5 (14.0)	450 (1,763)	0.8 (3.0)	0.4 (1.1)
Scenario 2: from the Southeast; 16% slope; Offshore 19 mph sustained; 52 mph gusts *(in parentheses)*				
Fuel modification zone 1 (FM8)	2.1 (2.9)	27 (59)	0.1 (0.2)	0.1 (0.4)
Fuel modification zone 2 (Sh1)	5.7 (10.4)	250 (930)	0.4 (1.4)	0.3 (0.9)
Summer On-shore wind Scenarios (50th percentile)				
Scenario 3: from the Southwest; 23% slope; 18 mph sustained				
Fuel modification zone 1 (FM8)	1.3	11	0.03	0.1
Fuel modification zone 2 (Sh1)	0.6	2	0.03	0.1

The results presented in Tables 5 and 6 depict values based on inputs to the BehavePlus software and are not intended to capture changing fire behavior as it moves across a landscape. Changes in slope, weather, or pockets of different fuel types are not accounted for in this analysis; rather, the models provide a worst-case wildfire behavior condition as part of a conservative approach. For planning purposes, the averaged worst-case fire behavior is the most useful information for conservative fuel modification design. Model results should be used as a basis for planning only, as actual fire behavior for a given location would be affected by many factors, including unique weather patterns, small-scale topographic variations, or changing vegetation patterns.

Table 1. Variables Used for Fire Behavior Modeling Efforts

Variable	Summer Weather Condition (Onshore Winds)	Extreme Weather Condition (offshore/Santa Ana Winds)
1h Moisture	6%	1%
10h Moisture	8%	4%
100h Moisture	15%	11%
Live Herbaceous Moisture	59%	30%
Live Woody Moisture	118%	60%
20-foot Wind Speed (upslope/downslope)	18 mph (sustained winds)	19 mph (sustained winds) and wind gusts of 52 mph
Wind Direction (From North)	210° and 315°	90°and 140°
Wind Adjustment Factor (BehavePlus)	0.4	0.4

Source: San Pasqual (045746) Remote Automated Weather Station

Table 2: Fire Behavior Model Results Existing Conditions for Questhaven Project

Fire Scenario	Flame Length[1] (feet)	Spread Rate[1] (mph)	Fireline Intensity[1] (Btu/ft/s)	Spot Fire[1] (miles)	Surface Fire to Tree Crown Fire
Scenario 1: Extreme Fall Weather from the East, 9% slope; Offshore 19 mph sustained w/ 52 mph gusts (97th percentile)					
Moderate Load Dry-Climate Grass/Shrub (Gs2)	10.8 (20.9)[5]	1.0 (4.4)	992 (4,219)	0.5 (1.5)	Crowning [4]
Moderate load, Dry-climate shrub (Sh2)	8.6 (16.1)	0.3 (1.0)	608 (2,376)	0.4 (1.2)	Crowning [4]
Eucalyptus and Pine Forest[2,3] (Sh4)	12.9 (24.3)	1.1 (4.4)	1,468 (5,861)	0.5 (1.6)	Crowning [4]
High load, Dry-climate scrub (Sh5)	26.2 (45.0)	2.1 (7.0)	6,848 (22,293)	0.9 (2.5)	Crowning [4]
Scenario 2: Extreme Fall Weather from the SE, 16% slope; Offshore 19 mph sustained w/ 52 mph gusts (97th percentile)					
Moderate load, Dry-climate shrub (Sh2)	8.5 (16.0)	0.3 (1.0)	594 (2,362)	0.4 (1.2)	No
High load, Dry-climate scrub (Sh5)	25.9 (44.9)	2.1 (7.0)	6,712 (22,157)	0.9 (2.5)	No
Scenario 3: Summer On-shore wind from the SW, 23% slope;18 mph sustained (50th percentile)					
Moderate load, Dry-climate shrub (Sh2)	1.7	0.0	19	0.1	No
High load, Dry-climate scrub (Sh5)	14.5	0.8	1,899	0.6	No
Scenario 4: Summer On-shore wind from the North, 12% slope;18 mph sustained (50th percentile)					
Moderate Load Dry-Climate Grass/Shrub (Gs2)	5.7	0.4	249	0.3	No
Moderate load, Dry-climate shrub (Sh2)	1.8	0.0	20	0.1	No

Note:

1. Wind-driven surface fire.
2. Eucalyptus and Pine Forest overstory torching increases fire intensity. Modeling included canopy fuel over Sh4, which represents surface fuels beneath the tree canopies.
3. A surface fire in the Eucalyptus and Pine Forest would transition into the tree canopies generating flame lengths higher than the average tree height (35 feet). Viable airborne embers could be carried downwind for approximately 1.0 mile and ignite receptive fuels.
4. Crowning= fire is spreading through the overstory crowns.
5. Parenthesis = 52 mph gusts of wind

Table 3: Fire Behavior Model Results Post-Project Conditions for Questhaven Project

Scenario	Flame Length (feet)	Fireline Intensity (BTU/feet/second)	Spread Rate (mph)	Spotting Distance (miles)
Scenario 1: Extreme Fall Weather from the East, 9% slope; Offshore 19 mph sustained w/ 52 mph gusts (97th percentile)				
Fuel modification zone 1 (FM8)	2.1 (2.9)	28 (59)	0.1 (0.2)	0.2 (0.4)
Fuel modification zone 2 (Sh1)	5.8 (10.4)	255 (930)	0.4 (1.4)	0.3 (0.9)
Fuel modification zone 2 (Gs1)	7.5 (14.0)	450 (1,763)	0.8 (3.0)	0.4 (1.1)
Scenario 2: Extreme Fall Weather from the SE, 16% slope; Offshore 19 mph sustained w/ 52 mph gusts (97th percentile)				
Fuel modification zone 1 (FM8)	2.1 (2.9)	27 (59)	0.1 (0.2)	0.1 (0.4)
Fuel modification zone 2 (Sh1)	5.7 (10.4)	250 (930)	0.4 (1.4)	0.3 (0.9)
Scenario 3: Summer On-shore wind from the SW, 23% slope;18 mph sustained (50th percentile)				
Fuel modification zone 1 (FM8)	1.3	11	0.03	0.1
Fuel modification zone 2 (Sh1)	0.6	2	0.03	0.1

SOURCE: AERIAL-BING MAPPING SERVICE

DUDEK

0 400 800 1,600 Feet

FIGURE 4
BehavePlus Fire Behavior Analysis Map
Questhaven Fire Protection Plan

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4.2 Fire Behavior Summary

4.2.1 Existing Condition

As presented in the Fire Modeling Analysis Map (Figure 4), wildfire behavior in high density coastal sage scrub/mixed chaparral (presented as Fuel Model Sh5) represents the most extreme conditions in Scenarios 1 and 2, varying with different wind speeds. In this case, flame lengths can be expected to reach up to approximately 44.9 and 45.0 feet with 52 mph winds (extreme fire weather conditions) and 25.9 and 26.2 feet with 19 mph wind speeds (onshore winds). Spread rates for high density coastal sage scrub/mixed chaparral fuel beds range from 2.1 mph (summer onshore winds) to 7.0 mph (extreme offshore winds). Spotting distances, where airborne embers can ignite new fires downwind of the initial fire, range from 0.9 miles to 2.5 miles. In comparison, a moderate density coastal sage scrub/mixed chaparral fuel type could generate flame lengths up to 8.6 and 16.1 feet high with a spread rate of 0.3 and 1.0 mph. The fire could potentially be spotting for a distance of 2.5 miles.

4.2.2 Post-development Condition

As presented in Table 5, Fire Behavior Results for Existing Conditions, Dudek conducted modeling of the site for post-development fuel recommendations for this project. Fuel modification includes irrigated landscaping, treated fuel modification zones, and paved streets and on the periphery of the developed area. Fuel model assignments were re-classified for modeling the post-development condition. Fuel model assignments for all other areas remained the same as those classified for the existing condition.

As depicted, the fire intensity and flame lengths in untreated, open space areas would remain the same. Conversely, the FMZ areas experience a significant reduction in flame length and intensity. The 45.0-foot and 26.2-foot tall flames predicted during pre-development modeling during extreme weather conditions are reduced to less than 3.0 feet tall in the irrigated landscaping fuel modification zone the outer edges of the development due to the higher live and dead fuel moisture contents.

4.3 Project Area Fire Risk Assessment

Wildland fires are a common natural hazard in most of southern California with a long and extensive history. Southern California landscapes include a diverse range of plant communities, including vast tracts of grasslands and shrublands, like those found adjacent to and on the Project site. Wildfire in this Mediterranean-type ecosystem ultimately affects the structure and functions of vegetation communities (Keeley 1984) and will continue to have a substantial and recurring role (Keeley and Fotheringham 2003). Supporting this are the facts that 1) native landscapes, from forest to grasslands,

become highly flammable each fall and 2) the climate of southern California has been characterized by fire climatologists as the worst fire climate in the United States (Keeley 2004) with high winds (Santa Ana) occurring during autumn after a six-month drought period each year. Based on this research, the anticipated growing population of WUI areas, and the regions fire history, it can be anticipated that periodic wildfires may start on, burn onto, or spot into the undeveloped areas of the site. The most common type of fire anticipated in the vicinity of the Project Area is a wind-driven fire from the south/southwest, moving through the coastal sage scrub/mixed chaparral found in the open space south of the project. A more aggressive, but less likely wildfire occurrence would include wildfire approaching from the east under Santa Ana wind conditions.

Therefore, it will be critical that the latest fire protection technologies, developed through intensive research and real-world wildfire observations and findings by fire professionals, for both ignition resistant construction and for creating defensible space in the ever-expanding WUI areas, are implemented and enforced. The Project, once developed, would not facilitate wildfire spread and would reduce projected flame lengths to levels that would be manageable by firefighting resources for protecting the site's structures, especially given the ignition resistance of the structures and the planned ongoing maintenance of the entire site landscape.

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5 EMERGENCY RESPONSE AND SERVICE

5.1 Existing Fire Department Response Capabilities

The Project is located within the RSFFPD responsibility area; however, the closest fire station RSFFPD Station 6 is 2.46 miles from the Project site. The City of Carlsbad provides fire service to areas west of the Project Area and has a fire station located approximately 1.55 miles west of the Project Site. Additionally, the City of San Marcos provides fire service to areas north and east of the Project Area and has a fire station located approximately 2.29 miles east of the Project Site. Given its proximity and ability to meet the County's 5-minute travel time requirement, Carlsbad Fire Department Station 6 would serve the Project site, per the North County Boundary Drop Program.

Based on current resources, there are up to three staffed fire stations with three different fire agencies in the area. Initial response to the Project site would be from Carlsbad Fire Department Station 6, which is located at 7201 Rancho Santa Fe Road, in Carlsbad, approximately 1.55 road miles from the Project site. Carlsbad Fire Department Station 6 has three full-time firefighters (captain, engineer, and fighter fire/paramedics and the following apparatus:

- Type I engine
- Type III brush engine

RSFFPD Fire Station 6 currently responds to approximately 87 calls per month.

Vegetation fires require special apparatus and, depending on weather and fuel conditions, may require a significant response. Carlsbad Fire Department and RSFFPD would be able to call on all of its wildfire apparatus, and depending on the size of the fire, neighboring and regional fire agencies would be dispatched along with the full CAL FIRE response weight, outlined as follows.

Local Government response:

- Two (2) Type I Engine
- Five (5) Type III Engines
- Water tender
- Two (2) Battalion Chiefs

Full CAL FIRE response:

- Five (5) to ten (10) Type III engines (depending on dispatch level)
- Battalion chief
- Three (3) fixed-wing aircraft (two tankers and air attack)
- Dozer
- Two (2) hand crews
- Two (2) helicopters

Of the existing fire stations in the vicinity of the Project, San Marcos' Fire Station 4 is the second closest. San Marcos Fire Station 4 is located at the intersection of San Elijo Road and Ledge Street, approximately 2.29 miles from the Project Site. It houses a staffed engine company. This location does allow for a five-minute travel time to a majority of the Project site.

Currently, the closest ladder truck is housed at San Marcos Fire Station 1 in San Marcos, approximately 5.6 road miles northeast of the Development Footprint, although no Project structures would trigger ladder truck response as all are below 30 feet roof height.

5.2 Estimated Calls and Demand for Service from the Project

As indicated in Table 7, using San Diego County Fire Agencies' estimate of 82 annual calls per 1,000 population, the Project's conservatively estimated 219 permanent residents would generate approximately 18 calls per year (0.05 calls per day). Of these calls, at least 44% are expected to be medical emergencies and 9% fire-related calls, based on typical call volumes reported by North County Dispatch JPA between 2017-2019.

Table 7
Calculated Call Volume Associated with Project

Emergency Calls per 1,000	Number of Residents[a]	Average No. Calls per Year (219/1,000)x82	Avg. No. Calls per Day (18/365)
82	219 (estimate)	18	0.05

[a] Population estimates based on 2.87 persons per residential dwelling unit (United States Census, 2019).

5.3 Emergency Response

The San Diego County General Plan Safety Element includes travel time standards from the "Closest Fire Station" (County of San Diego 2011). Travel time does not represent total response

time, which is calculated by adding the travel time to the call processing time and to the turnout/reflex time. Generally, the call processing and turnout/reflex time would add between two and three minutes to the travel time. Table 8 from the County General Plan's Table S-1 establishes a service level standard, not a requirement, for fire and first responder emergency medical services that is appropriate to the area where a development is located. Standards are intended to (1) help ensure development occurs in areas with adequate fire protection and/or (2) help improve fire service in areas with inadequate coverage by requiring mitigation for service-level improvements as part of Project approval.

Table 8
Travel Time Standards from the Closest Fire Station[a]

Travel Time	Regional Category (and/or Land Use Designation)	Rationale for Travel Time Standards[b]
5 minutes	Village (VR-2 to VR-30) and limited Semi-Rural Residential Areas (SR-0.5 and SR-1) Commercial and Industrial Designations in the Village Regional Category Development located within a Village Boundary	In general, this travel time standard applies to the County's more intensely developed areas, where resident and business expectations for service are the highest.
10 minutes	Semi-Rural Residential Areas (>SR-1 and SR-2 and SR-4) Commercial and Industrial Designations in the Semi-Rural Regional Category Development located within a Rural Village Boundary	In general, this travel time provides a moderate level of service in areas where lower-density development, longer access routes, and longer distances make it difficult to achieve shorter travel times.
20 minutes	Limited Semi-Rural Residential areas (>SR-4, SR-10) and Rural Lands (RL-20) All Commercial and Industrial Designations in the Rural Lands Regional Category	In general, this travel time is appropriate for very low density residential areas, where full-time fire service is limited and where long access routes make it impossible to achieve shorter travel times.
>20 minutes	Very-low rural land densities (RL-40 and RL-80)	Application of very-low rural densities mitigates the risk associated with wildfires by drastically reducing the number of people potentially exposed to this hazard. Future subdivisions at these densities are not required to meet a travel time standard. However, independent fire districts should impose additional mitigation requirements on development in these areas.

[a] The most restrictive standard would apply when the density, regional category, and/or village/rural village boundary do not yield a consistent response time standard.
[b] Travel time standards do not guarantee a specific level of service or response time from fire and emergency services. Level of service is determined by the funding and resources available to the responding entity.

The Project would be subject to the San Diego County General Plan five-minute travel time standard post-development based on its parcel sizes and Project densities and applying the most restrictive travel time. To understand fire department response capabilities, Dudek conducted an analysis of the travel-time response coverage from the three closest fire stations. Table 9 presents a

summary of the location, maximum travel distance, and travel time for the three closest stations. Travel distances are derived from Google road data while travel times are calculated applying the nationally recognized Insurance Services Office (ISO) Public Protection Classification Program's Response Time Standard formula (T=0.65 + 1.7 D, where T= time and D = distance). The ISO response travel time formula discounts speed for intersections, vehicle deceleration and acceleration, and does not include turnout time.

Table 9. Responding Fire Stations Summary

Station	Location	Maximum Travel Distance*	Travel Time**
RSFFPD Station 6	20223 Elfin Forest Road, Elfin Forest	2.84 mi.	5.48 min.
Carlsbad Fire Station 6	7201 Rancho Santa Fe Road, Carlsbad	1.8 mi.	3.71 min.
San Marcos Fire Station 4	204 San Elijo Road, San Marcos	2.67 mi.	5.19 min.

* Distance measured to the Project's entrance.
** Assumes travel time to the furthest parcel, an adjusted speed based on the ISO travel time formula and does not include turnout time.

Based on the Project site location in relation to existing Carlsbad Fire Station 6, travel time to the site for the first responding engine to the furthest parcel of the Project is less than four minutes. Secondary response would arrive in under six minutes from either RSFFPD Station 6 or San Marcos Fire Station 4. Based on these calculations, emergencies within the Project can be responded to according to San Diego County General Plan five-minute travel time standard. That is, when dispatch (1.0 minute) and turnout time (1.5 minutes) are added to the calculated travel time from Carlsbad Station 6, the total response time is approximately 5.5 to 6.5 minutes for the site. Therefore, the Project complies with the County's response time standards.

There are automatic aid agreements and dropped boundary agreements on first alarm or greater emergency calls with surrounding communities, ensuring that the closest unit will be dispatched, regardless of jurisdictional boundaries. The RSFFPD is also part of both the San Diego County and State of California Master Mutual Aid Agreements.

Response Capability Impact Assessment and Mitigation

The Project includes a modest number of new homes which would not substantially impact Carlsbad Fire Station or RSFFPD response times and capabilities. Additionally, the requirements described in this FPP are intended to aid fire-fighting personnel and minimize the demand placed on the existing emergency service system.

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6 FIRE SAFETY REQUIREMENTS – DEFENSIBLE SPACE, INFRASTRUCTURE, AND BUILDING IGNITION RESISTANCE

6.1 Fuel Modification Zones

6.1.1 Zones and Permitted Vegetation

As indicated in preceding sections of this FPP, an important component of a fire protection system is the FMZ. FMZs are designed to gradually reduce fire intensity and flame length and, therefore, slow the fire from advancing by strategically placing thinning zones, restricted vegetation zones, and irrigated zones adjacent to each other on the perimeter of the community's WUI exposed structures. FMZs would be located in the following areas (see Figure 5, Fuel Modification Plan):

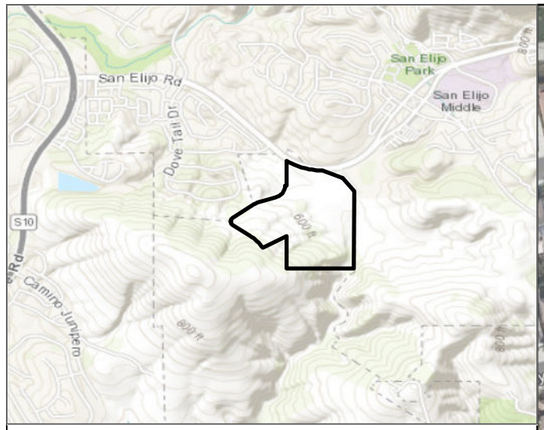
- All residential occupancies
- Open space areas within the Development Footprint
- Emergency access roads or streets

To accommodate these FMZs, the Project will be required to provide FMZ easements along the Project's western boundary. The FMZ easement would need to be 30 feet beyond the required road easement for the road along the western boundary. Further, the FMZ easement shall include the additional 30-feet necessary to accommodate the remaining portion of the FMZ's Zone 3 to the southwest of the development footprint.

Based on the modeled extreme weather flame lengths for the Project, average wildfire flame lengths are projected to be approximately 45 feet high in open space-adjacent fuels. The fire behavior modeling system used to predict these flame lengths was not intended to determine sufficient FMZ widths, but it does provide the average predicted length of the flames, which is a key element for determining adequate "defensible space" distances for providing firefighters with room to work and minimizing structure ignition. For this Project, the FMZ width outside the lot line is 80 feet, ranging from over two to several times the modeled flame lengths based on the fuel type represented adjacent to the Development Footprint.

The following FMZ requirements would be implemented for the Project and implemented and maintained prior to any combustible lumber being brought on site. In addition to the FMZs meeting defensible space requirements, the entire developed landscape would be restricted to lower flammability landscaping as part of a fire adapted community approach. The Project is designed to cluster development in the northern portion of the Project site in order to allow for the development of residential uses while providing biological open space in the southern portion of the Project site. Further, the topography of the Project site, the cut slope that will occur along the

southern edge of Lot R, and the construction of a 6’ heat-deflecting fencing along the lot lines of Lots 19-24 and atop the manufactured slope behind Lots 25-45 will provide enhanced protection for the Project. The FMZs and landscape areas are presented graphically in Figure 5. In addition, the proposed fire adapted plant palette is provided in Appendix E.



Project Site

Fuel Modification Zones

- Zone 1 (irrigated, no combustibles; 0-5')
- Zone 2 (irrigated; 6'-50')
- Zone 3 (thinned; 51'-100')
- Lot R Remainder Fire Buffer
- 30-Ft Roadside Zone

Land Use

- Development
- Park
- Manufactured Slope
- WQ Basin
- Roadway

Path: Z:\Projects\5176\800\MAPDOC\DOCUMENT\FPP\Fig 5 Fuel Modification Plan\20210326.mxd

SOURCE: AERIAL-BING MAPPING SERVICE; DEVELOPMENT-HUNSAKER & ASSOCIATES 2021

DUDEK

0 125 250 500 Feet

FIGURE 5

Fuel Modification Plan

Questhaven Fire Protection Plan

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Fuel Modification Zone Definition

FMZs are designed to provide buffers at perimeter areas of development projects to reduce fuel available to wildfire. These zones reduce fire spread rates and fire intensity by providing thinned fuels in the outer zones and irrigated, selective plantings in the inner zones. FMZs are typically 100 feet wide and are positioned around the perimeter of higher-density projects because the developed areas include lower flammability, maintained landscapes.

FMZ's shall consist of a total of 100' of defensible space. Zone 0 shall extend 0-5' from buildings or structures on the property. Zone 0 is considered an ember-resistant zone and should consist of hardscape such as gravel, pavers, concrete, and other noncombustible mulch materials. There should be no combustible bark or mulch in Zone 0. Zone 1 shall extend from 5-50' from buildings and structures, or to the property line, whichever is closer. Zone 1 may consist of irrigated, well managed vegetation. Zone 2 shall extend 50-100' from buildings and structures, or to the property line, whichever is closer. Zone 2 may consist of cut and managed grasses and shrubs. The property owner should reduce fuel in this zone by creating horizontal and vertical space between shrubs and trees. A detailed description of each zone can be found below.

Site Specific Fuel Modification Zones

The effective total width of the FMZs for the Project would be approximately 105 feet, with the rear yards, which average 20 feet, included as part of the FMZ measurement. Therefore, a typical landscape/fuel modification installation for the Project's perimeter lots exceeds the 100-foot standard, consisting of up to a 105-foot-wide fuel management area from the structure extending outwards toward preserved areas.

Fuel Modification Zone Discussion

Research has indicated that the closer a fire is to a structure, the higher the level of heat exposure (Cohen 2000). However, studies indicate that given certain assumptions (e.g., 10 meters of low-fuel landscape, no open windows), wildfire does not spread to homes unless the fuel and heat requirements (of the home) are sufficient for ignition and continued combustion (Alexander 1998; Cohen 1995). Construction materials and methods can prevent or minimize ignitions. Similar case studies indicate that with nonflammable roofs and vegetation modification from 10 to 18 meters (roughly 32–60 feet) in southern California fires, 85%–95% of the homes survived (Foote and Gilless 1996; Howard et al. 1973).

These results support Cohen's (2000) findings that if a community's homes have a sufficiently low home ignitability (i.e., homes built to the standards established in the 2023 Consolidated Fire Code and 2022 California Building Code), the community can survive exposure to wildfire without

major fire destruction. This provides the option of mitigating the wildland fire threat to homes/structures at the residential location without excessive wildland fuel reduction and focusing the effort in the areas nearest the structures. Cohen's (1995) studies suggest, as a rule-of-thumb, larger flame lengths and widths require wider FMZs to reduce structure ignition. For example, valid structure ignition assessment model results indicate that a 20-foot-high flame has minimal radiant heat to ignite a structure (bare wood) beyond 33 feet (horizontal distance). Whereas a 70-foot-high flame may require approximately 130 feet of clearance to prevent structure ignitions from radiant heat (Cohen and Butler 1996). This study used bare wood, which is more combustible than the ignition-resistant exterior walls for structures built today.

Obstacles, including steep terrain and non-combustible walls, can block or deflect all or part of the radiant heat, thus making narrower FMZ distances possible. Fire behavior modeling conducted for this Project indicates that fires in the off-site areas would result in roughly 45-foot-tall flame lengths under extreme conditions.

As indicated in this report, the FMZs and additional fire protection measures proposed for this Project provide a wildfire buffer that meets the standard 100-foot-wide, three-zone standard. The zones are based on a variety of analysis criteria, including predicted flame length, fire intensity, Study Area topography and vegetation, extreme and typical weather, position of structures on pads, position of roadways, adjacent fuels, fire history, current versus proposed land use, neighboring communities relative to the Project, and type of construction. The fire intensity research conducted by Cohen (1995), Cohen and Butler (1996), Cohen and Saveland (1997), and Tran et al. (1992) supports the fuel modification proposed for this Project.

RSFFPD General FMZ Criteria

- All plant material listed on the Questhaven FPP prohibited plant list (Appendix F) and RSFFPD prohibited plant list would be prohibited within any FMZ.
- Plants and landscaping materials and methods would comply with the Wildland/Urban Interface Development Standards plant palette (Appendix H). The addition of plant material to the approved list will be at the discretion of the RSFFPD. Landscape plans shall be in accordance with the following:
    - Spacing for fire resistive landscape plantings and for single species of plants, trees, shrubs, etc., shall be according to plant species as approved by the Fire District. Horizontal spacing of native vegetation in zone three (3) shall be at least three (3) times the height of the vegetation for flat areas, four (4) times the height of the vegetation for moderately sloped areas, and six (6) times the height of vegetation for high sloped areas.

- Vertical spacing between tree canopies shall be maintained at ten (10) feet for flat areas, twenty (20) feet for moderately sloped areas, and (30) feet for high sloped areas.
- Maintain all trees free of deadwood and dead palm fronds within one hundred (100) feet of a structure and thirty (30) feet of a roadway. Prune/trim trees back a minimum ten (10) feet from all roofs, eaves, and exterior siding.
- All mature trees within one hundred (100) feet of a structure shall be maintained so that the lowest tree branch is at least three times as high as the understory shrubs or ten (10) feet, whichever is greater.

- 50%–70% of the overall FMZs shall be planted with deep-rooting plant material.
- Debris and trimmings produced by thinning and pruning shall be removed, except for larger woody debris that may be chipped and left for weed and erosion control.
- Where shrubs are planted underneath the tree, the tree shall be trimmed three (3) times the height of the materials planted under the tree or up to one third (1/3) of the tree height.

Zone 0 – Immediate Zone: 0 to 5 feet from structure

This zone shall be constructed of continuous hardscape. Removal of combustible materials surrounding the exterior wall area and maintaining area free of combustible materials. The use of mulch and other combustible materials shall be prohibited.

RSFFPD Zone 0 Requirements:

- Any combustible vegetation, any dead or dying materials, combustible materials (i.e., hay bales, firewood), accumulation of ground needles and leaf litter shall be removed within this zone.
- All accumulations of needle and leaf litter shall be removed from roofs, rain gutters, deck, and porches.
- All new construction or any replacement landscape installations shall NOT have any combustible mulch within this five (5) foot zone from the furthest attached exterior point of the home. Landscaping is prohibited in Zone 0. Vegetation shall not come in contact with the structure and specimen spacing shall be such as not to allow the transfer of fire from plant to plant, or from plant to the structure.
- Any combustible materials that could catch fire shall not be stored under decks, exterior stairways and balconies. Combustible patio furniture, umbrellas, trash receptacles, or other combustible items should not be stored or placed directly adjacent to structures.

- Firewood shall not be stored in unenclosed space beneath a building or structure, on a deck or under eaves, a canopy or other projection or overhang. When required by the fire code official, firewood or other combustible material stored in the defensible space surrounding a structure shall be located at least 30 feet from any structure and separated by a minimum of 15 feet from the drip line of any trees, measured horizontally. Firewood and combustible materials not for use on the premises shall be stored so as to not pose a fire hazard. Wood storage shall be located on bare soil or a non-combustible material. Minimum clearance around wood storage pile shall be 10' bare soil, free of vegetation or other combustible material measured on a horizontal plane. The maximum size of wood storage shall be 2 cords of woods with the pile dimensions no greater than 4 feet in height, 4 feet in width, and 16 feet in length. A permit may be issued by the FAHJ for wood storage amounts in excess of the standards described above.
- All fireplace chimney flues must have a metal screen covering with openings of 3/8 inch to 1/2 inch and have 12-guage thickness or larger.

Zone 1 – Irrigated Zone: 5 to 50 feet from structure

This zone shall consist of planting of low growth, drought tolerant and fire resistive plant species. The height of the plants in this zone starts at 6" adjacent to Zone 0 and extending in a linear fashion up to a maximum of 18" at intersection with Zone 3. Vegetation in this zone shall be irrigated and not exceed 10' in height and shall be moderate in nature. Trees shall not exceed 30' in height and be limited or as approved by the FAHJ. Firewood inside this zone shall be piled minimum of 30' away from all buildings and structures. Cords of firewood shall also be maintained at least 10' from property lines and not stacked under tree canopies drip lines.

RSFFPD Zone 1 Requirements

- The area from six (6) to fifty (50) feet of a building or structure shall be cleared of vegetation that is not fire resistant and if re-planted, it shall be with fire-resistant plants. Fire resistive planting materials shall be Fire District approved, properly irrigated, spaced, and maintained. Any weeds or dead grasses shall be cut to a height not to exceed four (4) inches. Single specimens of trees, ornamental shrubbery or ground covers approved by the Fire District are permissible provided they are irrigated and that they do not form a means of rapidly transmitting fire to any structure or from the native growth to any structure. The Fire District must approve of such specimens and will provide the spacing requirements according to the desired planting species.

- All trees and shrubs in this zone shall be properly maintained free of deadwood, litter or dead palm fronds. Trees canopies shall be maintained and if in vicinity of structures shall be trimmed up to ten (10) feet from rooflines.
- Remove any portion of trees, which extend within ten (10) feet of the outlet of a chimney.
- Composted wood chip mulch may be used in a limited non-continuous fashion for landscaping purposes. Depth shall not exceed three (3) (inches). Course non-composted wood or vegetation chips, bark or wood nuggets, rubber mulch, or other shredded mulch shall not be utilized within thirty (30) feet of habitable structures.
- All newly planted fire-resistive tree species shall be planted and maintained at a minimum of ten (10) feet from the tree's drip line to any structure utilizing the trees mature canopy size.
- All newly planted non-fire-resistive tree species shall be planted and maintained at a minimum of thirty (30) feet from the tree's drip line to any structure utilizing the tree's mature canopy size. Newly planted trees of this nature must be approved by the Fire District and strictly comply with the Fire District's landscape standards.

Zone 2 – 50 to 100 feet from structure

This zone consists of planting of drought tolerant and fire resistive plant species of moderate height. Brush and plants shall be limbed up off the ground, so the lowest branches are 1/3 height of bush/tree/plant or up to 6' off the ground on mature trees. This area would be considered selective clearing of natural vegetation and dense chaparral by removing a minimum 20% of the square footage of this area.

RSFFPD Zone 2 Requirements

- Combustible vegetation in this zone must be removed by methods such as mowing, thinning and trimming, or by other means of modification that leave the plant root structure intact to stabilize the soil. Native vegetation may remain in this area provided that the vegetation is modified so that combustible vegetation does not occupy more than twenty (20) percent of this area and meets horizontal spacing requirements and vertical spacing requirements.
- Accumulated leaf litter or any combustible mulch in this zone may not exceed three (3) inches in depth.
- If the property is adjacent to Lot R, Zone 2 will extend from 50-105 feet from the structure.

6.2 Other Vegetation Management

6.2.1 Roadside Fuel Modification Zones (Including Driveways)

- Highly flammable vegetation, including shrubs and trees, shall be cleared and are prohibited (refer to the prohibited plant list in Appendix F).
- Tree canopies shall provide 20’ of horizontal spacing between dripline edge of trees at full maturity width of the tree.
- Grass shall be mowed to four (4) inches.
- Single tree specimens, fire resistive shrubs, or cultivated ground cover such as green grass, succulents, or similar plants used as ground covers may be used, provided they do not form a means of readily transmitting fire.
- All roads in the development would have vegetation clearance of flammable vegetation on each side, as follows:
    1. Fire access roads (any road that a responding fire engine would use to access an emergency) – 30 feet from edge of pavement.
    2. New roads/driveways – 30 feet from edge of pavement.
- Trees may be placed within roadside vegetation management zones within the developed portions of the Project. The following criteria must be followed:
    1. Tree spacing shall have 20' horizontal spacing between dripline edge of trees at full mature canopy size (30 feet if adjacent to a slope steeper than 41%).
    2. Trees must be limbed up one-third the height of mature tree or six (6) feet, whichever is greater.
    3. No tree canopies lower than 13 feet, 6 inches over roadways.
    4. No tree trunks intruding into roadway width.
    5. No trees or other plants on the prohibited plant list (Appendix F) are permitted.
    6. No flammable understory is permitted beneath trees.
    7. Any vegetation under trees to be fire resistive and kept to two (2) feet in height or less, and no more than one-third the height of the lowest limb/branch on the tree.

6.2.2 Building and Parcel Siting and Setbacks

Title 14, Section 1276.01 of the California Code of Regulations – Building and Parcel Siting and Setbacks states:

(a) All parcels shall provide a minimum thirty (30) foot setback for all Buildings from all property lines and/or the center of a Road, except as provided for in subsection (b).

(b) A reduction in the minimum setback shall be based upon practical reasons, which may include but are not limited to, parcel dimensions or size, topographic limitations, Development density requirements or other Development patterns that promote low-carbon emission outcomes; sensitive habitat; or other site constraints , and shall provide for an alternative method to reduce Structure-to-Structure ignition by incorporating features such as, but not limited to:

(1) non-combustible block walls or fences; or

(2) non-combustible material extending five (5) feet horizontally from the furthest extent of the Building; or

(3) hardscape landscaping; or

(4) a reduction of exposed windows on the side of the Structure with a less than thirty (30) foot setback; or

(5) the most protective requirements in the California Building Code, California Code of Regulations Title 24, Part 2, Chapter 7A, as required by the Local Jurisdiction.

6.2.3 San Diego Gas & Electric Easement

A San Diego Gas & Electric (SDG&E) easement runs diagonally (east to west) through the center of the development. The maintenance of the vegetation on the SDG&E easement is the responsibility of the HOA, not SDG&E. The Project's proposed FMZs adjacent to this area account for the native fuels that occur within this easement.

6.2.4 Parks and Open Space

- Landscaping within parks, detention basins, and maintained open space areas would be in compliance with the guidelines in this FPP as FMZs.
- Parks, detention basins, and maintained open space areas include 30 feet of Zone 1 fuel modification on the perimeter, and the remaining 70 feet (or in some cases, the entire park, basin, etc.) include characteristics of maintained Zone 2 standards, although are not technically included in the Project's FMZ.

6.2.5 Vacant Parcels and Lots

Vegetation management requirements would be implemented at commencement and throughout the construction phase and require different maintenance specifications than post construction. Vegetation management would be performed pursuant to the Fire District requirements on all building locations prior to the start of work and prior to any import of combustible construction materials. Adequate fuel breaks of at least 30 feet would be created around all grading and other construction activities in areas where there is flammable vegetation.

In addition to the requirements previously outlined, the Project would comply with the following important risk-reducing vegetation management guidelines during construction:

- Vacant parcels and lots shall be cleared, dry grass and weeds shall be mowed in entirety to a stubble height of no more than 4". Dead/dying trees, litter and any accumulation of "waste materials" shall be removed. Vacant parcels shall maintain roadway clearance as defined in Section 9 of the weed abatement ordinance.
- Vegetation abatement should occur prior to June 1, and maintained through fire season. However, perimeter FMZs must be implemented prior to commencement of construction using combustible materials on individual lots or groups of lots.
- Vacant lots adjacent to active construction areas/lots would be required to implement vegetation management if they are within 30 feet of the active construction area. Perimeter areas of the vacant lot would be maintained as a vegetation management zone extending 30 feet from adjacent construction areas.
- Road construction would include the establishment of 30-foot-wide FMZ areas along both sides of graded roads. The FMZ areas may be established following grading of the road.
- Prior to issuance of a permit for any construction, grading, digging, installation of fences, etc. on a vacant lot, the 100-foot fuel modification zone at the perimeter of the lot or the development pad is to be maintained as a vegetation management zone.
- Dead fuel, ladder fuel (fuel that can spread fire from ground to trees), and downed fuels located on vacant lots and/or within the temporary FMZs would be removed and trees/shrubs would be properly limbed, pruned, and spaced prior to combustibles being brought into the Development Area.
- New power lines would be underground for fire safety during high wind conditions or during fires on a right-of-way that can expose aboveground power lines. Temporary construction power lines may be allowed in areas that have been cleared of combustible vegetation.

- A construction FPP would be prepared to minimize the likelihood of ignitions and pre-plan the Project fire prevention, protection, and response plan.
- Caution must be used not to cause erosion or ground (including slope) instability or water runoff due to vegetation removal, vegetation management, maintenance, landscaping, or irrigation. Fuel reduction work should include removal of aboveground biomass only. No uprooting of treated plants/fuels is necessary.

6.2.6 Rancho La Costa Reserve

The Project's FMZ areas are designed into the overall footprint and there should not be a need for providing additional vegetation management within Reserve areas. However, should an unforeseen circumstance arise that necessitates fuel treatments, a Community Facilities District, HOA, Rancho La Costa Reserve Owner/Manager, or other legal entity approved by the RSFFPD Fire Marshal (Approved Maintenance Entity) will obtain permission from the County, and/or the appropriate resource agencies (California Department of Fish and Wildlife, U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers) prior to conducting vegetation management activities within any portion of the Rancho La Costa Reserve.

6.2.7 Annual Fuel Modification Maintenance

Vegetation management would be completed annually by May 1 of each year and more often as needed for fire safety, as determined by the RSFFPD. Homeowners and private lot owners would be responsible for all vegetation management on their lots, in compliance with this FPP, which is consistent with RSFFPD requirements. The approved maintenance entity would perform FMZ maintenance within the community FMZ and would be responsible for and would have the authority to ensure long-term funding, ongoing compliance with all provisions of this FPP, including vegetation planting, fuel modification on the perimeter and within interior maintained common areas, vegetation management, and maintenance requirements on all private lots, parks, common areas, roadsides (including San Elijo Road), and open space under their control (if not considered Rancho La Costa Reserve). Any water quality basins, flood control basins, channels, and waterways would be kept clear of flammable vegetation, subject to Section 6.2.6.

FMZs would be maintained by individual property owners with HOA or another approved maintenance entity responsible for enforcing that all properties are maintained and consistent with the FMZ requirements of RSFFPD and this FPP. Project CCR's shall provide for the maintenance of landscaping to meet and be maintained by what was approved by the fire district. Provide a bond that will not be released until landscaping has been reviewed, inspected and approved by the fire district. The CC&Rs would also provide for reciprocal/overlapping FMZ easements and maintenance enforcement. If an HOA or other funded entity is responsible for FMZ maintenance,

an inspection easement may be established. The approved maintenance entity would perform FMZ maintenance within the community FMZ and would be responsible for and would have the authority to ensure long term funding, ongoing compliance with all provisions of this FPP and approved landscape plan.

When FMZ non-compliances are documented, owners or responsible party would be provided with a violation notice and a timeline on when to mitigate the issue. If not completed within the timeline, then the HOA can remediate and collect payment from the homeowner. There may be instances where an FMZ violation would need to be turned over to RSFFPD for additional enforcement and a lien placed on the property.

6.2.7.1 Annual FMZ Compliance Inspection

Homeowners and Homeowners Association (HOA) shall be required to maintain landscaping and vegetation management on a year around basis in accordance with this Fire Protection Plan (FPP) and any RSFFPD adopted ordinance. Homeowners will be responsible for the maintenance of these provisions within the boundaries of homeowner's property lines. The maintenance of areas outside the homeowner's property lines shall be the responsibility of the HOA. All requirements placed on Homeowners and Homeowners Association for landscape and vegetation management shall be clearly identified and recorded in the Community's Covenants, Conditions & Restrictions (CC&R's). A map clearly demonstrating the HOA and homeowner maintenance zones can be found in Figure 6. Homeowners will be provided copies of the FPP and any RSFFPD Ordinance at the time of sale. The CC&R's shall also identify penalties for violation of landscaping and vegetation requirements.

To ensure common areas identified in the FPP are properly maintained in perpetuity, the Project will fund through the HOA, Community Facilities District, or other recognized funding mechanism, a means to meet the requirements pursuant to this FPP and any RSFFPD ordinance. The HOA shall also enter into an agreement with RSFFPD to fund the costs for providing inspection services on individual properties, common areas, and community fuel mitigation zones. The agreement shall be perpetual and identified in the Community's CC&Rs as a special assessment.

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SOURCE: AERIAL-BING MAPPING SERVICE; DEVELOPMENT-HUNSAKER & ASSOCIATES 2021

DUDEK

0 125 250 500 Feet

FIGURE 6

Fuel Modification Zones - Maintenance Responsibility

Questhaven Fire Protection Plan

6.3 Road Requirements

6.3.1 Access

Access Roads

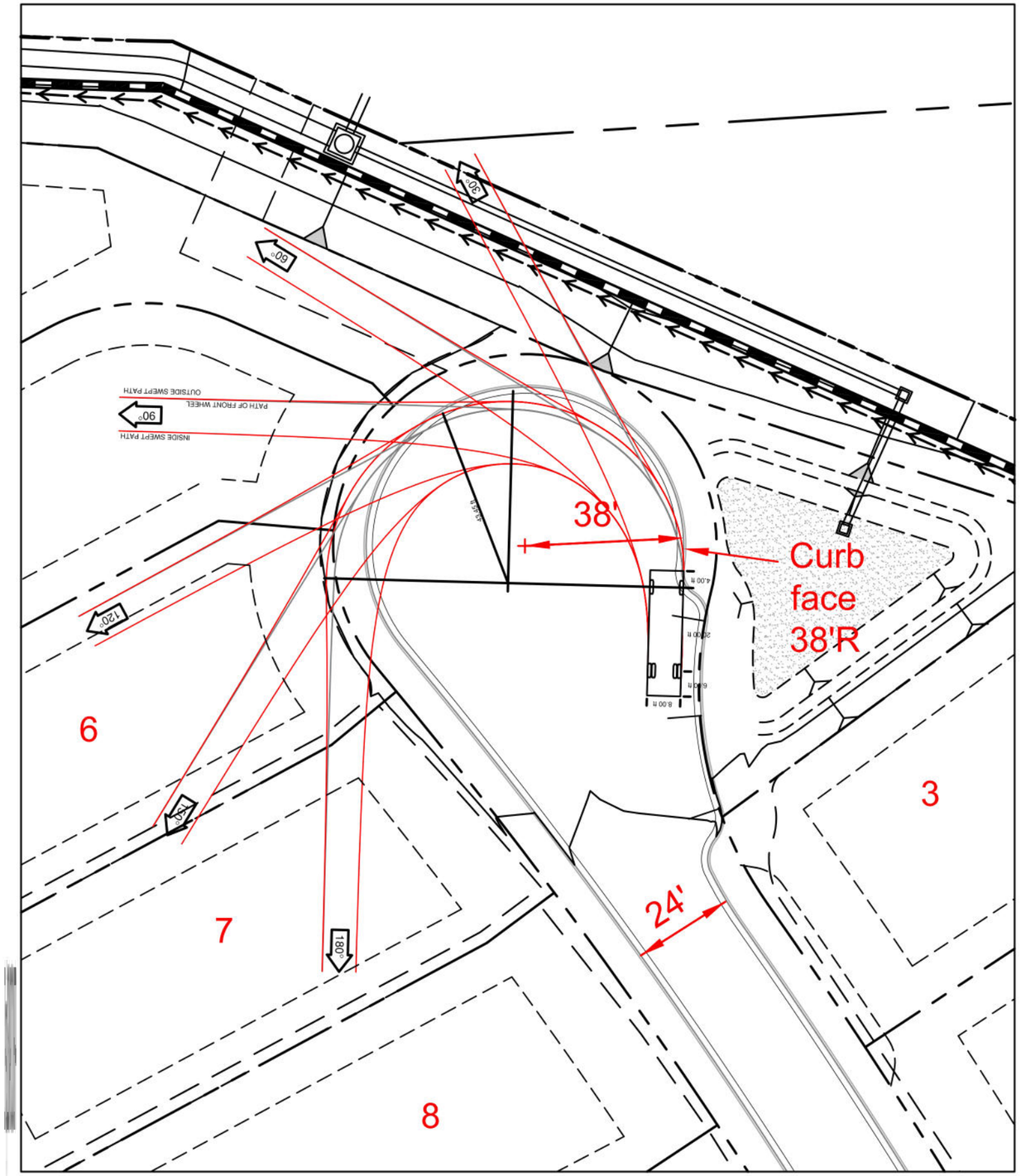
Project Area access, including road widths and connectivity, would comply with the requirements of the Consolidated County Fire Code (Section 96.1.503) (County of San Diego 2023), or current code at time of application for any building permit. Figure 2 presents the proposed roads along with detailed measurements.

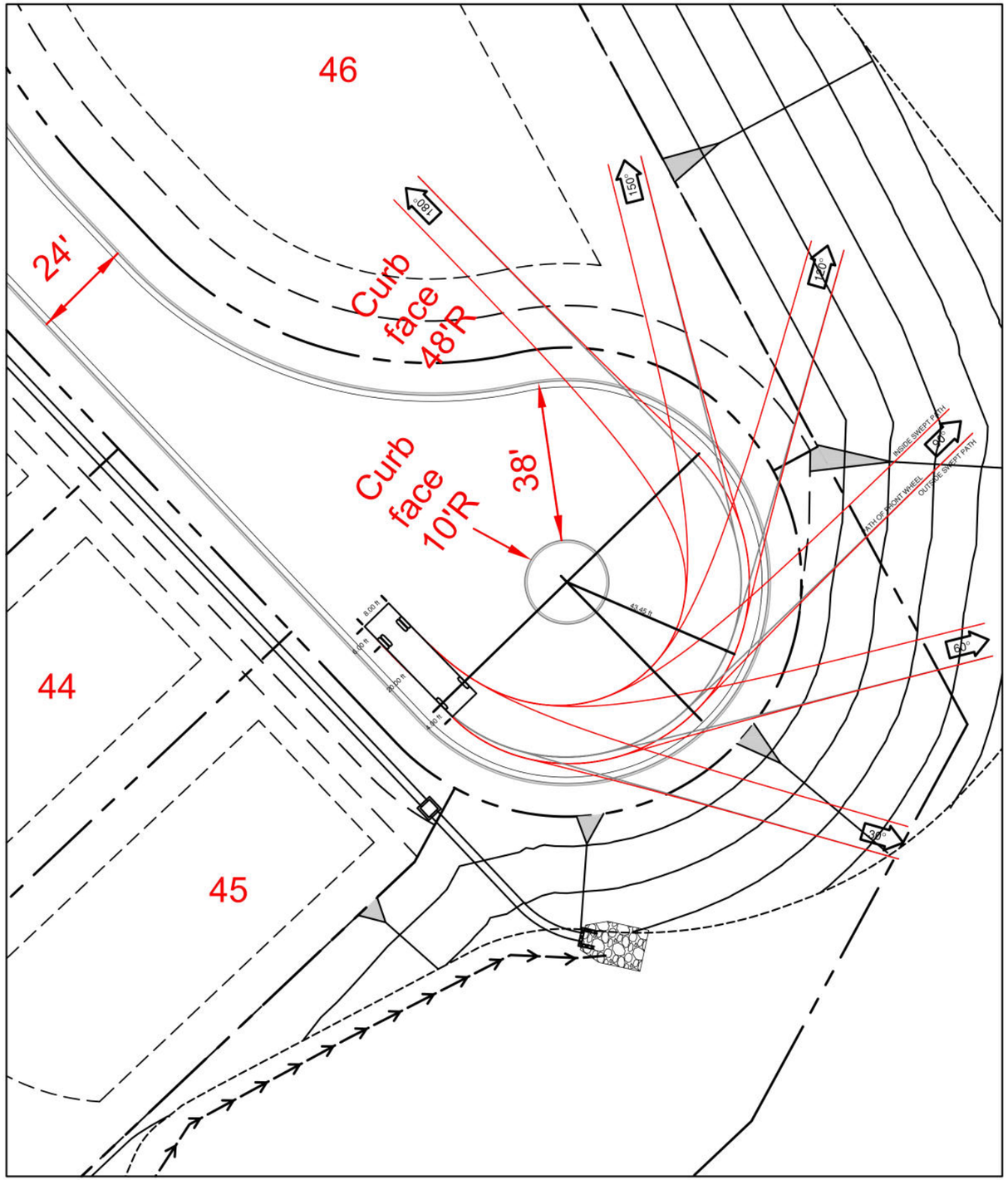
- All fire access and vehicle roadways would be of asphaltic concrete or approved all-weather alternative surfacing materials and designed and maintained to support the imposed loads of fire apparatus (not less than 75,000 pounds) that may respond, including Type I, II, and III engines, ladder trucks, and ambulances. Proposed Development Footprint roads would meet San Diego County Department of Public Works' (DPW's) Road Standards. Access roads would, at a minimum, provide first layer of pavement prior to combustible construction occurring.
- All roadways shall be installed prior to combustibles being brought on site.
- Fire access roads for each phase would meet Project-approved fire code requirements and/or mitigated modifications for maximum allowable dead-end distance, paving, and fuel management prior to combustibles being brought to the Development Area.
- Street parking would be provided on one or both sides of residential collector streets, depending on the location within the Project Area. Parking would be assumed to be six- to eight feet in width. Where road widths do not accommodate parking, restrictions would apply, per the DPW Road Modification, and the streets would be posted with signs stating, "No Parking; Fire Lane." In addition to "No Parking; Fire Lane" signs, the curbs shall be painted red and stenciled "No Parking Fire Lane" in 4 inch letters. Street sections are to be reviewed and approved by the County DPW and the County Fire Marshal.
- Roads with a median or center divider would have at least 14 feet of unobstructed width on both sides of the center median or divider. Emergency fire truck access points would be provided through the center divider at 1,000-foot intervals, where road segment length allows.

Secondary Access

- A minimum of two entrances from each of the Project phases would be provided. The location of these entrances satisfies the need for secondary access, shown in Figure 2.

- Any dead-end roads longer than 150 feet would have approved provisions for a fire apparatus turnaround. Fire apparatus turnarounds would include a turning radius of a minimum 28 feet, measured to the inside edge of improved width (CCFC 96.1.503.2.4).
- The longest dead-end road (cul-de-sac) allowed by the Consolidated Fire Code and CCR Title 14 varies by phase and lot size minimums. No dead-end cul-de-sac lengths in these areas would exceed 800 feet.
- All parcels in the Project would be less than one acre, allowing 800 feet for dead-end road length. There are no dead-end road lengths greater than 800 feet. The Consolidated Fire Code indicates a maximum dead-end road length of 800 feet, and the Project complies (County of San Diego 2023).
    - The Project complies with secondary access and avoidance of dead-end roads that exceed the allowable 800 feet.
- Cul-de-sac bulbs are required on dead-end roads in residential areas where roadways serve more than two residences. Cul-de-sacs would be provided with a paved radius of 42 feet to allow for street parking within the cul-de-sac. Cul-de-sacs will provide 28 foot inside turning radius and will be provided 24 feet of paving. Figure 7 illustrates compatibility.
- Roadways and/or driveways would provide fire department access to within 150 feet of all portions of the exterior walls of the first floor of each structure.
- Roadway design features (e.g., speed bumps, humps, speed control dips, planters, and fountains) that could interfere with emergency apparatus response speeds and required unobstructed access road widths would not be installed or allowed to remain on roadways. Traffic-calming features (i.e., raised intersections, intersection neck downs, roundabouts, and parallel bay parking with landscape pop-outs) shall not be allowed within the development.





SOURCE: DEVELOPMENT - HUNSAKER & ASSOC. 2021

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FIGURE 7

30-Ft Fire Engine Turnaround

Questhaven Fire Protection Plan

- Vertical clearance of vegetation along roadways would be maintained at 13 feet, 6 inches.
- Angle of driveway/roadway approach/departure would not exceed seven (7) degrees (12%), or as approved by the fire code official, per RSFFPD.
- The gradient for a fire apparatus access roadway shall not exceed 20.0%. Grades exceeding 15.0% shall not be allowed without mitigation measures.
- Developer would provide information illustrating the new roads, in a format acceptable to the RSFFPD, to update the RSFFPD maps (County Fire Code, Section 96.1.505.5) (County of San Diego 2023).

6.3.2 Driveways

Any structure that is 150 feet or more from a common road in the Development Footprint would have a paved driveway meeting the following specifications:

- Grades less than 20% with surfacing and sub-base consistent with the County Parking Design Manual.
- Driveways serving two houses or fewer would be 16 feet wide unobstructed. Driveways serving more than two houses would be 24 feet wide unobstructed.
- Driveways in excess of 150 feet would be provided hammerhead turnarounds to County Code.

Identification of roads and structures would comply with the current Consolidated Fire Code. At the time of this report, in Section 96.1.505 of the current fire code requires the following (County of San Diego 2023):

- All structures would be identified by street address numbers at the structure. Numbers would be four (4) inches in height, 0.5-inch stroke, located six to eight feet above grade, and be illuminated. Addresses on non-residential buildings would be eight (8) inches high with 0.5-inch stroke. Address numbers would contrast with background and be illuminated.
- Multiple structures located off common driveways would include posting addresses on structures, on the entrance to individual driveways, and at the entrance to the common driveway for faster emergency response.
- Structures 100 feet or more from a roadway would include numbers at the entrance to the driveway.

- Proposed roads within the Project development would be named, with the proper signage installed at intersections to the satisfaction of the RSFFPD and the DPW (County of San Diego Standard DS-13).
- Streets would have street names posted on non-combustible street signposts. Letters/numbers would be four (4) inches high, reflective, on a six-inch-high backing. Signage would be seven (7) feet above grade. There would be street signs at the entrances to the development, all intersections, and elsewhere as needed subject to approval of the Fire Chief. Street names shall be posted prior to the arrival of combustibles on site.
- Access roads to private lots to be completed and paved prior to lumber drop and prior to the occurrence of combustible construction.

6.4 Structure Requirements

6.4.1 Ignition-Resistance

This section outlines ignition-resistant construction (for all structures) that would meet the requirements of the current Consolidated County Fire Code, however the Project would be required to comply with the code edition in effect at the time of the building permit submittal, and the County Building Code (County Code of Regulatory Ordinance; Title 9, Division 2), Chapter 701-A. The following construction practices respond to the requirements of these codes and are consistent with the 2023 California Fire and Building Codes (Chapter 7-A). Appendix G provides a summary of the requirements for ignition-resistant construction. However, the Project shall comply with all applicable code requirements at the time of building plan submittal.

There are two primary concerns for structure ignition: (1) radiant and/or convective heat and (2) burning embers (IBHS 2008; NFPA 2018). Burning embers have been a focus of building code updates for at least the last decade, and new structures in the WUI built to these codes have proven to be very ignition resistant.

Likewise, radiant and convective heat impacts on structures have been minimized through the CBC Chapter 7-A exterior fire ratings for walls, windows, and doors. Additionally, provisions for modified fuel areas separating wildland fuels from structures have reduced the number of fuel-related structure losses. As such, most of the primary components of the layered fire protection system proposed for the Project are required by the RSFFPD and state codes. However, these requirements are worth listing because they have proven effective for minimizing structural vulnerability to wildfire and, with the inclusion of required interior sprinklers (required in the 2010 Building/Fire Code update), of extinguishing interior fires, should embers succeed in entering a

structure. Even though the current Building and Fire Codes require these measures, at one time, they were used as mitigation measures for buildings in WUI areas, because they were known to reduce structure vulnerability to wildfire. These measures performed so well, they were adopted into local and state codes.

For instance, San Diego County after-fire assessments, indicate strongly that the building codes are working in preventing home loss; of 15,000 structures within the 2003 fire perimeter, 17% (1,050) were damaged or destroyed. However, of the 400 structures built to the 2001 codes (the most recent at the time), only 4% (16) were damaged or destroyed. Further, of the 8,300 homes that were within the 2007 fire perimeter, 17% were damaged or destroyed. A much smaller percentage (3%) of the 789 homes that were built to 2001 codes were impacted, and an even smaller percentage (2%) of the 1,218 structures built to the 2004 codes were impacted (IBHS 2008). It has been reasoned that by fire officials conducting after-fire assessments that damage to the structures built to the latest codes is likely from unmaintained flammable landscape plantings or objects next to structures or open windows or doors (Hunter 2008). The building codes developed for construction in high and very high fire hazard zones is working to minimize the vulnerability of new residences and other structures to wildfires. There are numerous examples of master planned communities built to ignition-resistant standards and include HOA-managed FMZs that have been tested by wildfire and functioned as they were intended. The Project incorporates a fire protection system that has been found by after-action fire reports, independent researchers, and U.S. Geological Survey researchers (2013) to perform well against wildfires. Newer communities, especially those within jurisdictions that have adopted the latest state Fire and Building Codes (like San Diego County), and that have a well-defined FMZ requirement, perform well against wildfires. Examples include Cielo in Rancho Santa Fe, 4S Ranch in San Diego County, Stevenson's Ranch in Santa Clarita, Serrano Heights in Orange County and many others in Southern California.

The following features are required for new development in WUI areas and form the basis of the system of protection necessary to minimize structural ignitions and to provide adequate access for emergency responders. Although these standards would provide a high level of protection to structures in this development and should reduce the potential for ordering evacuations in a wildfire, there is no guarantee that compliance with these standards would prevent damage or destruction of structures by fire in all cases.

1. Exterior walls of all structures and garages are to be constructed with approved non-combustible (stucco, masonry, or approved cement fiber board) or ignition-resistant material from grade to underside of roof system. Wood shingle and shake wall covering is prohibited. Any unenclosed under-floor areas will have the same protection as exterior walls. Per County Building Code, Chapter 7-A: Exterior wall coverings to extend from top

of foundation to the underside of roof sheathing, and terminate at three-inch nominal solid wood blocking between rafters at all roof overhangs, or in the case of enclosed eaves, terminate at the enclosure). The underside of any cantilevered or overhanging appendages and floor projections will maintain the ignition-resistant integrity of exterior walls, or projection will be enclosed to grade.

2. Eaves and soffits will meet the requirements of SFM 12-7A-3 or be protected by ignition-resistant materials or non-combustible construction on the exposed underside, per County Building Code, Chapter 7-A.
3. There will be no use of paper-faced insulation or combustible installation in attics or other ventilated areas per County Building Code.
4. There will be no use of plastic, vinyl (with the exception of vinyl windows with metal reinforcement and welded corners), or light woods on the exterior.
5. All roofs will be a Class "A" listed and fire-rated roof assembly, installed per manufacturer's instructions, with approval of the RSFFPD. Roofs will be made tight with no gaps or openings on ends or in valleys, or elsewhere between roof covering and decking, to prevent intrusion of flame and embers. Any openings on ends of roof tiles will be enclosed to prevent intrusion of burning debris. When provided, roof valley flashings will not be less than 0.019-inch (No. 26 gage galvanized sheet) corrosion-resistant metal installed over a minimum 36-inch-wide underlayment consisting of one layer of 72 pound ASTM 3909 cap sheet running the full length of the valley (County Building Code, Chapter 7-A).
6. No vents in soffits, cornices, rakes, eaves, eave overhangs, or between rafters at eaves or in other overhang areas. Gable end and dormer vents to be at least 10 feet from property line or provided alternative design resistant to ember penetration. Vents in allowed locations to be protected with ember resistant designs with SFM testing approval.
7. Vents will not be placed on roofs unless they are approved for Class "A" roof assemblies (and contain an approved baffle system (such as Brandguard vents) to stop intrusion of burning material) or are otherwise approved.
8. Turbine vents are prohibited.
9. Exterior glazing in windows (and sliding glass doors, garage doors, or decorative or leaded glass in doors) to be dual pane with one tempered pane, or glass block or have a 20-minute fire rating. Glazing to comply with CBC Chapter 7-A.

10. Any vinyl frames to have welded corners and metal reinforcement in the interlock area to maintain integrity of the frame certified to ANSI/AAMA/NWWDA 101/I.S 2 97 requirements.
11. Skylights to be tempered glass (County Building Code, Chapter 7-A).
12. Rain gutters and downspouts to be non-combustible. They will be designed to prevent the accumulation of leaf litter or debris, which can ignite roof edges (County Building Code, Chapter 7-A).
13. Doors to conform to SFM standard 12-7A-1, or will be of approved noncombustible construction, or will be solid core wood having stiles and rails not less than 1.625 inches thick or have a 20-minute fire rating. Doors to comply with County Building Code, Chapter 7-A. Garage doors to be solid core 1.75-inch-thick wood or metal, to comply with code.
14. Decks and their surfaces, stair treads, landings, risers, porches, balconies to comply with language in County Building Code, Chapter 7-A, and be ignition-resistant construction, heavy timber, exterior approved fire-retardant wood, or approved non-combustible materials.
15. Decks or overhangs projecting over vegetated slopes are not permitted. Decks to be designed to resist failing due to the weight of a firefighter during fire conditions. There will be no plastic or vinyl decking or railings. The ends of decks to be enclosed with the same type of material as the remainder of the deck.
16. There will be no combustible awnings, canopies, or similar combustible overhangs.
17. No wood fences to be allowed within five feet of structures on any lots. The first five feet from a structure will be non-combustible or meet the same fire resistive standards as walls. The exception is that a wood gate may be used adjacent to a structure, if there is a five-foot length of non-combustible or fire-resistive fencing between the gate and the remainder of the fence where it abuts the structure.
18. All chimneys and other vents on heating appliances using solid or liquid fuel, including outdoor fireplaces and permanent barbeques and grills, to have spark arrestors that comply with the County Fire Code. The code requires that openings be maximum 0.5 inches. Arrestors will be visible from the ground.
19. Weather stripping. Exterior garage doors shall be provided with weather stripping to resist the intrusion of embers from entering through gaps between doors and door openings when visible gaps exceed 1/8 inch. Weather stripping or seals shall be installed on the bottom, sides, and tops of doors to reduce gaps between doors and door openings to 1/8-inch or less.

20. LOCATION OF LPG TANK, ABOVE GROUND STORAGE (CA Fire Code, Table 6104.3): The minimum separation between containers and buildings, public ways or lines of adjoining property that can be built upon is: 10 feet for containers 125 gallons to 500 gallons; 25 feet for containers 501 to 2,000 gallons.
21. Storage sheds, barns, and outbuildings to be constructed of approved non-combustible materials, including non-combustible Class A roofs and will be subject to the same restrictions as the main structure on lot.
22. Additionally, any of the above-listed structures (i.e., outbuildings, storage sheds, barns, and separate unattached garages) that are greater than 500 square feet in size will be equipped with automatic fire sprinklers. Locations, and required FMZs, will be subject to approval of the LAHJ and the Building Official based on size of the structure. No additional structures will be allowed in the 100' fuel modification zone.

6.4.2 Fire Protection System Requirements

Infrastructure, Structural Fire Protection, and Fire Protection Systems

WUI fire protection requires a systems approach, which includes the components of vegetation management, structural safeguards (both previously addressed), and appropriate infrastructure. This section provides recommendations for infrastructure components.

Infrastructure Recommendations

The following conceptual recommendations are made to comply with the RSFFPD requirements, the California Fire Code, the Consolidated Fire Code, and nationally accepted fire protection standards, as well as additional requirements to assist in providing fire protection.

Water service would be provided by the Olivenhain Municipal Water District, which is able to provide the appropriate fire flow without a connection to the Vallecitos Water District. All water storage and hydrant locations, mains, and water pressures would be designed to fully comply with San Diego County Fire Code Fire Flow Requirements. Water supply must meet a two-hour fire flow requirement of 2500 gpm as required by the RSFFPD, which must be over and above the daily maximum water requirements for this development. A measurement to confirm water supply of 2500 gpm shall be taken at the height of water usage.

Fire Hydrants

- Hydrants are subject to RSFFPD approval. Hydrants would be located on the normal fire apparatus response side of the road at each intersection and at 300-foot spacing as

required by the RSFFPD. Where applicable, hydrants would be located at the entrance to the cul-de-sac bulb (not in the bulb itself). Hydrants would be provided on each side of any divided road or highway.

- Loop all water mains for fire hydrants, no dead-end fire hydrants shall be permitted.
- The water system for fire protection would be an approved water supply with hydrants and mains. Fire flow in the mains for residential occupancies shall be at least 2,500 gpm with a duration of flow for a minimum of two hours as required by the RSFFPD at periods of maximum peak domestic demand. No credit for sprinklers is available in wildfire prone areas. Duration of flow is two hours or more if required by the Consolidated Fire Code based on the required flow. The amount of stored water for fire protection would be for the required duration (minimum two hours) at the worst-case fire flow at times of maximum peak domestic demand. In addition, fire protection water systems would comply with American Water Works Association Standard M-31; "Distribution Requirements for Fire Protection."
- Hydrants would have one 2.5-inch outlet and one 4-inch outlet and be of bronze construction per the District Fire Code.
- Hydrants would have a 3- by 3-foot concrete pad at base.
- Reflective blue dot hydrant markers (minimum 3-inch square) would be installed in the street to indicate location of the hydrant. The lateral shut-off valve would be located in the street 4–12 feet in front of hydrant.
- Crash posts would be provided where vehicles could strike fire hydrants, fire department connections, etc.
- All fire hydrants shall be installed and tested prior to combustibles being brought onto the Project site.

Fire Sprinklers

Per code requirements all new buildings constructed shall have an approved NFPA 13D automatic sprinkler system installed as per California Fire Code sections 903.3.1.1, 903.3.1.2 or 903.3.1.3. If additional structures are added, the application of the sprinkler system standard used will be provided by the fire code official. Regardless of lot size, a (minimum of a) 1" meter will be required for the sprinkler systems.

Smoke and Carbon Monoxide Alarm Systems

- All residential units would have electric-powered, hard-wired smoke alarms and carbon monoxide alarms compliant with the California Residential Code.

Heat-Deflecting Walls

Heat-deflecting retaining fire walls of masonry construction will be incorporated at the top of the slope behind Lots 19-45, within the Project's developed area, and will be a minimum of 6-feet tall, as represented in Figure 5. While heat-deflecting walls are typically constructed to protect habitable structures at the top of a slope, for the Project, these walls will serve as an ember accumulator and deflector. The retaining fire walls provide a vertical, non-combustible surface in the line of fumes, flame and embers that may move toward the Project. Once these fire byproducts intersect the walls, they are deflected or captured. In the case where lighter fuels are encountered, they are quickly consumed, heat and flame are absorbed or deflected by the walls, and the fuels burn peaks out within a short (30 second–2 minute) time frame (Quarles and Beall 2002). Walls like these have been observed to deflect heat and airborne embers on numerous wildfires in San Diego, Orange, Los Angeles, Ventura, and Santa Barbara County. Rancho Santa Fe Fire Protection District, Laguna Beach Fire Protection District, Orange County Fire Authority, and others utilize these walls as alternative methods based on observed performance during wildfires. This has led to these agencies approving use of non-combustible landscape walls as mitigations for reduced fuel modification zones. These walls are consistent with NFPA 1144 Standard for Reducing Structure Ignition Hazards from Wildland Fire – 2008 Edition, Section 5.1.3.3 and A.5.1.3.3 and International Urban Wildland Interface Code (ICC 2012). NFPA 1144, A.5.1.3.3 states, noncombustible barriers are effective for deflecting radiant heat and windblown embers from structures. These barriers are usually constructed of noncombustible materials (concrete block, bricks, stone, stucco) or earth with emergency access openings built around a development where 30 feet (9 meters) of defensible space is not available.

As indicated in this report, the FMZs and additional fire protection measures proposed for the Project provide equivalent wildfire buffers but are not standard RSFFRD zones. Rather, they are based on a variety of analysis criteria including predicted flame length, fire intensity (Btu), site topography and vegetation, extreme and typical weather, fuels, neighboring communities relative to the Project area, and type of construction. The fire intensity research conducted by Cohen (1995), Cohen and Butler (1996), and Cohen and Saveland (1997) and Tran et al. (1992) supports the fuel modification alternatives proposed for this Project.

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7 CONCEPTUAL WILDLFIRE EVACUATION PLAN

Early evacuation for any type of wildfire emergency at the Project is the preferred method of providing for resident safety, consistent with the RSFFPD's current approach within San Diego County. As such, the Project's HOA would formally adopt, practice, and implement a "Ready, Set, Go!" (International Fire Chiefs Association 2013) approach to evacuation. The "Ready, Set, Go!" concept is widely known and encouraged by the State of California and most fire agencies. Pre-planning for emergencies, including wildfire emergencies, focuses on being prepared, having a well-defined plan, minimizing potential for errors, maintaining the Project's fire protection systems, and implementing a conservative (evacuate as early as possible) approach to evacuation and Project Area activities during periods of fire weather extremes.

Support for the "Ready, Set, Go!" model is provided by a community Conceptual Wildfire Evacuation Plan (CWEP). The CWEP is be based on standard evacuation planning used by San Diego County Office of Emergency Services. The CWEP provides Project residents with potential egress route information and instructions for following the "Ready, Set, Go!" model. The CWEP provides Project Area-specific procedures for wildfire evacuations, and would be provided to the Project's residents and posted on the community website by the HOA. The CWEP would be reviewed by residents at least annually through organized meetings and educational outreach by the HOA, Community Services District, or other means.

The CWEP forms the backbone of hazard relocation/evacuation planning for the Project. However, emergency evacuations are controlled by emergency management agencies who implement evacuation plans that are situation based. The Project's CWEP is intended to raise resident awareness and preparedness so that they can follow direction they are provided during an evacuation. Among the important concepts that would be included in the CWEP are a description of the area's fire environment, mitigation strategies, roles and responsibilities, homeowner education materials, preparedness checklist, route planning, and specific procedures for early relocation and contingency planning for situations where evacuation is considered unsafe.

Note that large-scale evacuations during wildfire or other emergencies are managed by agencies including the Office of Emergency Services, law enforcement, and fire agencies. Emergencies are often fluid events and on-scene emergency personnel provide key information and direction regarding evacuations. The CWEP would be a baseline document, focusing on evacuation routes and pre-planning/preparedness. However, actual evacuation procedures would be a case-by-case basis and managed and controlled by the aforementioned agencies.

7.1 Wildfire Education

The Questhaven Project will be developed as a Firewise Community. The Firewise USA® program is administered by NFPA® and is co-sponsored by the USDA Forest Service and the National Association of State Foresters. This national program provides a collaborative framework to help neighbors in a geographic area get organized, find direction, and take action to increase the ignition resistance of their homes and community and to reduce wildfire risks.

Additionally, residents would be provided ongoing education regarding wildfire, the CWEP and the requirements FPP's requirements. This educational information would support the fire safety and evacuation features/plans designed for this community. Informational handouts, community Website page, mailers, Fire Safe Council participation, inspections, and seasonal reminders are some methods that would be used to disseminate wildfire and relocation awareness information. The Community HOA would oversee landscape committee enforcement of fire safe landscaping, ensure fire safety measures detailed in this FPP have been implemented, and educate residents on and prepare facility-wide "Ready, Set, Go!" plans. Further, the Community HOA would annually hire a third party to manage an outreach and emergency preparedness education and coordination with RSFFPD.

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8 CONCLUSION

This FPP has been prepared for the Questhaven project. This FPP complies with the requirements of the 2023 Consolidated Fire Code and the 2022 California Fire and Building Codes; however, the Project shall comply with all applicable code at the time of building plan submittal. The recommendations in this document meet fire safety, building design elements, infrastructure, fuel management/modification, and landscaping recommendations of the applicable codes. The recommendations provided in this FPP have been designed specifically for the proposed construction of structures within a WUI area.

When properly implemented on an ongoing basis, the fire protection strategies proposed in this FPP should significantly reduce the potential fire threat to vegetation on the community and its structures and should assist the fire authority in responding to emergencies in the Project Area. The Project's fire protection system includes a redundant layering of protection methods that have been shown through post-fire damage assessments to reduce risk of structural ignition. Modern infrastructure would be provided along with implementation of the latest ignition-resistant construction methods and materials. Further, all structures are required to include interior, automatic fire sprinklers consistent with the fire codes. Fuel modification would occur on perimeter edges adjacent to Rancho La Costa Preserve and throughout the interior of the Project. This is a conceptual plan, which provides enough detail for RSFFPD approval. Detailed plans such as improvement plans and building permits, demonstrating compliance with the concepts in this FPP and with Fire Code requirements, would be submitted to the fire authority at the time they are developed.

Based on the results of this FPP's analysis and findings, the FPP implementation measures presented in Table 10 summarize code-required measures; Table 11 summarizes measures offered that are code exceeding or mitigating through alternative means and methods.

Table 10
Code-Required Fire Safety Features

Feature No.	Features Description
1	**Ignition-Resistant Construction.** Project buildings would be constructed of ignition-resistant construction materials based on the latest Building and Fire Codes.
2	**Interior Fire Sprinklers.** All structures over 500 square feet, or what the current adopted code requires, would include interior fire sprinklers.
3	**Fuel Modification Zones.** Provided throughout the perimeter of the Development Footprint and would be 105 feet wide, which includes the rear yard of perimeter lots. Maintenance would occur as needed, and the HOA would annually hire a third party, RSFFPD-approved, FMZ inspector to provide annual certification that it meets the requirements of this FPP.

Table 10
Code-Required Fire Safety Features

Feature No.	Features Description
4	**Heat-Deflecting Walls.** A heat-deflecting retaining fire wall of masonry construction will be incorporated at the top of the slope behind Lots 19-45, within the Project's developed area, and will be a minimum of 6-feet tall.
5	**Fire Apparatus Access.** Provided throughout the community and would vary in width and configuration, but would all provide at least the minimum required unobstructed travel lanes, lengths, turnouts, turnarounds, and clearances required by the applicable code.
6	**Firefighting Improvements.** Firefighting staging areas and temporary refuge areas are available throughout the Project's developed areas and along roadways and HOA open space.
7	**Water Availability**. Water capacity and delivery would provide for a reliable water source for operations and during emergencies requiring extended fire flow.

Table 11
Code Exceeding or Alternative Materials and Methods Fire Safety Measures

Measure No.	Code Exceeding or Alternative Material or Method Measure
1	**Construction Fire Prevention Plan.** Details the important construction phase restrictions and fire safety requirements that would be implemented to reduce risk of ignitions and pre-plans for responding to an unlikely ignition.
2	**Community Evacuation Plan.** A Project-specific evacuation plan has been prepared for the Project and includes input and review with RSFFPD. (Code Exceeding)
3	**HOA Wildfire Education and Outreach.** The Community HOA would oversee landscape committee enforcement of fire safe landscaping, ensure fire safety measures detailed in this FPP have been implemented, and educate residents on and prepare facility-wide "Ready, Set, Go!" plans. Further, the Community HOA would annually hire a third party to manage an outreach and emergency preparedness education and coordination with RSFFPD. (Code Exceeding)
4	**Fuel Modification Zone Inspections.** Annual FMZ inspections would be provided by RSFFPD to certify that the Project's FMZs are maintained and LBZ/LDA have no authorized structures.
5	**Fuel Modification Zone Maintenance Enforcement.** The HOA would be responsible for enforcing private property maintenance of FMZs. These FMZ areas would also be inspected by the third-party inspector. (Code Exceeding)
6	**Building and Parcel Siting and Setbacks.** In compliance with Title 14 Section 1276.01, 5 feet of non-combustible material, or hardscape landscaping will be installed and extend 5 feet horizontally around the structure from the furthest extent of the building, or to the property line, whichever is greater.

Fire is a dynamic and somewhat unpredictable occurrence, and as such, this FPP does not guarantee that a fire will not occur or will not result in injury, loss of life, or loss of property. There are no warranties, expressed or implied, regarding the suitability or effectiveness of the recommendations and requirements in this FPP, under all circumstances.

The developers, contractors, engineers, and architects would be responsible for proper implementation of the concepts and requirements set forth in this FPP. Homeowners and property managers would be responsible to maintain their structures and lots as required by this FPP, the RSFFPD, and as required by the Fire Code. Alternative methods of compliance with this FPP may be submitted to the fire authority and County Fire Marshal for consideration.

It will be extremely important for all homeowners, property managers, and occupants to comply with the recommendations and requirements described and required by this FPP on their property. The responsibility to maintain the fuel modification and fire protection features required for this Project lies with the homeowners and business owners. The HOA or similar entity would be responsible for ongoing education and maintenance of the common areas, and the fire authority would enforce the vegetation management requirements detailed in this FPP. Such requirements would be made a part of deed encumbrances and CC&Rs for each lot, as appropriate.

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9 LIST OF PREPARERS

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APPENDIX A

Photograph Log

Photo log

Questhaven

Photograph 1. View facing northwest toward San Elijo Road from the eastern project site boundary.

Photograph 2. View of Edenpark driveway and eastern boundary of the project site.

Photograph 3. View facing southeast of existing vegetation along driveway on eastern project site boundary.

Photograph 4. View facing south of existing vegetation along driveway on eastern site project boundary.

Photograph 5. Looking south towards existing Eucalyptus grove in the northeastern portion of the project site.

Photograph 6. View looking southwest from the eastern boundary.

Photograph 7. View looking south of trails that surround Eucalyptus groves on the northeastern portion of the project site.

Photograph 8. View looking southwest of trails that surround Eucalyptus groves on the northeastern portion of the project site.

Photograph 9. View looking west from the northeastern portion of the project site.

Photograph 10. View looking south from northern portion of the project site.

Photograph 11. View looking southwest from the northeastern portion of the project site.

Photograph 12. View looking east from the central portion of the project site.

Photograph 13. View of the housing development west of the project site.

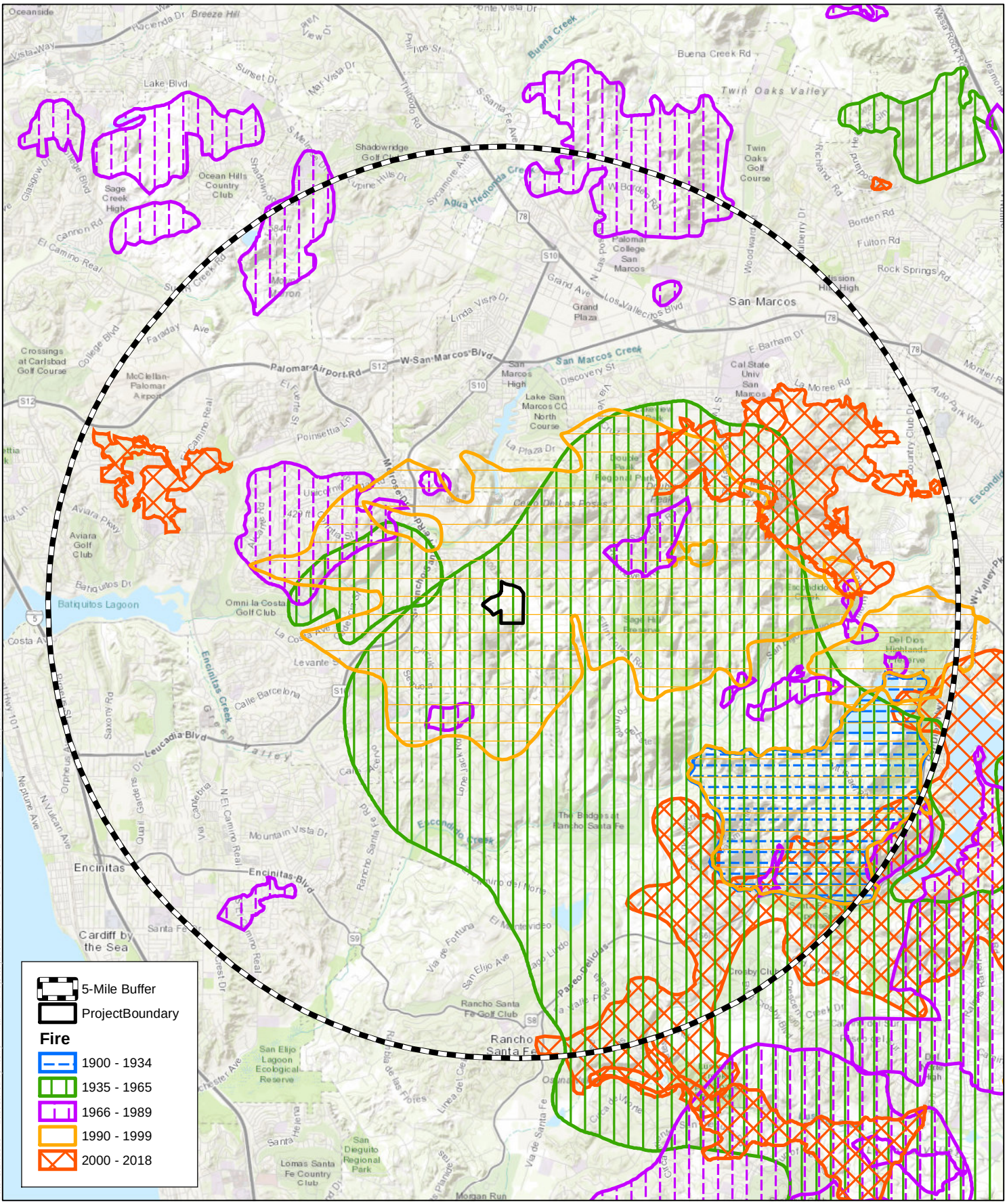
Photograph 14. View of Rancho La Costa Reserve and residential development west of the project site.

Photograph 15. View of project site looking west from the eastern boundary of the project site.

Photograph 16. View looking south of the eastern portion of the project site.

APPENDIX B

Fire History Exhibit



SOURCE: BASE-ESRI MAPPING SERVICE; FIRE DATA-CALFIRE 2018

DUDEK

0 1 2 Miles

APPENDIX B

Fire History Map

Questhaven Fire Protection Plan

APPENDIX C

Water Service Availability Form

County of San Diego, Planning & Development Services
PROJECT FACILITY AVAILABILITY - WATER
ZONING DIVISION

Please type or use pen

CR Questhaven, LLC — (619) 490-2300
Owner's Name — Phone

444 West Beech Street, Suite 300
Owner's Mailing Address — Street

San Diego — CA — 92101
City — State — Zip

ORG_____
ACCT_____
ACT_____
TASK_____
DATE_____

W

AMT $_____

DISTRICT CASHIER'S USE ONLY

SECTION 1. PROJECT DESCRIPTION — TO BE COMPLETED BY APPLICANT

A. ☒ Major Subdivision (TM) ☐ Specific Plan or Specific Plan Amendment
☐ Minor Subdivision (TPM) ☐ Certificate of Compliance:_____
☐ Boundary Adjustment
☐ Rezone (Reclassification) from_____ to _____ zone.
☐ Major Use Permit (MUP), purpose:_____
☐ Time Extension...Case No._____
☐ Expired Map...Case No._____
☐ Other_____

B. ☒ Residential . . . . . Total number of dwelling units 64 single-family
☐ Commercial. . . . . Gross floor area_____
☐ Industrial . . . . . Gross floor area_____
☐ Other . . . . . Gross floor area_____

C. ☒ Total Project acreage 89.23 Total number of lots 78

D. Is the project proposing the use of groundwater? ☐ Yes ☒ No
Is the project proposing the use of reclaimed water? ☐ Yes ☒ No

Assessor's Parcel Number(s)
(Add extra if necessary)

223-080-46	
223-070-08	
223-070-07	

Thomas Guide Page 1128 Grid C7 and D7

1058 San Elijo Road
Project address — Street

San Dieguito Community Plan area — 92078
Community Planning Area/Subregion — Zip

Owner/Applicant agrees to pay all necessary construction costs, dedicate all district required easements to extend service to the project and COMPLETE ALL CONDITIONS REQUIRED BY THE DISTRICT.

Applicant's Signature:_____ Date: 04/13/2020

Address: 444 West Beech Street, Suite 300, San Diego, CA 92101 Phone: (619) 490-2300

(On completion of above, present to the district that provides water protection to complete Section 2 below.)

SECTION 2: FACILITY AVAILABILITY — TO BE COMPLETED BY DISTRICT

District Name: Olivenhain MWD Service area Zone 7-B

A. ☑ Project is in the district.
☐ Project is not in the district but is within its Sphere of Influence boundary, owner must apply for annexation.
☐ Project is not in the district and is not within its Sphere of Influence boundary.
☐ The project is not located entirely within the district and a potential boundary issue exists with the _____ District.

B. ☑ Facilities to serve the project ☐ ARE ☐ ARE NOT reasonably expected to be available within the next 5 years based on the capital facility plans of the district. Explain in space below or on attached_____. (Number of sheets)
☐ Project will not be served for the following reason(s):_____

C. ☐ **District conditions are attached. Number of sheets attached:**_____
☐ **District has specific water reclamation conditions which are attached. Number of sheets attached:**_____
☐ **District will submit conditions at a later date.**

D. ☐ **How far will the pipeline(s) have to be extended to serve the project?**_____

This Project Facility Availability Form is valid until final discretionary action is taken pursuant to the application for the proposed project or until it is withdrawn, unless a shorter expiration date is otherwise noted.

Authorized Signature: Karen Ogawa Print Name Karen Ogawa

Print Title Engineering Project Administrator Phone 760-753-6466 Date 24 June 2020.

NOTE: THIS DOCUMENT IS NOT A COMMITMENT OF SERVICE OR FACILITIES BY THE DISTRICT
On completion of Section 2 and 3 by the District, applicant is to submit this form with application to:
Planning & Development Services – Zoning Counter, 5510 Overland Ave, Suite 110, San Diego, CA 92123

OLIVENHAIN
Municipal Water District

June 26, 2020

County of San Diego
Planning & Development Services
5510 Overland Ave., Suite 110
San Diego, CA, 92123

Re: Tax Assessors Parcel # 223-080-46, 223-070-07 and -08

Subject: Water Availability Letter /
Supplement to County Form 399W

The fee owner, applicant (Applicant), has requested the District to provide a Water Availability Letter for the property identified above for a proposed project Applicant described as: Major Single Family Residential Subdivision of 64 dwelling units project. This property is in the District and eligible to receive domestic service at this time.

The District has or will have adequate facilities in this area to serve the project for domestic use. The project will require an emergency interconnect with the Vallecitos Water District for fire flow. There is or will be capacity in these facilities to serve the proposed project at a minimum of 25 psi pressure at the District's main during normal operating conditions and upon completion of all necessary facilities, including any onsite and offsite water lines, facilities and appurtenances that are required, at the sole discretion of the District. While there is adequate water to serve the project at this time, all water received by the District is imported from other agencies. Accordingly, there is no guarantee that water will be available to serve the project when water is requested. The availability of water depends upon a number of complex factors including annual rainfall, drought periods, the amount of water remaining in storage and environmental and other constraints to the delivery of water. No final decision will be made by the District on the ability to serve water to the project until an application for water service is made by the applicant and approved by the District. At that time, the District will determine whether adequate water is available to serve the project in the District's sole discretion.

Both Water Code §350 and Water Code §71640 grant the District the right to restrict the use of water during any emergency caused by a drought or any other threatened or existing water shortage and to prohibit the use of District water during such periods as the District determines to be necessary. The District may also prohibit the use of District water during any periods for specific uses which it finds to be nonessential. Nothing

contained in this water availability letter shall be construed as limiting in any way the legislative discretion of the District to declare an emergency or water shortage and to curtail or prohibit the use of water as determined necessary or appropriate by the District to conserve water during droughts or other threatened or existing water shortages. Certain stages of water shortages may result in a prohibition on new water meters.

The District has been requested to furnish a staff estimate, based on current water service conditions, of the availability of water service in this area. This letter is issued for planning purposes and is not a representation, express or implied, that the District will provide any water service at a future date. Commitments to provide water service are made only when an application for water service is made by the applicant and approved by the District and are subject to the applicants compliance with the Districts' fees, charges, rules and regulations, the Environmental Quality Act of 1970, as amended, and the applicants' agreement to construct any required onsite and off site facilities together with the Applicant's providing security as required by the District for construction of those facilities.

The issuance of this Water Availability Letter does not grant the Applicant any water rights. The Applicant does not secure a right to water until application for service is made and approved by the District in its sole discretion, and the Applicant has complied with all requirements of the District.

The failure of the Applicant to pay any fee or charge of the District's when due, or to comply with other requirements of the District, shall entitle the District to unilaterally terminate this Water Availability Letter, and all further rights of the Applicant to water service.

Improvement fees, when applicable, are paid to the District to reserve future water service for the project contingent upon the Applicant paying all fees and charges and complying with all requirements of the District. The payment of all improvement fees by the date they are due is an express condition precedent to any right of the Applicant to receive future water service. The failure of Applicant to make any improvement fee payment by the date it is due shall automatically terminate the right of Applicant to receive future water service and no previous improvement fee payments paid by the Applicant shall be refunded. Reinstatement of the water commitment requires Applicant to remedy any defects or deficiencies and payment of fees and charges applicable, as determined by the District, in its sole discretion.

This commitment to water service availability is conditioned on the following requirements and/or limitations:

1. The District's determination that adequate water is available to serve the project at the time the applicant submits a request for water service to the District.

2. Payment of all improvements fees, as appropriate, when due in accordance with District Ordinance 301, or successor Ordinance, not attached hereto, but incorporated herein by reference.
3. Applicant is required to have a hydraulic analysis done by the District's consulting engineer to ascertain the impact of the project on the District's water system and to determine fire flow availability as required by the Fire Department.
4. Applicant is required to provide all fee and easements as required for construction of onsite and offsite facilities as required by the District, in its sole discretion.
5. Applicant is required to construct all onsite and offsite facilities as required by the District, in its sole discretion.
6. Applicant is required to execute District Agreement for pipeline construction and furnish all necessary documents for insurance, bonding, and pay all District's charges as they are invoiced.
7. In accordance with District Assessment District 96-01, not attached hereto, but incorporated herein by reference, lots of ½ acre or less may have a ¾ inch meter installed unless owner chooses to upgrade the meter and pay the additional fees and charges. Lots greater than ½ acre but less than 3 acres require one-inch meters to be installed. Lots in excess of 3 acres require a minimum 1½ inch meter to be installed. Larger meters may be required by the District, in its sole discretion.
8. The District may require larger meters than the Assessment District 96-01 lot size criteria would dictate if the individual residence requires water service greater than can be accommodated by the standard ¾ inch meter irrespective of the lot size, in its sole discretion.
9. Applicant is required to comply with District Ordinance 280 for the mitigation of impacts to the District's Assessment District 96-1R. Ordinance 280 requires an executed agreement to request increased EDU's that this project requires. The Applicant is responsible for payment of all fees and charges as outlined in the executed agreement.
10. The District has not declared a water shortage that restricts water usage or prohibits new water meters. The District's Board of Directors on July 20, 2016 adopted Resolution 2016-13 returning the District to a Level 1 Water Supply Shortage per Ordinance 427 rules, rates and regulations.

This letter of water availability pertains solely to the proposed project as described by Applicant, is not transferable to any other project, and is not transferable to any other owner or developer without written permission of the Board of Directors of the District. Any purported transfer, sale, or assignment of this Water Availability Letter without the prior written consent of the District renders this letter null and void.

This letter automatically terminates, and is of no further force or effect, on the occurrence of: (1) June 26, 2021 without an approved tentative map; (2) termination of

any tentative map; (3) termination of any final map; or (4) five years from the date of recordation of any final map.

OLIVENHAIN MUNICIPAL WATER DISTRICT

By: _____
Karen Ogawa
Engineering Project Administrator

APPENDIX D

Fire Behavior Modeling Input Data

APPENDIX D
Fire Behavior Technical Report
Questhaven Project

1 FIRE BEHAVIOR MODELING HISTORY

Fire behavior modeling has been used by researchers for over 50 years to predict how a fire will move through a given landscape (Linn 2003). The models have had varied complexities and applications throughout the years. One model has become the most widely used for predicting fire behavior on a given landscape. That model, known as "BEHAVE," was developed by the U.S. Government (USDA Forest Service, Rocky Mountain Research Station) and has been in use since 1984. Since that time, it has undergone continued research, improvements, and refinement. The current version, BehavePlus V6, includes the latest updates incorporating years of research and testing. Numerous studies have been completed testing the validity of the fire behavior models' ability to predict fire behavior given site specific inputs. One of the most successful ways the model has been improved has been through post-wildfire modeling (Brown 1972, Lawson 1972, Sneeuwjagt and Frandsen 1977, Andrews 1980, Brown 1982, Rothermel and Rinehart 1983, Bushey 1985, McAlpine and Xanthopoulos 1989, Grabner, et. al. 1994, Marsden-Smedley and Catchpole 1995, Grabner 1996, Alexander 1998, Grabner et al. 2001, Arca et al. 2005). In this type of study, BehavePlus is used to model fire behavior based on pre-fire conditions in an area that recently burned. Real-world fire behavior, documented during the wildfire, can then be compared to the prediction results of BehavePlus and refinements to the fuel models incorporated, retested, and so on.

Fire behavior modeling includes a high level of analysis and information detail to arrive at reasonably accurate representations of how wildfire would move through available fuels on a given site. Fire behavior calculations are based on site specific fuel characteristics supported by fire science research that analyzes heat transfer related to specific fire behavior. Predicting wildland fire behavior is not an exact science. As such, the minute-by-minute movement of a fire will probably never be predictable, especially when considering the variable state of weather and the fact that weather conditions are typically estimated from forecasts made many hours before a fire. Nevertheless, field-tested and experienced judgment in assessing the fire environment, coupled with a systematic method of calculating fire behavior yields surprisingly accurate results. To be used effectively, the basic assumptions and limitations of fire behavior modeling applications must be understood.

1. First, it must be realized that the fire model describes fire behavior only in the flaming front. The primary driving force in the predictive calculations is the dead fuels less than 0.25 inches in diameter. These are the fine fuels that carry fire. Fuels greater than one inch have little effect, while fuels greater than three inches have no effect on fire behavior.

2. Second, the model bases calculations and descriptions on a wildfire spreading through surface fuels that are within six feet of the ground and contiguous to the ground. Surface fuels are often classified as grass, brush, litter, or slash.
3. Third, the software assumes that weather and topography are uniform. However, because wildfires almost always burn under non-uniform conditions, creating their own weather, length of projection period and choice of fuel model must be carefully considered to obtain useful predictions.
4. Fourth, fire behavior computer modeling systems are not intended for determining sufficient fuel modification zone/defensible space widths. However, it does provide the average length of the flames, which is a key element for determining defensible space distances for minimizing structure ignition.

Although BehavePlus has limitations, it can still provide valuable fire behavior predictions, which can be used as a tool in the decision-making process. In order to make reliable estimates of fire behavior, one must understand the relationship of fuels to the fire environment and be able to recognize the variations in these fuels.

2 MODELING INPUTS

2.1 Fuels

Natural vegetation fuels are made up of both live and dead plant materials that occur in a particular landscape. The type and quantity will depend upon soil, climate, geographic features, and fire history. The major fuel groups of grass, shrub, trees, and slash are defined by their constituent types and quantities of litter and duff layers, dead woody material, grasses and forbs, shrubs, regeneration, and trees. Fire behavior can be predicted largely by analyzing the characteristics of these fuels. Fire behavior is affected by seven principal fuel characteristics: fuel loading, size and shape, compactness, horizontal continuity, vertical arrangement, moisture content, and chemical properties. Table D-1 includes the various modeling inputs to address several of these fuel moisture characteristics.

The fuel characteristics help define the 13 standard fire behavior fuel models (Anderson 1982) and the more recent custom fuel models developed for Southern California (Weise and Regelbrugge 1997). According to the model classifications, fuel models used for fire behavior modeling (BehavePlus) have been classified into four groups, based upon fuel loading (tons/acre), fuel height, and surface-to-volume ratio. Observation of the fuels in the field (on site) determines which fuel models should be applied in modeling efforts. The following describes the distribution of fuel models among general vegetation types for the standard 13 fuel models and the custom southern California fuel models:

- Grasses Fuel Models 1 through 3
- Brush Fuel Models 4 through 7, SCAL 14 through 18
- Timber Fuel Models 8 through 10
- Logging slash Fuel Models 11 through 13.

In addition, the aforementioned fuel characteristics were utilized in the development of 40 additional fire behavior fuel models (Scott and Burgan 2005) developed for use in the BehavePlus modeling system. These additional models attempt to improve the accuracy of the 13 standard fuel models outside of severe fire season conditions, and to allow for the simulation of fuel treatment prescriptions. The following describes the distribution of fuel models among general vegetation types for the 40 additional fuel models:

- Non-burnable Models NB1, NB2, NB3, NB8, NB9
- Grass Models GR1 through GR9

- Grass shrub Models GS1 through GS4
- Shrub Models SH1 through SH9
- Timber understory Models TU1 through TU5
- Timber litter Models TL1 through TL9
- Slash blowdown Models SB1 through SB4.

For the Project BehavePlus analyses, fuel model assignments were based on observed field conditions. As is customary for this type of analysis, the terrain and fuels directly adjacent to the proposed development and fuel modification zones (FMZ) are used for determining flame lengths and fire spread. It is these fuels that would have the potential to affect the project's structures from a radiant and convective heat perspective as well as from direct flame impingement. Fuel beds, including sage scrub and non-native grasslands were observed adjacent to the proposed development. These fuel types can produce flying embers that may affect the project, but defenses have been built into the structures to prevent ember penetration. Table D-2 includes descriptions of the fuel models observed in the vicinity of the site that were subsequently used in the analysis for this project. Modeled areas include the grasslands intermixed with sage scrub/chaparral (Fuel Model Gs2), coastal sage scrub/chaparral mix (Fuel Models Sh2 and Sh5), and eucalyptus woodland (Fuel Model Sh4). Dudek also conducted modeling of the site for post-development recommendations for this project (refer to Table D-4 for post-development fuel model results). Fuel modification includes such features as irrigated landscaping, paved parking lots, paved streets and treated fuel modification zones on the periphery of the developed area.

2.2 Weather

To evaluate different scenarios, analyses were conducted for both the summer, on-shore wind (50^{th} percentile), and the fall, off-shore wind (97^{th} percentile, Santa Ana), conditions. Fuel moisture and wind speed information data was incorporated into the BehavePlus modeling runs. The input wind speed and direction is roughly an average surface wind at 20 feet above the vegetation over the analysis area. Table D-1 includes the weather and wind input variables used in the BehavePlus modeling efforts.

Table D-1. Variables Used for Fire Behavior Modeling

Input Variable	Summer Weather Condition (Onshore Winds)	Extreme Weather Condition (offshore/Santa Ana Winds)
1h Moisture	6%	1%
10h Moisture	8%	4%
100h Moisture	15%	11%
Live Herbaceous Moisture	59%	30%
Live Woody Moisture	118%	60%
20-foot Wind Speed (upslope/downslope)	18 mph (sustained winds)	19 mph (sustained winds) and wind gusts of 52 mph
Wind Direction (From North)	210° and 315°	90°and 140°
Wind Adjustment Factor (BehavePlus)	0.4	0.4

Source: San Pasqual (045746) Remote Automated Weather Station

2.3 Slope

Slope is a measure of angle in degrees from horizontal and can be presented in units of degrees or percent. Slope is important in fire behavior analysis as it affects the exposure of fuel beds. Additionally, fire burning uphill spreads faster than those burning on flat terrain or downhill as uphill vegetation is pre-heated and dried in advance of the flaming front, resulting in faster ignition rates. For the BehavePlus analysis, slope values were determined by field observation at the locations for each modeling scenario, and ranged in value between 9 to 23 percent. Slope gradients for landscaped areas are assumed to be relatively flat (3%).

3 BEHAVEPLUS ANALYSIS

To objectively predict flame lengths, intensities, and spread rates, the BehavePlus V6 fire behavior modeling system (Andrews, Bevins, and Seli 2004) was used in four modeling scenarios and incorporated observed fuel types representing the dominant on-site and off-site vegetation, slope gradients, and wind and fuel moisture values. Modeling scenario locations were selected to better understand different fire behavior that may be experienced on or adjacent to the site. The results of fire behavior modeling analysis for pre- and post-development conditions are presented in Table D-3 and D-4, respectively. Identification of modeling run (fire scenarios) locations is presented graphically in Figure 4, BehavePlus Fire Behavior Modeling exhibit in the Project's FPP.

Fire Scenario locations and descriptions:

- Scenario 1. Fire flaming front approaching from the east, through the open space south of San Elijo Road from the vicinity of the San Elijo Hills community and onsite toward the eastern portion of the project, into the existing grassland and scrub/chaparral vegetation (Fuel Model Gs2) and eucalyptus stand, with strong northeastern Santa Ana winds. Post-development includes the irrigated landscaping (Fuel Model 8) and treated fuel modification zones (Fuel Models Sh1 and Gs1).

- Scenario 2. Fire flaming front approaching from the southeast, through the adjacent open space towards the southeast portion of the project, through the existing sage scrub/mixed chaparral vegetation (Fuel Models Sh2 and Sh5), with strong northeastern Santa Ana winds. Post-development includes irrigated landscaping (Fuel Model 8) and treated fuel modification zones (Fuel Models Sh1 and Gs1).

- Scenario 3. Fire flaming front approaching from the southwest, through the Rancho La Costa Reserve open space entering the site through the existing sage scrub/mixed chaparral vegetation (Fuel Models Sh2 and Sh5), with moderate westerly onshore winds. Post-development irrigated landscaping (Fuel Model 8) and treated fuel modification zones (Fuel Models Sh1).

- Scenario 4. Fire flaming front approaching from the north, through the open space north of San Elijo Road and the University Commons community approaching the northern Project boundary, through the existing sage scrub/mixed chaparral vegetation (Fuel Models Sh2 and Sh5), with moderate westerly onshore winds.

Table D-2. Fuel Models used for Fire Behavior Modeling

Observed Vegetation type(s)	Fuel Model selection	Fuel Model description
Existing conditions		
Mixture of native and non-native grasslands intermixed with coastal sage scrub/mixed chaparral	Gs2	Moderate Load Dry-Climate Grass/Shrub
Moderate density coastal sage scrub/mixed chaparral	Sh2	Moderate load, Dry-climate shrub
High density coastal sage scrub/mixed chaparral	Sh5	High load, Dry-climate scrub
Eucalyptus woodland	Sh4	Chaparral
Post-project		
Fuel modification zone 1 – irrigated landscaping	FM8	Closed canopy with compact litter layer (needles, leaves, twigs)
Fuel modification zone 2 – fuel treatments	Sh1	Low load dry climate shrub
Fuel modification zone 2 – cut grasses	Gs1	Low load dry climate grass-shrub

Table D-3: Fire Behavior Model Results Existing Conditions for Questhaven Project

Fire Scenario **Fuel Model(s)**	**Flame Length[1] (ft)**	**Spread Rate[1] (mph)**	**Fireline Intensity[1] (Btu/ft/s)**	**Spot Fire[1] (mi)**	**Surface Fire to Tree Crown Fire**
Extreme Fall Weather Scenarios (97th percentile)					
Scenario 1: from the East; 9% slope; Offshore 19 mph sustained; 52 mph gusts *(in parentheses)*					
Moderate Load Dry-Climate Grass/Shrub (Gs2)	10.8 (20.9)[5]	1.0 (4.4)	992 (4,219)	0.5 (1.5)	Crowning [4]
Moderate load, Dry-climate shrub (Sh2)	8.6 (16.1)	0.3 (1.0)	608 (2,376)	0.4 (1.2)	Crowning [4]
Eucalyptus and Pine Forest[2,3] (Sh4)	12.9 (24.3)	1.1 (4.4)	1,468 (5,861)	0.5 (1.6)	Crowning [4]
High load, Dry-climate scrub (Sh5)	26.2 (45.0)	2.1 (7.0)	6,848 (22,293)	0.9 (2.5)	Crowning [4]
Scenario 2: from the Southeast; 16% slope; Offshore 19 mph sustained; 52 mph gusts *(in parentheses)*					
Moderate load, Dry-climate shrub (Sh2)	8.5 (16.0)	0.3 (1.0)	594 (2,362)	0.4 (1.2)	No
High load, Dry-climate scrub (Sh5)	25.9 (44.9)	2.1 (7.0)	6,712 (22,157)	0.9 (2.5)	No
Summer On-shore wind Scenarios (50th percentile)					
Scenario 3: from the Southwest; 23% slope; 18 mph sustained					
Moderate load, Dry-climate shrub (Sh2)	1.7	0.0	19	0.1	No

High load, Dry-climate scrub (Sh5)	14.5	0.8	1,899	0.6	No
Scenario 4: from the North; 12% slope; 18 mph sustained					
Moderate Load Dry-Climate Grass/Shrub (Gs2)	5.7	0.4	249	0.3	No
Moderate load, Dry-climate shrub (Sh2)	1.8	0.0	20	0.1	No

Note:

1. Wind-driven surface fire.
2. Eucalyptus and Pine Forest overstory torching increases fire intensity. Modeling included canopy fuel over Sh4, which represents surface fuels beneath the tree canopies.
3. A surface fire in the Eucalyptus and Pine Forest would transition into the tree canopies generating flame lengths higher than the average tree height (35 feet). Viable airborne embers could be carried downwind for approximately 1.0 mile and ignite receptive fuels.
4. Crowning= fire is spreading through the overstory crowns.
5. Parentheses = 52 mph gusts of wind

Table D-4: Fire Behavior Model Results Post-Project Conditions for Questhaven Project

Scenario	Flame Length (feet)	Fireline Intensity (BTU/feet/second)	Spread Rate (mph)	Spotting Distance (miles)
Extreme Fall Weather Scenarios (97th percentile)				
Scenario 1: from the East; 9% slope; Offshore 19 mph sustained; 52 mph gusts *(in parentheses)*				
Fuel modification zone 1 (FM8)	2.1 (2.9)	28 (59)	0.1 (0.2)	0.2 (0.4)
Fuel modification zone 2 (Sh1)	5.8 (10.4)	255 (930)	0.4 (1.4)	0.3 (0.9)
Fuel modification zone 2 (Gs1)	7.5 (14.0)	450 (1,763)	0.8 (3.0)	0.4 (1.1)
Scenario 2: from the Southeast; 16% slope; Offshore 19 mph sustained; 52 mph gusts *(in parentheses)*				
Fuel modification zone 1 (FM8)	2.1 (2.9)	27 (59)	0.1 (0.2)	0.1 (0.4)
Fuel modification zone 2 (Sh1)	5.7 (10.4)	250 (930)	0.4 (1.4)	0.3 (0.9)
Summer On-shore wind Scenarios (50th percentile)				
Scenario 3: from the Southwest; 23% slope; 18 mph sustained				
Fuel modification zone 1 (FM8)	1.3	11	0.03	0.1
Fuel modification zone 2 (Sh1)	0.6	2	0.03	0.1

Note: Parentheses = 52 mph gusts of wind

As presented in Table D-3, wildfire behavior in high density coastal sage scrub/mixed chaparral, presented as a Fuel Model Sh5, represents the most extreme conditions in Scenarios 1 and 2, varying with different wind speeds. In this case, flame lengths can be expected to reach up to approximately 44.9 and 45.0 feet with 52 mph winds (extreme fire weather conditions) and 25.9 and 26.2 feet with 19 mph wind speeds (onshore winds). Spread rates for high density coastal sage scrub/mixed chaparral fuel beds range from 2.1 mph (summer onshore

winds) to 7.0 mph (extreme offshore winds). Spotting distances, where airborne embers can ignite new fires downwind of the initial fire, range from 0.9 miles to 2.5 miles. In comparison, a moderate density coastal sage scrub/mixed chaparral fuel type could generate flame lengths up to 8.6 and 16.1 feet high with a spread rate of 0.3 and 1.0 mph. The fire could potentially be spotting for a distance of 2.5 miles.

As presented in Table D-4, Dudek conducted modeling of the site for post-development fuel modification recommendations for this project. Fuel modification includes irrigated landscaping, treated fuel modification zones, and paved streets and on the periphery of the developed area. Fuel model assignments were re-classified for modeling the post-development condition. Fuel model assignments for all other areas remained the same as those classified for the existing condition. As depicted, the fire intensity and flame lengths in untreated, open space areas would remain the same. Conversely, the FMZ areas experience a significant reduction in flame length and intensity. The 45.0-foot and 26.2-foot tall flames predicted during pre-development modeling during extreme weather conditions are reduced to less than 3.0 feet tall in the irrigated landscaping fuel modification zone the outer edges of the development due to the higher live and dead fuel moisture contents.

It should be noted that the results presented in Tables D-2 and D-3 depict values based on inputs to the BehavePlus software. Changes in slope, weather, or pockets of different fuel types are not accounted for in this analysis, but models provide a worst-case wildfire condition as part of a conservative approach. Further, this modeling analysis assumes a correlation between the project site vegetation and fuel model characteristics. Model results should be used as a basis for planning only, as actual fire behavior for a given location will be affected by many factors, including unique weather patterns, small-scale topographic variations, or changing vegetation patterns.

The information in Table D-5 pertains to interpretation of flame length and fireline intensity as it relates to fire suppression efforts. Based on the post-development calculated flame lengths of under 3.0 feet tall, fire fighters should be able to conduct a direct attack on the fire.

Table D-5. Fire Suppression Interpretation

Flame Length (ft)	Fireline Intensity (Btu/ft/s)	Interpretations
Under 4 feet	Under 100 BTU/ft/s	Fires can generally be attacked at the head or flanks by persons using hand tools. Hand line should hold the fire.
4 to 8 feet	100-500 BTU/ft/s	Fires are too intense for direct attack on the head by persons using hand tools. Hand line cannot be relied on to hold the fire. Equipment such as dozers, pumpers, and retardant aircraft can be effective.
8 to 11 feet	500-1000 BTU/ft/s	Fires may present serious control problems -- torching out, crowning, and spotting. Control efforts at the fire head will probably be ineffective.

Table D-5. Fire Suppression Interpretation

Flame Length (ft)	Fireline Intensity (Btu/ft/s)	Interpretations
Over 11 feet	Over 1000 BTU/ft/s	Crowning, spotting, and major fire runs are probable. Control efforts at head of fire are ineffective.

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APPENDIX D
Fire Behavior Technical Report
Questhaven Project

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APPENDIX E

Project Suggested Plant List

APPENDIX H
SUGGESTED PLANT LIST FOR A DEFENSIBLE SPACE

BOTANICAL NAME	COMMON NAME	Climate Zone
TREES		
Acer		
platanoides	Norway Maple	M
rubrum	Red Maple	M
saccharinum	Silver Maple	M
saccarum	Sugar Maple	M
macrophyllum	Big Leaf Maple	C/ (R)
Agonis flexuosa	Peppermint Tree	
Alnus rhombifolia	White Alder	C/I/M (R)
Arbutus		
unedo	Strawberry Tree	All zones
Archontophoenix		
cunninghamiana	King Palm	C
Arctostaphylos spp.**	Manzanita	C/I/D
Brachychiton		
acerifolius	Australian Flame Tree	
Brachychiton		
populneus	Bottle Tree	
Brahea		
armata	Blue Hesper Palm	C/D
edulis	Guadalupe Palm	C/D
Callistemon citrinus		
Compacta	Dwarf Lemon Bottlebrush	
Ceratonia siliqua	Carob	C/I/D
Cerdidium floridum	Blue Palo Verde	D
Cercis occidentalis**	Western Redbud	C/I/M
Chamaerops	Mediterranean Fan Palm	
humillis		
Cornus		
nuttallii	Mountain Dogwood	I/M
stolonifera	Redtwig Dogwood	I/M
Cupressus	Italian Cypress	
semperv		
irens		
Strica		
Cycas	Sago Palm	
revoluta		
Eriobotrya		C/I/D
japonica	Loquat	C
Erythrina caffra	Kaffirboom Coral Tree	I/M
Ficus robiginosa	Rustyleaf Fig	
Geijera parviflora	Australian Willow	
Gingko biloba "Fairmount"	Fairmount Maidenhair Tree	I/D/M

BOTANICAL NAME	COMMON NAME	Climate Zone
Gleditisia triacanthos	Honey Locust	
Juglans		I
californica	California Walnut	C/I
hindsii	California Black Walnut	I/D/M
Koelreuteria paniculata	Golden Rain Tree	
Lagerstroemia indica	Crape Myrtle	I
Laurus nobils	Sweet Bay	
Ligustrum japonicum	Japanese	
'Texanum'	Privet	
Ligustrum lucidum	Glossy Privet	C/I/M
Liquidambar styraciflua	Sweet Gum	I
Liriodendron tulipifera	Tulip Tree	
Lyonothamnus floribundus		C
ssp. Asplenifolius	Fernleaf Catalina Ironwood	C/I/D
Melaleuca spp.	Melaleuca	C/I
Metrosideros exelsus	New Zealand Christmas Tree	
Olea europea Wilsoni	Fruitless Olive Tree	
Parkinsonia aculeate	Mexican Palo Verde	
Phoenix canariensis Phoenix	Canary Island Date Palm	
dactylifera	Phoenix Date Palm	
Phoenix reclinata	Senegal Date Palm	
Phoneix roebelenii	Pigmy Date Palm	
Pistacia	Chinese Pistache	
chinensis	Pistachio Nut	C/I/D
vera	Pistachio Nut	I
Pittosporum		
phillyraeoides	Willow Pittosporum	C/I/D
viridiflorum	Cape Pittosporum	C/I
Platanus		
acerifolia	London Plane Tree	All zones
racemosa**	California Sycamore	C/I/M
Podocarpus gracilior	Fern Pine	
Populus		
alba	White Poplar	D/M
fremontii**	Western Cottonwood	I
trichocarpa	Black Cottonwood	I/M
Prunus		
xblireiana	Flowering Plum	M
caroliniana	Carolina Laurel Cherry	C
ilicifolia**	Hollyleaf Cherry	C
lyonii**	Catalina Cherry	C
serrulata ‘Kwanzan’	Flowering Cherry	M
yedoensis ‘Akebono’	Akebono Flowering Cherry	M
Quercus		
agrifolia**	Coast Live Oak	C/I

BOTANICAL NAME	COMMON NAME	Climate Zone
engelmannii	Engelmann Oak	I
** suber	Cork Oak	C/I/D
Rhus		
lancea**	African Sumac	C/I/D
Salix spp.**	Willow	All zones (R)
Sapium		
sebiferum	Chinese Tallow Tree	
Stenocarpus		
sinuatus	Firewheel Tree	
Tipuana tipu	Tipu Trees	
Tristania conferta	Brisbane Box	C/I
Ulmus		
parvifolia	Chinese Elm	I/D
pumila	Siberian Elm	C/M
Umbellularia californica**	California Bay Laurel	C/I

BOTANICAL NAME	COMMON NAME	Climate Zone
SHRUBS		
Aloe species	Aloe	
Agapanthus africanus	Lily-of-the-Nile	
Agave		
americana	Century Plant	D
attenuata	Century Plant	D
deserti	Century Plant	
shawi**	Shawis Century Plant	D
Amorpha fruticosa**	False Indigobush	I
Arbutus		
menziesii**	Madrone	C/I
Arctostaphylos spp.**	Manzanita	C/I/D
Archtostapylos Emerald Carpet	Emerald Carpet Manzanita	
Artemisia douglasiana	Mugwort	
Atriplex**		
canescens	Hoary Saltbush	I
lentiformis	Quail Saltbush	D
Baccharis**		
glutinosa	Mule Fat	C/I
pilularis	Coyote Bush	C/I/D
Bougainvillea spp.	Bougainvillea	

BOTANICAL NAME	COMMON NAME	Climate Zone
Buxus microphylla 'Green Beauty'	Dwarf Boxwood	
Carissa grandiflora	Natal Plum	C/I
Carissa macrocarpa Green Carpet	Prostrate Natal Plum	
Ceanothus spp.**	California Lilac	C/I/M
Cistus spp.	Rockrose	C/I/D
Cneoridium dumosum**	Bushrue	C
Comarostaphylis** diversifolia	Summer Holly	C
Convolvulus cneorum	Bush Morning Glory	C/I/M
Cotoneaster lacteus	Parnys Red Clusterberry	
Dalea orcuttii	Orcutt's Delea	D
Dalea spinosa**	Smoke Tree	I/D
Dianela spp.	Flax Lily	
Dietes bicolor	Fortnight Lily	
Disctus Rivers	Royal Trumpet Vine	
Distictus buccinat oria	Blood-Red Trumpet Vine	
Echium fastuosum	Pride of Madeira	C/I/M
Elaeagnus pungens	Silverberry	C/I
Encelia** californica	Coast Sunflower	D/I
Encelia** farinose	White Brittlebush	
Epilobium californicum	California Fushcia	C/I
Eriobotrya deflexa	Bronze Loquat	C/I
Eriophyllum confertiflorum**	Golden Yarrow	C
Eriophyllum staechadifolium	Lizard Tail	C/I
Escallonia spp.	Escallonia	C/I/D
Feijoa sellowiana	Pineapple Guava	

BOTANICAL NAME	COMMON NAME	Climate Zone
Euryops pectinatus	Shrub Daisy	D
Fouqueria splendens	Ocotillo	I/M
Fremontodendron**		
californicum	Flannelbush	I
mexicanum	Southern Flannelbush	
Galvezia		C
juncea	Baja Bush-Snapdragon	C
speciosa	Island Bush-Snapdragon	
Garrya		C/I
elliptica	Coast Silktassel	I/M
flavescens**	Ashy Silktassel	
Heteromeles arbutifolia**	Ashy Silktassel	I/M
	Toyon	C/I/M
Isocoma menziesii	Goldenbush	
Lantana spp.	Lantana	C/I/D
Lotus scoparius	Deerweed	C/I
Mahonia spp.	Barberry	C/I/M
Malacothamnus clementinus	San Clemente Island Bush Mallow	C
fasciculatus**	Mesa Bushmallow	C/I
Melaleuca spp.	Melaleuca	C/I/D
Mimulus aurianticus	Pink Wisp Grass	
Mimulus spp.**	Monkeyflower	C/I (R)
Muhlenbergia caillaris	Pacifica Saltbush	
Myoporum pacificum	No Common Name	
Myoporum parvifolium	Myrtle	
Putah Creek Myrtus species	Heavenly Bamboo	
Nandina domestica		
Nolina	Parry's Nolina	
parryi	Wolf's Bear Grass	I
parryi ssp. wolfii	Rye Puffs	D
Pennisetum spatheolatum		

BOTANICAL NAME	COMMON NAME	Climate Zone
	Flax	
Phormium species	Photinia	
Photinia spp.		All Zones
Pittosporum	Karo	
crassifolium	Queensland Pittosporum	CI/I
rhombifolium	Wheeler's Dwarf	C/I
tobira 'Wheeleri'	Victorian Box	C/I/D
undulatum	Cape Pittosporum	C/I
viridiflorum	Cape Plumbago	C/I
Plumbago auriculata		C/I/D
Prunus	Carolina Laurel Cherry	
caroliniana	Hollyleaf Cherry	C
ilicifolia**	Catalina Cherry	C
lyonii**	Pomegranate Firethorn	C
Puncia granatum		C/I/D
Pyracantha spp.	Scrub Oak	All Zones
Quercus		
dumosa**	Italian Blackthorn	C/I
Rhamus	Coffeeberry	
alaternus	Rhaphiolepis	C/I
californica**	India Hawthorn	C/I/M
Rhaphiolepis spp.		C/I/D
Rhaphiolepis indica	Lemonade Berry	
	Pink-Flowering Sumac	
Rhus	Sugarbush squawbush	
integrifolia**		C/I
laurina lentii	Evergreen Currant	C/D
ovata**	Fuschia-Flowering Gooseberry	I/M I
trilobata**	Matilija Poppy	
Ribes		C/I
viburnifolium	California Wild Rose	C/I/D
speciosum**	Baja California Wild Rose	I
Romneya coulteri		
Rosa		C/I
californica**		C/I
minutifolia		
Salvia spp.**		
Salvia mellifera	Honey Sage	
Sambucus spp.**		
Strelitzia nicolia	Giant Bird of Paradise	
Strelitzia reginae	Bird of Paradise	
Symphoricarpos mollis**	Sage	All Zones
Syringa vulgaris	Elderberry	C/I/M
Tecomaria capensis	Creeping Snowberry	C/I

BOTANICAL NAME	COMMON NAME	Climate Zone
Teucrium fruticans	Lilac	M
~~Toxicodendron**~~Tecomaria capensis	Cape Honeysuckle	
~~diversilobum~~ Teucrium fruticans	Bush Germander	C/I/D
Trachelospermum jasminoides	Star Jasmine	C/I
Trachycarpus fortunei	Windmill Palm	
Verbena species	Verbena	
Verbena lilacina	Lilac Verbena	
Xylosma congestum	Shiny Xylosma	I/M
Yucca**		C
schidigera	Mojave Yucca	C/I
whipplei	Foothill Yucca	
Zamia furfuraccea	Cardboard Palm	D I

BOTANICAL NAME	COMMON NAME	Climate Zone
GROUNDCOVERS		
Achillea**	Yarrow	All Zones
Agapanthus Rancho White	White Lily-of-the-Nile	
Aptenia cordifolia	Apteria	C
Arctostaphylos spp.**	Manzanita	C/I/D
Baccharis**		
pilularis	Coyote Bush	C/I/D
Carex spp.	Sedge	
Ceanothus spp.**	California Lilac	C/I/M
Cerastium tomentosum	Snow-in-Summer	All Zones
Coprosma kirkii	Creeping Coprosma	C/I/D
Cotoneaster spp.	Redberry	All Zones
Cotoneaster dammeri Lowfast	Bearberry Cotoneaster	
Dichelostemma capitatum	Wild-Hyacinth	
Distichlis spicata	Salt Grass	
Drosanthemum hispidum	Rosea Ice Plant	C/I
Dudleya brittonii	Brittonis Chalk Dudleya	C

BOTANICAL NAME	COMMON NAME	Climate Zone
edulis	Lady's Fingers	
pulverulenta**	Chalk Dudleya	C/I
virens	Island Live Fore-ever	C
Eschscholzia californica**	California Poppy	All Zones
Euonymus fortunei		
'Carrierei'	Glossy Winter Creeper	M
'Coloratus'	Purple-Leaf Winter Creeper	M
Ferocactus viridescens**	Coast Barrel Cactus	C
Gaillardia grandiflora	Blanket Flower	All Zones
Gazania spp.	Gazania	C/I
Helianthemum spp.**	Sunrose	All Zones
Lantana spp.	Lantana	
Lasthenia		C/I/D
californica**	Common Goldfields	I
glabrata	Coastal Goldfields	C
Lavandula	English	
angustifolia	Lavender	
Layia platyglossa	Tips Miniature	
Lupinus spp.**	Lupine	C/I/M
Marathon 2e	Dwarf Tall	
	Fescue	
Paspalum vaginatum	Seashore	
'Aloha'	Paspalum	
Myoporum spp.	Myoporum	C/I
Nassella pulchra	Needle Grass	
Pyracantha spp.	Firethorn	All zones
Rosmarinus officinalis	Rosemary	C/I/D
Santolina		
chamaecyparissus	Lavender Cotton	All Zones
virens	Santolina	All Zones
Trifolium frageriferum	O'Connor's Legume	C/I
Verbena		
rigida	Verbena	All Zones
Viguiera laciniata**	San Diego Sunflower	C/I
Vinca		
minor	Dwarf Periwinkle	M

BOTANICAL NAME	COMMON NAME	Climate Zone
VINES		
Antigonon leptopus	San Miguel Coral Vine	C/I
Distictis buccinatoria	Blood-Red Trumpet Vine	C/I/D
Keckiella cordifolia**	Heart-Leaved Penstemon	C/I
Lonicera		
japonica 'Halliana'	Hall's Honeysuckle	All Zones
subspicata**	Chaparral Honeysuckle	C/I
Solanum		
jasminoides	Potato Vine	C/I/D

BOTANICAL NAME	COMMON NAME	Climate Zone
PERENNIALS		
Coreopsis	Giant Coreopsis	C
gigantean	Coreopsis	All Zones
grandiflora	Sea Dahlia	C
maritime	Coreopsis	C/I
verticillata	Island Coral Bells	C/I
Heuchera maxima	Douglas Iris	C/M
Iris douglasiana**	Poverty Weed	C/I
Iva hayesiana**	Red-Hot Poker	C/M
Kniphofia uvaria	Lavender	All Zones
Lavandula spp.		
Limonium californicum	Coastal Statice	C
var. mexicanum	Sea Lavender	C/I
perezii	Primrose	C/I/M
Oenothera spp.	Penstemon	C/I/D
Penstemon spp.**	Yerba Buena	C/I
Satureja douglasii		
Sisyrinchium	Blue-Eyed Grass	C/I
bellum	Golden-Eyed Grass	C
californicum		
Solanum		
xantii	Purple Nightshade	C/I
Zauschneria**		
californica	California Fuschia Hoary	C/I
cana	California Fuschia	C/I
'Catalina'	Catalina Fuschia	C/I

BOTANICAL NAME	COMMON NAME	Climate Zone
ANNUALS		
Lupinus spp.**	Lupine	C/I/M

APPENDIX F

Prohibited Plant List

UNDESIRABLE PLANT LIST

The following species are highly flammable and should be avoided when planting within the first 50 feet adjacent to a structure. The plants listed below are more susceptible to burning, due to rough or peeling bark, production of large amounts of litter, vegetation that contains oils, resin, wax, or pitch, large amounts of dead material in the plant, or plantings with a high dead to live fuel ratio. Many of these species, if existing on the property and adequately maintained (pruning, thinning, irrigation, litter removal, and weeding), may remain as long as the potential for spreading a fire has been reduced or eliminated.

BOTANICAL NAME	COMMON NAME
Abies species	Fir Trees
Acacia species	Acacia (trees, shrubs, groundcovers)
*Adenostoma sparsifolium***	Red Shanks
*Adenostoma fasciculatum***	Chamise
Agonis juniperina	Juniper Myrtle
Araucaria species	Monkey Puzzle, Norfolk Island Pine
*Artemesia californica***	California Sagebrush
Bambusa species	Bamboo
Cedrus species	Cedar
Chamaecyparis species	False Cypress
Coprosma pumila	Prostrate Coprosma
Cryptomeria japonica	Japanese Cryptomeria
Cupressocyparis leylandii	Leylandii Cypress
*Cupressus forbesii***	Tecate Cypress
Cupressus glabra	Arizona Cypress
Cupressus sempervirens	Italian Cypress
Dodonea viscosa	Hopseed Bush
*Eriogonum fasciculatum***	Common Buckwheat
Eucalyptus species	Eucalyptus
*Heterotheca grandiflora***	Telegraph Plant
Juniperus species	Junipers
Larix species	Larch
Lonicera japonica	Japanese Honeysuckle
Miscanthus species	Eulalia Grass
*Muhlenbergia species***	Deer Grass
Palmae species	Palms
Picea species	Spruce Trees
*Pickeringia Montana***	Chaparral Pea
Pinus species	Pines
Podocarpus species	Fern Pine
Pseudotsuga menziesii	Douglas Fir
Rosmarinus species	Rosemary
*Salvia mellifera***	Black Sage
Taxodium species	Cypress
Taxus species	Yew
Thuja species	Arborvitae
Tsuga species	Hemlock
*Urtica urens***	Burning Nettle

Schinus molle	Pepper Tree

** San Diego County native species

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APPENDIX G

Ignition-Resistant Construction Requirements

APPENDIX G
Ignition Resistant Construction Requirements

As of the date of this fire protection plan, the following are the requirements for ignition resistant construction for The Proposed Project, including requirements under Chapter 7A of the California Building Code (CBC). In addition, exterior building construction including roofs, eaves, exterior walls, doors, windows, decks, and other attachments must meet the most current CBC Chapter 7A ignition resistance requirements at the time of building permit application.

1. All structures will be built with a Class A roof assembly, including a Class A roof covering. Roofs shall have a roofing assembly installed in accordance with its listing and the manufacturer's installation instructions.
2. Where the roof profile allows a space between the roof covering and roof decking, the spaces shall be constructed to prevent the intrusion of flames and embers, be fire stopped with approved materials or have one layer of minimum 72 pound mineral-surfaced non-perforated cap sheet complying with ASTM D 3909 installed over the combustible decking. However, openings on barrel tiles or similar roof coverings, must be fire stopped (bird stopped) with approved materials to prevent the accumulation of debris, bird nests, etc. between the tiles and decking material.
3. When provided, exposed valley flashings shall be not less than 0.019-inch (No. 26 galvanized sheet gage) corrosion-resistant metal installed over a minimum 36-inch-wide underlayment consisting of one layer of minimum 72 pound mineral-surfaced non-perforated cap sheet complying with ASTM D 3909 running the full length of the valley.
4. All rain gutters, down spouts and gutter hardware shall be constructed from metal or other non-combustible material to prevent wildfire ignition along eave assemblies.
5. All chimney, flue or stovepipe openings attached to a fireplace, stove, or other solid or liquid fuel burning equipment or device shall be equipped with an approved spark arrester. An approved spark arrester is defined as a device intended to prevent sparks from escaping into the atmosphere and constructed of nonflammable materials, having a 12-gauge minimum thicknesses with openings no greater than ½ inch, or other alternative material the Fontana Fire Protection District determines to provide equal or better protection. It shall be installed to be visible for the purposes of inspection and maintenance.
6. The exterior surface materials shall be non-combustible, including hard or ignition resistant, such as stucco. In all construction, exterior walls shall extend from the top of the foundation to the roof and terminate at 2-inch nominal solid blocking between rafters at all roof overhangs, or in the case of enclosed eaves, terminate at the enclosure.
7. All eaves, fascias, and soffits will be enclosed (boxed) with non-combustible materials. This shall apply to the entire perimeter of each structure. Eaves of heavy timber construction are not required to be enclosed as long as attic venting is not installed in the

eaves. For the purposes of this section, heavy timber construction shall consist of a minimum of 4"x 6" rafter tails.

8. Paper-faced insulation shall be prohibited in attics or ventilated spaces.
9. Automatic interior fire sprinklers for single-family residences shall be installed according to the National Fire Protection Association (NFPA) 13D 2016 edition - *Standard for theInstallation of Sprinkler Systems in One and Two-family Homes and Manufactured Homes*.
10. Roof vents, dormer vents, gable vents, foundation ventilation openings, ventilation openings in vertical walls, or other similar ventilation openings shall be louvered. Turbine attic vents shall be prohibited.

    Specialized vents with baffle systems or other methods to catch burning embers, such as Brandguard (www.brandguardvents.com) or approved equivalent shall be considered by the San Diego County Fire Authority and Building Official for all structure vents on all homes/garages in the Proposed Project.

11. Attic or foundation ventilation louvers or ventilation openings in vertical walls shall not exceed 144 square inches per opening.
    Ventilation louvers and openings may be incorporated as part of access assemblies.
12. No attic ventilation openings or ventilation louvers shall be permitted in soffits, in eave overhangs, between rafters at eaves, or in other overhanging areas.
13. All fences and gate assemblies (fences, gates, and fence posts) attached or within five feet of a structure shall be of non-combustible material or pressure-treated exterior fire-retardant wood.
14. All projections (exterior balconies, decks, patio covers, unenclosed roofs and floors, and similar architectural appendages and projections) or structures less than five feet from a building shall be of non-combustible material, one-hour fire resistive construction on the underside, heavy timber construction, pressure-treated exterior fire- retardant wood or ignition resistant construction. When such appendages and projections are attached to exterior fire- resistive walls, they shall be constructed to maintain same fire-resistant standards as the exterior walls of the structure.
15. Accessory structures attached to buildings with habitable spaces and projections shall be in accordance with Chapter 7A of the CBC.

16. Detached accessory structures located less than 50 feet from a building containing habitable space shall be constructed in accordance with Chapter 7A of the CBC.
17. Exterior doors shall be approved non-combustible construction, solid core wood and shall conform to the performance requirements of standard SFM 12-7A-1 or shall be of approved noncombustible construction, or solid core wood having stiles and rails not less than 1⅜ inches thick with interior field panel thickness no less than 1¼ inches thick, or shall have a fire-resistance rating of not less than 20 minutes when tested according to National Fire Protection Association (NFPA) 252.
18. All glass or other transparent, translucent or opaque glazing materials, that is used in exterior windows, including skylights, or exterior glazed door assemblies shall be constructed of multipane glazing with one tempered pane meeting the requirements of Section 2406 (2013 CBC) Safety Glazing. .
19. Vinyl window assemblies are deemed acceptable if the windows have the following characteristics:

    Frame and sash are comprised of vinyl material with welded corners

    Metal reinforcements in the interlock area

    Glazed with insulating glass, annealed or tempered (one layer of which must be tempered glass).

    Frame and sash profiles are certified in AAMA Lineal Certification Program.

    Certified and labeled to ANSI/AAMA/NWWDA 101/LS2-97 for Structural Requirements.

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APPENDIX H

Rancho Santa Fe Fire Protection District
Plant and Landscape Guide

Plant and Landscape Guide

Lady Bank's Rose

Rancho Santa Fe, California, is considered to be in a very high fire hazard severity zone because of its unique characteristics. It is considered a Wildland Urban Interface area because of the proximity of the natural chaparral vegetation to developed areas, often immediately abutting structures. Additionally, warm coastal weather, Santa Ana winds, mountainous terrain, and steep slopes contribute to the very high fire hazard severity zone designation.

In an effort to protect homes from a future devastating Wildland fire such as the ones experienced in 2003 and 2007, the Rancho Santa Fe Fire Protection District (RSFFPD) does not allow certain types of trees, plants, or shrubs to be planted within certain distances of structures. This booklet contains valuable information pertaining to both desirable and undesirable trees, shrubs, ground covers, vines, roadway clearances, and palm trees. The goal is to educate the public on RSFFPD's ordinances regarding landscaping so they can increase the the chances of their home surviving a wildfire. Please feel free to contact the Fire District if you have any questions, comments, or concerns.

Please Note:

1. THIS IS NOT A COMPREHENSIVE LIST. This booklet is intended to simply guide the public on what types of trees and shrubs are acceptable within the Fire District. Other trees and shrubs not listed may also be acceptable upon approval by the RSFFPD.

2. Trees listed as requiring 30-foot spacing from the drip line to the structure are considered non-fire resistive trees by the RSFFPD. Consult a design professional or the Fire District for site-specific questions regarding tree placement.

3. Trees that grow near power lines pose a potential electrical hazard. San Diego Gas & Electric (SDG&E) is required by law to maintain minimum clearances between all vegetation and power lines. No tree should be allowed to grow within 10 feet of electrical conductors. SDG&E provides a list of suggested trees species that are appropriate to grow under or adjacent to power lines. This list, along with other information regarding SDG&E Vegetation Management, can be found at http://www.sdge.com/safety/tree-safety/healthy-trees-healthy-community.

Silk Oak

Henkel's Yellowwood

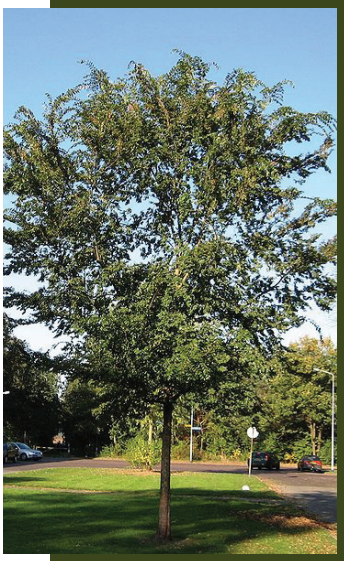
All photo credits are listed on the back of this booklet.

Canopy Trees: Broad spreading trees that make good accent trees

Grow 25-50 ft. tall and should be spaced 30-40 ft. apart

Botanical Name	Common Name	Drip line to Structure (ft.)	Evergreen or Deciduous
Albizia julibrissin	Silk Tree	10	D
Chorisia speciosa	Silk Floss Tree	10	D
Cinnamomum camphora	Camphor Tree	10	E
Erythrina species	Coral Tree	10	D
Ficus species		10	D
Jacaranda mimosifolia	Jacaranda	10	D
Koelreuteria paniculata	Golden Raintree	10	D
Melaleuca linariifolia	Paperbark	10	E
Pinus halepensis	Aleppo Pine	30	E
Platanus acerifolia	Sycamore	10	D
Phoenix canariensis	Canary Island Date Palm	30	E
Podocarpus gracilior	Fern Pine	10	E
Pyrus kawakamii	Evergreen Pear	10	E
Quercus species	Oak	10	E
Rhus lancea	African Sumac	10	E
Robinia pseudoacacia	Black Locust	10	D
Schinus species	Pepper Tree	30	E
Spathodea campanulata	African Tulip Tree	10	D
Tipuana tipu	Tipu Tree	10	D
Ulmus parvifolia	Chinese Elm	10	D
Zelkova serrata	Sawleaf Zelkova	10	D

African Tulip Tree



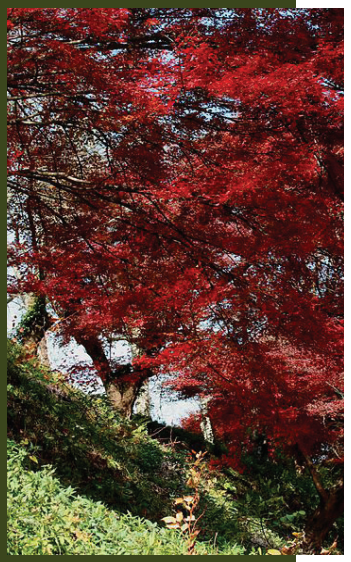
Chinese Elm

Vertical Growing Trees: Upright character and are good choices for narrow areas

Grow up to 30 ft. tall and should be spaced 20-30 ft. apart

Botanical Name	Common Name	Drip line to Structure (ft.)	Evergreen or Deciduous
Betula pendula	European White Birch	10	D
Brachychiton populneus	Bottle Tree	10	D
Callistemon viminalis	Weeping Bottle Brush Tree	30	E
Dracaena draco	Dragon Tree	10	E
Hymenosporum flavum	Sweetshade Tree	10	E
Maytenus boaria	Mayten	10	E
Melaleuca quinquenervia	Paperbark Tree	10	E
Metrosideros tomentosa	New Zealand Christmas Tree	10	E
Tristania conferta	Brisbane Box Tree	10	E

Dragon Tree



Japanese Maple

Redbud

Pomegranate

Ornamental Trees: Various canopy heights and widths that serve many uses such as accent trees

Grow 15-40 ft. tall and should be spaced 20-25 ft. apart

Botanical Name	Common Name	Drip line to Structure (ft.)	Evergreen or Deciduous
Acer palmatum	Japanese Maple	10	D
Agonis flexuosa	Peppermint Tree	10	E
Arbutus unedo	Strawberry Tree	10	E
Avocado species		30	E
Bauhinia species	Orchid Tree	10	D
Cassia leptophylla	Gold Medallion Tree	10	D
Cercis canadensis	Eastern Redbud	10	D
Citrus species		10	E
Cupaniopsis anacardioides	Carrotwood Tree	10	E
Geijera parvifola	Australian Willow	10	E
Lagerstroemia indica	Crape Myrtle	10	D
Lagunaria patersonii	Primrose Tree	10	E
Magnolia species		10	E/D
Olea europaea	Olive Tree	10	E
Pistacia chinensis	Chinese Pistache	10	D
Prunus species		10	E/D
Pyrus species	Ornamental Pear	10	E/D
Tabebuia species	Trumpet Tree	10	E/D

Low-Multi Branching Trees: Large shrubs and small tree forms good for under-story screening

Grow 10-25 ft. tall and should be spaced 15-20 ft. apart

Botanical Name	Common Name	Drip line to Structure (ft.)	Evergreen or Deciduous
Acacia species		30	E
Eriobotrya deflexa	Bronze Loquat	10	E
Feijoa sellowiana	Guava	10	E
Melaleuca nesophila	Pink Melalueca	10	E
Myoporum laetum		10	E
Pittosporum undulatum	Victorian Box	10	E
Punica granatum	Pomegranate	10	D
Thevetia thevetioides	Giant Thevitia	10	E

Tall Skyline Trees: Dramatic silhouettes against the skyline

Grow 40-70 ft. tall and should be spaced 30-40 ft. apart

Botanical Name	Common Name	Drip line to Structure (ft.)	Evergreen or Deciduous
Acer macrophyllum	Bigleaf Maple	10	D
Alnus rhombifolia	White Alder Tree	10	D
Cedrus species	Cedar Tree	30	E
Eucalyptus species		30	E
Fraxinus species	Ash Tree	10	D
Grevillea robusta	Silk Oak	10	D
Liriodendron tulipifera	Tulip Tree	10	D
Liquidambar species	Sweet Gum	10	D
Pinus canariensis	Canary Island Pine	30	E
Pinus torreyana	Torrey Pine	30	E
Platanus racemosa	Sycamore	10	D
Populus fremontii	Western Cottonwood	10	D
Populus nigra	Lombardy Poplar	10	D

Sycamore

Palm Trees: Vary from single to multiple trunks

Grow 20-100 ft. tall and should be spaced 20-40 ft. apart

Botanical Name	Common Name	Drip line to Structure (ft.)	Evergreen or Deciduous
Archontophoenix alexandrae	Alexandra Palm	10	E
Archontophoenix cunninghamiana	King Palm	10	E
Brahea armata	Blue Hesper Palm	30	E
Brahea edulis	Guadalupe Palm	30	E
Chamaerops humilis	Mediterranean Fan Palm	30	E
Cycas revoluta	Sago Palm	10	E
Howea forsteriana	Kentia Palm	30	E
Phoenix canariensis	Canary Island Date Palm	30	E
Phoenix dactylifera	Date Palm	30	E
Phoenix reclinata	Senegal Date Palm	30	E
Phoenix roebelenii	Pygmy Date Palm	30	E
Syagrus romanzoffianum	Queen Palm	10	E
Trachycarpus fortunei	Windmill Palm	30	E
Washingtonia filifera	California Fan Palm	30	E
Washingtonia robusta	Mexican Fan Palm	30	E
*All other Palm species	Various Palms	30	E

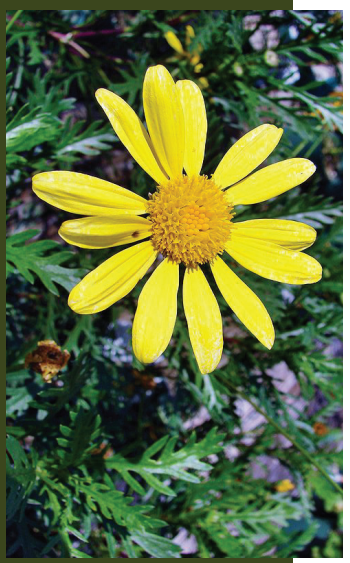
King Palm

Kentia Palm

*Shall be planted a minimum 30 feet away from any combustible structure. The Fire Department may make exceptions for various species they deem as being more fire-resistant.

Pride of Madiera

Bronze Loquat



Shrub Daisy

Shrubs

Botanical Name	Common Name
Abelia grandiflora	Glossy Abelia
Abutilon palmeri	Indian Mallow
Aesculus californica	California Buckeye
Alyogyne huegelii	Blue Hibiscus
Atriplex canescens	Four-wing Saltbush
Atriplex glauca	Saltbush
Atriplex lentiformis	Quail Saltbush
Baccharis glutinosa	Mule Fat
Baccharis pilularis	Coyote Bush
*Bamboo Species	
Buxus species	Boxwood
Carissa grandiflora	Natal Plum
Ceanothus spp.	California Lilac
Cistus spp.	Rockrose
Coprosma repens	Mirror Plant
*Dicksonia antartica	Tasmanian Tree Fern
Echium candicans	Pride of Madiera
Elaeagnus pungens	Silverberry
Encelia californica	California Sunflower
Eriobotrya deflexa	Bronze Loquat
Eriophyllum confertiflorum	Golden Yarrow
Escallonia spp.	Escallonia
Euryops pectinatus	Shrub Daisy
Feijoa sellowiana	Pineapple Guava
Galvezia speciosa	Bush Snapdragon
Heteromeles arbutifolia	Toyon
Ilex species	Holly
Lavandula spp.	Lavender
Leptospermum scoparium	New Zealand Tea Tree
Ligustrum japonicum	Japanese Privot
Mahonia aquifolium	Oregon Grape
Myoporum laetum	Myoporum
Myrtus communis	Myrtle
Nerium Oleander	Dwarf Oleander
Photina spp.	Photina
Pittosporum tobria	Tobria
Plumbago auriculata	Cape Plumbago
Podocarpus henkelii	Henkel's Yellowwood
Prunus caroliniana	Carolina Laurel Cherry

*Shall be planted a minimum 30 feet away from any combustible structure. The Fire Department may make exceptions for various species they deem as being more fire-resistant.

Prunus ilicifolia	Hollyleaf Cherry
Punica granatum	Pomegranate
Pyracantha species	Firethorn
Quercus dumosa	Coast Scrub Oak
Rhamnus californica	Coffeeberry
Rhaphiolepis indica	India Hawthorn
Rhus integrifolia	Lemonadeberry
Ribes speciosum	Fuchsia-flowered Gooseberry
Rosa species	Rose
Rosa banksiae	Lady Bank's Rose
Salvia greggii	Autumn Sage
Salvia leucantha	Mexican Bush Sage
Santolina chamaecyparissus	Lavender Cotton
Trichostema lanatum	Wooly Blue Curls
Westringia fruticosa	Coast Rosemary
Xylosma congestum	Shiny Xylosma

Perennials

Botanical Name	Common Name
Achillea species	Yarrow
Agapanthus species	Lily-of-the-Nile
Amaryllis belladonna	Naked Lady
Anigozanthos species	Kangaroo Paw
Artemisia "powis castle"	Wormwood
Baileya multiradiata	Desert Marigold
Camissonia cheiranthifolia	Beach Evening Primrose
Camellia species	Camellia
Clivia miniata	Clivia
Coreopsis grandiflora	Large-Flowered Tickseed
Coreopsis maritime	Sea Dahlia
Dietes species	Fortnight Lily
Felicia ammeloides	Blue Marguerite
Heuchera species/hybrids	Coral Bells
Iris douglasiana	Pacific Coast Iris
Kniphofia uvaria	Red-hot Poker
Lantana species	Lantana
Limonium perezii	Sea Lavender
Narcissus species	Daffodil
Oenothera species	Primrose
Penstemon species	Beardtongue
Senecio cineraria	Dusty Miller
Sisyrinchium bellum	Blue-eyed Grass
Tagetes lemmonii	Mountain Marigold
Tulbaghia violacea	Society Garlic

Lavender Cotton

Kangaroo Paw

Blue-eyed Grass

Carpet Bugle

Natal Plum

Trailing Rosemary

Ground Covers

Botanical Name	Common Name
Ajuga reptans	Carpet Bugle
Aptenia cordifolia	Red Apple Iceplant
Arctostaphylos edmundsii 'Little Sur'	Little Sur Manzanita
Arctostaphylos hookeri 'Monterey carpet'	Monterey Carpet Manzanita
Baccharis pilularis 'Twin Peaks' or 'Pigeon Point'	Coyote Bush
Carex species	Sedge
Carissa macrocarpa	Natal Plum
Ceanothus griseus horizontalis	Ceanothus
Cerastium tomentosum	Snow-in-summer
Delosperma alba	White Trailing Iceplant
Delosperma cooperi	Pink Carpet
Dymondia margaretea	Silver Carpet
Erigeron karvinskianus	Fleabane, Mexican Daisy
Fragaria chiloensis	Wild Strawberry
Gazania hybrids	Gazania species
Hedera helix	English Ivy
Lampranthus species	Iceplant
Lantana montevidensis	Lantana
Mahonia repens	Creaping Mahonia
Malephora crocea	Iceplant
Malephora luteola	Iceplant
Myoporum parvifolium	Myoporum
Oenothera berlandieri	Mexican Evening Primrose
Oenothera stubbei	Saltillo Evening Primrose
Osteospermum fruticosum	Trailing African Daisy
Pelargonium peltatum	Ivy Geranium
Rosmarinus officinalis 'Prostratus'	Trailing Rosemary
Sagina subulata	Irish Moss
Sedum brevifolium	Stonecrop
Sedum confusum	Stonecrop
Sedum rubrotinctum	Pork and Beans
Senecio mandraliscae	Blue Chalk Sticks
Thymus species	Thyme
Verbena species	Verbena
Vinca minor	Periwinkle
Vinca minor alba	White Periwinkle

Vines

Botanical Name	Common Name
Bougainvillea species	Bougainvillea
Calliandra haematocephala	Pink Powder Puff
Clematis species	Clematis species
Clytostoma callistegioides	Violet Trumpet Vine
Distictis buccinatoria	Blood-red Trumpet Vine
Distictis 'Rivers'	Royal Trumpet Vine
Grape species	Wine Grapes
Hardenbergia comptoniana	Lilac Vine
Hedera helix	English Ivy
Ipomoea tricolor	Morning Glory
Mandevilla hybrids	Mandevilla
Pandorea jasminoides	Bower Vine
Parthenocissus tricuspidata	Boston Ivy
Passiflora species	Passion Vine
Rosa species	Climbing Rose types
Thunbergia gregorii	Orange Clock Vine
Trachelospermum jasminoides	Star Jasmine
Vitis californica	California Wild Grape
Wisteria sinensis	Chinese Wisteria

Clematis

Aloe

Succulents and Cacti

Botanical Name	Common Name
Aeonium species	
Agave species	
Aloe species	
Cereus peruvianus	Peruvian Apple Cactus
Crassula argentea	Jade Plant
Dudleya species	
Echeveria species	Hen and Chicks
Euphorbia species	
Kalanchoe blossfeldiana	Kalanchoe
Opuntia species	Cacti
Sansevieria trifasciata	Mother-in-law's Tongue
Sedum species	Stonecrop
Yucca gloriosa	Spanish Dagger

Mother-in-law's Tongue

Palm Trees

Following the 2007 wildfires, it was determined that certain species of palms increased the fire hazard due to tree form and lack of maintenance. The following is the Rancho Santa Fe Fire Protection District requirements for palm trees.

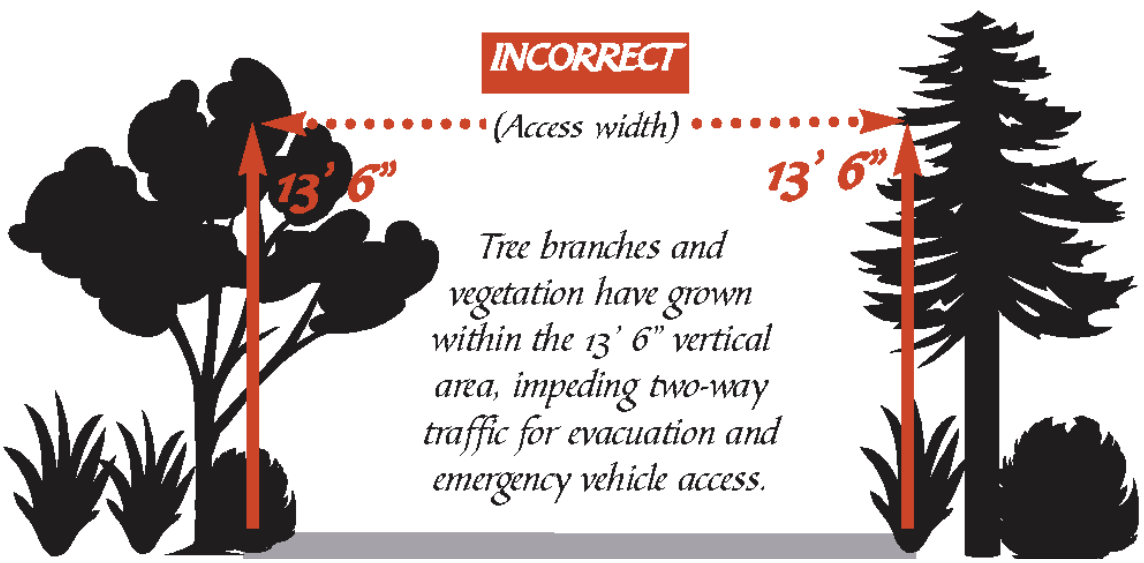
Palm Tree Requirements (Local Policy). Palm Trees that have fibrous tissue (Photograph 1) or leaf bases (Photograph 2) on the trunk shall be planted and maintained 30 feet from the tree's drip line to any combustible structure. Some examples of tree species with fibrous tissue include:

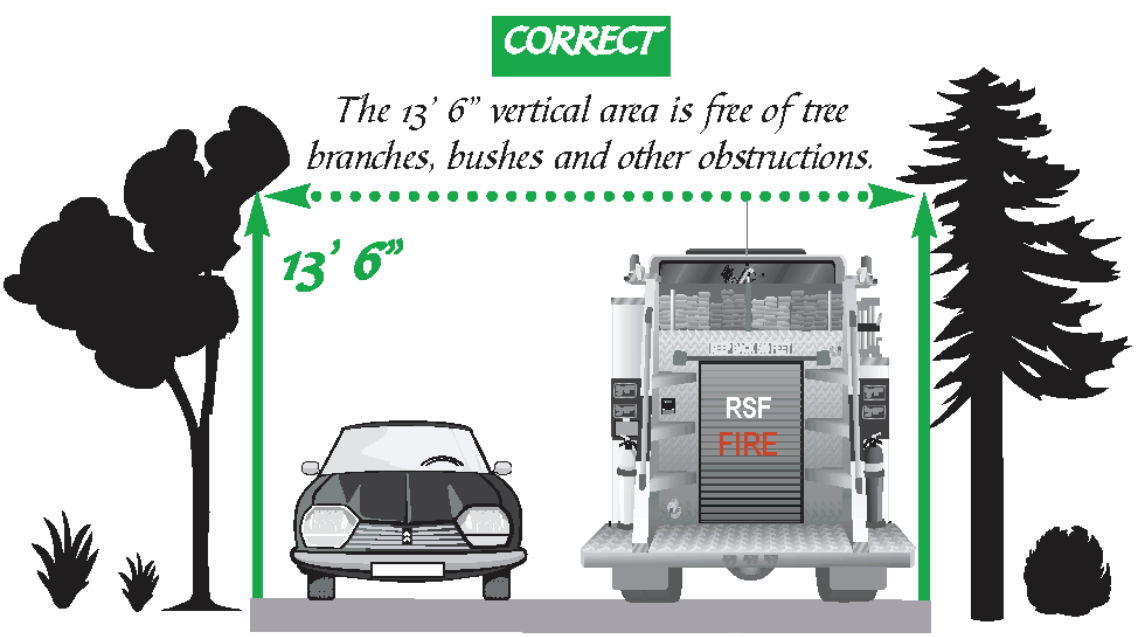
Chamaerops humilis (Mediterranean Fan Palm)
Phoenix canariensis (Canary Island Date Palm)
P. dactylifera (Date Palm)
P. reclinata (Senegal Date Palm)
P. roebelenii (Pygmy Date Palm)
Trachycarpus fortunei (Windmill Palm)

The Washingtonia robusta (Mexican Fan Palm) is an example of a palm tree with leaf bases. All dead palm fronds including older leaves that persist on the tree, forming a "skirt" of brown thatch (Photograph 3) shall be removed annually; this requirement applies to palms within 100 feet of any structure or within 30 feet of a driveway or roadway.

Vertical Clearance

To provide safer wildfire evacuation routes for residents and adequate access routes for fire engines, all roadways must be free of obstructions. Start at the edge of the improved roadway/driveway surface and measure 13 feet, 6 inches straight up from the gournd. This area must remain free of obstructions like overhanging tree branches, vegetation, signs, gates, etc.





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Page 3 *African Tulip Tree: Source - http://www.naturform.ch; Chinese Elm: Public Domain; Dragon Tree: Photo - Esculapio, Source - Wikipedia*

Page 4 *Japanese Maple: Public Domain; Redbud: Courtesy of Missouri Botanical Garden PlantFinder; Pomegranate: Photo - JoJan, Source: Wikipedia*

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Page 6 *Pride of Madiera: Photo - Velela, Source: Wikipedia; Bronze Loquat: Public Domain; Shrub Daisy: Photo - Forest and Kim Starr*

Page 7 *Lavender Cotton: Public Domain; Kangaroo Paw: Photo - Forest and Kim Starr, Source - Wikipedia; Blue-eyed Grass: Public Domain*

Page 8 *Carpet Bugle: Photo - Jerzy Opiola, Source - Wikipedia; Natal Plum: Photo - Forest and Kim Starr, Source - Wikipedia; Training Rosemary: Photo - Fir0002/Flagstaffotos, Source - Wikipedia*

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