Appendix R1
Fire Protection Plan

Fire Protection Plan

Carlton Oaks Project

JANUARY 2025

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Printed on 30% post-consumer recycled material.

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Acronyms and Abbreviations

Acronym/Abbreviation	Definition
AMSL	Above Mean Sea Level
BTU	British Thermal Unit
CAL FIRE	California Department of Forestry and Fire Protection
CBC	California Building Code
CC&R	Covenants, Conditions, and Restrictions
CEQA	California Environmental Quality Act
CFC	California Fire Code
City	City of Santee
County	County of San Diego
FAHJ	Fire Authority Having Jurisdiction
FMZ	Fuel Modification Zone
FEMA	Federal Emergency Management Agency
FMZ	Fuel Modification Zone
FPP	Fire Protection Plan
FRAP	Fire and Resource Assessment Program
GIS	Geographic Information Systems
HOA	Homeowner's Association
HFHSZ	High Fire Hazard Severity Zone
ISO	Insurance Service Office
LRA	Local Responsibility Area
LPG	Liquid Propane Gas
MPH	Miles Per Hour
MFHSZ	Moderate Fire Haard Severity Zone
NFPA	National Fire Protection Association
PDMWD	Padre Dam Municipal Water District
PA	Planning Area
Project	Carlton Oaks Project
RAWS	Remote Automated Weather Station
SFD	Santee Fire Department
USGS	United States Geological Survey
VHFHSZ	Very High Fire Hazard Severity Zone
WUI	Wildland Urban Interface
WEA	Wireless Emergency Alert

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Executive Summary

This Fire Protection Plan (FPP) has been prepared for the Carlton Oaks Project (Project) within the City of Santee, San Diego County, California. This FPP evaluates and identifies the potential fire risk associated with the Project's land uses and identifies requirements for water supply, fuel modification and defensible space, secondary access, building ignition and fire resistance, fire protection systems, and wildfire emergency pre-planning, among other pertinent fire protection criteria. The purpose of this plan is to generate and memorialize the fire safety requirements of the City of Santee along with project-specific measures based on the site, its intended use, and its fire environment.

The Project site encompasses approximately 165 acres in the City of Santee (100.6 acres) and a portion (64.2 acres) in the City of San Diego , California. The Project is proposing to redevelop the existing Country Club and 52-room hotel, into a recreational-oriented mixed-use resort community. The Project will include an improved golf course, clubhouse, hotel, pro shop, practice area, tournament hall, and residential accessory uses.

The Project Site is within a wildland urban interface (WUI) location that is in an area statutorily designated a Local Responsibility Area (LRA) with portions of the Project site classified as a Very High Fire Hazard Severity Zone (VHFHSZ) by the California Department of Forestry and Fire Protection (CAL FIRE); however, a small portion of the Project's westernmost developed area (approximately 10% of the site – planned for residential units) is within the VHFHSZ, while the majority of the project's developed areas are outside designated FHSZs. Fire hazard designations are based on topography, vegetation, and weather, amongst other factors with more hazardous sites including steep terrain, unmaintained fuels/vegetation, and WUI locations. The Project proposes to redevelop the existing Country Club and 52-room hotel, into a recreational-oriented mixed-use resort community. The Project will include an improved golf course, clubhouse, hotel, pro shop, practice area, tournament hall, and residential accessory uses. The land is generally flat on the west side and mountainous sloping on the east side. The Project site is bordered on the north by Carlton Oaks Drive and existing residential development, to the west and south by SR-52, and a mix of residential, commercial, and open space to the east. The area, like all of San Diego County, is subject to seasonal weather conditions that can heighten the likelihood of fire ignition and spread; however, the Project would implement a system of fire protection features that would reduce the overall risk of ignition.

The Project is accessed by Carlton Oaks Drive from the north and West Hills Parkway from the west. The Project has been designed with fire protection as a key objective. The Project site improvements are designed to facilitate emergency apparatus and personnel access onsite. Driveway and road improvements with fire engine turnarounds provide access to within 150 feet of all sides of every building. Residential water availability and flow will be consistent with City of Santee requirements including fire flow and duration. These features along with the ignition resistance of all buildings, the automatic interior fire sprinkler systems, and the pre-planning, training and resident awareness will assist responding firefighters through prevention, protection and suppression capabilities. As detailed in this FPP, the Project site's fire protection system will include a redundant layering of protection methods that have proven to reduce overall fire risk. The requirements and recommendations included herein are performance oriented and specific to the Project site, based on its unique characteristics rather than a prescriptive, one-size-fits-all approach. The fire protection system is designed to reduce the wildfire risk to onsite structures, to minimize risks associated with typical uses, and aid the responding firefighters during an emergency. No singular measure is intended to be relied upon for the Project's fire protection, but rather, a system of fire protection measures, methods, and features combine to result in enhanced fire safety, reduced fire potential, and a prepared community.

This document provides an analysis of the Project site's fire environment and its potential impact on the Project as well as the Project's potential impact on the existing fire protection service in the area. Requirements and recommendations herein are based on site-specific fire environment and Project characteristics and incorporate input from the Santee Fire Department (SFD), local fire personnel, area fire planning documents, site risk analysis, and standard principles of fire protection planning.

The Project site is within the jurisdiction of the SFD, and the closest fire station to the Project site is SFD Station 5. The SFD operates two fire stations that could respond to an incident onsite in under 10 minutes travel time, one of which could reach the most remote portion of the site within 2 minutes and 47 seconds (Station 5). In addition, automatic/mutual aid agreements are in place with neighboring fire agencies to augment response, especially at the fringe area of SFD's jurisdiction.

The structures in the Proposed Project would be built to ignition-resistant standards per the California Fire and Building Codes and the Santee Municipal Code in effect at the time of building permit issuance. Chapter 7-A of the California Building Code and Santee's adopted Municipal Code focuses on structure ignition resistance from flame impingement and flying embers. Construction will include enhanced ignition resistant construction features, the installation of automatic interior residential fire sprinkler systems (conforming to NFPA 13-D requirements), appropriate fire flow and water capacity, roads, and supporting infrastructure. The Project would establish a 100-foot fuel modification and defensible space areas for proposed structures, and fast fire response travel times. The recommendations and conditions provided herein are also consistent with the lessons learned from After Fire Action Reports from numerous fires occurring over the last roughly 20 years, including the 2003, 2007, 2014, and 2017 San Diego County Fires. When it became clear that specifics of how homes were built, how fire and embers ignited homes, what effects fuel modification had on structure ignition, how fast firefighters could respond, and how much (and how reliable) water was available, were critically important to structure survivability, the Fire and Building codes were revised appropriately.

As determined during the analysis of the Project site and its fire environment, in its current condition, is considered to include characteristics that, under favorable conditions, have the potential to facilitate fire spread. Under extreme conditions, wildfires originating in the nearby mountain side could burn erratically and aggressively and result in significant ember production. Once the Project is constructed, the on-site fire potential will be significantly lower than its current condition due to conversion of areas of wildland fuels to managed landscapes, fuel modification areas, improved accessibility to firefighting personnel and equipment, and new structures built to the latest ignition resistant codes. However, it is anticipated that fire will occasionally encroach upon the Project site and subject its structures to wildfire. This FPP contemplates wildfire encroachment and provides specific requirements that will minimize the potential for structural damage.

Early evacuation for any type of wildfire emergency near the Project Site is the preferred method of providing for resident safety, consistent with the City's current approach. As such, each property owner will be individually responsible to adopt, practice, and implement a "Ready, Set, Go!"[1] approach to site 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 site's fire protection systems, and implementing a conservative (evacuate as early as possible) approach to evacuation and site uses during periods of fire weather extremes.

[1] https://www.readyforwildfire.org/prepare-for-wildfire/ready-set-go/

1 Introduction

This Fire Protection Plan has been prepared for the proposed Carlton Oaks Project in the western portion of the City of Santee (City) of San Diego County (County), California with small portions of the Project within City of San Diego. The purpose of this FPP is to assess the potential impacts resulting from wildland fire hazards and identify the measures necessary to adequately mitigate those impacts. This FPP provides specific measures for fire protection which meet or provide equivalent protection as 2022 California Fire and ignition-resistant Building Codes. It also identifies the fire risk associated with proposed land uses, and identifies requirements for fuel modification, building design and construction, and other pertinent development infrastructure criteria for fire protection. The purpose of this plan is to generate and memorialize the fire safety requirements of the Fire Authority Having Jurisdiction (FAHJ), which is the Santee Fire Department (SFD). These requirements are based on Project site-specific characteristics and incorporate input from the Project's developer/applicant, planners, engineers, and architects, fire protection planners, as well as the City.

As part of the assessment, this fire protection plan has considered the property location, topography, surrounding combustible vegetation (fuel types), climatic conditions, and fire history. This FPP also addresses water supply, access (including secondary access), structural ignitability and fire resistive building features, fire protection systems and equipment, impacts to existing emergency services, defensible space, and vegetation management. Further, this plan identifies fuel modification zones and recommends the types and methods of treatment that will protect the Project's homeowners and essential infrastructures. The FPP recommends measures that the property owner, developer, and builders will implement to reduce the probability of ignition to the structures throughout the area addressed by the plan.

The following tasks were performed toward completion of this plan:

- Gather Project site specific climate, terrain, and fuel data.
- Collect Project site photographs.
- Process and analyze the data using the latest Geographic Information Systems (GIS) technology.
- Predict fire behavior using scientifically based fire behavior models, comparisons with actual wildfires in similar terrain and fuels, and experienced judgment.
- Analyze and guide design of proposed infrastructure.
- Analyze the existing emergency response capabilities.
- Assess the risk associated with the Project and the Project site; and
- Prepare this FPP detailing how fire risk will be mitigated through a system of fuel modification, homeowner education, structural ignition resistance enhancements, and fire protection delivery system upgrades.

Field observations were utilized to augment existing digital on-site data in generating the fire behavior models and formulating the recommendations presented in this FPP. Refer to Appendix A for Project site photographs of existing on-site conditions.

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 commercial development.

1.2 Applicable Codes and Existing Regulations

This FPP demonstrates that the Project would comply with applicable portions of the City of Santee Municipal Code and Ordinance No. 570. The Project would also be consistent with the Santee adopted version of the 2022 California Building Code, Chapter 7A, 2022 California Fire Code, Chapter 49, 2019 California Referenced Standards Code Chapter 1-7A, and 2022 California Residential Code, Section R327 as adopted by City of Santee. Future construction will comply with the most current adopted codes and ordinances in effect at the time of building permit issuance.

Chapter 7-A of the California Building Code (CBC) focuses primarily on preventing ember penetration into homes, a leading cause of structure loss from wildfires. Thus, it is an important component of the requirements of this FPP given the Project site's WUI location and that a portion of the Project site is within an area statutorily designated a VHFHSZ by CAL FIRE (FRAP 2018). Fire hazard designations are based on topography, vegetation, and weather, amongst other factors with higher hazard category sites including steep terrain, unmaintained fuels/vegetation, and WUI locations. Projects situated in VHFHSZs require fire hazard analysis and application of fire protection measures that have been developed to specifically result in defensible communities in these WUI locations. It should be noted that roughly 70 percent of San Diego County is designated as VHFHSZ. The areas that have not received this designation are primarily the urbanized areas. The fact that an area is designated as a VHFHSZ does not preclude development but indicates that additional measures are required to address the increased likelihood of wildfire (CAL FIRE 2025). However, it is worth noting that approximately 10% of the project site planned for residential and golf course redevelopment is within VHFHSZ, approximately 25% of the site planned for golf course redevelopment is within HFHSZ or MFHSZ, and the remainder of the site is outside of designated FHSZs. The Project incorporates all the required measures and provides for a comprehensive wildfire protection approach that has been shown to perform well in wildfires.

1.3 Project Summary

1.3.1 Project Location

As depicted in Figure 1, Project Location Map, the Carlton Oaks Project is located at 9200 Inwood Drive, which is on the south side of Carlton Oaks Drive and the east side of West Hills Parkway. The Project consists of approximately 100.54 acres of land located within the City of Santee, and approximately 64.29 acres within the City of San Diego, for a total of 164.83 acres. The Project is adjacent to State Route 52 and Carlton Oaks Drive. The Project site is in Township 15S, Range 1W of the U.S. Geological Survey (USGS) "La Mesa" 7.5-minute quadrangle map (USGS 2018).

The Project is located within the Carlton Oaks Country Club property as described in the General Plan. A portion of the Project site is designated as a Planned Development and the other portion is designated as Open Space/Recreation. It should be noted that portions of the Open Space/Recreation (golf course) are located within both the City of Santee and the City of San Diego; however, the land uses located within the City of San Diego will remain the same and are consistent with the respective cities' general plan.

A small portions of the Project site is within an area statutorily designated a Local Responsibility Area (LRA) Very High, High or Moderate Fire Hazard Severity Zone by the California Department of Forestry and Fire Protection (CAL FIRE) (Figures 2a and 2b, Fire Hazard Zone Severity Maps). While the Development Footprint largely avoids these areas, with the exception of residences and golf course area in the west, the Project will implement Chapter 7A of the CBC for development in a WUI within a VHFHSZ. The proposed fire protection measures for the Project will meet or under certain circumstances, exceed all applicable fire and building codes requirements.

1.3.2 Project Description

The proposed Project site that will be developed is located on approximately 165 acres and would include the following components: (1)) redesign of the golf course, (2) reconstruction of the clubhouse and pro shop, practice area, and learning center structure; (3) a hotel and associated cottages; (4) residential accessory uses consisting of two residential neighborhoods with open space areas; and (5) related on-site infrastructure. Approximately 3.4 acres consist of areas outside of the Project site that will be developed with improvements associated with the Project and are located either in the City of San Diego or Santee (Off-site improvement areas). The off-site improvement areas and the proposed Project site (developed and undeveloped) make up the CEQA Study area. The Project is proposing to redevelop the existing Country Club and 52-room hotel, into a recreational-oriented mixed-use resort community (Figure 3, Project Site Plan). The Project will include an improved golf course, clubhouse, hotel, pro shop, practice area, tournament hall, and residential accessory uses. The following is a summary of the proposed Project uses:

Golf Course Redesign

The existing 145-acre, 18-hole golf course would be redesigned to a 104-acre, 18-hole golf course with a reduced length from approximately 7,300 yards to 6,450 yards. The new course design would have a 50 percent reduction in turf irrigation and would utilize a new modern irrigation system. The existing ponds on the golf course would be reshaped, and the existing drainage patterns would be improved. Out-of-play areas around the golf course would be planted with native grasses and smaller shrubs native to the region. The maintenance facility in the eastern portion of the Project site would remain in its current location.

Carlton Oaks Country Club and Resort

The Carlton Oaks Country Club and Resort would consist of approximately 51,926 square feet of golf related resort amenities including 10 cottage-style hotel units, 42-room hotel, a clubhouse with a restaurant, event space, a golf learning center, a cart barn, a pro shop, and a store all located in the eastern portion of the Project site. There would also be a golf cart waiting area and a shared, surface parking lot. The hotel and cottage buildings would be constructed as two-story structures with eave heights less than 26 feet. The clubhouse and resort would also provide an outdoor pool and deck area, a patio, and a courtyard.

Residential Development

The Carlton Oaks Country Club and Resort would include a residential component in the western and northeastern portions of the Project site. Residential West, in the western portion of the Project site, would consist of 86 multi-family detached residential units. Residential North would be located in the northern portion of the Project site and would consist of 150 detached multi-family residential units. In addition, six single-family lots would front Carlton Oaks Drive and allow for single-story homes on a minimum 6,000 square-foot lots. One existing home located at 9225 Inwood Drive has also been included within the Project area to allow for minor driveway modifications but no changes to the structure are proposed. The applicant is requesting approval of required easements from the City of San Diego for grading, landscaping, utilities, access, and maintenance.

Access

All Project road widths would include a 26-foot-width minimum, with the exception of the private drives, which would provide direct vehicular access to each of the cluster units of four units or fewer. These private cul-de-sacs would be 20 feet in width, as allowed by the exceptions to California Fire Code Section (CFC) 503.2.1 (described below).,

Access to Residential West would be from a private driveway off the eastern side of West Hills Parkway, which would be widened and restriped. Two private internal streets would provide access to the homes. The private driveway would require access easements across vacant, previously disturbed lands owned by the City of San Diego (Public Utilities Department).

Access to Residential North and the resort would be from Carlton Oaks Drive at the intersection of Burning Tree Way. Internal streets and a roundabout would provide access to homes and to the resort facilities. A private utility maintenance road would be provided between Residential North and Residential West. Access to the golf course and resort would be provided by a private drive through Residential North from Carlton Oaks Drive southerly via a new bridge across the San Diego River (North Channel).

The bridge will accommodate two travel lanes, a multi-use trail and additional paved shoulder on either side. The proposed bridge would be constructed of non-combustible steel, and will include FMZs along both sides. The proposed bridge will assist in safe and efficient evacuation from the Project site. The golf course operator as part of the maintenance of the golf course, will be responsible for proper brush management and defensible space by providing targeted vegetation removal, thinning, and fuel reduction underneath the bridge and extending outward from the bridge to meet City of Santee defensible space requirements. Given the lack of vegetation around the bridge, the surface water that is present throughout the year, the resulting high internal fuel moisture of vegetation in this area, and the bridge's construction with non-combustible steel the bridge would not be vulnerable to radiant heat exposure or ember cast from a nearby wildfire event.

Two points of primary access for emergency response and evacuation would be provided into the Carlton Oaks community, Carlton Oaks Drive to the north and West Hills Parkway to the west. These emergency access roadways would be in addition to the primary residential access roads which could also be used for emergency vehicle access. Site access would comply with CFC and City of Santee requirements.

Emergency access would be provided to Residential West via an extension of a private drive to West Hills Parkway, which would be 26 feet wide with curb and gutter and asphalt concrete pavement and base, with grades, horizontal alignment, and turnarounds that meet the City of Santee's fire requirements. This emergency-access point would be gated and would not be open to the public except during times of emergency.

Emergency access would be provided for Residential North and the Golf Course Resort via a 26-foot-wide private roadway through provided through the existing Vista del Verde condominiums located in the northeastern corner of the Project site. This emergency access would be for the proposed project only and would not be open to the public. A new fence with an emergency access gate will also be erected between buildings of the existing adjacent condominium complexes. A private emergency access road would be provided in the northern corner of Residential West from West Hills Parkway.

Proposed Trail Segments

Multipurpose, public trail segments will be provided on the project site that will link with existing and planned trails to the east and west of the site. In the western portion of the site, the trail segment will be constructed beginning at the Santee jurisdictional line ending at the property line and link to the future planned trail known as the Carlton Oaks Golf Course Segment. A graded bench (located within the Carlton Oaks Golf Course Segment) would also be provided within the easement areas that will be granted to the applicant by the City of San Diego as a part of this Project. In the eastern portion of the site, an onsite trail segment will traverse through the resort to Carlton Oaks Drive and will extend the offsite Mast Park West Trail (east of the Project boundary to the south to the property line), as well as link to the future planned trail known as the Carlton Oaks Golf Course Segment.

In addition to the proposed trail alignment currently proposed through Residential North and the County Club and Resort Area, a supplemental trail offer of dedication is shown on the applicant's map should the City request this supplemental trail alignment. The supplemental trail offer of dedication starts from an area east of the Country Club and Resort parking lot to the property line of the Vista del Verde community. If the City were to request this supplemental segment, the applicant will agree to dedicate the trail alignment and construct this trail at a later date if the city determines that it desires to build this trail in the future.

100-Year Floodway Improvements

The project site is located within the regulatory limits of the San Diego River (floodplain and floodway) and receives runoff from Sycamore Canyon Creek (Santee Lakes) channel, the San Diego River (North Channel), several storm drain outfalls from the existing developments along Carlton Oaks Drive and Mast Boulevard roadway corridors, and runoff from Forester Creek.

The proposed grading for the clubhouse, hotel, and golf course would occur within the regulatory floodway. The proposed development would require elevating the grade of the proposed clubhouse and hotel above the floodplain. In addition, a small portion of the Residential North development encroaches into the existing floodplain. A Conditional Letter of Map Revision and Letter of Map Revision would be processed through the Federal Emergency Management Agency (FEMA) to revise the flood mapping associated with the proposed alteration of the floodway.

Offsite Improvements (Additional APNs 383-221-05, -08, 383-223-02, 383-330-39, 383-381-22, 383-425-10, 383-431-01, 383-480-04, -44, -47, -48, -51)

1. Emergency Vehicle Access: The project will include the construction of an emergency vehicle access roadway, from the Vista del Verde community south onto the golf course property to the developed portion of the resort. One parking spot on the Vista del Verde property may be removed but will be relocated within that property. The project also includes installation of a motorized gate and replacement of the existing chain link fence with a steel tubular fence, on the boundary of the Golf Course property.

2. West Hills Parkway: West Hills Parkway will be widened within the existing right-of-way from Carlton Oaks Drive approximately 700 feet southerly to the existing bridge, to provide a dedicated left-turn lane into Residential West. New striping will include a striped median and increased width for bike lanes. This work would be located within the City of San Diego's jurisdiction, and therefore would follow their standards.

3. Extension of a Padre Dam Municipal Water District (PDMWD) public water main: A PDMWD water main would be extended from Carlton Oaks Drive south along West Hills Parkway and into Residential West to provide a connection to the proposed private water system.

4. Access to Residential North and the Resort Area: Access to these areas would be provided by Carlton Oaks Drive at the intersection of Burning Tree Way. This access point is approximately 200 feet east of the existing hotel access road (Inwood Drive). Inwood Drive will be closed and replaced with curb and sidewalk. Access to the golf course and resort would be provided by a private drive through Residential North from Carlton Oaks Drive southerly via a new bridge across the San Diego River (North Channel). The proposed bridge would be constructed of steel, which can withstand fire. Additionally, several existing driveway aprons along the project frontage will be closed and replaced with curb and landscaping along with other miscellaneous frontage improvements such as overhead power undergrounding and landscaping. Overhead power undergrounding would extend north of Carlton Oaks Drive. Potable and recycled water would be connected to existing main lines in Carlton Oaks Drive and extended into the project.

5. Drainage Improvements: Existing drainage pipes discharge to the golf course at five locations along the north subdivision boundary. All improvements will be constructed in a manner that will maintain the existing flow and drainage patterns.

    a) *An existing 42-inch storm drain discharges to the site from a headwall located approximately 15 feet offsite, within a public easement (City of Santee) on an existing residential lot (Lot 17 of Map 4402).* The offsite flows will be picked up onsite by proposed storm drain improvements and discharged into the San Diego River (North Channel).

    b) *An existing 27-inch storm drain extends onto the project site from an existing residential lot (Lot 14 of Map 5417).* This pipe will be extended under the proposed access road to a new headwall and discharge onto the golf course.

    c) *An existing 18-inch storm drain discharges to the site from a headwall located approximately 15 feet offsite, located within a public easement (City of Santee) on an existing residential lot (Lot 230 of Map 6973).* The offsite flows will be picked up onsite by proposed storm drain improvements and discharged onto the golf course.

    d) *An existing 47"x71" storm drain discharges to the site from a headwall located approximately 20 feet offsite, located within a public easement (City of Santee) on an existing residential lot (Lot 239 of Map 6973).* The offsite flows will be picked up onsite by proposed storm drain improvements and discharged onto the golf course.

    e) *An existing 72-inch diameter storm drainpipe discharges to the site from the headwall located approximately immediately offsite at the north property line of Residential West.* The existing headwall includes a large concrete energy dissipator and concrete channel. These storm drain facilities are located offsite on existing residential lots (Lots 679 & 680 of Map 7295) and within an existing public

easement (City of Santee). The offsite flows will be picked up onsite by proposed storm drain improvements and discharged onto the golf course.

6. Sewer Maintenance Hole Improvements: There are three, existing sewer maintenance holes located offsite within a PDMWD easement within the Vista del Verde condominium property. The need for engineered sewer maintenance hole liners will be determined in the project design phase. All work will be limited to within the public easement area.

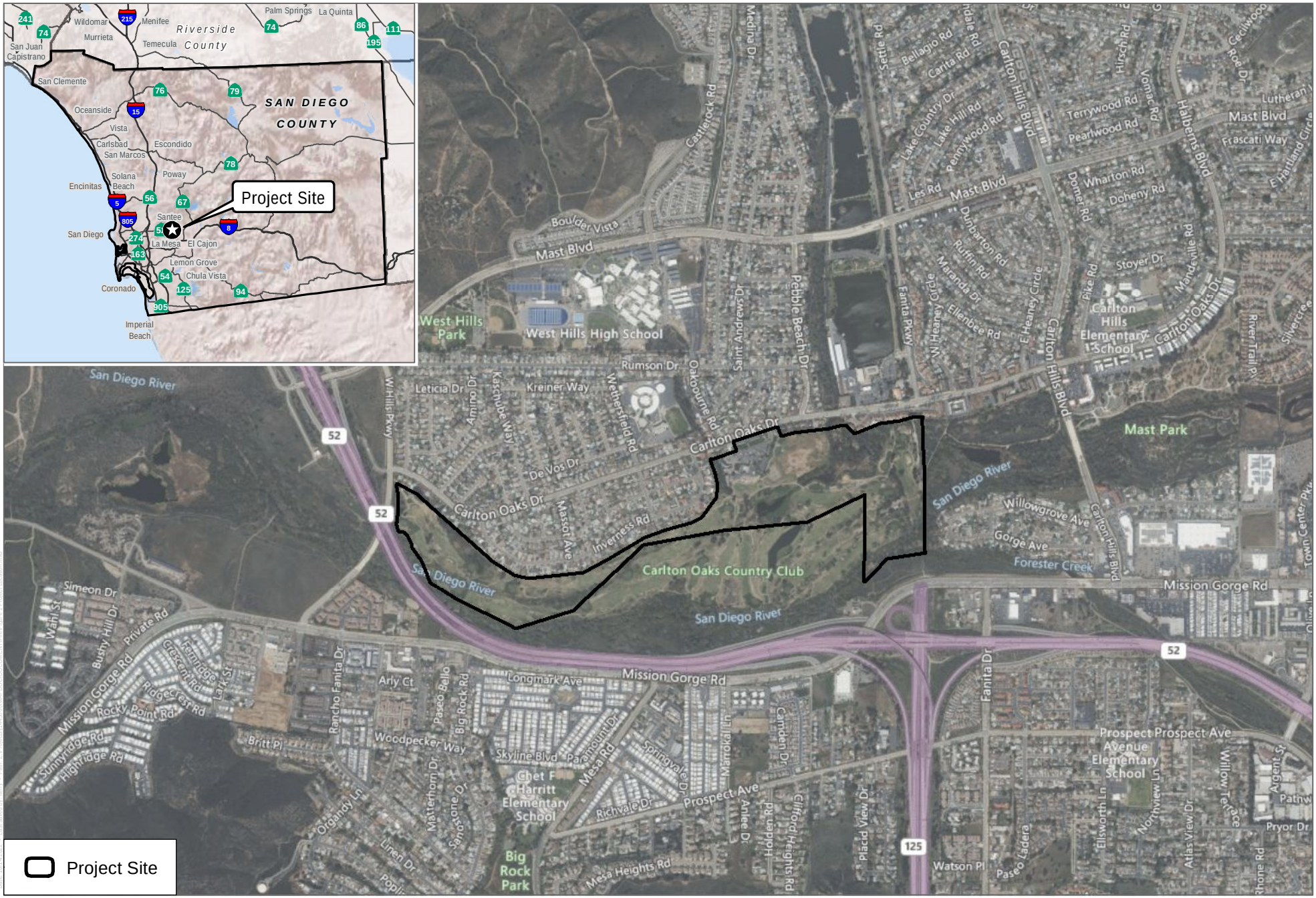
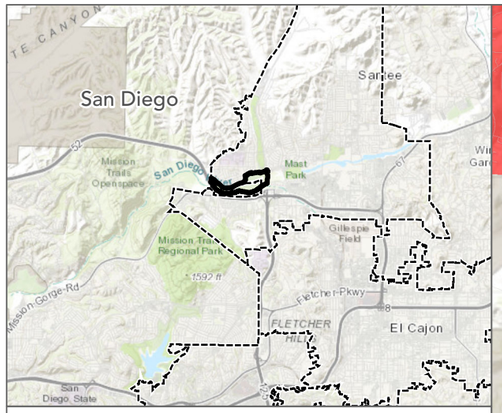


FIGURE 1

Project Location

Fire Protection Plan for the Carlton Oaks Project

DUDEK



Project Boundary
Municipal Boundary

Local Responsibility Area (LRA)
- Very High
- High
- Moderate
- Non-Wildland

State Responsibility Area (SRA)
- Very High
- High
- Moderate

SOURCE: CAL FIRE 2024; SANGIS 2025

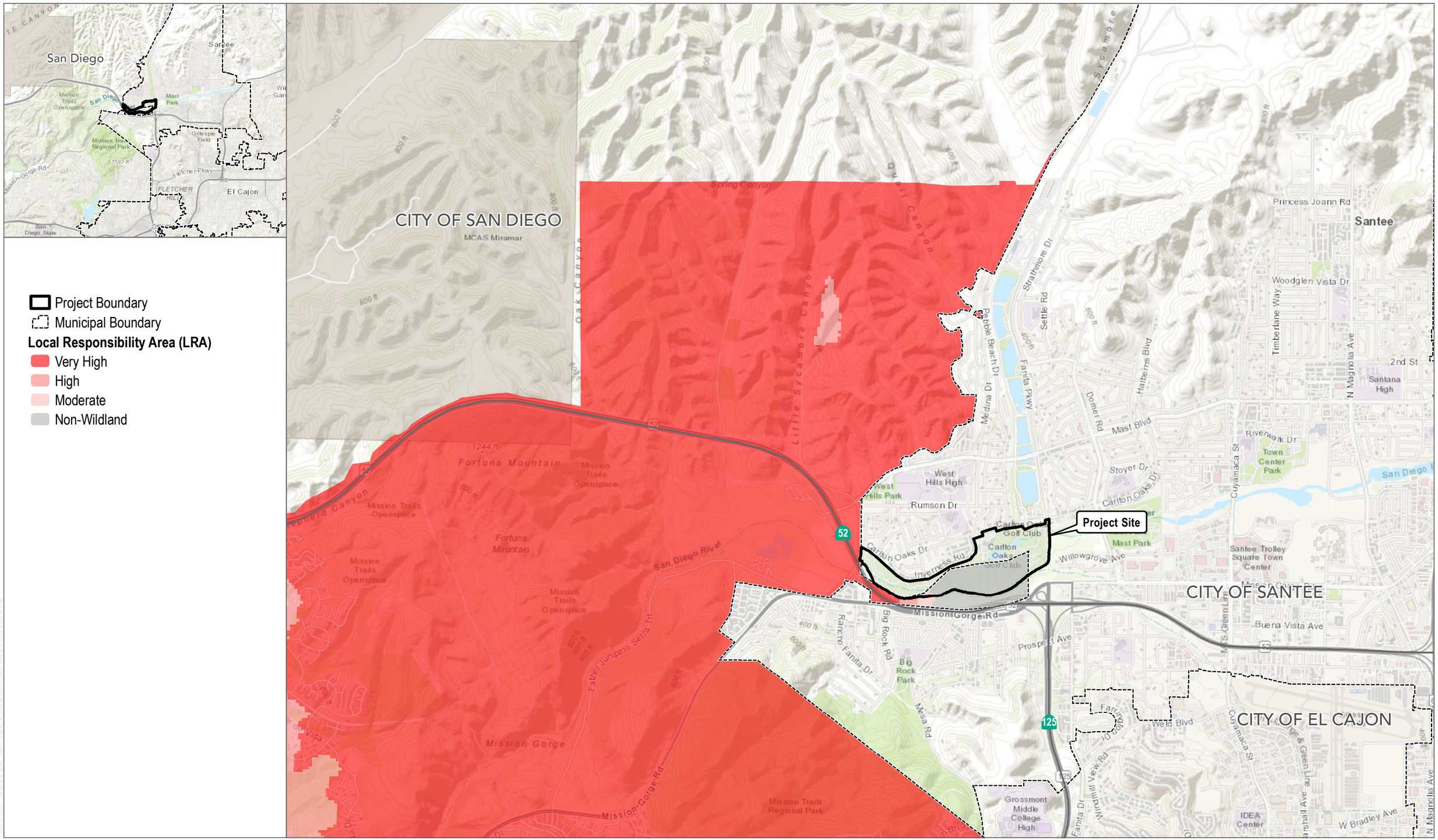
DUDEK

0 0.5 1 Miles

FIGURE 2A

CAL FIRE Fire Hazard Severity Zones

Fire Protection Plan for Carlton Oaks Project



SOURCE: CAL FIRE 2024; SANGIS 2025

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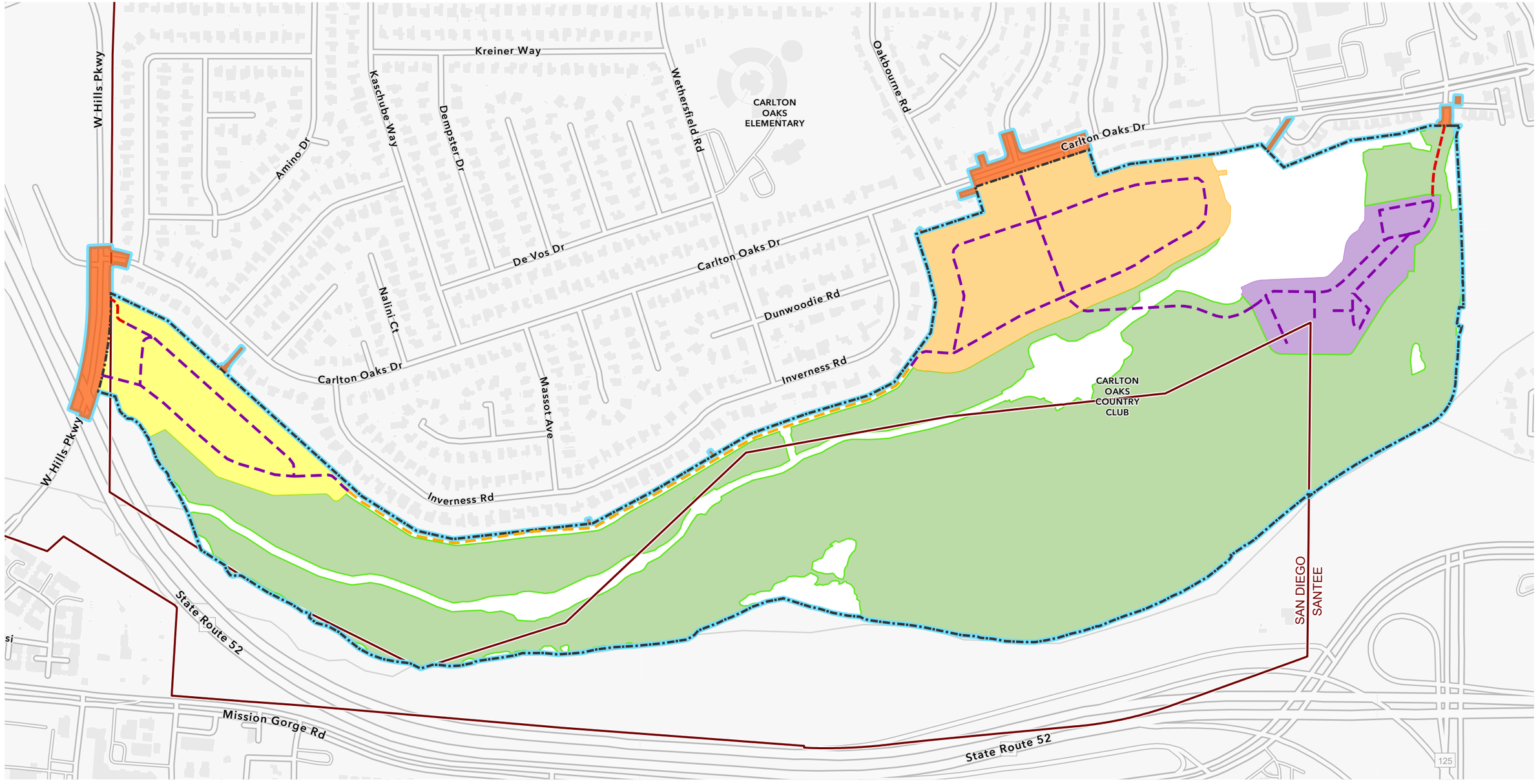
0 0.5 1 Miles

FIGURE 2B

City of San Diego Fire Hazard Severity Zones

Fire Protection Plan for Carlton Oaks Project



SOURCE: Hunsaker & Associates, 2024

DUDEK

FIGURE 3

Site Plan and Off-Site Improvements

Carlton Oaks FPP

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2 Proposed Project Site Risk Analysis

2.1 Environmental Setting and Field Assessment

After review of available digital Study Area information, including topography, vegetation types, fire history, and the Project's Development Footprint, a Dudek Fire Protection Planner conducted a Project site evaluation on May 5, 2022, in order to confirm/acquire Project site information, document existing on-site conditions, and to determine potential actions for addressing the protection of the Project's structures. The site's fuels have not changed from this visit's results except where maintenance by the City of Santee has occurred that reduced on-site fuels as part of its fuel modification efforts. While on-site, Dudek's Fire Planner assessed the area's topography, natural vegetation, and fuel loading, surrounding land use, and general susceptibility to wildfire. Among the field tasks that were completed included:

- Topography evaluation;
- Vegetation/fuel assessments;
- Photograph documentation of the existing condition;
- Confirmation/verification of hazard assumptions;
- Off-site, adjacent property fuel and topography conditions;
- Surrounding land use confirmations;
- Necessary fire behavior modeling data collection;
- Ingress/egress documentation;
- Nearby Fire Station reconnaissance.

Study Area photographs were collected (refer to Appendix A, *Representative Site Photographs*), and fuel conditions were mapped using aerial images. Field observations were utilized to augment existing on-site data in generating the fire behavior models and formulating the requirements and recommendations detailed in the FPP.

2.2 Project Site Characteristics and Fire Environment

Fire environments are dynamic systems and include many types of environmental factors and Project site characteristics. Fires can occur in any environment where conditions are conducive to ignition and fire movement. Areas of naturally vegetated open space are typically comprised of conditions that may be favorable to wildfire spread. The three major components of the fire environment are topography, vegetation (fuels), and climate. The state of each of these components and their interactions with each other determines the potential characteristics and behavior of a fire at any given moment. It is important to note that wildland fire may transition to urban fire if structures are receptive to ignition. Structure ignition depends on a variety of factors and can be prevented through a layered system of protective features including fire-resistive landscapes directly adjacent to the structure(s), application of known ignition resistive materials and methods, and suitable infrastructure for firefighting purposes. Understanding the existing wildland vegetation and urban fuel conditions on and adjacent to the Project site is necessary to understand the potential for fire within and around the Project site.

The following sections discuss the Project site characteristics, local climate, and fire history within and surrounding the Project site. The following sections discuss the characteristics of the Project site at a regional scale. The intent of evaluating conditions at this macro-scale is providing a better understanding of the regional fire environment, which is not constrained by property boundary delineations.

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 fire spread down-slope in the absence of wind. Terrain that forms a funneling effect, such as chimneys, chutes, and 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 wind.

Topography on the Project site is relatively flat as it is within the historical floodplain of the San Diego River. Elevations within the Project site range from approximately 727 feet above mean sea level (AMSL) at the southwest property boundary to approximately 1,022 feet AMSL. Natural slope values ranging from approximately 3% to 5% were measured around the perimeter of the Project area from USGS topographic maps.

Topographic features that may present a fire spread facilitator are slopes and canyon alignments, which may serve to funnel or channel winds, thus increasing their velocity and potential for influencing wildfire behavior. Topography at and near the Project site does not include fire-facilitating features.

2.2.2 Climate

The Project site, like much of southern California, climate has a large influence on fire risk. The climate of San Diego County is typical of a Mediterranean area, with warm, dry summers and wetter winters. The prevailing wind is an onshore flow from the Pacific Ocean with fall Santa Ana winds from the northeast that may gust up to 50 miles per hour (mph) or higher. 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. The average high temperature for the Project area is approximately 77°F, with average daily highs in the summer and early fall months (June through October) averaging 84°F (Weather Spark 2022). Precipitation typically occurs between December and April with average rainfall of 12 inches.

From a regional perspective, the fire risk in southern California can be divided into three distinct “seasons” (Nichols et al. 2011, Baltar et al 2014). The first season, the most active season and covering the summer months, extends from late May to late September. This is followed by an intense fall season characterized by fewer but larger fires. This season begins late September and continues until early November. The remaining months, November to late May cover the mostly dormant, winter season. Mensing et al. (1999) and Keeley and Zedler (2009) found that large fires in the region consistently occur at the end of wet periods and the beginning of droughts. Typically, the highest fire danger in southern California coincides with Santa Ana winds. The Santa Ana wind conditions are a reversal of the prevailing southwesterly winds that usually occur on a region-wide basis near the end of fire season during late summer and early fall. They are dry, warm winds that flow from the higher desert elevations in the east through the mountain passes and canyons. As they converge through the canyons, their velocities increase. Consequently, peak velocities are highest at the mouths of canyons and dissipate as they spread across valley floors. Localized wind patterns on the Project site are strongly affected by both regional and local topography.

The prevailing wind pattern is from the west (onshore), but the presence of the Pacific Ocean causes a diurnal wind pattern known as the land/sea breeze system. During the day, winds are from the west–southwest (sea) and at night winds are from the northeast (land), averaging 2 mph. During the summer season, the diurnal winds may average slightly higher (approximately 19 mph) than the winds during the winter season due to greater pressure gradient forces. Surface winds can also be influenced locally by topography and slope variations. The highest wind velocities are associated with downslope, canyon, and Santa Ana winds. The Project site does not include topography that would create unusual weather conditions, however, the open space areas to the north and west of the Project site would be subject to periodic extreme fire weather conditions that occur throughout San Diego County and could result in fire ignition onsite.

2.2.3 Vegetation

2.2.3.1 Fuels (Vegetation)

Extensive vegetation type mapping is useful for fire planning because it enables each vegetation community to be assigned a fuel model, which is used in a software program to predict fire behavior characteristics, as discussed in Section 3.1, Fire Behavior Modeling. Based on the Project's Biological Survey Report conducted by ICF (February 2022), 13 vegetation communities, including coastal and valley freshwater marsh, developed (including golf course), Diegan coastal sage scrub – disturbed, disturbed habitat, disturbed wetland, eucalyptus woodland, freshwater (jurisdictional ponds), mule fat scrub – disturbed, non-native grassland, non-native riparian, southern cottonwood-willow riparian forest (including disturbed), and southern riparian scrub. Overall, the majority of the Project site (80 percent) is made up of developed and disturbed habitats, with the remainder (20 percent) consisting of natural habitats.

Post-development vegetation composition proximate to the Project footprint is expected to be significantly different than current conditions. Following build-out, irrigated and thinned landscape vegetation associated with fuel modification zones (FMZs) would be located in the immediate area surrounding the Development Footprint, extending 100 horizontal feet from structures. A FMZ is a strip of land where combustible vegetation has been removed and/or modified and partially or totally replaced with more adequately spaced, drought-tolerant, fire resistant plants in order to provide a reasonable level of protection to structures from wildland fire. FMZs are designed to provide vegetation buffers that gradually reduce fire intensity and flame lengths from advancing fire by strategically placing thinning zones, restricted vegetation zones, and irrigated zones adjacent to each other on the perimeter of the WUI exposed structures. Cal Fire describes typical FMZs as consisting of Zone 0: 0-5 feet from the structure, Zone 1: 5-30 feet from the structure, and Zone 2: 30-100 feet from the structure, or until the property line. The FMZ surrounding the Project structures will be consistent with requirements, have native and naturalized vegetation occurring within FMZ Zone 2, is not expected to be irrigated, have overall fuel volumes reduced by removing dead and dying plants, non-natives, highly flammable species, and thinning the remaining plants so they would not readily facilitate the spread of fire. Further, the additional FMZ areas will be maintained on an ongoing basis.

2.2.3.2 Vegetative Fuel Dynamics

The vegetation characteristics described above are used to model fire behavior, discussed in Section 3.0 of this FPP. 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 compose the coastal sage scrub and mixed chaparral plant communities on site are considered to 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, while 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 of fire behavior models discussed in the report. A critical factor to consider is the dynamic nature of vegetation communities. Fire presence and absence at varying cycles or regimes 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, while fire exclusion tends to convert grasslands to shrublands, over time. In general, biomass and associated fuel loading will increase over time, assuming that disturbance (fire, or grading) or fuel reduction efforts are not diligently 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 fuel modification zones on-site. The Project's FMZs will consist of irrigated and maintained landscapes as well as thinned native fuel zones that will be subject to regular "disturbance" in the form of maintenance and will not be allowed to accumulate excessive biomass over time, which results in reduced fire ignition, spread rates, and intensity. In contrast, conditions outside the fuel modification zones, where the wildfire threat will exist post-development, are classified as medium to heavy fuel loads due to the maturity of the vegetation, which haven't burned for many decades.

2.2.4 Fire History

Fire history is an important component of a site-specific FPP. Fire history data provides valuable information regarding fire spread, fire frequency, most vulnerable areas, significant ignition sources, and vegetation/fuel mosaics across a given landscape. Fire frequency, behavior, and ignition sources are important for fire response and planning purposes. One important use for this information is as a tool for pre-planning. It is advantageous to know which areas may have burned recently and therefore may provide a tactical defense position, what type of fire burned on the Project site, and how a fire may spread. 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. Appendix B, Fire History Map provides a graphical representation of the quantity of times the landscape has burned in the area.

Fire history represented in the FPP uses the CAL FIRE Fire and Resource Assessment Program (FRAP) database. FRAP summarizes fire perimeter data dating to the late 1800s, but which is incomplete due to the fact that it only includes fires over 10 acres in size and has incomplete perimeter data, especially for the first half of the 20th century (Syphard and Keeley 2016). However, the data does provide a summary of recorded fires and can be used to show whether large fires have occurred in the Project area, which indicates whether they may be possible in the future.

According to available data from the CAL FIRE in the FRAP database (FRAP 2020)[2] there have been 44 fires recorded since 1910 within five miles, which range from approximately 24 acres to 270,686 acres (2003 Cedar

[2] Based on polygon GIS data from CAL FIRE's FRAP, which includes data from CAL FIRE, USDA Forest Service Region 5, BLM, NPS, 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 1878–2021.

Fire) and the average fire size is approximately 964 acres (not including the 2003 Cedar Fire or fires smaller than 10 acres). The SFD may have data regarding smaller fires (less than 10 acres) that have occurred onsite that have not been included herein. It should be noted that one wildfire has burned on the Project site (Un-named 1942) and one fire has burned adjacent to the Project site (Assist #59 1981). Table 1 summarizes the fire history for the area within five miles of the site.

Table 1. Fire History within Five Miles of the Carlton Oaks Project Site

Fire Year*	Fire Name	Interval (years)	Total Area Burned (acres)
1910	UN-NAMED	N/A	1314.7
1939	UN-NAMED	29	574.0
1939	UN-NAMED	0	1211.4
1941	UN-NAMED	2	405.6
1942	UN-NAMED	1	237.8
1942	UN-NAMED	0	625.7
1942	UN-NAMED	0	1221.4
1943	UN-NAMED	1	292.2
1943	UN-NAMED	0	3577.5
1944	UN-NAMED	1	194.0
1944	UN-NAMED	0	453.0
1944	UN-NAMED	0	6174.4
1945	UN-NAMED	1	2139.9
1950	QUARRY	5	280.6
1950	ELLIOTT RESERVATION	0	324.0
1950	SYCAMORE CANYON	0	3150.3
1955	HAIR PIN #2	5	140.3
1966	CARLTON HILLS	11	329.5
1974	UN-NAMED	8	24.6
1974	UN-NAMED	0	68.1
1974	UN-NAMED	0	155.0
1975	UN-NAMED	1	24.6
1978	UN-NAMED	3	90.3
1980	LAKESIDE	2	75.4
1980	ASSIST #69	0	745.2
1981	OUTSIDE ORIGIN #4	1	56.1
1981	ASSIST #72	0	696.4
1981	ASSIST #59	0	7310.7
1983	ASSIST #14	2	125.9
1984	ASSIST #21	1	62.0
1984	OUTSIDE ORIGIN #1	0	121.8
1985	OAK CREEK	1	160.7
1986	ASSIST #76	1	106.6
1987	ASSIST #105	1	46.6
1987	ASSIST #38	0	379.6
1987	ASSIST #79	0	1493.2

Table 1. Fire History within Five Miles of the Carlton Oaks Project Site

Fire Year*	Fire Name	Interval (years)	Total Area Burned (acres)
1988	ASSIST #78	1	935.3
1989	ASSIST #61	1	95.7
1989	ASSIST #59/MAGNOLIA	0	310.0
1994	ROCOSO	5	3217.9
1995	SYCAMORE	1	2115.7
1997	HOPE	2	48.0
2003	SYCAMORE	6	375.3
2003	CEDAR	0	270686.0

Source: CAL FIRE FRAP 2021

Based on an analysis of the fire history data set, specifically, the years in which the fires burned, the average interval between wildfires within 5 miles of the Project site was calculated to be approximately two years with intervals ranging between 0 (multiple fires in the same year) to 29 years. Based on the analysis, it is expected that there will be wildland fires within 5 miles of the Project site at least every 29 years and on average, every two years, as observed in the fire history record. Based on fire history, wildfire risk for the Project site is associated primarily with a Santa Ana wind-driven wildfire burning or spotting onsite from the north, although a fire approaching from the west during more typical on-shore weather patterns is possible. The proximity of the Project to large expanses of open space to the north and west, has the potential to funnel Santa Ana winds, thereby increasing local wind speeds and increasing wildfire hazard in the Project vicinity.

2.2.5 Analysis of Wildfire Risk from Adding New Residents

Humans (i.e., human related activities or human created features, services, or processes) are responsible for the majority of California wildfires (Syphard et al. 2007, 2008; Romero-Calcerrada et al. 2008). Certain human activities result in sparks, flames, or heat that may ignite vegetative fuels without proper prevention measures in place. These ignitions predominantly occur as accidents, but may also be purposeful, such as in the case of arson. Roadways are a particularly high source for wildfire ignitions due to high usage and vehicle caused fires (catalytic converter failure, overheated brakes, dragging chains, tossed cigarette, and others) (Harris 2019; Dudek 2008). In Southern California, and San Diego County, the population living at, working in, or traveling through the wildland urban interface is vast and provides a significant opportunity for ignitions every day. However, it is a relatively rare event when a wildfire occurs, and an even rarer event when a wildfire escapes initial containment efforts. Approximately 90 to 95 percent of wildfires are controlled below 10 acres (CAL FIRE 2019; Santa Barbara County Fire Department 2019).

Research indicates that the type of dense, master planned developments, like Carlton Oaks, are not associated with increased vegetation ignitions. Syphard and Keeley (2015) summarize all wildfire ignitions included in the CAL FIRE FRAP database – dating back over 100 years. They found that in San Diego County, equipment-caused fires were by far the most numerous, and these also accounted for most of the area burned, followed closely by the area burned by power line fires. Ignitions classified as equipment caused frequently resulted from exhaust or sparks from power saws or other equipment with gas or electrical motors, such as lawn mowers, trimmers or tractors and associated with lower density housing. In San Diego County, ignitions were more likely to occur close to roads and structures, and at intermediate structure densities.

As figures 4 through 6 illustrate, housing density directly influences susceptibility to fire because in higher density developments, there is one interface (the community perimeter) with the wildlands whereas lower density development creates more structural exposure to wildlands, less or no ongoing landscape maintenance (an intermix rather than interface), and consequently more difficulty for limited fire resources to protect well-spaced homes. The intermix includes housing amongst the unmaintained fuels whereas the proposed project converts all fuels within the footprint and provides a wide, managed fuel modification zone separating homes from unmaintained fuel and creating a condition that makes defense easier. Syphard and Keeley go on to state that "The WUI, where housing density is low to intermediate is an apparent influence in most ignition maps" further enforcing the conclusion that lower density housing poses a higher ignition risk than higher density communities. They also state that "Development of low-density, exurban housing may also lead to more homes being destroyed by fire" (Syphard et al. 2013). A vast wildland urban interface already exists in the area near to Carlton Oaks, dominated by older, more fire-vulnerable structures, constructed before stringent fire code requirements were imposed on residential development, with varying levels of maintained fuel modification buffers. As discussed in detail throughout this FPP, Carlton Oaks is an ignition resistant community designed to include professionally managed and maintained fire protection components, modern fire code compliant safety features and specific measures provided where ignitions are most likely to occur (such as roadways). Therefore, the development of the Carlton Oaks Project and the addition of new residents would not be expected to materially increase the risk of vegetation ignitions.

Figure 4. Example higher density development that is ignition resistant and excludes readily ignitable vegetative fuels throughout and provides a perimeter fuel modification zone. This type of new development requires fewer fire resources to defend and can minimize the likelihood of on-site fires spreading off-site.

Figure 5. Example of moderate density development. Homes are located on larger properties and include varying levels of ignition resistance and landscape / fuel modification provision and maintenance. This type of development results in a higher wildland exposure level for all homes and does not provide the same buffers from wildfire encroaching onto the site or starting at a structure and moving into the wildlands as a higher density project.

Figure 6. Example of "lower density" development where homes are interspersed amongst wildland fuels, are of varying ages, and include varying levels of fuel modification zone setbacks. Homes are exposed on most or all sides by flammable vegetation and properties rely solely on owners for maintenance, are often far distances from the nearest fire station, and have minimal buffer from on-site fire spreading to wildlands.

Moreover, frequent fires and lower density housing growth may lead to the expansion of highly flammable exotic grasses that can further increase the probability of ignitions (Keeley et al. 2012). This is not the case with the proposed project as the landscapes are managed and maintained to remove exotic fuels that may establish over time.

As discussed above, research indicates that it is less likely for higher density developments to be impacted by wildfires than lower density developments. The same protections that starve wildfire of fuels and minimize or prevent wildfire from transitioning into a high density community such as Carlton Oaks also serve to minimize or prevent on-site fires from transitioning into the wildlands. Further, the requirement that all structures will include interior fire sprinklers significantly reduces the likelihood that a building fire spreads to the point of flashover, where a structure will burn beyond control and produce embers. Interior sprinklers are very efficient, keeping fires to the room of origin, or extinguishing the fire before the responding firefighters arrive. Similarly, the irrigated fuel modification zones are positioned throughout the development areas as well as the first zones on the perimeter of the project's structures. Irrigated zones include plants with high internal moisture and spacing between plants and plant groups that 1) make it difficult to ignite and 2) make it difficult for fire to spread plant to plant. Lastly, the nearby fire station and additional humans on the site result in fast detection of fires and fast firefighter response, a key in limiting the growth of fires beyond the incipient stage.

2.2.6 Fire Protection Features' Beneficial Effect on Wildfire Ignition Risk Reduction

Each of the fire protection features provided as part of the code requirements or customized for this Project are based on the FPP's evaluation work to protect the site, its structures and their occupants from wildfires. These features also have a similar positive impact on the potential for wildfire ignitions caused by the Project and its inhabitants.

As mentioned previously, the ignition resistant landscapes and structures and the numerous specific requirements would minimize the ability for an on-site fire to spread to off-site fuels, as follows:

1. Ignition resistant, planned and maintained landscape – all site landscaping of common areas and fuel modification zones will be subject to strict plant types that are lower ignition plants with those closest to structures requiring irrigation to maintain high plant moistures which equates to difficult ignition. These areas are closest to structures, where ignitions would be expected to be highest, but will be prevented through these ongoing maintenance efforts.
2. Fuel Modification Zone around perimeter of project – the FMZ (100 feet wide) includes specifically selected plant species, very low fuel densities (30% to 50% retention of native plants in outer zones and irrigated inner zones), and ongoing Homeowners Association (HOA) funded and applied maintenance, resulting in a wide buffer between the developed areas and the off-site native fuels.
3. Twice-annual FMZ inspections – the Carlton Oaks HOA will have a contracted, 3rd party, SFD-approved FMZ inspector perform two inspections per year to ensure that FMZs are maintained in a condition that is consistent to the City's and FPP's requirements and would provide a benefit of a wide barrier separating wildland fuels from on-site ignitions.
4. Ignition resistant structures – all structures will be built to the Chapter 7A (CBC) ignition resistant requirements that have been developed and codified as a direct result of after fire save and loss assessments. These measures result in homes that are designed, built and maintained to withstand fire and embers associated with wildfires. It must be noted that the wide FMZs would not result in wildfire directly next to these structures. Homes and buildings can be built in the VHFHSZs and WUI areas when they are part of an overall approach that contemplates wildfire and provides design features that address the related risk. A structure within a VHFHSZ that is built to these specifications can be at lower risk than an older structure in a non-fire hazard severity zone. The ignition resistance of on-site structures would result in a low incidence of structural fires, further minimizing potential for project-related wildfires.
5. Interior fire sprinklers – sprinklers in residences are designed to provide additional time for occupants to escape the home. Sprinklers in multi-family and commercial structures are designed to provide structural protection. The common benefit of fire sprinklers is that they are very successful at assisting responding firefighters by either extinguishing a structural fire or at least, containing the fire to the room of origin and delaying flash over. This benefit also reduces the potential for an open space vegetation ignition by minimizing the possibility for structure fires to grow large and uncontrollable, resulting in embers that are blown into wildland areas.
6. Fire access roads – roads provide access for firefighting apparatus. Project roads provide SFD-consistent access throughout the Project.
7. Water – providing firefighting water throughout the Project with hundreds of fire hydrants accessible by fire engines is a critical component of both structural and vegetation fires. The Project provides firefighting water volume, availability and sustained pressures to the satisfaction of SFD. Water accessibility helps firefighters control structural fires and helps protect structures from and extinguish wildfires.

3 Anticipated Fire Behavior

3.1 Fire Behavior Modeling

Following field data collection efforts and available data analysis, fire behavior modeling was conducted to document the type and intensity of the 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[3] for the wildland fuels to the north/northwest, northeast, and east of the Project site. BehavePlus is the most widely used as industry standard for predicting fire behavior on a given landscape. The model was developed by the U.S. Forest Service in 1984 and has since been updated and refined to produce a highly detailed and reasonably accurate output. As is customary for this type of analysis, three fire scenarios were evaluated, including one summer, on-shore weather condition (north/northwest of the Project site) and two extreme fall, off-shore weather conditions (northeast and east of the Project site). Results are provided below and a more detailed presentation of the BehavePlus analysis, including fuel moisture and weather input variables, is provided in Appendix C.

3.2 Fire Behavior Modeling Analysis Effort

An analysis utilizing the BehavePlus software package was conducted to evaluate fire behavior variables and to objectively predict flame lengths (feet), fireline intensities (BTU/feet/second), spotting distance (miles), and spread rates (feet/minute) for seven modeling scenarios for the Carlton Oaks Project; these seven fire scenarios incorporated observed fuel types representing the dominant on and offsite vegetation on open space lands nearby, in addition to measured slope gradients, wind, and fuel moisture values derived from Remote Automated Weather Stations (RAWS) weather data sets for both the 50th percentile weather (on-shore winds) and the 97th percentile weather (off-shore winds). Modeling scenario locations were selected to better understand different fire behavior that may be experienced on or adjacent to the site.

To support the fire behavior modeling efforts conducted for this FPP, the different vegetation types observed on and adjacent to the Project site were classified into the aforementioned numeric fuel models. Dudek analyzed fire behavior for the fuels adjacent to/in close proximity to the property to the north and west. As is customary for this type of analysis, the terrain and fuels within and adjacent to the Project area were 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 low- to-moderate-load grass/grass-shrubs, low- to- moderate-load shrubs and chaparrals, and willow and eucalyptus dominated riparian forest habitat within the San Diego River/Forester Creek exhibit moderate-load understory vegetation surrounding the southern, western, and eastern portions of the existing golf course and proposed Project development site. These fuel types can produce flying embers that may affect the project, therefore defenses have been built into the structures to prevent ember penetration. Table 2 provides a description of the six existing fuel models observed in the vicinity of the site that were subsequently used in the analysis for this Project. A total of six fire modeling scenarios were completed for the Project area. These modeling scenario locations were selected based on the low probability of a fire approaching from these directions during a Santa Ana wind-driven fire event (fire scenarios 3, 4, 6 and 7) and an on-shore weather pattern (fire scenarios 1, 2, and 5). Dudek also conducted

[3] A discussion of fire behavior modeling is presented in Appendix C, Fire Behavior Modeling.

modeling of the site for post-Fuel Modification Zones recommendations for this Project (Refer to Table 2 for post-FMZ fuel model descriptions). Fuel modification includes establishment of irrigated and thinned zones on the periphery of new residential structure. For modeling the post-FMZ treatment condition, fuel model assignments were re-classified for the FMZs 0 and 1 (Fuel Model Gr1) and FMZ 2 (Fuel Model Gr2).

Table 2. Fuel Models Used for Fire Behavior Modeling

Fuel Model	Description	Location of Fuel Models	Fuel Bed Depth (Feet)
Existing Conditions			
Gr2	Low-load, Dry climate grasses	Represents the grass fairway areas throughout the existing golf course.	<1.0 ft.
Gr4	Moderate-load, Dry Climate grasses	Represents the grass understory vegetation within the riparian habitat and some areas within the existing golf course.	<3.0 ft.
Gs2	Moderate-load, Dry climate grass-shrubs	Represents the grass-shrub understory within the riparian habitat, as well as ground cover fuels surrounding the Project site without maintenance.	<2.0 ft.
Sh2	Moderate-load, Dry Climate Shrubs	Represents the vegetation communities located throughout the adjacent areas surrounding the Project site without maintenance.	<2.0 ft.
Sh4	Eucalyptus woodland and riparian forest habitat	Represents the eucalyptus woodland/riparian habitat that surrounds the existing golf course along the western, southern and eastern boundaries of the Project site	>8.0 ft.
Sh5	High-load, Dry Climate Shrubs	Represents the understory vegetation within the riparian areas of the San Diego River in the eastern portion of the development without maintenance.	>5.0 ft.
Post-Development Conditions			
Gr1	Short, sparse, dry climate grasses	Fuel Modification Zones 0 and 1: irrigated landscape throughout the Project site	<1.0 ft.
Gr2	Load, dry climate grasses	Fuel Modification Zone 2: 50% thinning of brush around the perimeter of the structures	<2.0 ft.

Table 3 summarizes the weather and wind input variables used in the BehavePlus modeling process.

Table 3. Fuel Moisture and Wind Inputs

Model Variable	Summer Weather Condition (50th Percentile)	Peak Fall Weather Condition (97th Percentile)
Fuel Models	Gr2, Gr4, Gs2, Sh2, Sh4, and Sh5	Gr2, Gr4, Gs2, Sh2, and Sh4
1 h fuel moisture	7%	2%
10 h fuel moisture	8%	3%
100 h fuel moisture	13%	8%
Live herbaceous moisture	52%	30%
Live woody moisture	104%	60%

Table 3. Fuel Moisture and Wind Inputs

Model Variable	Summer Weather Condition (50th Percentile)	Peak Fall Weather Condition (97th Percentile)
20 ft. wind speed	14 mph (sustained winds)	16 mph (sustained winds); wind gusts of 50 mph
Wind Directions from north (degrees)	300 (East Development) 210 and 310 (West Development)	20 and 100 (East Development) 80 and 140 (West Development)
Wind adjustment factor	0.4	0.4
Slope (uphill)	3% to 5%	2% to 4%

3.3 Fire Behavior Modeling Results

The results of fire behavior modeling analysis for pre- and post-Project conditions are presented in Table 4 and Table 5, respectively. Identification of modeling run (fire scenarios) locations is presented graphically in Figure 7, BehavePlus Fire Behavior Analysis.

As presented, in the Fire Behavior Analysis (Appendix C), wildfire behavior on the Project site is expected to be primarily of low to moderate intensity throughout the non-maintained surface grass dominated fuels throughout the perimeter areas of the Project site. As mentioned, the BehavePlus fire behavior modeling software package was utilized in evaluating anticipated fire behavior adjacent to the Project site. Six focused analyses were completed for both the existing conditions and the post-development conditions within the Project site, each assuming worst-case fire weather conditions for a fire approaching the Project site from the northwest, northeast, southeast, southwest, and east. The results of the modeling effort included anticipated values for surface fires flame length (feet), rate of spread (mph), fireline intensity (Btu/ft/s), and spotting distance (miles). The aforementioned fire behavior variables are an important component in understanding fire risk and fire agency response capabilities. Flame length, the length of the flame of a spreading surface fire within the flaming front, is measured from midway in the active flaming combustion zone to the average tip of the flames (Andrews, Bevins, and Seli 2008). Fireline intensity is a measure of heat output from the flaming front, and also affects the potential for a surface fire to transition to a crown fire. Fire spread rate represents the speed at which the fire progresses through surface fuels and is another important variable in initial attack and fire suppression efforts (Rothermel and Rinehart 1983). Spotting distance is the distance a firebrand or ember can travel down wind and ignite receptive fuel beds. Six fire modeling scenario locations were selected to better understand the different fire behavior that may be experienced on or adjacent the site based on slope and fuel conditions; these fire scenarios are explained in more detail below:

Fire Scenario Locations and Descriptions:

- Scenario 1: A summer, on-shore fire (50th percentile weather condition) burning through the approximately 20-foot-tall eucalyptus tree woodland and riparian habitat area within the San Diego River on the west side of SR-52 and northwest of the Proposed Project site. The terrain is flat (approximately 3% slope) with potential ignition sources from a car fire or wildland fire originating in the open space land northwest of the property. This type of fire would typically spread through the grass/grass-shrub dominated understory vegetation relatively slow towards the western portion of the residential development site on the western side of the property.
- Scenario 2: A summer, on-shore fire (50th percentile weather condition) burning through the approximately 25-foot tall eucalyptus tree woodland and riparian habitat area within Forester Creek southwest of the Project site towards the existing golf course. The terrain is flat (approximately 5% slope) with potential

ignition sources from a car fire along SR-52 and/or structure fire originating within the existing structures southwest of the Project site. This type of fire would typically spread through the grass/grass-shrub dominated understory vegetation towards the southern portion of the existing golf course and the proposed residential development site on the western side of the property.

- **Scenario 3:** A fall, off-shore fire (97th percentile weather condition) burning through the approximately 25-foot tall eucalyptus tree woodland and riparian habitat area along the southern property boundary of the existing golf course. The terrain is flat (approximately 3% slope) with potential ignition sources from a car fire along SR-52 and/or structure fire originating within the existing structures south/southeast of the Project site. This type of fire would typically spread through the grass/grass-shrub dominated understory vegetation towards the southern portion of the existing golf course and the proposed residential development site on the western side of the property.
- **Scenario 4:** A fall, off-shore fire (97th percentile weather condition) potentially spotting on the golf course and burning within the sparse- to- low-load grass fairway areas. The terrain is flat (approximately 2% slope) with potential ignition sources from a car and/or structure fire originating within the adjacent residential community to the north of the Project site. This type of fire would typically spread through the grass dominated vegetation towards the eastern portion of the proposed residential development site on the western side of the property.
- **Scenario 5:** A summer, on-shore fire (50th percentile weather condition) potentially spotting on the golf course and burning within the sparse- to- low-load grasses within the existing golf course. The terrain is flat (approximately 3% slope) with potential ignition sources from a car and/or structure fire originating within the adjacent residential community to the north of the Project site. This type of fire would typically spread through the grass dominated vegetation towards the eastern portion of the proposed residential development site on the eastern side of the property.
- **Scenario 6:** a fall, off-shore fire (97th percentile weather condition) potentially spotting within the approximately 25- to- 30-foot-tall eucalyptus/willow tree dominated woodland and riparian habitat areas within the San Diego River located on the eastern side of the development (being blow by an eastern santa ana wind from the east or southeast) and potentially burning through the moderate-load understory vegetation. The terrain is flat (approximately 3% slope) with potential ignition sources from a car and/or structure fire originating within the adjacent residential communities to the northeast/east/southeast of the site. This type of fire would typically spread through the moderate-load grass/grass-shrub dominated understory vegetation towards the eastern portions of the development/existing golf course

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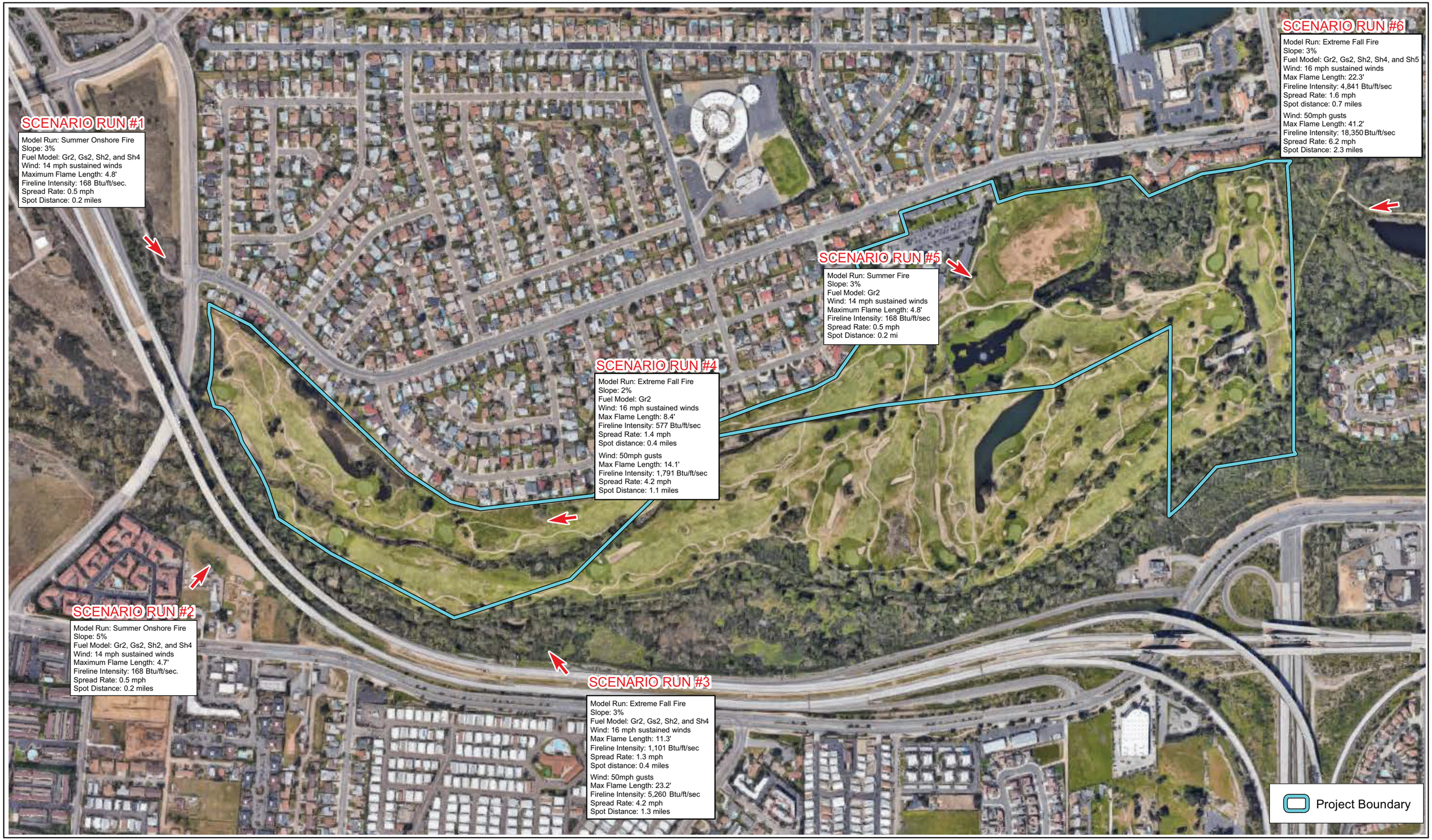

SOURCE: AERIAL- BING MAPPING SERVICE, 2021

DUDEK

0 500 1,000 Feet

FIGURE 7

BehavePlus Analysis Map

Fire Protection Plan for the Carlton Oaks Projectt

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The results presented in Tables 4 and 5 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. For planning purposes, the average 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 will be affected by many factors, including unique weather patterns, small-scale topographic variations, or changing vegetation patterns.

3.3.1 Existing Conditions

Based on the BehavePlus analysis result presented below and in Tables 4 and 5, worst-case fire behavior is expected to occur within the riparian woodland areas of the San Diego River to the east as this areas appeared to exhibit more dense understory vegetation and has the potential to have a Santa Ana wind-driven wildfire originate further east (represented by Fall Weather, Scenario 6). The fire is anticipated to be a wind-driven fire from the east/northeast during the fall. Under such conditions, expected surface flame length could potentially reach approximately 41 feet with wind speeds of 50+ mph. Under this scenario, fireline intensities reach 18,350 BTU/feet/second with moderate spread rates of 6.2 mph and could have a spotting distance up to 2.3 miles away Because embers could spot within 2.3 miles of the Project site, a crown fire could potentially occur within the riparian woodland areas. However, the higher soil moisture along with the lower vegetation density within the riparian areas could disrupt the spread of fire across the landscape and reduce the fire threat within these areas, which is evident by the project history as the golf course and riparian habitat has not burned in the past.

Wildfire behavior in non-maintained grass/grass-shrubs understory vegetation within the riparian woodland areas southwest of the Project site fanned by 14 mph sustained, on-shore winds. Fires burning from the west/southwest and pushed by ocean breezes typically exhibit less severe fire behavior due to lower wind speeds and higher humidity. Under typical onshore weather conditions, an on-shore fire could have flame lengths between approximately 3 feet and 13 feet in height and spread rates between 0.1 and 0.6 mph. Spotting distances, where airborne embers can ignite new fires downwind or within the riparian woodland area southwest of the developed portion of the Project site, range from 0.1 to 0.4 miles. A crown fire could potentially reach 73 feet under these conditions.

Table 4: RAWS BehavePlus Fire Behavior Model Results – Existing Conditions

Fire Scenario	Flame Length[1] (feet)	Spread Rate[1] (mph[2])	Fireline Intensity[1] (Btu/ft./sec)	Spot Fire[1] (Miles)
Scenario 1: 3% slope; Summer on-shore wind from W/NW (50th percentile) – (Northwest of Western Development)				
Low Load Grasses (Gr2)	4.8’	0.5	168	0.2
Moderate Load Grass-Scrubs (Gs2)	3.8’	0.2	106	0.2
Moderate Load Scrubs and Chaparral (Sh2)	1.5’	0.0	14	0.1
Riparian Habitat - Timber Shrub (Sh4)	2.3’	0.1	34	0.1
Scenario 2: 5% slope; Summer on-shore wind from W/NW (50th percentile) – (Southwest of Western Development)				
Low Load Grasses (Gr2)	4.7	0.5	168	0.2
Moderate Load Grass-Scrubs (Gs2)	3.8	0.2	106	0.2
Moderate Load Scrubs and Chaparral (Sh2)	1.5	0.0	14	0.1

Riparian Habitat - Timber Shrub (Sh4)	2.3	0.1	34	0.1
Scenario 3: 3% slope; Fall-offshore extreme wind from E/SE (97th percentile) 16 mph sustained winds with 50 mph wind gusts – (Southeast of Western Development)				
Low Load Grasses (Gr2)	8.4' (14.1')[3]	1.3 (4.2)[3]	577 (1,791)[3]	0.4 (1.3)[3]
Moderate Load Grass-Scrubs (Gs2)	8.9' (18.8')[3]	0.7 (3.8)[3]	655 (3,357)[3]	0.4 (1.3)[3]
Moderate Load Scrubs and Chaparral (Sh2)	7.4' (15.1')[3]	0.2 (0.9)[3]	447 (2,074)[3]	0.4 (1.3)[3]
Riparian Habitat - Timber Shrub (Sh4)	11.3' (23.2')[3]	0.9 (4.1)[3]	1,101 (5,260)[3]	0.4 (1.3)[3]
Scenario 4: 2% slope; Fall-offshore extreme wind from E (97th percentile) 16 mph sustained winds with 50 mph wind gusts – (East of Western Development area)				
Low-load grasses (Gr2)	8.4 (14.1')[3]	1.4 (4.2)[3]	577 (1,791)[3]	0.3 (1.1)[3]
Scenario 5: 3% slope; Summer on-shore wind from W/NW (50th percentile) – (NW of Eastern Development area)				
Low Load Grasses (Gr2)	4.8'	0.5	168	0.2
Scenario 6: 3% slope; Fall-offshore extreme wind from E (97th percentile) 16 mph sustained winds with 50 mph wind gusts – (East of Eastern Development area)				
Low Load Grasses (Gr2)	8.4 (14.1')[3]	1.4 (4.2)[3]	578 (1,791)[3]	0.3 (1.0)[3]
Moderate Load Grass-Scrubs (Gs2)	8.9 (18.8')[3]	0.7 (3.8)[3]	656 (3,358)[3]	0.3 (1.3)[3]
Moderate Load Scrubs and Chaparral (Sh2)	7.5 (15.1')[3]	0.2 (0.9)[3]	447 (2,074)[3]	0.3 (1.1)[3]
Riparian Habitat - Timber Shrub (Sh4)	11.3 (23.2')[3]	0.9 (4.1)[3]	1,103 (5,261)[3]	0.4 (1.5)[3]
High Load Scrubs and Chaparral (Sh5)	22.3 (41.2')[3]	1.6 (6.2)[3]	4,841 (18,350)[3]	0.7 (2.3)[3]

Notes:

1 Wind-driven surface fire.

2 Riparian 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 mixed sycamore riparian forest would transition into the tree canopies generating flame lengths higher than the average tree height (25 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 MPH=miles per hour

6 Spotting distance from a wind driven surface fire; it should be noted that the wind mph in parenthesis represent peak gusts of 50 mph.

3.3.2 Post-Development Conditions

As previously mentioned, Dudek conducted modeling of the site for post-fuel modification zones. Typical fuel modification includes establishment of a minimum 50-foot wide irrigated zone (Zone 1) and a 50-foot wide thinned zone (Zone 2) on the periphery of the Project Site, beginning from the structure. For modeling the post-FMZ treatment condition, the fuel model assignment was re-classified according to the specific fuel's management treatment (e.g., irrigated, fire resistive landscaping vs. 50% thinned native brush).

As depicted in Table 5, post development fire behavior expected in the irrigated and replanted with plants that are acceptable with the Santee Fire Department (FMZ Zones 0 and 1 – Gr1), as well as in an area with thinning of the existing shrubs (FMZ Zone 2 – Gr2) under peak weather conditions experience a significant reduction in flame

length and intensity. Fuel modification would result in approximately 14 feet at the outer edges of the FMZ (Zone 2) and to 3.0 feet by the time the inner portions of the FMZ (Zones 0 and 1) are reached. During on-shore weather conditions, a fire approaching from the west/southwest towards the development footprint would have low fire intensity and spotting distances due to the higher live and dead fuel moisture contents. These reduction of flame lengths and intensities are assumed to occur within the 100 feet of fuel modification that is achieved for most of the. Therefore, the FMZs proposed for the Project are approximately 2.5-times the flame length of the worst-case fire scenario under peak weather conditions and approximately 6-times the flame lengths within the development footprint and would provide adequate defensible space to augment a wildfire approaching the perimeter of the Project site.

Table 5: RAWS BehavePlus Fire Behavior Model Results – Post Project Conditions

Fire Scenario	Flame Length [1] (feet)	Spread Rate[1] (mph[2])	Fireline Intensity[1] (Btu/ft./sec)	Spot Fire[1] (Miles)
Scenario 2: 5% slope; Summer on-shore wind from W/NW (50th percentile) – (Southwest of Western Development)				
Non-combustible (NB1)	N/A	N/A	N/A	N/A
FMZ Zones 0 and 1 (Gr1)	1.7’	18	0.2	0.1
FMZ Zone 2 (Gr2)	4.7’	168	0.5	0.2
Scenario 3: 3% slope; Fall-offshore extreme wind from E/SE (97th percentile) 16 mph sustained winds with 50 mph wind gusts – (Southeast of Western Development)				
Non-combustible (NB1)	N/A	N/A	N/A	N/A
FMZ Zone 1 (Gr1)	3.1’ (3.1’)[3]	67 (67)[3]	0.5 (0.5)[3]	0.2 (0.5)[3]
FMZ Zone 2 (Gs1)	8.4’ (14.1’)[3]	577 (1,791)[3]	1.3 (4.2)[3]	0.4 (1.4)[3]
Scenario 4: 2% slope; Fall-offshore extreme wind from E (97th percentile) 16 mph sustained winds with 50 mph wind gusts – (East of Western Development area)				
Non-combustible (NB1)	N/A	N/A	N/A	N/A
FMZ Zone 1 (Gr1)	3.1’ (3.1’)[3]	67 (67)[3]	0.5 (0.5)[3]	0.2 (0.4)[3]
FMZ Zone 2 (Gs1)	8.4 ‘(14.1’)[3]	577 (1,791)[3]	1.4 (4.2)[3]	0.3 (1.1)[3]
Scenario 5: 3% slope; Summer on-shore wind from W/NW (50th percentile) – (NW of Eastern Development area)				
Non-combustible (NB1)	N/A	N/A	N/A	N/A
FMZ Zone (Gr1)	1.7’	18	0.2	0.1
FMZ Zone 2 (Gr2)	4.8’	168	0.5	0.2
Scenario 6: 3% slope; Fall-offshore extreme wind from E (97th percentile) 16 mph sustained winds with 50 mph wind gusts – (East of Eastern Development area)				
Non-combustible (NB1)	N/A	N/A	N/A	N/A
FMZ Zones 0 and 1 (Gr1)	3.1’ (3.1’)[3]	67 (67)[3]	0.5 (0.5)[3]	0.2 (0.4)[3]
FMZ Zone 2 (Gr2)	8.4 ‘(14.1’)[3]	577 (1,791)[3]	1.4 (4.2)[3]	0.3 (1.1)[3]

Note:

1. Wind-driven surface fire.
2. MPH=miles per hour.
3. Spotting distance from a wind driven surface fire; it should be noted that the wind mph in parenthesis represent peak gusts of 50 mph

Surface Fire:

- **Flame Length (feet):** The flame length of a spreading surface fire within the flaming front is measured from midway in the active flaming combustion zone to the average tip of the flames.
- **Fireline Intensity (Btu/ft/s):** Fireline intensity is the heat energy release per unit time from a one-foot wide section of the fuel bed extending from the front to the rear of the flaming zone. Fireline intensity is a function of rate of spread and heat per unit area and is directly related to flame length. Fireline intensity and the flame length are related to the heat felt by a person standing next to the flames.
- **Surface Rate of Spread (mph):** Surface rate of spread is the "speed" the fire travels through the surface fuels. Surface fuels include the litter, grass, brush and other dead and live vegetation within about 6 feet of the ground.

The information in Table 6 presents an interpretation of the outputs for four fire behavior variables as related to fire suppression efforts. The results of fire behavior modeling efforts are presented in Tables 4 and 5. Identification of modeling run locations is presented graphically in Figure 7 of this FPP.

Table 6. 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.
Over 11 feet	Over 1000 BTU/ft/s	Crowning, spotting, and major fire runs are probable. Control efforts at head of fire are ineffective.

3.4 Project Area Fire Risk Assessment

Given the climatic, vegetative, topographic characteristics, and local fire history of the area, the Project site, once developed, is determined to be subject to occasional wildfires. Potential for wildfire encroaching on, or showering embers on the site is considered high, but risk of ignition from such encroachments or ember showers is considered low based on the type of construction, fuel modification zones, and fire protection features that will be provided for the structures.

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 Carlton Oaks Project, once developed, would provide each structure with defensible space that 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 sites' landscapes. In addition, the 100-foot FMZ widths for the Project site would be approximately seven times as wide as the longest calculated flame lengths during off-shore wind conditions for portions of the proposed developed area that abut riparian vegetation types.

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 shrublands, like those found adjacent to 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 chaparral to grasslands, become highly flammable each fall; 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; and 3) homes embedded in natural and managed landscape vegetation in what may be accurately described as a wildland urban intermix. Based on this research, it can be anticipated that periodic wildfires will occur in the designated open space areas adjacent to portions of the Project site.

Wildfires have occurred within five miles of the site. As such, wildlands near the Project are expected to be vulnerable to recurring wildfire ignition and spread and may be subject to nearby wildfire that could, under worst case conditions, spread through the riparian areas within the Project's open space areas outside of the fuel modification zones.

4 Emergency Response Service

The following sections analyze the Project in terms of current Santee Fire Department fire service capabilities and neighboring fire agency resources to provide Fire Protection and Emergency Services. The analysis that follows examines the ability of the closest existing SFD fire station to adequately serve the Project. Response times were evaluated using Project build-out conditions. It was assumed that phased construction would include access roads to the newly constructed buildings and that the shortest access route to those structures would be utilized.

4.1 Emergency Response Fire Facilities

The Project site is located within the SFD jurisdictional response area. SFD services approximately 16.5 square miles and a population of approximately 58,000 residents in the City of Santee (City of Santee 2024)[4]. SFD currently operates two Fire Stations (Stations 4 and 5) with 53 uniformed fire personnel. The closest fire station to the Project site is SFD Station 5. Generally, each agency is responsible for structural fire protection and wildland fire protection within their area of responsibility. However, mutual aid agreements enable non-lead fire agencies to respond to fire emergencies outside their district boundaries. In the Project area, fire agencies cooperate on a statewide master mutual aid agreement for wildland fires and there are mutual aid agreements in place with neighboring fire agencies and typically include interdependencies that exist among the region's fire protection agencies for structural and medical responses but are primarily associated with the peripheral "edges" of each agency's boundary. These agreements are voluntary, as no local governmental agency can exert authority over another.

As depicted in Table 7, SFD Station 5, located at 9130 Carlton Oaks Drive is the closest fire station to the Project site and would likely be the first to respond. SFD Station 5 is staffed by eight fulltime fire personnel. Station 5 is equipped with one (1) Type 1 Paramedic Fire Engine and one (1) Rescue Ambulance. SFD Station 5 is approximately 0.04 miles from eastern entrance to the Project site along Carlton Oaks Drive, and approximately 1.25 miles to the most remote portions of the Project site and could respond to an incident within approximately 2 minutes and 47 seconds travel time. SFD Fire Station 4, which is located at 8950 Cottonwood Avenue, is the next closest SFD station that could respond to the Project site. Station 4 is located approximately 3.5 miles from the most remote portion of the Project site. Station 4 is staffed by nine fulltime fire personnel.

Emergency travel time for first arriving engines from each station to the Project Site are provided in Table 7. Travel distances are derived from Google road data while travel times are calculated using response speeds of 35 mph, consistent with nationally recognized National Fire Protection Association (NFPA) 1710 and Insurance Services Office (ISO) Public Protection Classification Program's Response Time Standard formula (Time=0.65 + 1.7(Distance). The ISO response travel time formula discounts speed for intersections, vehicle deceleration and acceleration, and does not include turnout time. Automatic and/or Mutual Aid agreements with surrounding fire departments are in place and would potentially result in additional resources that are not analyzed in this FPP.

[4] https://www.cityofsanteeca.gov/government/fire-department/department-overview

Table 7. SFD Emergency Response Analysis Stations Summary

Station	Location	Equipment	Staffing*	Maximum Travel Distance**	Est. Travel Time***
SFD Station 5	9130 Carlton Oaks Drive Santee, California	(1) Type 1 Fire Engine (1) Rescue Ambulance (1) Type 3 Brush Engine	(1) Fire Captain (1) Engineer (2) Firefighter/Paramedics (1) Paramedic/EMT	1.25 mi.	2 minutes, 47 seconds
SFD Station 4	8950 Cottonwood Avenue Santee, California	(1) Type 1 Fire Engine (1) Rescue Ambulance	(1) Fire Captain (1) Engineer (1) Firefighter/Paramedic (2) Paramedics	3.5 mi.	6 minutes, 36 seconds

* Stations are staffed 24/7 by three rotating shifts.
** Distance measured to farthest portion of Project site
*** Assumes travel at 35 mph travel speed and does not include donning turnout gear and fire dispatch time. Actual travel speeds are likely to be closer to 45 mph speed limits

4.1.1 Emergency Response Travel Time Coverage

The Santee Fire Department has not adopted a general time performance baseline and benchmark for initial response to emergency calls, however the City's Safety Element states "The Department's response times vary within the City, with the current goal being to provide an average maximum initial response time of no more than six minutes, with an average maximum response time of no more than ten minutes for supporting paramedic transport units 90% of the time." (City of Santee). As indicated in Table 4, response to the Project site from the closest existing SFD fire station (Station 5) would achieve the response time standard for first arriving. Response travel time from Station 5 is calculated at roughly 1 minutes 3 seconds to the eastern entrance of the Project site and 2 minutes 47 seconds to the furthest lot in the northwestern corner. The second engine to the site is estimated to arrive within approximately 6 minutes 36 seconds travel time. All response calculations are based on an average response speed of 35 mph, consistent with nationally recognized National Fire Protection Association (NFPA) 1710. Based on these calculations, the project would comply with the City's response time standards from existing fire stations and would not require provisions for additional resources.

4.2 Estimated Calls and Demand for Service from the Project

Determining the potential impact associated with the Project's estimated population increase is required in order to compare how many additional calls may be realized and determine what effects they may have on the available response resources. The estimated incident call volume of the Project is based on a conservatively calculated estimate from the maximum potential number of additional persons that would be expected onsite. Emergency call volumes related to typical projects, such as new residential developments, can be reliably estimated based on the historical per-capita call volume from a particular fire jurisdiction.

The Santee Fire Department provides emergency services within the City of Santee which covers an area of 16.5 square miles and a population of approximately 60,000 residents. Emergency call volumes related to typical projects, such as new residential developments, can be reliably estimated based on the historical per-capita call

volume from a particular fire jurisdiction. Heartland Communications, which provides dispatching services for SFD and surrounding fire agencies, reports a total 7,969 service calls to SFD in 2023 (Heartland Communication 2023). The City's per capita annual call volume is approximately 133 calls per 1,000 persons (7,969 calls/60,000 residents x 1000).

Per the City's General Plan Housing Element, the average persons per household is 2.82 (City of Santee 2022). Based on the proposed development plans, the Project's proposes up to 243 residential unit, which would generate approximately 686 residents. In addition to the residential population, there would be approximately 200 guests and employees of the hotel and golf course. The total onsite population is calculated at 886 persons. The Project's estimated population is calculated to generate up to 118 calls per year (0.32 calls per day).

Across all fire agencies that Heartland Fire provides dispatch services there were a total of 74,908 calls, of which 55,271 were classified as medical, approximately 74% of calls. There were approximately 4,319 calls classified as fire, which is approximately 6% of all calls. Therefore, it can be assumed most of the 133 calls are expected to be medical-related calls.

Service level requirements, absent additional resources, would not be expected to be significantly impacted with the increase of 118 calls per year or approximately 0.32 calls per day if the Carlton Oaks community were serviced from one or both of the existing SFD stations. The SFD will determine the potential for impacts on its service delivery. However, the project, like all new projects, would pay development fees to the City that would support the acquisition of response resources and development of future fire stations, as needed, to support the City's growing population. This type of incremental growth and response enhancements is contemplated and planned for in the City's General Plan.

Table 8. Calculated Call Volume Associated with the Project

Emergency Calls per 1,000 (County Data)	Number of Residents/Guest/ Employees	Avg. No. Calls per Year (886*0.13)	Avg. No. Calls per Day (88.6/365)
133	+/- 886	118	0.32

4.3 Cumulative Impacts on Fire Response

The available firefighting and emergency medical resources in the vicinity of the Project site include an assortment of fire apparatus and equipment considered capable of responding to the type of fires and emergency medical services potentially occurring within the Project site. The Project, which includes the construction of 243 residential dwelling units and its proposed usage by up to 683 residents and a 52-room hotel with approximately 200 employees and guests is an increase in potential service demand of approximately 44 calls per year, is within the capacity of the existing SFD Fire Stations that will service the Carlton Oaks Project. Based on the height of the hotel with eave heights of approximately 25 feet (one architectural element/tower is approximately 40 feet tall), there is no trigger for ladder truck response. Fire engines equipped with ground-based ladders would be the standard response approach. Regardless, SFD's truck company could respond to the site if considered beneficial and would be facilitated throughout most of the site based on road widths and turning radii.

Other future projects in the vicinity of Station 5 are not known at the time of this FPPs preparation, but when considered cumulatively, the potential impact of multiple projects is considered less than significant, mitigated by

increased funding available from each project to the SFD through property taxes and other fees associated with each project, including the Carlton Oaks Project. This funding would be utilized to maintain or enhance fire response capabilities.

For major emergencies, such as wildland fires, there are avenues for cost recovery through the Fire Management Assistance Grant, which generally would cover 75% of the costs for fire emergencies. If there is a fire outside of the State Recovery Area, the local jurisdiction is responsible for those costs, which could run into the hundreds of thousands of dollars. However, these costs could be offset by at least 75% through the Fire Management Assistance Grant.

The City of Santee Fire Department and Sheriff's Department work together under unified command on fire evacuation protocols and procedures. There have been improvements to avoid bottlenecking during evacuation. These improvements include the use of geo-targeting, in conjunction with the County's public safety grid maps which are available to all first responders. The Sheriff's Department, CalFire, most of the firefighting agencies and SDG&E developed the maps so that the county is broken into grids and subsections of grids. The public safety grid maps help first responders make specific, targeted, tiered and staggered evacuations.

In January of 2018, the Federal Communications Commission introduced rules for wireless carriers to create the ability to geo-target to one-tenth of a mile. With these new rules, the City can utilize the public safety grid maps, assess the risk, the fire, the direction, intensity and speed, and immediately communicate the grid map to the Sheriff's Department. They, in turn, utilize the Wireless Emergency Alert (WEA) system, which provides them the ability to alert residents of an evacuation order. In the near future, the WEA will be updated to have more characters and allow the Sheriff's Department to give more detailed alerts and have the capability to outline specific evacuation routes to different neighborhoods.

5 Fire Safety Requirements - Buildings, Infrastructure, and Defensible Space

The City of Santee's Municipal Code (Refer to Section 1.1 of this FPP for code references) governs the building, infrastructure, and defensible space requirements detailed in this FPP. The Project will meet applicable codes or will provide alternative materials and/or methods that will be approved by SFD prior to their implementation. While these standards will provide a high level of protection to structures for the Project site, there is no guarantee that compliance with these standards will prevent damage or destruction of structures by fire in all cases.

The following summaries highlight important fire protection features. Prior to bringing combustible materials onsite, all underground utilities shall be in place, hydrants operational, water mains, curbs, gutters, sidewalks, and an approved all-weather roadway in place, and interim fuel modification zones established and approved. All items listed here shall meet approval by the SFD.

5.1 Road Requirements

5.1.1 Fire Apparatus Access Roads

Site access would comply with the requirements of the 2022 or most recently adopted Santee Fire Code, adopting with amendments the CFC and City Ordinance No. 570. The Project's circulation system would consist of private roads with each being built to the respective standards and maintained by the Project's HOA.

At least two points of primary access for emergency response and evacuation would be provided into the Carlton Oaks community, Carlton Oaks Drive to the north and West Hills Parkway to the west. All interior residential streets would be designed to accommodate a minimum of a 77,000-pound fire truck. SFD would participate in approval of street names. A private emergency access road for the Residential North and resort parcels would be provided through the existing Vista del Verde condominiums located in the northeastern corner of the project site. This emergency access would comply with the City's Fire requirements. A new fence with an emergency access gate will be erected at the boundary line between the Project and Vista del Verde condominium property. Emergency access will also be provided to PA-1 via an extension of Private Drive "C" westerly to West Hills Parkway and constructed to meet applicable fire code requirements.

Figures 8A and 8B, Fire Truck Turning Right and Fire Truck Turning Left, demonstrate the space necessary for a fire apparatus to successfully turn into an alley/driveway in Planning Area 2 (PA-2). In PA-2, where fire apparatus' need to turn into a long driveway/alley, there shall be no vegetative landscaping within 4 feet of the fire apparatus turning radius. Acceptable landscaping within 4 feet of the turning radius includes rock, cobblestone, or similar materials that allow for the fire apparatus to drive over. Additionally, the curb adjacent to the access of each alley shall be painted red with proper "NO PARKING – FIRE LANE" signage and/or lettering painted on the curb itself, to ensure parked vehicles do not encroach on the turning radius of the fire apparatus.

Consistent with SFD fire code, driveways that are 20-feet wide serving 4 units or less in PA-2 are acceptable with proper "NO PARKING – FIRE LANE" signage prominently displayed on both sides of the roadway, along with properly painted red curbs indicating that parking is prohibited, as detailed above. SFD indicates that the 20-foot-wide road

exceeds the Santee Fire Code exception minimum of 16 feet and would not impair or impede adequate emergency fire department access to the project site.

5.1.2 Road Widths and Circulation

All on-site road widths would be constructed according to the City of Santee standards and include Alternate Standards with roads between 20 feet and 36 feet widths. Private streets which provide direct vehicular access to each of the cluster units of 4 units of less will be served via 20 feet wide cul-de-sac streets, as allowed by the Santee Fire Code Section 503.2.1, which states:

EXCEPTION: A fire apparatus access road may be reduced to an unobstructed width of not less than 16 feet (or other approved width) when in the opinion of the Fire Chief the number of vehicles using the roadway will not limit or impair adequate emergency fire department access.

The City of Santee Fire Chief has determined that the 20-foot road width would not impair or impede adequate emergency fire department access to structures along these routes. The 20-foot-wide road allows for two 10-foot travel lanes. Fire engines are approximately 9 feet wide, mirror to mirror, and to enable opposing engines to pass each other, 20-feet is sufficient because parking would not be allowed on these roads and the number of residential units along these roads is low, resulting in a low number of vehicles using these roadways. Where the 20-foot width is proposed for internal streets, they would also be required to comply with the City of Santee Public Works Alternative Standards, which are noted on the Tentative Tract Map.

All streets within the project, public and private, include on-street parking when there is at least 36 feet of paved road width for parking on both sides. No building elements, balconies, drains, projections, or any other object shall encroach into this clear space. The fire lane(s) shall be identified by painting curbs red with white- stenciled letters indicating "NO PARKING - FIRE LANE" every 30 feet along all portions of the fire lane. The signs would include language identifying the towing company and their phone number enabling legal enforcement of the no parking areas. Roadways over 150 feet in length will require a fire department turn-around. All Project roads would also include at minimum a 50-foot FMZ. The roadside FMZs have specific plant restrictions and maintenance requirements as detailed in this FPP.

The project will also include a private utility maintenance road between the western and eastern development areas that also serves as a pedestrian/golfcart passageway that connects PA-1 to the Resort. This roadway is not considered a fire apparatus access road but would be built to code and could be used as an emergency evacuation route if needed. It would be gated on both ends and available to pedestrian and golf cart use.

5.1.3 Grade and Surface

All fire access and vehicle roadways would be of asphaltic concrete, except as noted for grades exceeding 13% and designed and maintained to support the imposed loads of fire apparatus (not less than 77,000 pounds) that may respond, including Type I engines, Type III engines, and ladder trucks. Access roads would be completed and paved prior to issuance of building permits and prior to the occurrence of combustible construction. All Fire apparatus access roadways shall be surfaced so as to provide all-weather driving capabilities. This will also apply to proposed Grasscrete, a porous paving system that combines concrete and grass to provide engineered load capacity to support fire apparatus, and the Access Bridge. Supporting documentation will be required for the proposed Grasscrete along with testing it with SFD fire apparatus prior to final.

SOURCE: Hunsaker & Associates 2025

FIGURE 8A

Fire Truck Turning Radius Right Turn

Fire Protection Plan for the Carlton Oaks Project

SOURCE: Hunsaker & Associates 2024

FIGURE 8B

Fire Truck Turning Radius Left Turn

Fire Protection Plan for the Carlton Oaks Project

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5.1.4 Gates

Gates are not proposed within Carlton Oaks except as provided for the utility maintenance road between the eastern and western development areas. These gates and any future proposed gate will be consistent with Santee Fire Code:

- Any automatic gates would be provided in compliance with SFD requirements and may not include gating of public roads.
- Any automatic gates would be equipped with a Knox, emergency key-operated switch overriding all command functions and opening the gate(s). Automatic gates accessing through the utility maintenance road would be equipped with approved emergency traffic control-activating strobe light sensor(s) which would activate the gate from both directions of travel on the approach of emergency apparatus. The automatic gate would have a battery back-up or manual mechanical disconnect in case of a power failure. The gate(s) would include a magnetic or pressure activated switch for automatically opening the gate from the interior of the project for resident egress.
- Pole gates or other structures or devices, which could obstruct fire access roadways or otherwise hinder emergency operations would be equipped with an approved Knox padlock.

5.1.5 Driveways

Any new structure that is 150 feet or more from a fire apparatus access road would have a paved driveway meeting the following specifications:

- Grades would be less than 15%. If over 15% grade, Portland cement concrete base with heavy broom finish would be required. In no case would a driveway exceed 20% grade.
- Driveway aprons would meet the code standard with a 28 degree inside turning radius.

5.1.6 Premise Identification

Identification of roads and structures would comply with the 2022 or most recently adopted CFC, Sections 505, as follows:

- Approved numbers and/or addresses would be placed on all new and existing buildings and at appropriate additional locations, plainly visible and legible from the street or roadway fronting the property when approaching from either direction. The numbers would contrast with their background and would meet the following minimum size standards: 4" high with a ½" stroke for residential buildings, 6" high with a ½" stroke for commercial and multi-residential buildings and 12" high with a 1" stroke for industrial buildings. Additional numbers would be required where deemed necessary by the fire code official, such as rear access doors, building corners and entrances to commercial centers. The fire code official may establish different minimum sizes for numbers for various categories of projects.
- Multiple structures located off common driveways would include posting structure identification on structures, on the entrance to individual driveways, and at the entrance to the common driveway.
- If the structure is 100 feet from the roadway, structure identification should also be located at the entrance to the driveway.

- Illuminated directory maps would be installed at driveway entrances to all multi-family residential developments with 15 units or more within the project site (City of Santee 2022 - Section 505.3). The directory shall be approximately 12 square feet (or other approved size) and show the layout of buildings, building addresses, hydrant locations and FDC locations. The exact design and location for directory placement shall be approved by the fire code official prior to installation. Final location of directory maps and content would be approved by the SFD Fire Marshal.

5.1.7 Response Map Updates

Any new development which necessitates updating of emergency response maps by virtue of new structures, hydrants, roadways or similar features, are required to provide map updates to the City of Santee. The applicant would provide a copy of building plans in Geo-Referenced format to be used by SFD for pre-fire planning purposes and for update of applicable incident response maps. Information would specifically include a site plan and building plan showing locations of utility shut-offs, fire sprinkler risers and shut-off valves, the fire department connection for fire protection sprinkler system, fire alarm panels, fire hydrants, fire department connection standpipe, and Knox box. The map update information would be provided in a City- approved coordinate system to the City's data management lead.

5.2 Ignition Resistant Construction and Fire Protection Systems

This section outlines ignition-resistant construction (for all structures) that would meet the requirements of the City's Fire and Building Codes. The following construction practices respond to the requirements of the Santee Municipal Code and Ordinance 570 and are consistent with the 2022 California Fire and Building Codes (Chapter 7A) as amended by the City of Santee. Code updates are likely to occur before the Project is fully constructed. As such, building plans must meet the "then-current" California Building and Fire Codes and City amendments in effect at the time of building plan submittal. Appendix E provides a summary of the requirements for ignition resistant construction.

There are two primary concerns for structure ignition: 1) radiant and/or convective heat and 2) burning embers (NFPA 2008, IBHS 2008). 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 7A 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 provided by the Proposed Project are required by the City, County, 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 by SFD since 1989), of extinguishing interior fires, should embers succeed in entering a structure.

Even though these measures are now required by the latest Building and Fire Codes, at one time, they were used as to compensate 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 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, as well as USGS 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 well-defined FMZ requirements, perform well against wildfires. Examples include 4S Ranch, Cielo, The Crosby, The Bridges (IBHS 2008), and Bel Etage/Santa Fe Valley in San Diego County, Stevenson's Ranch in Santa Clarita, Serrano Heights in Orange County, and many other examples of master planned communities and individual, prepared homes in Southern California (FEMA/CalOES 2008).

The following Project features are required for new development in WUI areas (CBC Chapter 7-A and CFC Chapter 49)[5] and form the basis of the system of protection necessary to minimize structural ignitions as well as providing adequate access by emergency responders:

1. Exterior walls of all structures and garages 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 would have the same protection as exterior walls. Per City Building Code, Chapter 7-A: Exterior wall coverings to extend from top of foundation to the underside of roof sheathing and terminate at 2-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 would maintain the ignition-resistant integrity of exterior walls, or projection would be enclosed to grade.
2. Eaves and soffits would meet the requirements of SFM 12-7A-3 or be protected by ignition-resistant materials or non-combustible construction on the exposed underside, per City Building Code.
3. There would be no use of paper-faced insulation or combustible installation in attics or other ventilated areas.
4. There would be no use of plastic, vinyl (with the exception of vinyl windows with metal reinforcement and welded corners), or light wood on the exterior.
5. All roofs would be a Class "A" listed and fire-rated roof assembly, installed per manufacturer's instructions, to approval of the City. Roofs would be made tight with no gaps or openings on ends or in valleys, or elsewhere between roof covering and decking, in order to prevent intrusion of flame and embers. Any openings on ends of roof tiles would be enclosed to prevent intrusion of burning debris. When provided, roof valley flashings would not be less than 0.019 inch (No. 26 gage galvanized sheet) corrosion-resistant

[5] Items in the list include a summary of features found in the California Fire and Building Codes for building in wildland urban interface and/or fire hazard severity zone areas. Not all requirements are listed, but all applicable requirements will be implemented.

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.

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 wire mesh having no openings greater than 0.125 inch. Vent openings would not exceed 144 square inches. Vents would be designed to resist the intrusion of any burning embers or debris.
7. Vents would not be placed on roofs unless they are approved for Class "A" roof assemblies (and contain an approved baffle system (such as Brandguard or O'Hagin vents) to stop intrusion of burning material) or are otherwise approved.
8. Turbine vents would be 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.
12. Rain gutters and downspouts to be non-combustible. They would be designed to prevent the accumulation of leaf litter or debris, which can ignite roof edges.
13. Doors to conform to SFM standard 12-7A-1, or would be of approved noncombustible construction or would be solid core wood having stiles and rails not less than 1 3/8 inches thick or have a 20-minute fire rating. Doors to comply with City 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 City 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 would 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 would be no combustible awnings, canopies, or similar combustible overhangs.
17. No combustible fences to be allowed within 5 feet of structures on any lots. The first 5 feet from a structure would be non-combustible or meet the same fire resistive standards as walls.
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 City Fire Code. The code requires that openings would not exceed 1/4-inch. Arrestors would be visible from the ground
19. Any liquid propane gas (LPG) tanks (except small barbecue and outdoor heater tanks), firewood, hay storage, storage sheds, barns, and other combustibles would be located at least 30 feet from structures, and, within the FMZ, 30 feet from flammable vegetation. There would be no flammable vegetation under or within 30 feet of LPG tanks, or tanks would be enclosed in an approved ignition-resistant enclosure with 10 feet clearance of flammable vegetation around it. In no case would a tank be closer than 10 feet from the structure (consultant recommendation). City Fire Code requires 10 feet of clearance of native vegetation, weeds, and brush from under and around LPG tanks.

20. Storage sheds, barns, and outbuildings to be constructed of approved non-combustible materials, including non-combustible Class A roofs and would be subject to the same restrictions as the main structure on lot.
21. Additionally, any of the above-listed structures (i.e., outbuildings, storage sheds, barns, separate unattached garages) that are 500 square feet or less in size and 10 or more feet from an adjacent structure would not be required to include automatic fire sprinklers. Locations, and required FMZs, would be subject to approval of City Fire Marshal and the Building Official based on size of the structure.

While these standards would provide a high level of protection to structures in this development and would be expected to 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. Nevertheless, the analysis indicates that the potential risk is considered acceptable according to industry standards.

5.3 Infrastructure and Fire Protection Systems Requirements

WUI fire protection requires a systems approach, which includes the components of vegetation management, structural safeguards, and adequate infrastructure. This section describes the infrastructure components:

Infrastructure Requirements

The following City of Santee requirements are consistent with the 2022 California Fire Code and nationally accepted fire protection standards. All water storage and hydrant locations, mains and water pressures would be consistent with City's Fire Code fire flow requirement.

Water

Water service for the Carlton Oaks Project would be provided by PDMWD. The water system shall be a private system designed and installed per PDMWD and SFD requirements. The water system for Carlton Oaks shall provide 2,500 gallons per minute for 2-hours fire flow.

Fire Hydrants

Hydrants are subject to SFD approval. These hydrants shall have two, 2 1/2" ports and one, 4" port, with a minimum fire flow of 2500 gallons per minute for 2 hours. Hydrants shall be of all bronze construction, painted "fire hydrant yellow" and be installed per Padre Dam. Water District requirements. Exact location of required hydrants is to be determined by the fire code official prior to installation. All underground utilities including fire mains, fire hydrants and fire service underground devices shall be installed and approved prior to the delivery of construction materials.

Hydrants to be located on the normal fire apparatus response side of the road at each intersection, at the beginning radius of cul-de-sacs, and at 300-foot spacing as required by SFD within VHFHSZs. Where applicable, hydrants to be located at the entrance to cul-de-sac bulb (not in the bulb itself unless specified by SFD). Hydrants to be provided on each side of any divided road or highway. Hydrants would be consistent with SFD Design Standards as follows:

- Required installations. The location, type and number of fire hydrants connected to a water supply capable of delivering the required fire flow would be provided on the public or private street, or on the site of the premises to be protected or both. Fire hydrants would be accessible to the fire department apparatus by roads meeting

the requirements of section 503 of the CFC. Fire service laterals, valves, backflow preventers, and meters would be installed on site as required by the PDMWD. All fire department connections would be installed in accordance with mounting requirements as specified by the SFD Fire Marshal.

- **Location of fire hydrants.** Hydrants would be in place and serviceable prior to delivery of combustible materials to the site. Fire hydrants would be located according to engineering standards and as required by the fire code official using the following criteria and taking into consideration departmental operational needs. Hydrants within Project neighborhoods would be 300 feet apart. Prior to the issuance of building permits, the applicant would submit to SFD plans demonstrating a water system capable of handling the fire flow requirements.
- **Fire hydrant construction and configuration.** All fire hydrants would be of bronze construction, including all internal parts except seats. Alternative materials may be used if approved by SFD's Fire Marshal and PDMWD. The stems would be designed and installed in a manner that would ensure that they would not be projected outward from the main body by internal water pressure due to disassembly. The number and size of fire hydrant outlets would be at a minimum one 4-inch port and two, 2 1/2-inch ports.
- **Signing of water sources and fire department connections.** Fire hydrants would be identified by a reflectorized blue marker and fire department connections would be identified by a reflectorized green marker, with a minimum dimension of 3 inches, in the center of the travel lane adjacent the water source. Crash posts would be provided where needed in on-site areas where vehicles could strike fire hydrants and would be consistent with Section 312 of the CFC.
- **Vegetation Clearance.** A three-foot clear space (free of ornamental landscaping and retaining walls) would be maintained around the circumference of all fire hydrants.

Fire Sprinklers

All new structures would be provided interior fire sprinklers. Automatic internal fire sprinklers would be in accordance with NFPA 13, 13-D, or 13-R and City of Santee installation requirements as appropriate. Actual system design is subject to final building design and the occupancy types in the structure.

Exterior audio/visual device(s) would be connected to every automatic fire sprinkler system in an SFD-approved location. These sprinkler water-flow alarm devices would be activated by water flow equivalent to the flow of a single sprinkler of the smallest orifice size in the system. Where a building fire alarm system is installed, actuation of the automatic sprinkler system would actuate the building fire alarm system.

Smoke Detectors

All residential units would have electric-powered, hard-wired smoke detectors in compliance with SFD Fire Code.

5.4 Ongoing Building and Infrastructure Maintenance

The Project HOA shall be responsible for long term funding and maintenance of private roads and fire protection systems, including fire sprinklers and private fire hydrants.

5.5 Pre-Construction Requirements

As required by fire code and SFD requirements, prior to bringing combustible materials onto the site, all utilities and site improvements within the active development shall be in place, fire hydrants operational, an approved all-weather roadway in place, and fuel modification zones established and approved.

5.6 Defensible Space and Vegetation Management

5.6.1 Defensible Space and Fuel Modification Zone

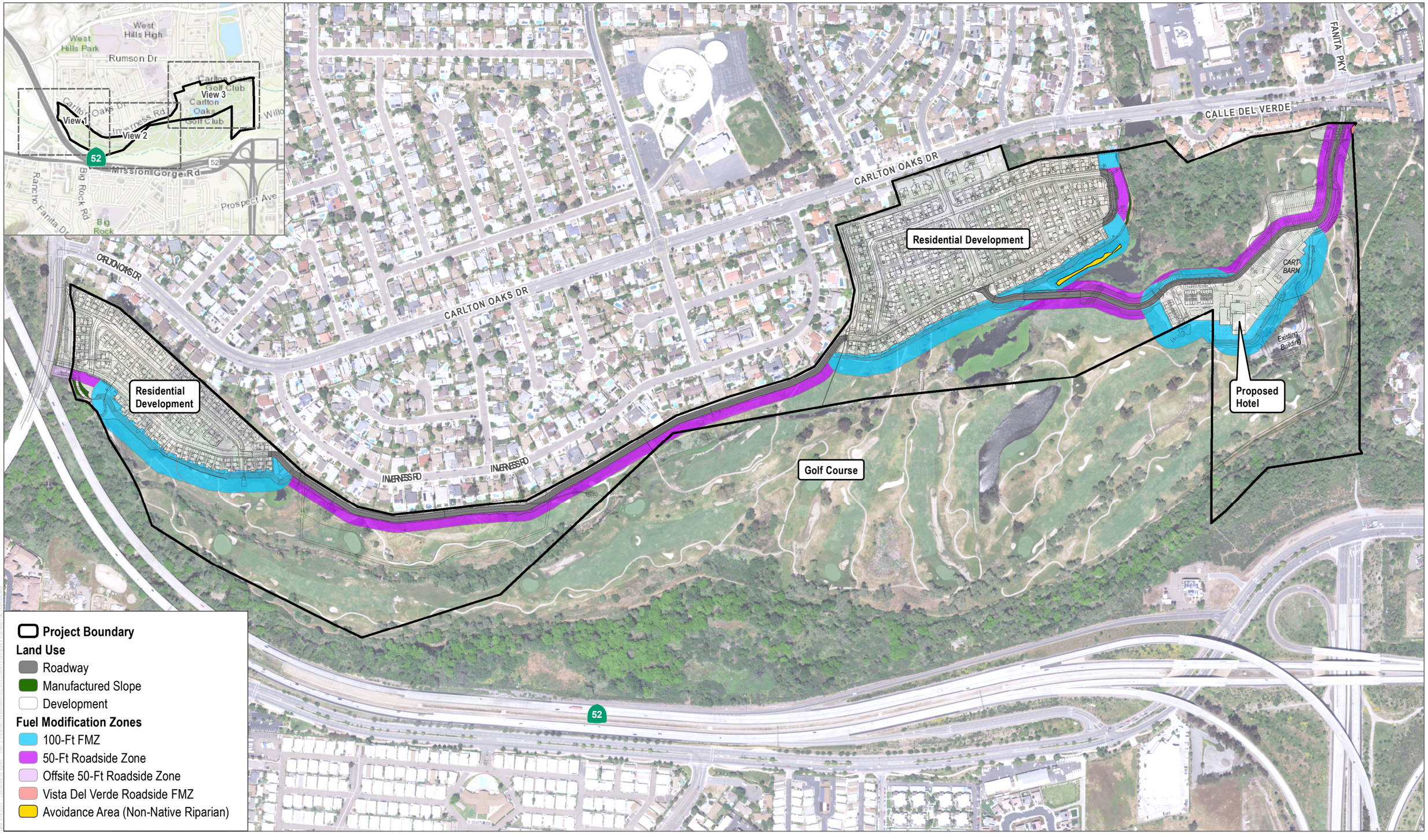
WUI fire protection requires a systems approach, which includes the components of infrastructure and water, structural safeguards (addressed in the FPP), and adequate defensible space setbacks. This section provides defensible space details for the Carlton Oaks Project.

An important component of a fire protection system for this Project is the provision for ignition-resistant landscapes, and modified vegetation buffers. FMZs are designed to provide vegetation buffers that gradually reduce fire intensity and flame lengths from advancing fire by strategically placing thinning zones, restricted vegetation zones, and irrigated zones adjacent to each other. FMZs are arguably more important when situated adjacent to older structures that were built prior to the latest ignition resistant codes and interior sprinkler requirements. All dwelling units on the Project site will be highly ignition resistant based on required construction design, materials, and methods. FMZs would be located on the perimeter of all structures (where applicable), along all ingress/egress roadways. As previously mentioned, Dudek conducted modeling of the site for post-fuel modification zones. Typical fuel modification includes establishment of a minimum 50-foot wide irrigated zone (Zones 1 and 2) and a 50-foot wide thinned zone (Zone 3) on the periphery of the Development Footprint, beginning from the structure. For modeling the post-FMZ treatment condition, the fuel model assignments were re-classified according to the specific fuel's management treatment (e.g., irrigated, fire resistive landscaping vs. 50% thinned native brush).

Based on the modeled extreme weather flame lengths for the Project sites, average wildfire flame lengths are projected to be approximately 14 feet high in areas of Development Footprints adjacent riparian fuels during a Santa Ana wind event. 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 "defensible space" distances for providing firefighters with room to work and minimizing structure ignition. For this Project, as indicated in *Figure 9*, the Fuel Modification Zones are approximately seven times wide as the modeled flame lengths in each of the fuel types representing the existing onsite fuels. In the Project's current configuration, 100 feet of FMZ for the Project site will be provided between the Development Footprint and open space areas and will be in accordance with all code requirements.

The Santee Municipal Code requires that FMZ be provided around every building that is designed primarily for human habitation or use and building design specifically for house farm animals. Decks, sheds, gazebos, freestanding open-sided shade covers and similar accessory structures less than 250 square feet and 30 feet or more from a dwelling, and fences more than 5 feet from a dwelling, are not considered structures for the purposes of establishing fuel modification zones. FMZs will include 100-foot fuel modification zones (Zones 1, 2, and 3) between the natural open space areas and on-site structures. The fuel modification zones will be constructed from the structure outwards towards undeveloped areas. Figure 9 illustrate the FMZ Plan proposed for the Project Site, including a non-combustible zone, Zone 1 Ember Resistant Zone (0 to 5 feet), a fully-irrigated, limited planting zone, Zone 2 Irrigated Zone (5 to

50 feet), and a 50% thinning Zone 3 Thinning Zone (50 feet to 100 feet), which would lessen the spread of fire as it approaches the primary FMZ adjacent to structures. The FMZs will be extending from the structures towards the undeveloped areas. Additionally, a 50-foot wide roadside FMZ along each roadway adjacent to combustible vegetation shall be required, which will be completed and maintained by the community's HOA.



SOURCE: AERIAL-NAIP 2020; DEVELOPMENT-HUNSAKER & ASSOCIATES, INC. 2024, 2025

DUDEK

0 210 420 Feet

FIGURE 8

Fuel Modification Plan Overview

Fire Protection Plan for the Carlton Oaks Project

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5.6.1.1 Fuel Modification Zone Standards

Based on the predicted fire intensity and duration along with flame lengths for this Project site and the provided FMZs, the highest concern is considered to be from firebrands or embers as a principal ignition factor. To that end, this site, based on its location and ember potential, will include the latest ignition and ember resistant construction materials and methods for roof assemblies, walls, vents, windows, and appendages, as defined by the California Building Code (e.g., Chapter 7A).

The following section provides standard Santee Fire Department FMZ requirements.

Definition

Fuel Modification Zone: A FMZ is measured on a horizontal plane from the rear of the structure extending outwards towards the naturally vegetated open space areas. FMZs shall be a minimum of 100 feet in width for lots adjacent to the open space areas. To ensure long-term identification and maintenance, each respective FMZ shall be identified by a permanent marker system meeting the approval of SFD.

General Criteria for Fuel Modification Zones

Zone 1 Immediate Zone (0 feet to 5 feet) - This is the area located from the exterior wall surface of the building extending 5 feet on a horizontal plane to Zone 2. This zone shall be constructed of continuous hardscape or limited fire-resistant plantings acceptable to the FAHJ. Vegetation in this zone shall not exceed 6-inches to 18-inches in height and irrigation is required. 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. This zone applies around all new buildings associated with the Project.

Zone 2 Intermediate Zone (5 feet to 50 feet) – This zone is located from the immediate edge of Zone 1 extending out in a horizontal plane to a minimum distance of 50 feet. The zone shall consist of planting low growth, drought tolerant and fire resistive plant species. The height of the plants in this zone starts as 6-inches adjacent to Zone 1 and extending in a linear fashion up to a maximum of 18-inches at intersection with Zone 3. Vegetation in this zone shall be irrigated and not exceed 10 feet in height and shall be moderate in nature. Trees shall not exceed 30 feet in height and be limited or as approved by the FAHJ. Firewood inside this zone shall be piled a minimum of 30 feet away from all buildings and structures. Cords of firewood shall also be maintained at least 10 feet from property lines and not stacked under tree canopies drip lines. This Zone is a fully irrigated zone with a maintained landscape with trees, shrubs and other plantings that shall be fire resistive, and shall be spaced according to Figure 10, Fuel Modification Measurement Distance. Any dead or dying material shall be removed from this zone.

Zone 3 Extended zone (50 feet to 100 feet) – This zone is located from the immediate edge of Zone 2 extending out in a horizontal plane for 50 feet for a total of 100 feet of fuel modification. 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 feet off the ground on mature trees. This area would be considered selective clearing of natural vegetation and dense chaparral by removing a minimum 50% of the square footage of this area. Weeds and annual grasses are to be mowed to a height of 4–6 inches. Any chipping that is done on site should be spread not to exceed 6 inches in depth. Trees may remain in the Zone 3 area provided that the horizontal distance between crowns of adjacent trees or tree groupings and crowns of trees and structures is not less than 10 feet.

5.6.1.2 Project Specific FMZ Treatments

Planning Area 1

As illustrated in Figure 9A, FMZ in Planning Area 1 includes a typical 100 feet of FMZ, including Zones 1, 2, and 3 adjacent to structures on the golf course side and ignition resistant landscapes provided by the existing structures to the north. Roadside FMZ totaling 50 feet in width is also provided adjacent to the primary access road, the maintenance road on the eastern side of this Planning Area and the EVA.

Maintenance Road

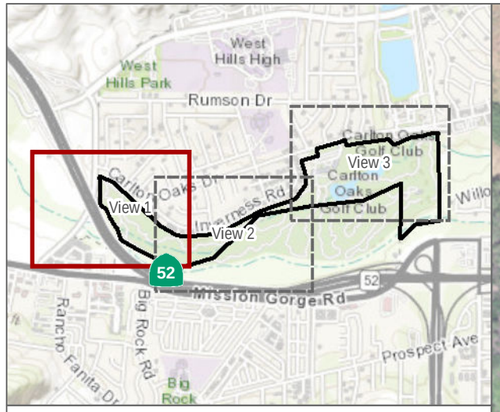
FMZ south of the maintenance road that connects Planning Areas 1 and 2 will continue to be maintained as part of the golf course area and existing development, per Figure 9B. Existing development north of the road provides an FMZ that is superior to a typical roadside FMZ because it includes no wildland fuels and is converted to maintained and irrigated landscapes, hardscape, and structures. The roadside FMZ to the south of this maintenance road will be established on the tentative map, and maintenance within this area will continue to be provided by the golf course as part of its routine and ongoing maintenance.

Planning Area 2

FMZ adjacent to Planning Area 2 includes a total of 100 feet of width, including Zones 1, 2 and 3 (Figure 8C). Within the FMZ, approximately 65 feet from the nearest planned structures, a riparian habitat consisting primarily of willow and cottonwood trees occurs as a narrow band within this area. Figure 9C illustrates the location of the riparian habitat within the FMZ. The 100 feet of FMZ for the proposed development includes maintained golf course, riparian vegetation and open water/inundated area. The vegetation adjacent to the proposed residences would be removed outside of a narrow riparian habitat within the blue FMZ area. Riparian habitat in this site has very high fuel moisture due to the inundated area within which it is located, which represents an excellent ignition resistant fuel type, appropriate for the outer portions of the FMZ. The 50 feet FMZ along the road also includes maintained golf course and open water. The lack of a true wildland urban interface or fire hazard severity zone designation in this area and high moisture results in the existing conditions in this area serving as an acceptable FMZ. Future ongoing maintenance, provided by the golf course or the HOA, would include removal of undesirable trees, shrubs and understory in these areas, as needed and to the satisfaction of the SFD. Three other, small, FMZ consistent riparian polygons occur within FMZ adjacent to the resort access road and will be avoided during FMZ maintenance.

Vista Del Verde

As presented in the inset within Figure 9C, the full 50 feet of roadside FMZ is achievable on site for approximately 98% of the roadway extent. In the northeast corner of the Project, along the planned EVA, (Figure 9A), a small polygon of the 50-foot roadside FMZ falls just outside the Project's boundary. This area has already been cleared by the City and is within the 100 feet defensible space area for existing residences along Calle del Verde. This area varies between 0 and 7 feet in width, but it is within the 100 feet defensible area for the existing townhomes, has been treated within the last few years, and is currently addressed by the adjacent property owners and enforced by SFD. The area will be maintained by the landowner (under Santee's defensible space requirements) and the golf course as part of the roadside FMZ requirements and enforced by the SFD.



- Project Boundary

Land Use
- Roadway
- Manufactured Slope
- Development

Fuel Modification Zones
- 100-Ft FMZ
- 50-Ft Roadside Zone
- Offsite 50-Ft Roadside Zone
- Vista Del Verde Roadside FMZ
- FMZ Dimension

SOURCE: AERIAL-NAIP 2020; DEVELOPMENT-HUNSAKER & ASSOCIATES, INC. 2024

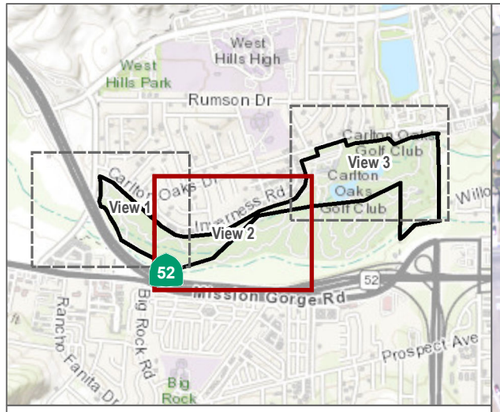
DUDEK

0 110 220 Feet

FIGURE 8A

Fuel Modification Plan - View 1

Fire Protection Plan for the Carlton Oaks Project



Project Boundary

Land Use

- Roadway
- Manufactured Slope
- Development

Fuel Modification Zones

- 100-Ft FMZ
- 50-Ft Roadside Zone
- Offsite 50-Ft Roadside Zone
- Vista Del Verde Roadside FMZ
- FMZ Dimension

CARLTON OAKS DR

INVERNESS RD

INVERNESS RD

FMZ as recorded on the Tentative Map, but is maintained by the golf course with HOA conditioned to maintain should the golf course land use change.

Golf Course

52

52

SOURCE: AERIAL-NAIP 2020; DEVELOPMENT-HUNSAKER & ASSOCIATES, INC. 2024

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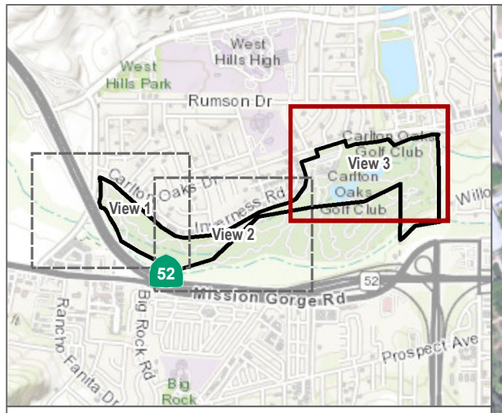
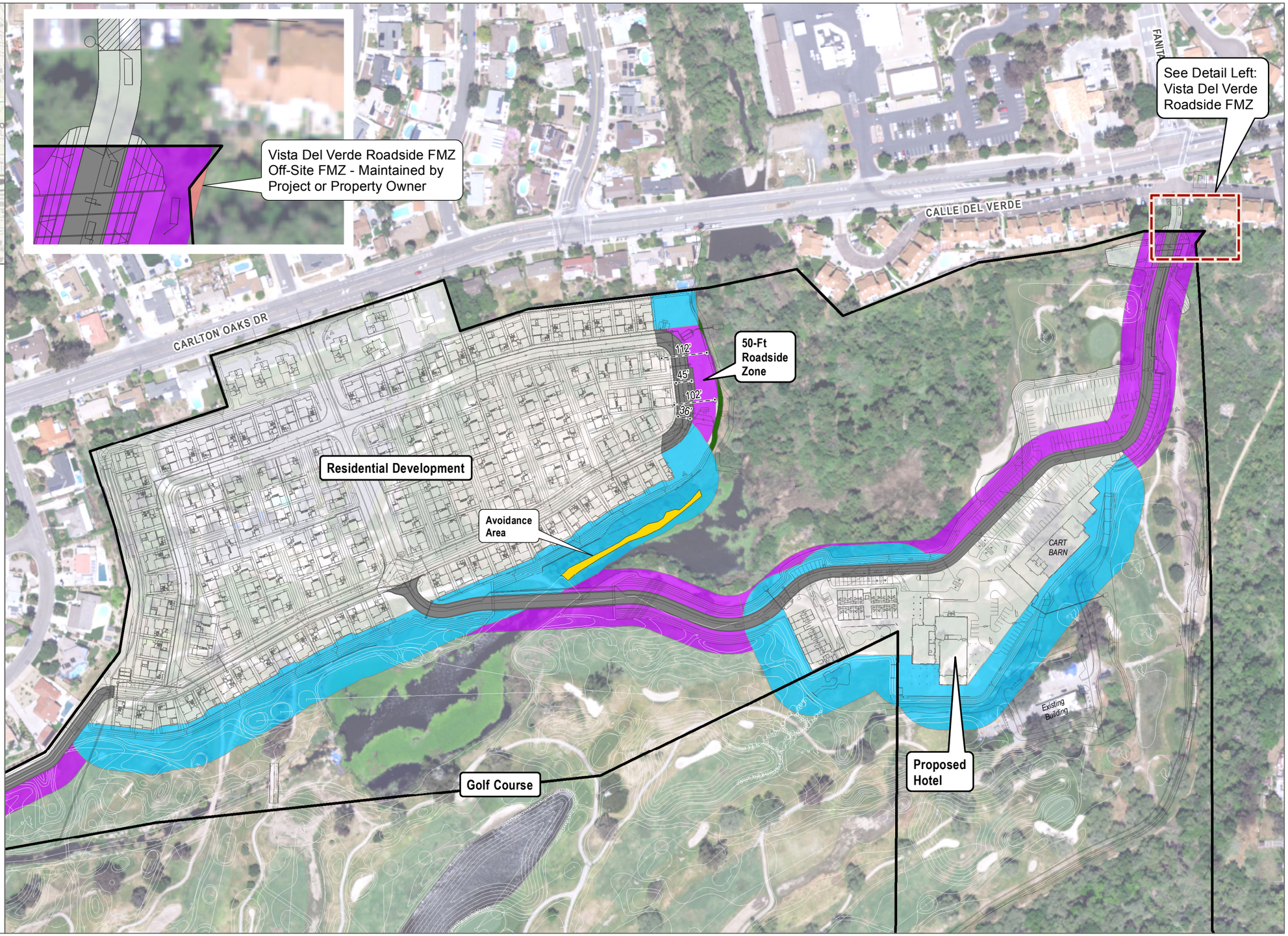
FIGURE 8B

Fuel Modification Plan - View 2

Fire Protection Plan for the Carlton Oaks Project





Project Boundary

Land Use
- Roadway
- Manufactured Slope
- Development

Fuel Modification Zones
- 100-Ft FMZ
- 50-Ft Roadside Zone
- Offsite 50-Ft Roadside Zone
- Vista Del Verde Roadside FMZ
- Avoidance Area (Non-Native Riparian)
- FMZ Dimension

SOURCE: AERIAL-NAIP 2020; DEVELOPMENT-HUNSAKER & ASSOCIATES, INC. 2024, 2025

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0 110 220 Feet

FIGURE 8C

Fuel Modification Plan - View 3

Fire Protection Plan for the Carlton Oaks Project

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Provision for Ongoing Fuel Modification Zone Maintenance

The Project benefits from the golf course land use which includes irrigated and maintained, low fuel, highly ignition resistant landscapes, open water, and functions as a large fuel break. Should the golf course operation and treatment of these areas change, ever be vacated or otherwise cease to operate, designated FMZ areas that rely on the golf course (e.g., maintenance road FMZ, resort road/bridge) will be provided ongoing maintenance by the HOA (or similar funding/management entity) and enforced by SFD. All other designated FMZ areas will be maintained by the HOA on an ongoing basis according to this FPP and SFD requirements.

Vegetation Management

The following requirements are provided for FMZs. These zones are presented graphically in Figure 9. Each zone would include permanent field markers (field markers are often metal poles that are 4 feet high, painted white with red or blue tops signifying the different zones. The markers are spaced approximately every 500 feet or as needed) or a non-combustible fence (tubular steel, fire treated wood, fire treated composite, etc.) at the property line to delineate the zones, aiding ongoing maintenance activities that will occur on site. All fuel modification zones shall be maintained by the Homeowners Association in perpetuity.

Plants used in the fuel modification areas or landscapes will include drought-tolerant, fire resistive trees, shrubs, and groundcovers, and in accordance with the suggested and undesirable plant lists provided in Appendix D. The intent of the plant list is to provide examples of plants that are less prone to ignite or spread flames to other vegetation and combustible structures during a wildfire. The addition of plant material to the approved list will be at the discretion of SFD.

5.6.1.3 Other Vegetation Management

Roadside Fuel Modification Zones

Roadside FMZs would be provided and maintained for all Project roads and designated fire department access roads. Roadside FMZs would be 50 feet wide from edge of roadways, when adjacent to natural open space areas.

Roadside FMZs would include the following restrictions and maintenance requirements:

- No use of undesirable plants (Appendix D) within this zone.
- Roadside FMZ would be permanently irrigated and replanted with fire resistive plant material to Zone 1 FMZ standards.
- Native or annual grasses would be mowed to 4 inches in height before drying out
- Single specimen trees, fire-resistive shrubs, or cultivated ground cover (such as green grass, succulents, or similar plants) may be used, provided they do not form a means of readily transmitting fire.

Trees may be planted within the Roadside FMZs. The following criteria must be followed:

- Tree spacing to be 20 feet between mature canopies (30 feet if adjacent to a slope steeper than 41%). This may require initial planting spacing of 50 feet on center.
- Trees must be limbed up one-third the height of mature tree or 6 feet above ground, whichever is greater.

- No tree canopies lower than 13 feet 6 inches over travel lanes to allow clearance for emergency response vehicles.
- No trees would be planted that are listed on the Undesirable Plant List (Appendix D)
- No flammable understory is permitted beneath trees. Any vegetation under trees to be fire resistive and kept to 2 feet in height or below, and no more than one-third the height of the lowest limb/branch on the tree.
- No tree limbs/branches are permitted within 10 feet of a structure.

Pre-Construction Requirements

- Perimeter fuel modification areas must be implemented and approved by the SFD prior to combustible materials being brought on site.
- Existing flammable vegetation shall be reduced by 50% on vacant lots upon commencement of construction.
- Dead fuel, ladder fuel (fuel which can spread fire from ground to trees), and downed fuel shall be removed and trees/shrubs shall be properly limbed, pruned, and spaced per this plan.
- Private lot owners will be responsible for installing their irrigated fuel modification zones. Prior to establishment of the irrigated fuel modification zone, the entire required irrigated fuel modification zone will be mowed to 4-inch stubble height until such time that the homeowner installs the irrigated fuel modification zone, which will be required to be in place within 6 months of structure occupancy.

Undesirable Plants

Certain plants are considered undesirable in the landscape due to characteristics that make them highly flammable. These characteristics can be physical (structure promotes ignition or combustion) or chemical (volatile chemicals increase flammability or combustion characteristics). The plants included in the Prohibited Plant List (Appendix D) are unacceptable from a fire safety standpoint and will not be planted onsite or allowed to establish opportunistically within fuel modification zones or landscaped areas, unless otherwise approved by the SFD.

Special Fuel Management Issues

- Interior areas that are outside private homeowner property will be maintained by the HOA.
- Detention/Retention basin will be planted with low fuel, low fire hazard plantings and will be maintained by the HOA in a low fire hazard condition consistent with a thinning zone.
- Trees may be planted within FMZs as long as they conform to the City's Municipal Code. Roadside tree planting is acceptable, as long as they meet the following restrictions:
  - Crowns of trees located within defensible space shall maintain a minimum horizontal clearance of 10 feet for fire resistant trees. No non-fire resistive trees will be allowed.
  - Mature trees shall be pruned to remove limbs one-third the height or 6 feet, whichever is less, above the ground surface adjacent to the trees.
  - Dead wood and litter shall be regularly removed from trees.
  - Ornamental trees shall be limited to groupings of 2–3 trees with canopies for each grouping separated horizontally as described in Table 9.

Table 9. Distance Between Tree Canopies by Percent Slope

Percent of Slope	Required Distances Between Edge of Mature Tree Canopies[1]
0 to 20	10 feet
21 to 40	20 feet
41+	30 feet

1 Determined from canopy dimensions as described in Sunset Western Garden Book (Current Edition)

Vacant Parcels and Lots

- Vegetation management would not be required on vacant lots until construction begins. However, perimeter FMZs must be implemented prior to commencement of construction utilizing combustible materials (See Pre-Construction Requirements, above).
- Vacant lots adjacent to active construction areas/lots would be required to implement vegetation management if they are within 50 feet of the active construction area. Perimeter areas of the vacant lot would be maintained as a vegetation management zone extending 50 feet from roadways and adjacent construction areas.
- Prior to issuance of a permit for any construction, grading, digging, installation of fences, etc., on a vacant lot, the 50 feet at the perimeter of the lot is to be maintained as a vegetation management zone.
- In addition to the establishment of a 50-foot-wide vegetation management zone prior to combustible materials presence on site, existing vegetation on the lot would be reduced by at least 70% upon commencement of construction.
- Dead fuel, ladder fuels, and downed fuels would be removed, and trees/shrubs would be properly limbed, pruned and spaced per Zone 2 and 3 standards.

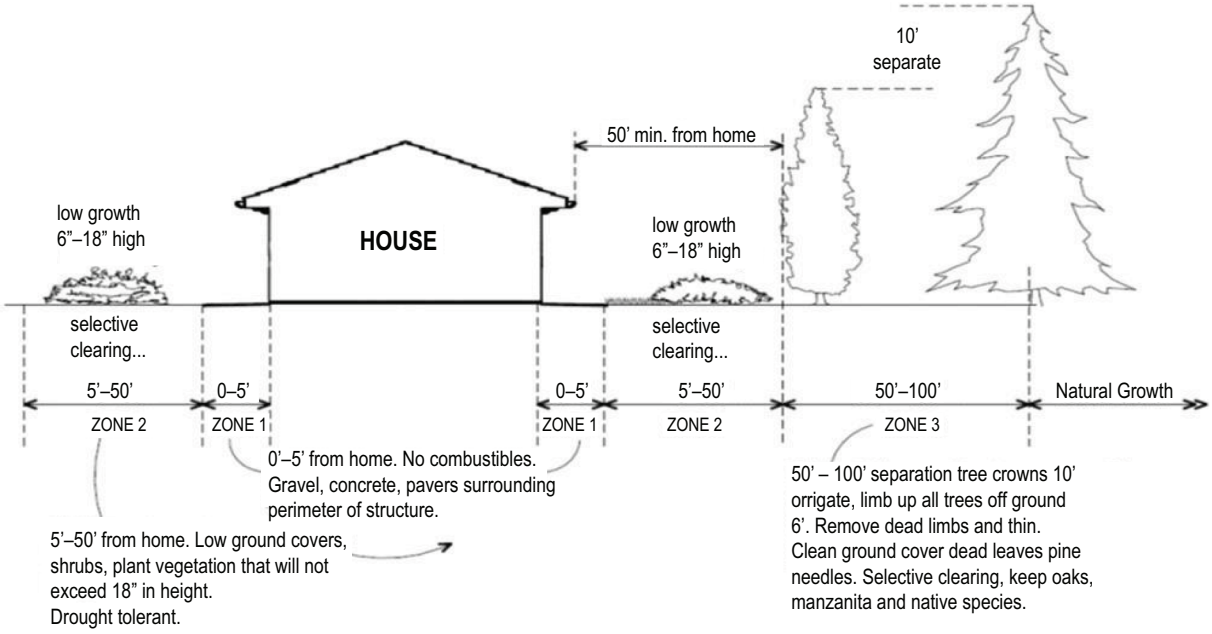
5.6.2 Fuel Modification Area Vegetation Maintenance

All fuel modification area vegetation management shall be completed annually by May 1 of each year and more often as needed for fire safety, as determined by the SFD which is granted discretionary authority via the adopted Santee Fire Code (CFC Section 104.1 – Duties and Powers of the Fire Code Official). The project HOA shall be responsible for all vegetation management throughout the common areas of the Project site, in compliance with the requirements detailed herein and SFD requirements. Figure 10 provides an illustration of typical FMZ vegetation spacing and maintenance goals. The Project's HOA shall be responsible for ensuring long-term funding and ongoing compliance with all provisions of this FPP covering common areas and off-site fuel management easements, including vegetation planting, fuel modification, vegetation management, and maintenance requirements throughout the common portions of the Carlton Oaks Project site. Additionally, private lot owners will be responsible for installing their irrigated fuel modification zones. Prior to establishment of the irrigated fuel modification zone, the entire required irrigated fuel modification zone will be mowed to 4-inch stubble height until such time that the homeowner installs the irrigated fuel modification zone, which will be required to be in place within 6 months of structure occupancy. The residents shall maintain fuel modification zones on their properties. To promote enforcement of the covenants, conditions and restrictions (CC&Rs), the governing documents of the Master HOA shall vest the governing board of the Master HOA with authority to impose fines on any homeowner who violates any provision of the CC&R related to Fire Safety Requirements, and shall establish a schedule of reasonable monetary penalties to be assessed by the Master HOA against any homeowner that violates any provision of the CC&Rs related to Fire Safety Requirements. The required schedule of monetary penalties shall also be included as part of a general CC&R enforcement policy to be adopted and administered by the governing

board of the Master HOA, which policy shall describe in detail the steps to be followed in enforcing the Master HOA governing documents and CC&Rs. As provided in California Civil Code Section 5855, no fine shall be assessed against a homeowner for violating a provision of the CC&Rs related to Fire Safety Requirements unless and until the Master HOA first conducts a hearing on the alleged violation. At least ten days advance notice must be provided to the relevant homeowner of the date and time of the hearing, the general nature of the allegation of rules violation against such homeowner, and informing such homeowner that they have the right to attend such hearing and to address the governing board.

5.6.3 Annual Fuel Modification Zone Compliance Inspection

The HOA would obtain an FMZ inspection and report from a qualified SFD-approved 3rd party inspector to perform inspections twice annually, in May and October, or as needed dependent on precipitation, of each year certifying that vegetation management activities throughout the Project Site have been performed pursuant to this FPP. A copy of the annual inspection report would be provided to the Project HOA and a copy made available to SFD, if requested



SOURCE: SAN DIEGO COUNTY CONSOLIDATED FIRE CODE, 2020

FIGURE 9

Fuel Modification Zone Measurements

Carlton Oaks Fire Protection Plan

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6 Homeowner's Wildfire Education Program

Early evacuation for any type of wildfire emergency at the Project site is the preferred method of providing for resident safety, consistent with the current approach within San Diego County. As such, the Project's Homeowner's Association would formally adopt, practice, and implement a "Ready, Set, Go!" approach to evacuation[6]. 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 the potential for errors, maintaining the Project site'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.

The Project's residents will be provided a proactive educational component disclosing the potential wildfire risk and this report's requirements as part of their CC&Rs. Property owners will be required to sign notice of receiving this information during escrow. This educational information must include maintaining the landscape and structural components according to the standards defined herein, as well as "Ready, Set, Go!" materials provided in Appendix E of this FPP.

6 https://www.readyforwildfire.org/prepare-for-wildfire/ready-set-go/

7 Conclusion

This FPP has been prepared for the Carlton Oaks Project. It is submitted in compliance with requirements of the SFD and the Santee Fire Code. 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 a recreational-oriented mixed-use resort community adjacent to the WUI in order to protect human life based on the best available science and code requirements. The Project's fire protection system includes a redundant layering of protection materials, measures, and methods that have been shown through post-fire damage assessments to reduce risk of structural ignition.

Fuel modification would occur throughout the Project site and includes a 100-foot wide FMZ. Project access roadways adjacent hazardous fuels will include a minimum 50 feet of FMZ on either side. The fuel modification zones will be maintained by the HOA and/or golf course and inspected annually by a third party FMZ inspector along with SFD, removing all dead and dying materials and maintaining appropriate horizontal and vertical spacing. In addition, plants that are established or are introduced to the FMZ that are not on the approved plant list will be removed so that the FMZs function as intended by reducing fire spread rates and intensity. Landscaping within the Project will conform to fire safe plant palettes, planting densities and spacing.

Project site improvements are designed to facilitate emergency apparatus and personnel access to all portions of the Project site. Roads and driveways meeting the code width standards, including fire engine turnarounds and provide access to within 150 feet of all sides of every building. Onsite water availability and flow will be consistent with City requirements. These features along with the ignition resistance of all buildings, the interior fire sprinkler systems, and the pre-planning, training and awareness will assist responding firefighters through prevention, protection and suppression capabilities.

Ultimately, it is the intent of this FPP to guide, through code and other Project specific requirements, the construction of structures that are defensible from wildfire and, in turn, do not represent significant threat of ignition source for the adjacent native habitat. It must be noted that during extreme fire conditions, there are no guarantees that a given structure will not burn. Fire safety precautions and measures identified in this report are designed to reduce the likelihood that fire would impinge upon the proposed structures. There's no guarantee that wildfires will not occur in the area that could damage property or harm persons. However, implementation of the required enhanced construction features provided by the applicable codes and the mitigating fuel modification requirements provided in this FPP will accomplish the goal of this FPP to assist firefighters in their efforts to defend these structures and reduce the risk associated with this Project's WUI location. For maximum benefit, the developer, contractors, engineers, and architects are responsible for proper implementation of the concepts and requirements set forth in this report. Homeowners and HOA are responsible to maintain their structures and landscaping as required by this report, the applicable Fire Code, and the SFD.

This FPP recommends that the Project maintains a conservative approach to fire safety. This approach must include maintaining the landscape and structural components according to the appropriate standards and embracing a "Ready, Set, Go!" stance on evacuation. Although the proposed development and landscape will be significantly improved in terms of ignition resistance, it should not be considered a shelter-in-place community, but this approach to public safety may be utilized by incident managers as a contingency to an unsafe evacuation. Accordingly,

evacuation of the Project site and the surrounding area should occur according to pre-established evacuation decision points, or as soon as notice to evacuate is received, which may vary depending on many environmental and other factors, whichever is more conservative. Fire is a dynamic and somewhat unpredictable occurrence, and it is important for anyone living at the Project to educate themselves on practices that will improve their home survivability and their personal safety.

8 Limitations

This FPP does not provide a guarantee that all residents and visitors will be safe at all times because of the enhanced fire protection features it requires. There are many variables that may influence overall safety. This FPP provides requirements and recommendations for implementation of the latest fire protection features that have proven to result in reduced wildfire related risk and hazard. Even then, fire can compromise the fire protection features through various, unpredictable ways. The goal is to reduce the likelihood that the system is compromised through implementation of the elements of this FPP and a regular occurring maintenance program.

For maximum benefit, the developer, contractors, engineers, and architects are responsible for proper implementation of the concepts and requirements set forth in this report. Homeowners and the HOA are responsible for maintaining their structures and lots as required by this report and all applicable City Fire and Building Codes.

9 List of Preparers

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Dudek

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Fire Protection Planner
Dudek

Fire Behavior Modeling Preparer

Noah Stamm
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10 References

(Including References Cited from Appendices)

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Appendix A
Photograph Log

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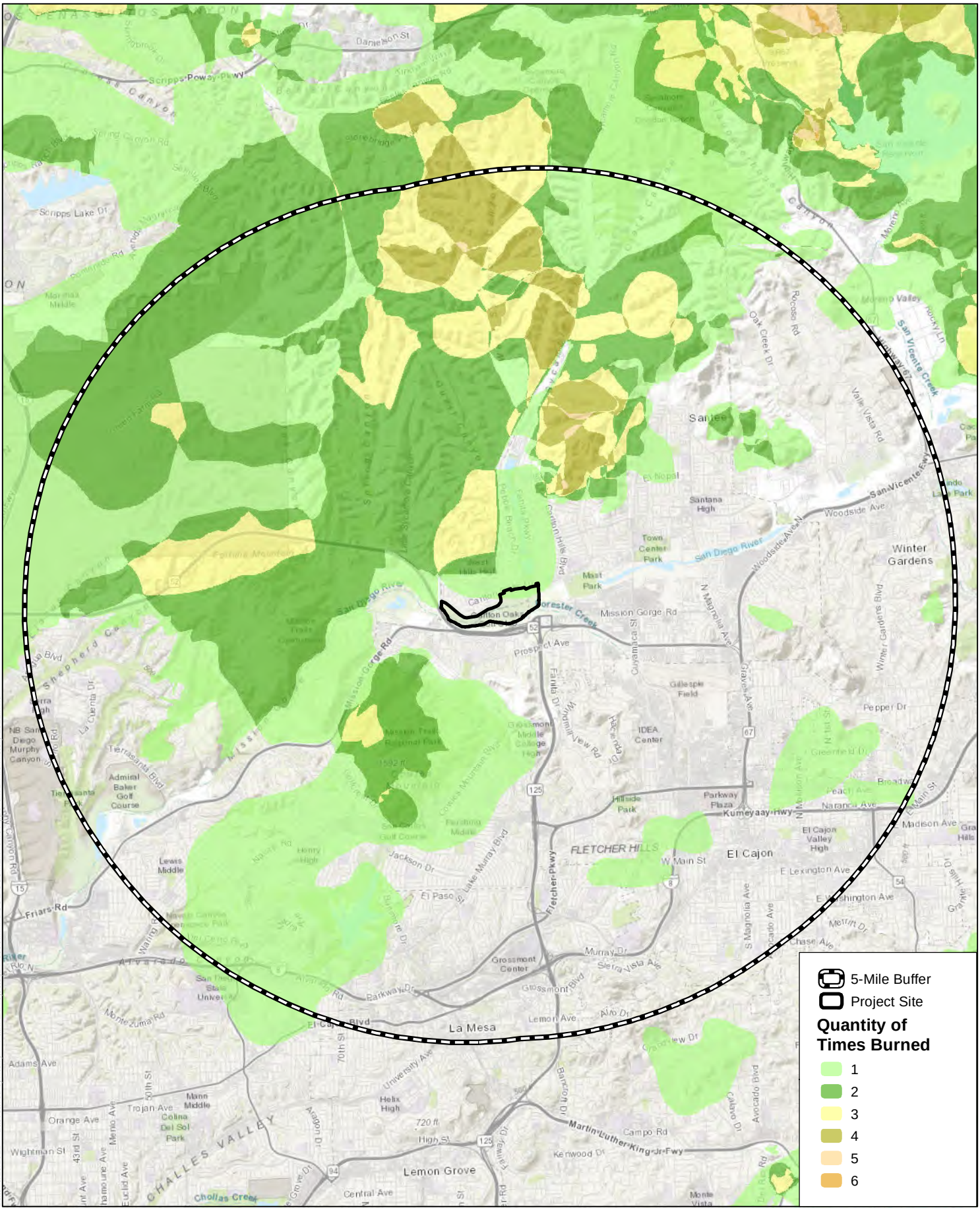
Appendix B

Carlton Oaks Project Vicinity Fire History Map



SOURCE: BASE MAP- ESRI MAPPING SERVICE; FIRE DATA-CALFIRE 2021

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0 1 2 Miles

APPENDIX B

Fire History Map

Fire Protection Plan for the Carlton Oaks Project

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Appendix C

BehavePlus Fire Behavior Analysis

FIRE BEHAVIOR MODELING SUMMARY
CARLTON OAKS FIRE PROTECTION PLAN PROJECT, SANTEE, SAN DIEGO COUNTY, CALIFORNIA

1 BehavePlus Fire Behavior Modeling History

Fire behavior modeling has been used by researchers for approximately 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 as the industry standard 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 6.0, 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, Behave 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 Behave and refinements to the fuel models incorporated, retested, and so on.

Fire behavior modeling conducted on this site includes a relatively high-level of detail and analysis which results in reasonably accurate representations of how wildfire may move through available fuels on and adjacent the property. Fire behavior calculations are based on site-specific fuel characteristics supported by fire science research that analyzes heat transfer related to specific fire behavior. To objectively predict flame lengths, spread rates, and fireline intensities, this analysis incorporated predominant fuel characteristics, slope percentages, and representative fuel models observed on site. The BehavePlus fire behavior modeling system was used to analyze anticipated fire behavior within and adjacent to key areas just outside of the proposed lots. Predicting wildland fire behavior is not an exact science. As such, the movement of a fire will likely never be fully predictable, especially considering the variations in weather and the limits of weather forecasting. Nevertheless, practiced and experienced judgment, coupled with a validated fire behavior modeling system, results in useful and accurate fire prevention planning information. To be used effectively, the basic assumptions and limitations of BehavePlus must be understood.

- 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 dead fuels less than one-quarter inch 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.
- 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.
- Third, the software assumes that weather and topography are uniform. However, because wildfires almost always burn under non-uniform conditions, length of projection period and choice of fuel model must be carefully considered to obtain useful predictions.

- Fourth, the BehavePlus fire behavior computer modeling system was 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 some 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. Natural fuels are made up of the various components of vegetation, both live and dead, that occur on a site. The type and quantity will depend upon the soil, climate, geographic features, and the fire history of the site. 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.

The seven fuel characteristics help define the 13 standard fire behavior fuel models[1] and the five custom fuel models developed for Southern California[2]. According to the model classifications, fuel models used in 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 BehavePlus. 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 recent development of 40 new fire behavior fuel models[3] developed for use in BehavePlus modeling efforts. These new models attempt to improve the accuracy of the standard 13 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 new 40 fuel models:

- Grass Models GR1 through GR9
- Grass-shrub Models GS1 through GS4
- Shrub Models SH1 through SH9

1 Anderson, Hal E. 1982. Aids to Determining Fuel Models for Estimating Fire Behavior. USDA Forest Service Gen. Tech. Report INT-122. Intermountain Forest and Range Experiment Station, Ogden, UT.

2 Weise, D.R. and J. Regelbrugge. 1997. Recent chaparral fuel modeling efforts. Prescribed Fire and Effects Research Unit, Riverside Fire Laboratory, Pacific Southwest Research Station. 5p.

3 Scott, Joe H. and Robert E. Burgan. 2005. Standard fire behavior fuel models: a comprehensive set for use with Rothermel's surface fire spread model. Gen. Tech. Rep. RMRS-GTR-153. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 72 p.

- Timber-understory Models TU1 through TU5
- Timber litter Models TL1 through TL9
- Slash blowdown Models SB1 through SB4

BehavePlus software was used in the development of the Carlton Oaks Residential Development Project (Proposed Project) Fire Protection Plan (FPP) Report in order to evaluate potential fire behavior for the Project site. Existing site conditions were evaluated, and local weather data was incorporated into the BehavePlus modeling runs.

2 Fuel Models

Dudek utilized the BehavePlus software package to analyze fire behavior potential for the Proposed Project site in Santee, California. Refer to Figure 4, *Fire Behavior Modeling Map* for fire modeling scenario locations. As is customary for this type of analysis, six fire scenarios were evaluated to gain an understanding of the potential fire hazard for multiple areas around the development, including three summer, onshore weather condition (northwest and southwest of the Project site) and four extreme fall, offshore weather condition (north, northeast, east, and southeast of the Project site). The Project site is currently a golf course and is surrounded by a variety of land uses including existing single-family residential developments directly to the north and east; State Route 52 (SR-52) directly to the south and west with existing residential structures further to the south; riparian habitats within the San Diego River/Forester Creek which run east to west, surround the southern and eastern portions of the development; and naturally-vegetated open space further to the west. With that said, fuels and terrain within and adjacent to the Project development area could possibly produce flying embers that may affect the Project, but defenses would be built into the new residential structures to prevent ember penetration and to extinguish fires that may result from ember penetration. It is the fuels directly adjacent to and within fuel modification zones 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. The BehavePlus software requires site-specific variables for surface fire spread analysis, including fuel type, fuel moisture, wind speed, and slope data. The output variables used in this analysis include flame length (feet), rate of spread (feet/minute), fireline intensity (BTU/feet/second), and spotting distance (miles). The following provides a description of the input variables used in processing the BehavePlus models for the Proposed Project site. In addition, data sources are cited, and any assumptions made during the modeling process are described.

2.1 Vegetation (Fuels)

To support the fire behavior modeling efforts conducted for the Carlton Oaks Residential Development Project, the different vegetation types observed within and adjacent to the Project site were classified into the aforementioned numeric fuel models. As is customary for this type of analysis, the terrain and fuels within and adjacent to the project area were used for determining flame lengths and fire spread. It is these fuels that would have the potential to affect the Project's structure from a radiant and convective heat perspective as well as from direct flame impingement. Fuel beds, including low- to- moderate-load grass/grass-shrubs, low- to- moderate-load shrubs and chaparrals, and willow and eucalyptus dominated riparian forest habitat within the San Diego River/Forester Creek exhibit moderate-load understory vegetation surrounding the southern, western, and eastern portions of the existing golf course and proposed Project development site. These fuel types can produce flying embers that may affect the project, but defenses would be built into the structures to prevent ember penetration. Table 1 provides a

description of the five existing fuel models observed in the vicinity of the site that were subsequently used in the analysis for this Project. A total of six fire modeling scenarios were completed for the Project area. These modeling scenario locations were selected based on the low probability of a fire approaching from these directions during a Santa Ana wind-driven fire event (fire scenarios 3, 4, 6 and 7) and an on-shore weather patterns (fire scenarios 1, 2, and 5). Dudek also conducted modeling of the site for post-Fuel Modification Zones' (FMZ) recommendations for this project (Refer to Table 2 for post-FMZ fuel model descriptions). Fuel modification includes establishment of irrigated and thinned zones on the periphery of the new residential structure. For modeling the post-FMZ treatment condition, fuel model assignments were re-classified for the FMZs 0 and 1 (Fuel Model Gr1) and FMZ 2 (Fuel Models Gr2).

Table 1. Existing Fuel Model Characteristics

Fuel Model Assignment	Vegetation Description	Location	Fuel Bed Depth (Feet)
Gr2	Low-load, Dry climate grasses	Represents the grass fairway areas throughout the existing golf course.	<1.0 ft.
Gr4	Moderate-load, Dry Climate grasses	Represents the grass understory vegetation within the riparian habitat and some areas within the existing golf course.	<3.0 ft.
Gs2	Moderate-load, Dry climate grass-shrubs	Represents the grass-shrub understory within the riparian habitat, as well as ground cover fuels surrounding the Project site without maintenance.	<2.0 ft.
Sh2	Moderate-load, Dry Climate Shrubs	Represents the vegetation communities located throughout the adjacent areas surrounding the Project site without maintenance.	<2.0 ft.
Sh4	Eucalyptus woodland and riparian forest habitat	Represents the eucalyptus woodland/riparian habitat that surrounds the existing golf course along the western, southern and eastern boundaries of the Project site.	>8.0 ft.
Sh5	High-load, Dry Climate Shrubs	Represents the understory vegetation within the riparian areas of the San Diego River in the eastern portion of the development without maintenance.	>5.0 ft.

Table 2. Post-development Fuel Model Characteristics

Fuel Model Assignment	Vegetation Description	Location	Fuel Bed Depth (Feet)
Gr1	Short, sparse, dry climate grasses	Fuel Modification Zones 0 and 1: irrigated landscape throughout the Project site	<1.0 ft.
Gr2	Load, dry climate grasses	Fuel Modification Zone 2: 50% thinning of brush around the perimeter of the structures	<2.0 ft.

The results of this analysis were utilized in generating the Fuel Modification Zones map (Figure 6 of FPP) and Fire Behavior Modeling Summary results. This analysis models fire behavior outside of the FMZs (off-site) as these areas would be the influencing wildfire areas post-development of the site. The following section presents the fire weather and fuel moisture inputs utilized for the fire behavior modeling conducted for the Proposed Project.

2.2 Topography

Topography influences fire risk by affecting fire spread rates. Typically, steep terrain results in faster fire spread up-slope and slower spread down-slope in the absence of wind; 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. 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. 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. The project site is relatively flat throughout and natural slope values ranging from approximately 3% to 5% were measured around the perimeter of the Project area from U.S. Geological Survey (USGS) topographic maps. Slope gradients for landscape areas are assumed to be flat (3%) as presented on the project's site plan.

2.3 Weather Analysis

Historical weather data for the Santee region was utilized in determining appropriate fire behavior modeling inputs for the Project area. 50th and 97th percentile moisture values were derived from Remote Automated Weather Station (RAWS) and utilized in the fire behavior modeling efforts conducted in support of this report. Weather data sets from the San Miguel RAWS (ID number 045737)[4] were utilized in the fire modeling runs.

RAWS fuel moisture and wind speed data were processed utilizing the Fire Family Plus software package to determine atypical (97th percentile) and typical (50th percentile) weather conditions. Data from the RAWS was evaluated from August 1 through November 30 for each year between 2002 and 2021 (extent of available data record) for 97th percentile weather conditions and from June 1 through September 30 for each year between 2002 and 2021 for 50th percentile weather conditions.

Following analysis in Fire Family Plus, fuel moisture information was incorporated into the Initial Fuel Moisture file used as an input in BehavePlus. Wind speed data resulting from the Fire Family Plus analysis was also determined. Initial wind direction and wind speed values for the two BehavePlus runs were manually entered during the data input phase. The input wind speed and direction is roughly an average surface wind at 20 feet above the vegetation over the analysis area. Table 3 summarizes the wind and weather input variables used in the Fire BehavePlus modeling efforts.

[4] San Miguel RAWS Station Latitude and Longitude: 32.686214, -116.978242

Table 3: Variables Used for Fire Behavior Modeling

Model Variable	Summer Weather (50th Percentile)	Peak Weather (97th Percentile)
Fuel Models	Gr2, Gr4, Gs2, Sh2, and Sh4	Gr2, Gr4, Gs2, Sh2, and Sh4
1 h fuel moisture	7%	2%
10 h fuel moisture	8%	3%
100 h fuel moisture	13%	8%
Live herbaceous moisture	52%	30%
Live woody moisture	104%	60%
20 ft. wind speed	14 mph (sustained winds)	16 mph (sustained winds); wind gusts of 50 mph
Wind Directions from north (degrees)	300 (East Development) 210 and 310 (West Development)	20 and 100 (East Development) 80 and 140 (West Development)
Wind adjustment factor	0.4	0.4
Slope (uphill)	3% to 5%	2% to 4%

3 Fire Behavior Modeling Efforts

As mentioned, the BehavePlus fire behavior modeling software package was utilized in evaluating anticipated fire behavior adjacent to the Proposed Project site. Six focused analyses were completed (four around the western development and three around the eastern development) for both the existing project site conditions and the post project conditions, each assuming worst-case fire weather conditions for a fire approaching the project site from the west, northwest, and northeast. The results of the modeling effort included anticipated values for surface fires flame length (feet), rate of spread (mph), fireline intensity (Btu/ft/s), and spotting distance (miles). Although highly unlikely, there is the possibility that a ground fire could transition to a crown fire within the small eucalyptus woodland/riparian areas surrounding the golf course. However, the higher soil moisture along with the lower vegetation density within the riparian areas could disrupt the spread of fire across the landscape and reduce the fire threat within these areas, which is evident by the project history as the golf course and riparian habitat has not burned in the past. The aforementioned fire behavior variables are an important component in understanding fire risk and fire agency response capabilities. Flame length, the length of the flame of a spreading surface fire within the flaming front, is measured from midway in the active flaming combustion zone to the average tip of the flames (Andrews, Bevins, and Seli 2008). Fireline intensity is a measure of heat output from the flaming front, and also affects the potential for a surface fire to transition to a crown fire. Fire spread rate represents the speed at which the fire progresses through surface fuels and is another important variable in initial attack and fire suppression efforts (Rothermel and Rinehart 1983). Spotting distance is the distance a firebrand or ember can travel down wind and ignite receptive fuel beds. Six fire modeling scenario locations were selected to better understand the different fire behavior that may be experienced on or adjacent the site based on slope and fuel conditions; these fire scenarios are explained in more detail below:

Fire Scenario Locations and Descriptions:

- **Scenario 1:** A summer, on-shore fire (50th percentile weather condition) burning through the approximately 20-foot-tall eucalyptus tree woodland and riparian habitat area within the San Diego River on the west side of SR-52 and northwest of the Proposed Project site. The terrain is flat (approximately 3% slope) with

potential ignition sources from a car fire or wildland fire originating in the open space land northwest of the property. This type of fire would typically spread through the low- to- moderate-load grass/grass-shrub dominated understory vegetation relatively slow towards the western portion of the residential development site on the western side of the property. Although highly unlikely, there is the possibility that a ground fire could transition to a crown fire within the small eucalyptus woodland/riparian areas surrounding the golf course. However, the higher soil moisture along with the lower vegetation density within the riparian areas could disrupt the spread of fire across the landscape and reduce the fire threat within these areas, which is evident by the project history as the golf course and riparian habitat has not burned in the past.

- **Scenario 2:** A summer, on-shore fire (50th percentile weather condition) burning through the approximately 25-foot tall eucalyptus tree woodland and riparian habitat area within Forester Creek southwest of the Project site towards the existing golf course. The terrain is flat (approximately 5% slope) with potential ignition sources from a car fire along SR-52 and/or structure fire originating within the existing structures southwest of the Project site. This type of fire would typically spread through the low- to- moderate-load grass/grass-shrub dominated understory vegetation towards the southern portion of the existing golf course and the proposed residential development site on the western side of the property. Although highly unlikely, there is the possibility that a ground fire could transition to a crown fire within the small eucalyptus woodland/riparian areas surrounding the golf course. However, the higher soil moisture along with the lower vegetation density within the riparian areas could disrupt the spread of fire across the landscape and reduce the fire threat within these areas, which is evident by the project history as the golf course and riparian habitat has not burned in the past.
- **Scenario 3:** A fall, off-shore fire (97th percentile weather condition) potentially spotting within the approximately 25-foot tall eucalyptus tree woodland and riparian habitat within Forester Creek area along the southern property boundary of the existing golf course and potentially burning within the understory vegetation. The terrain is flat (approximately 3% slope) with potential ignition sources from a car fire along SR-52 and/or structure fire originating within the existing structures south/southeast of the Project site. This type of fire would typically spread through the low- to- moderate-load grass/grass-shrub dominated understory vegetation towards the southern portion of the existing golf course and the proposed residential development site on the western side of the property. Although highly unlikely, there is the possibility that a ground fire could transition to a crown fire within the small eucalyptus woodland/riparian areas surrounding the golf course. However, the higher soil moisture along with the lower vegetation density within the riparian areas could disrupt the spread of fire across the landscape and reduce the fire threat within these areas, which is evident by the project history as the golf course and riparian habitat has not burned in the past.
- **Scenario 4:** A fall, off-shore fire (97th percentile weather condition) potentially spotting on the golf course and burning within the sparse- to- low-load grass fairway areas. The terrain is flat (approximately 2% slope) with potential ignition sources from a car and/or structure fire originating within the adjacent residential community to the north of the Project site. This type of fire would typically spread through the grass dominated vegetation towards the eastern portion of the proposed residential development site on the western side of the property.

- **Scenario 5:** A summer, on-shore fire (50th percentile weather condition) potentially spotting on the golf course and burning within the sparse- to- low-load grasses within the existing golf course. The terrain is flat (approximately 3% slope) with potential ignition sources from a car and/or structure fire originating within the adjacent residential community to the north of the Project site. This type of fire would typically spread through the grass dominated vegetation towards the eastern portion of the proposed residential development site on the eastern side of the property.
- **Scenario 6:** A fall, off-shore fire (97th percentile weather condition) potentially spotting within the approximately 25- to- 30-foot-tall eucalyptus/willow tree dominated woodland and riparian habitat areas within the San Diego River located on the eastern side of the development (being blow by an eastern Santa Ana wind from the east or southeast) and potentially burning through the moderate-load understory vegetation. The terrain is flat (approximately 3% slope) with potential ignition sources from a car and/or structure fire originating within the adjacent residential communities to the northeast/east/southeast of the site. This type of fire would typically spread through the moderate-load grass/grass-shrub dominated understory vegetation towards the eastern portions of the development/existing golf course. Although highly unlikely, there is the possibility that a ground fire could transition to a crown fire within the eucalyptus/willow woodland/riparian areas surrounding the golf course. However, the higher soil moisture along with the lower vegetation density within the riparian areas could disrupt the spread of fire across the landscape and reduce the fire threat within these areas, which is evident by the project history as the golf course and riparian habitat has not burned in the past.

4 Fire Behavior Modeling Results

The results presented in Tables 4 and 5 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. 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 will be affected by many factors, including unique weather patterns, small-scale topographic variations, or changing vegetation patterns.

As presented in Table 4, wildfire behavior within the proposed project development area/golf course area and within the adjacent vegetation areas surrounding the proposed project development area is expected to be primarily of moderate to high intensity throughout the non-maintained grass/grass-shrub and chaparral dominated understory fuels within the riparian woodland areas within the San Diego River/Forester Creek surrounding the project site. The fire behavior modeling indicates that the fire behavior is pretty consistent if it were to spot within the riparian areas that surround the proposed project site, however, the worst-case fire behavior is expected to occur within the riparian woodland areas of the San Diego River to the east as this areas appeared to exhibit more dense understory vegetation and has the potential to have a Santa Ana wind-driven wildfire originate further east (represented by Fall Weather, Scenario 6). The fire is anticipated to be a wind-driven fire from the east/northeast during the fall. Under such conditions, expected surface flame length could potentially reach approximately 41 feet with wind speeds of 50+ mph. Under this scenario, fireline intensities reach 18,350 BTU/feet/second with moderate spread rates of 6.2 mph and could have a spotting distance up to 2.3 miles away. As mentioned above, although highly unlikely, there is the possibility that a ground fire could transition to a crown fire within the eucalyptus woodland/riparian

areas surrounding the golf course and/or because embers have the potential to spot up to 2.3 miles away, a crown fire could potentially occur within the riparian woodland areas. However, the higher soil moisture along with the lower vegetation density within the riparian areas could disrupt the spread of fire across the landscape and reduce the fire threat within these areas, which is evident by the project history as the golf course and riparian habitat has not burned in the past.

Wildfire behavior in non-maintained grass/grass-shrubs understory vegetation within the riparian woodland areas southwest of the Project site fanned by 14 mph sustained, on-shore winds. Fires burning from the west/southwest and pushed by ocean breezes typically exhibit less severe fire behavior due to lower wind speeds and higher humidity. Under typical onshore weather conditions, an on-shore fire could have flame lengths between approximately 3 feet and 13 feet in height and spread rates between 0.1 and 0.6 mph. Spotting distances, where airborne embers can ignite new fires downwind or within the riparian woodland area southwest of the developed portion of the Project site, range from 0.1 to 0.4 miles. A crown fire could potentially reach 73 feet under these conditions.

As depicted in Table 5, post development fire behavior expected in the irrigated and replanted with plants that are acceptable with the Santee Fire Department (FMZ Zones 0 and 1 – Gr1), as well as in an area with thinning of the existing shrubs (FMZ Zone 2 – Gr2) under peak weather conditions experience a significant reduction in flame length and intensity. Fuel modification would result in approximately 14 feet at the outer edges of the FMZ (Zone 2) and to 3.0 feet by the time the inner portions of the FMZ (Zones 0 and 1) are reached. During on-shore weather conditions, a fire approaching from the west/southwest towards the development footprint would have low fire intensity and spotting distances due to the higher live and dead fuel moisture contents. These reduction of flame lengths and intensities are assumed to occur within the 100 feet of fuel modification that is achieved for most of the. Therefore, the FMZs proposed for the Project are approximately 2.5-times the flame length of the worst-case fire scenario under peak weather conditions and approximately 6-times the flame lengths within the development footprint and would provide adequate defensible space to augment a wildfire approaching the perimeter of the Project site.

Table 4: RAWS BehavePlus Fire Behavior Model Results – Existing Conditions

Fire Scenario	Flame Length[1] (feet)	Spread Rate[1] (mph[2])	Fireline Intensity[1] (Btu/ft./sec)	Spot Fire[1] (Miles)
Scenario 1: 3% slope; Summer on-shore wind from W/NW (50th percentile) – (Northwest of Western Development)				
Low Load Grasses (Gr2)	4.8'	0.5	168	0.2
Moderate Load Grass-Scrubs (Gs2)	3.8'	0.2	106	0.2
Moderate Load Scrubs and Chaparral (Sh2)	1.5'	0.0	14	0.1
Riparian Habitat - Timber Shrub (Sh4)	2.3'	0.1	34	0.1
Scenario 2: 5% slope; Summer on-shore wind from W/NW (50th percentile) – (Southwest of Western Development)				
Low Load Grasses (Gr2)	4.7	0.5	168	0.2
Moderate Load Grass-Scrubs (Gs2)	3.8	0.2	106	0.2
Moderate Load Scrubs and Chaparral (Sh2)	1.5	0.0	14	0.1
Riparian Habitat - Timber Shrub (Sh4)	2.3	0.1	34	0.1
Scenario 3: 3% slope; Fall-offshore extreme wind from E/SE (97th percentile) 16 mph sustained winds with 50 mph wind gusts – (Southeast of Western Development)				
Low Load Grasses (Gr2)	8.4' (14.1')[3]	1.3 (4.2)[3]	577 (1,791)[3]	0.4 (1.3)[3]
Moderate Load Grass-Scrubs (Gs2)	8.9' (18.8')[3]	0.7 (3.8)[3]	655 (3,357)[3]	0.4 (1.3)[3]
Moderate Load Scrubs and Chaparral (Sh2)	7.4' (15.1')[3]	0.2 (0.9)[3]	447 (2,074)[3]	0.4 (1.3)[3]
Riparian Habitat - Timber Shrub (Sh4)	11.3' (23.2')[3]	0.9 (4.1)[3]	1,101 (5,260)[3]	0.4 (1.3)[3]
Scenario 4: 2% slope; Fall-offshore extreme wind from E (97th percentile) 16 mph sustained winds with 50 mph wind gusts – (East of Western Development area)				
Low-load grasses (Gr2)	8.4 (14.1')[3]	1.4 (4.2)[3]	577 (1,791)[3]	0.3 (1.1)[3]
Scenario 5: 3% slope; Summer on-shore wind from W/NW (50th percentile) – (NW of Eastern Development area)				
Low Load Grasses (Gr2)	4.8'	0.5	168	0.2
Scenario 6: 3% slope; Fall-offshore extreme wind from E (97th percentile) 16 mph sustained winds with 50 mph wind gusts – (East of Eastern Development area)				
Low Load Grasses (Gr2)	8.4 (14.1')[3]	1.4 (4.2)[3]	578 (1,791)[3]	0.3 (1.0)[3]
Moderate Load Grass-Scrubs (Gs2)	8.9 (18.8')[3]	0.7 (3.8)[3]	656 (3,358)[3]	0.3 (1.3)[3]
Moderate Load Scrubs and Chaparral (Sh2)	7.5 (15.1')[3]	0.2 (0.9)[3]	447 (2,074)[3]	0.3 (1.1)[3]
Riparian Habitat - Timber Shrub (Sh4)	11.3 (23.2')[3]	0.9 (4.1)[3]	1,103 (5,261)[3]	0.4 (1.5)[3]
High Load Scrubs and Chaparral (Sh5)	22.3 (41.2')[3]	1.6 (6.2)[3]	4,841 (18,350)[3]	0.7 (2.3)[3]

Notes:

1 Wind-driven surface fire.

2 MPH=miles per hour

3 Spotting distance from a wind driven surface fire; it should be noted that the wind mph in parenthesis represent peak gusts of 50 mph.

A crown fire would not be expected to occur within the canopies of the eucalyptus/willow tree species located within the San Diego River riparian areas based upon the location of these areas, the existing surrounding infrastructure, the proposed BMZs, the ongoing maintenance of the BMZs, and the high moisture levels within the riparian zone areas; the higher soil moisture along with the lower vegetation density within the riparian areas could disrupt the spread of fire across the landscape and reduce the fire threat within these areas, which is evident by the project history as the golf course and riparian habitat has not burned in the past.

Table 5: RAWS BehavePlus Fire Behavior Model Results – Post Project Conditions

Fire Scenario	Flame Length [1] (feet)	Spread Rate[1] (mph[2])	Fireline Intensity[1] (Btu/ft./sec)	Spot Fire[1] (Miles)
Scenario 2: 5% slope; Summer on-shore wind from W/NW (50th percentile) – (Southwest of Western Development)				
Non-combustible (NB1)	N/A	N/A	N/A	N/A
FMZ Zones 0 and 1 (Gr1)	1.7'	18	0.2	0.1
FMZ Zone 2 (Gr2)	4.7'	168	0.5	0.2
Scenario 3: 3% slope; Fall-offshore extreme wind from E/SE (97th percentile) 16 mph sustained winds with 50 mph wind gusts – (Southeast of Western Development)				
Non-combustible (NB1)	N/A	N/A	N/A	N/A
FMZ Zone 1 (Gr1)	3.1' (3.1')[3]	67 (67)[3]	0.5 (0.5)[3]	0.2 (0.5)[3]
FMZ Zone 2 (Gs1)	8.4' (14.1')[3]	577 (1,791)[3]	1.3 (4.2)[3]	0.4 (1.4)[3]
Scenario 4: 2% slope; Fall-offshore extreme wind from E (97th percentile) 16 mph sustained winds with 50 mph wind gusts – (East of Western Development area)				
Non-combustible (NB1)	N/A	N/A	N/A	N/A
FMZ Zone 1 (Gr1)	3.1' (3.1')[3]	67 (67)[3]	0.5 (0.5)[3]	0.2 (0.4)[3]
FMZ Zone 2 (Gs1)	8.4 '(14.1')[3]	577 (1,791)[3]	1.4 (4.2)[3]	0.3 (1.1)[3]
Scenario 5: 3% slope; Summer on-shore wind from W/NW (50th percentile) – (NW of Eastern Development area)				
Non-combustible (NB1)	N/A	N/A	N/A	N/A
FMZ Zone (Gr1)	1.7'	18	0.2	0.1
FMZ Zone 2 (Gr2)	4.8'	168	0.5	0.2
Scenario 6: 3% slope; Fall-offshore extreme wind from E (97th percentile) 16 mph sustained winds with 50 mph wind gusts – (East of Eastern Development area)				
Non-combustible (NB1)	N/A	N/A	N/A	N/A
FMZ Zones 0 and 1 (Gr1)	3.1' (3.1')[3]	67 (67)[3]	0.5 (0.5)[3]	0.2 (0.4)[3]
FMZ Zone 2 (Gr2)	8.4 '(14.1')[3]	577 (1,791)[3]	1.4 (4.2)[3]	0.3 (1.1)[3]

Note:

1. Wind-driven surface fire.
2. MPH=miles per hour.
3. Spotting distance from a wind driven surface fire; it should be noted that the wind mph in parenthesis represent peak gusts of 50 mph

The following describes the fire behavior variables (Heisch and Andrews 2010) as presented in Tables 4 and 5:

Surface Fire:

- **Flame Length (feet):** The flame length of a spreading surface fire within the flaming front is measured from midway in the active flaming combustion zone to the average tip of the flames.

- **Fireline Intensity (Btu/ft/s):** Fireline intensity is the heat energy release per unit time from a one-foot wide section of the fuel bed extending from the front to the rear of the flaming zone. Fireline intensity is a function of rate of spread and heat per unit area, and is directly related to flame length. Fireline intensity and the flame length are related to the heat felt by a person standing next to the flames.
- **Surface Rate of Spread (mph):** Surface rate of spread is the "speed" the fire travels through the surface fuels. Surface fuels include the litter, grass, brush and other dead and live vegetation within about 6 feet of the ground.

Crown Fire:

- **Transition to Crown Fire:** Indicates whether conditions for transition from surface to crown fire are likely. Calculation depends on the transition ratio. If the transition ratio is greater than or equal to 1, then transition to crown fire is Yes. If the transition ratio is less than 1, then transition to crown fire is No.
- **Crown Fire Rate of Spread (mph):** The forward spread rate of a crown fire. It is the overall spread for a sustained run over several hours. The spread rate includes the effects of spotting. It is calculated from 20-ft wind speed and surface fuel moisture values. It does not consider a description of the overstory.

Fire Type:

Fire type is one of the following four types: surface (understory fire), torching (passive crown fire; surface fire with occasional torching trees), conditional crown (active crown fire possible if the fire transitions to the overstory), and crowning (active crown fire; fire spreading through the overstory crowns). Dependent on the variables: transition to crown fire and active crown fire.

The information in Table 6 presents an interpretation of the outputs for five fire behavior variables as related to fire suppression efforts. The results of fire behavior modeling efforts are presented in Tables 4 and 5. Identification of modeling run locations is presented graphically as Figure 5 within the Project's FPP.

Table 6: 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.
Over 11 feet	Over 1000 BTU/ft/s	Crowning, spotting, and major fire runs are probable. Control efforts at head of fire are ineffective.

Appendix D

Suggested and Prohibited Plant Lists

Botanical Name	Common Name	Comment*
Trees		
Abies species	Fir	F
Acacia species (numerous)	Acacia	F, I
Agonis juniperina	Juniper Myrtle	F
Araucaria species *(A. heterophylla, A. araucana, A. bidwillii)*	Araucaria (Norfolk Island Pine, Monkey Puzzle Tree, Bunya Bunya)	F
Callistemon species *(C. citrinus, C. rosea, C. viminalis)*	Bottlebrush (Lemon, Rose, Weeping)	F
Calocedrus decurrens	Incense Cedar	F
Casuarina cunninghamiana	River She-Oak	F
Cedrus species *(C. atlantica, C. deodara)*	Cedar (Atlas, Deodar)	F
Chamaecyparis species (numerous)	False Cypress	F
Cryptomeria japonica	Japanese Cryptomeria	F
Cupressocyparis leylandii	Leyland Cypress	F
Cupressus species *(C. fobesii, C. glabra, C. sempervirens,)*	Cypress (Tecate, Arizona, Italian, others)	F
Eucalyptus species (numerous)	Eucalyptus	F, I
Juniperus species (numerous)	Juniper	F
Larix species *(L. decidua, L. occidentalis, L. kaempferi)*	Larch (European, Japanese, Western)	F
Leptospermum species *(L. laevigatum, L. petersonii)*	Tea Tree (Australian, Tea)	F
Lithocarpus densiflorus	Tan Oak	F
Melaleuca species *(M. linariifolia, M. nesophila, M. quinquenervia)*	Melaleuca (Flaxleaf, Pink, Cajeput Tree)	F, I, #7
Olea europea	Olive	I, #8
Picea (numerous)	Spruce	F
Palm species (numerous)	Palm	F, I
Pinus species *(P. brutia, P. canariensis, P. b. eldarica, P. halepensis, P. pinea, P. radiata,* numerous others)	Pine (Calabrian, Canary Island, Mondell, Aleppo, Italian Stone, Monterey)	F
Platycladus orientalis	Oriental arborvitae	F
Podocarpus species (*P. gracilior, P. macrophyllus, P. latifolius)*	Fern Pine (Fern, Yew, Podocarpus)	F, #7
Pseudotsuga menziesii	Douglas Fir	F
Schinus molle	Peruvian Pepper Tree	F
Schinus terebinthifolia	Brazilian Pepper Tree	F
Tamarix species *(T. africana, T. aphylla, T. chinensis, T. parviflora)*	Tamarix (Tamarisk, Athel Tree, Salt Cedar, Tamarisk)	F, I
Taxodium species *(T. ascendens, T. distichum, T. mucronatum)*	Cypress (Pond, Bald, Monarch, Montezuma)	F
Taxus species *(T. baccata, T. brevifolia, T. cuspidata)*	Yew (English, Western, Japanese)	F
Thuja species *(T. occidentalis, T. plicata)*	Arborvitae/Red Cedar	F
Tsuga species *(T. heterophylla, T. mertensiana)*	Hemlock (Western, Mountain)	F
Groundcovers, Shrubs and Vines		
Acacia species	Acacia	F, I
Adenostoma fasciculatum	Chamise	F
Adenostoma sparsifolium	Red Shanks	F

Botanical Name	Common Name	Comment*
Agropyron repens	Quackgrass	F, I
Anthemis cotula	Mayweed	F, I
Groundcovers, Shrubs and Vines (cont.)		
Arbutus menziesii	Pacific Madrone	F
Arctostaphylos species	Manzanita	F
Arundo donax	Giant Reed	F, I
Artemisia species *(A. abrotanium, A. absinthium, A. californica, A. caucasica, A. dracunculus, A. tridentata, A. pynocephala)*	Sagebrush (Southernwood, Wormwood, California, Silver, True tarragon, Big, Sandhill)	F
Atriplex species (numerous)	Saltbush	F, I
Avena fatua	Wild Oat	F
Baccharis pilularis	Coyote Bush	F
Bambusa species	Bamboo	F, I
Bougainvillea species	Bougainvillea	F, I, #7
Brassica species *(B. campestris, B. nigra, B. rapa)*	Mustard (Field, Black, Yellow)	F, I
Bromus rubens	Foxtail, Red brome	F, I
Castanopsis chrysophylla	Giant Chinquapin	F
Cardaria draba	Hoary Cress	I
Carpobrotus species	Ice Plant, Hottentot Fig	I
Cirsium vulgare	Wild Artichoke	F,I
Conyza bonariensis	Horseweed	F
Coprosma pumila	Prostrate Coprosma	F
Cortaderia selloana	Pampas Grass	F, I
Cytisus scoparius	Scotch Broom	F, I
Dodonaea viscosa	Hopseed Bush	F
Eriodictyon californicum	Yerba Santa	F
Eriogonum species *(E. fasciculatum)*	Buckwheat (California)	F
Fremontodendron species	Flannel Bush	F
Hedera species *(H. canariensis, H. helix)*	Ivy (Algerian, English)	I
Heterotheca grandiflora	Telegraph Plant	F
Hordeum leporinum	Wild barley	F, I
Juniperus species	Juniper	F
Lactuca serriola	Prickly Lettuce	I
Larix species (numerous)	Larch	F
Larrea tridentata	Creosote bush	F
Lolium multiflorum	Ryegrass	F, I
Lonicera japonica	Japanese Honeysuckle	F
Mahonia species	Mahonia	F
Mimulus aurantiacus	Sticky Monkeyflower	F, #7
Miscanthus species	Eulalie Grass	F
Muhlenbergia species	Deer Grass	F
Nicotiana species *(N. bigelovii, N. glauca)*	Tobacco (Indian, Tree)	F, I
Pennisetum setaceum	Fountain Grass	F, I

Botanical Name	Common Name	Comment*
Perovskia atroplicifolia	Russian Sage	F
Phoradendron species	Mistletoe	F
Groundcovers, Shrubs and Vines (cont.)		
Pickeringia montana	Chaparral Pea	F
Rhus (R. laurina, R. lentii)	Sumac (Laurel,Pink Flowering)	F
Ricinus communis	Castor Bean	F, I
Rhus Lentii	Pink Flowering Sumac	F
Rosmarinus species	Rosemary	F
Salvia species (numerous)	Sage	F, I, #7
Salsola australis	Russian Thistle	F, I
Solanum Xantii	Purple Nightshade (toxic)	I
Silybum marianum	Milk Thistle	F, I
Thuja species	Arborvitae	F
Urtica urens	Burning Nettle	F
Vinca major	Periwinkle	I

* F = flammable, I = Invasive

Notes:

1 This list was prepared by Dudek for the Project. Certain plants are considered to be undesirable in the landscape due to characteristic that make them highly flammable. These characteristics can be either physical or chemical. Physical properties would include large amounts of dead material retained within the plant, rough or peeling bark, and the production of copious amounts of litter. Chemical properties include the presence of volatile substances such as oils, resins, wax, and pitch. Plants with these characteristics should not be planted within the first 50 feet adjacent to a structure in fire hazard areas. These species are typically referred to as "Target Species" since their complete or partial removal form the landscape is a critical part of hazard reduction.

2 Plants on this list that are considered invasive are a partial list of commonly found plants. There are many other plants considered invasive that should not be planted in a fuel modification zone and they can be found on The California Invasive Plant Council's Website www.cal-ipc.org/ip/inventory/index.php. Other plants not considered invasive at this time may be determined to be invasive after further study.

3 For the purpose of using this list as a guide in selecting plant material, it is stipulated that all plant material will burn under various conditions.

4 The absence of a particular plant, shrub, groundcover, or tree, from this list does not necessarily mean it is fire resistive.

5 All vegetation used in Fuel Modification Zones and elsewhere in this development shall be subject to approval of the City of Santee Fire Marshal.

6 Landscape architects may submit proposals for use of certain vegetation on a project specific basis. They shall also submit justifications as to the fire resistivity of the proposed vegetation to the City of Santee Fire Marshal.

7 Plant species is allowed, if deadwood is removed annually or as needed to minimize flammability.

8 Olive trees will be used in an orchard setting under intensive, agricultural management to minimize fire hazard.

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City of Santee. 2016. Santee Municipal Code (Ordinance No. 545), Chapter 15.20 Section 4907.2.1 Fuel Modification Defensible Space, Zone One. October 2016.

County of Los Angeles Fire Department. 2011. Fuel Modification Plan Guidelines. Appendix III, Undesirable Plant List. July 2011.

County of San Diego. 2004. Department of Planning and Land Use, Building Division. Fire, Plants, Defensible Space and You (DPLU #199). June 2004.

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Appendix E
Ready, Set, Go!

Your Personal Wildland Fire ACTION GUIDE

Ready

Set

Go!

2nd Edition

Ready, Set, Go!

Saving Lives and Property through Advance Planning

Fire season is a year-round reality in our region, requiring firefighters and residents to be on heightened alert for the threat of wildfire throughout the year.

With our many canyons, San Diego has hundreds of linear miles of Wildland Urban Interface (WUI). Each year, wildland fires consume hundreds of homes in the WUI. Studies show that as many as 80 percent of those homes could have been saved if their owners had only followed a few simple fire-safe practices. In addition, wildland fire related deaths occur because people wait too long to leave their home.

The San Diego Fire-Rescue Department takes every precaution to help protect you and your property from wildland fire. However, the reality is that in a major wildland fire event, there will simply not be enough fire resources or firefighters to defend every home.

Successfully preparing for a wildland fire requires you to take personal responsibility for protecting yourself, your family and your property. In this Action Guide, we hope to provide the tips and tools you need to prepare; to know what to do when a fire starts; and to leave early.

The Ready, Set, Go! Program works in complementary and collaborative fashion with Firewise USA® and other wildland fire public education efforts.

Fire has always been, a natural occurance in Southern California. Our hills and canyons burned periodically long before we built homes here. Wildland fire, fueled by a build-up of dry vegetation and driven by seasonal Santa Ana winds, are extremely dangerous and difficult to control. Many homes have been built and landscaped without fully understanding what a fire can do and few families are adequately prepared for a quick evacuation.

It's not a question of **if** but **when** the next major wildland fire will occur. Advance planning and preparation are our best defense. We hope you find the tips in the following pages helpful and take them to heart.

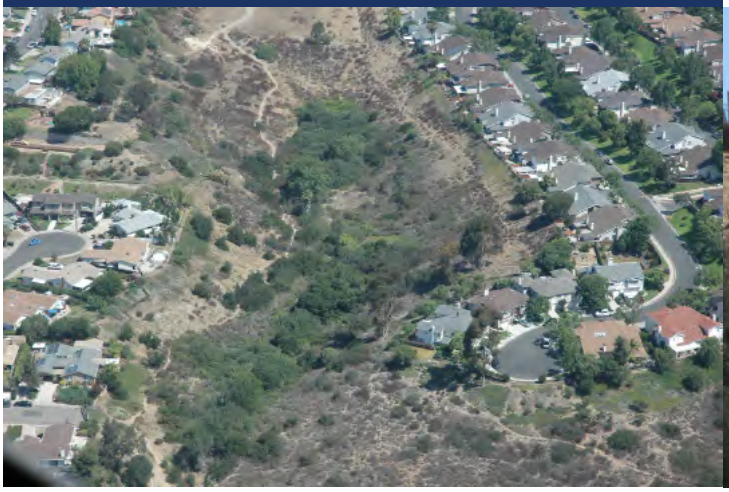
Colin Stowell, Fire Chief
San Diego Fire-Rescue Department

INSIDE

This publication was produced by the San Diego Fire-Rescue Department in a cooperative effort with the International Association of Fire Chiefs. The national RSG! Program is managed by the International Association of Fire Chiefs, funded by the United States Department of Agriculture Forest Service, the United States Department of the Interior, with partner support from the United States Fire Administration, Firewise USA® and the Insurance Institute for Business and Home Safety. For more information on the RSG! Program, please visit www.wildlandfireRSG.org

Living in the Wildland Urban Interface and the Ember Zone

Ready, Set, Go! begins with a house that firefighters can defend.

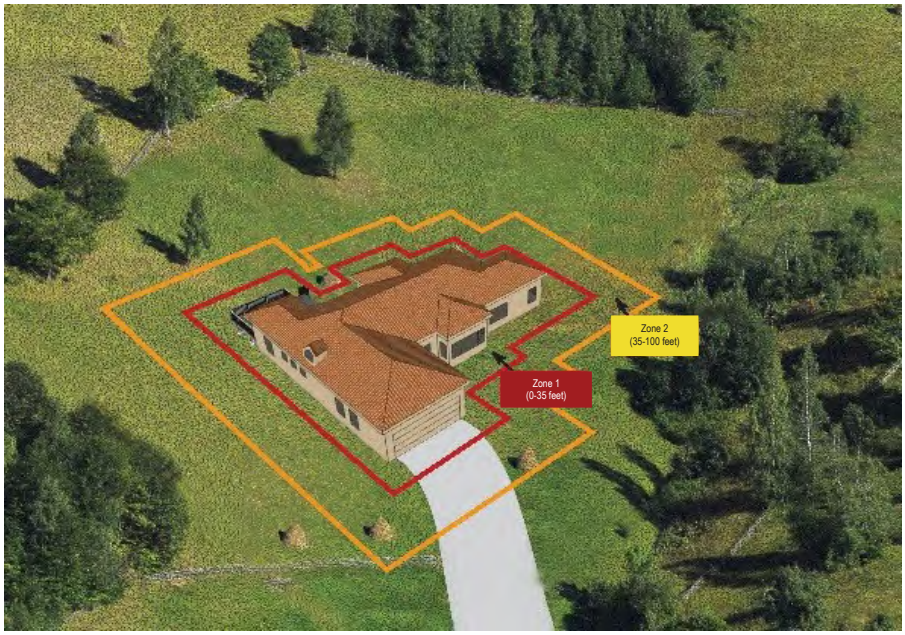


Defensible Space Works!

If you live next to a naturally vegetated area, the Wildland Urban Interface, you should provide firefighters with the defensible space they need to protect your home. Create a buffer zone by removing weeds, brush, and other vegetation. This helps keep the fire away from your home and reduces the risk from flying embers.

A home within one mile of a natural area is in the Ember Zone, where wind-driven embers can be a risk to your property. You and your home must be prepared well before a fire occurs. Ember fires can destroy homes or neighborhoods far from the actual front of the wildfire.

Create Defensible Space



Defensible space is the space between a structure and the wildland area that, under normal conditions, creates a sufficient buffer to slow or halt the spread of fire to a structure.

It protects the home from igniting due to direct flame or radiant heat. Defensible space is essential to help protect a structure during a wildland fire.

Defensible space is made up of two zones around your home; Zone 1: 0-35ft and Zone 2: 35-100ft.

Follow the advice under each zone to help protect your home.

Zone 1

This zone, which consists of an area of 0 to 35 feet around the structure, features the most intense modification and treatment. This distance is measured from the outside edge of the home's eaves and any attached structures, such as decks.

Do not plant directly beneath windows or next to foundation vents. Frequently prune and maintain plants in this zone to ensure vigorous growth and a low growth habit. Remove dead branches, stems, and leaves. Do not store firewood or other combustible materials in this area. Enclose or screen decks with metal screening. Extend gravel coverage under the decks. Do not use areas under decks for storage.

Prune trees with low-lying branches (ladder fuels that would allow a surface fire to climb into the tree) and any branches that interfere with the roof or are within 10 feet of the chimney.

Zone 2

This zone features fuel reduction efforts and serves as a transitional area between Zones 1 and 2. The size of Zone 2 depends on the slope of the ground where the structure is built. Typically, the defensible space should extend 100 feet from the structure.

Remove stressed, diseased, dead, or dying trees and shrubs. Thin and prune the remaining larger trees and shrubs. Be sure to extend thinning along either side of your driveway all the way to your main access road. In all other areas, prune all branches of shrubs or trees up to a height of 10 feet above ground (or 1/3 the height, whichever is the least).

These actions help eliminate the continuous fuel surrounding a structure while enhancing home site safety and the aesthetics of the property. Keep grass and wildflowers under 2 inches in height. Regularly remove leaf and needle debris from the yard.

Making Your Home Fire Resistant

Harden Your Home

Construction materials and the quality of the defensible space surrounding the structure are what increases the chance of survival in a wildland fire. Embers from a wildland fire will find the weak spot in your home's fire protection scheme and can easily catch because of a small, overlooked or seemingly inconsequential factor. Below are some measures you can take to safeguard your home.

ROOFS

Roofs are the most vulnerable surface where embers land because they can become lodged and can start a fire. Roof valleys, open ends of barrel tiles and rain gutters are all points of entry. **Block off all open spaces, and regularly inspect these areas.**

EAVES

Embers can gather under open eaves and ignite combustible material. **Enclose your eaves to prevent ember intrusion, and regularly clear away debris that collect here.**

VENTS

Embers can enter the attic or other concealed spaces and ignite combustible materials. Vents in eaves and cornices are particularly vulnerable, as are any unscreened vents. **Use corrosion resistant metal mesh to screen all vents, and check them reguarly to remove any debris that collects in front of the screen.**

WALLS and FENCING

Combustible siding or other combustible/overlapping materials provide surfaces or crevices for embers to nestle and ignite. **Build or remodel with noncombustible or ignition-resistant materials whenever possible. Regularly clear away debris from any crevices and perform annual upkeep.**

WINDOWS and DOORS

Embers can enter gaps in doors, including garage doors. **Install weather proofing around your garage door, and if your garage is attached to your home make sure the interior door is solid and on self-closing hinges.**

Plants or combustible storage near windows can be ignited from embers and generate heat that can break windows and/or melt combustible frames. **Wherever possible, use dual-paned windows with tempered glass, as they are less likely to shatter from radiant heat.**

BALCONIES and DECKS

Construct your balconies or decks with noncombustible materials, and do not store combustible items underneath them. If there is a fire threat, bring any furniture into your home. Embers can collect in or on combustible surfaces, or beneath decks and balconies, igniting the material and entering the home through walls or windows.

To harden your home even further, consider protecting your homes with a residential fire sprinkler system. In addition to extinguishing a fire started by an ember that enters your home, it also can help protect you and your family year-round from any home fire.

Tour a Wildland Fire Prepared Home

Home Site and Yard: Ensure all vegetation within 100 feet around your home or to your property line is well-managed. This area may need to be enlarged in severe fire hazard areas. This may mean considering the impact a common slope or neighbor's yard may have on your property during a wildland fire.

Cut dry weeds and grass before noon when temperatures are cooler to reduce the chance of sparking a fire.

Landscape with fire-resistant plants that have a high moisture content and are low-growing.

Keep woodpiles, propane tanks and combustible materials away from your home and other structures such as detached garages, barns and sheds.

Ensure that trees are far away from power lines.

Roof: Your roof is the most vulnerable part of your home because it can easily catch fire from wind-blown embers. Homes with wood-shake or shingle roofs are at high risk of being destroyed during a wildfire.

Build your roof or re-roof with Class A fire-resistant materials such as composition, metal or tile. Block any spaces between roof decking and covering to prevent ember intrusion.

Clear pine needles, leaves and other debris from your roof and gutters.

Cut any tree branches within 10 feet of your roof.

Vents: All vent openings should be covered with 1⁄8-inch or smaller corrosion resistant metal mesh.

Do not use fiberglass or plastic mesh because they can melt and burn.

Attic vents in eaves or cornices should be baffled or otherwise protected to prevent ember intrusion (mesh is not enough).

Windows: Radiant heat from burning vegetation or a nearby structure can cause the glass in windows to break. This will allow burning embers to enter and start internal fires. Single-paned and large windows are particularly vulnerable.

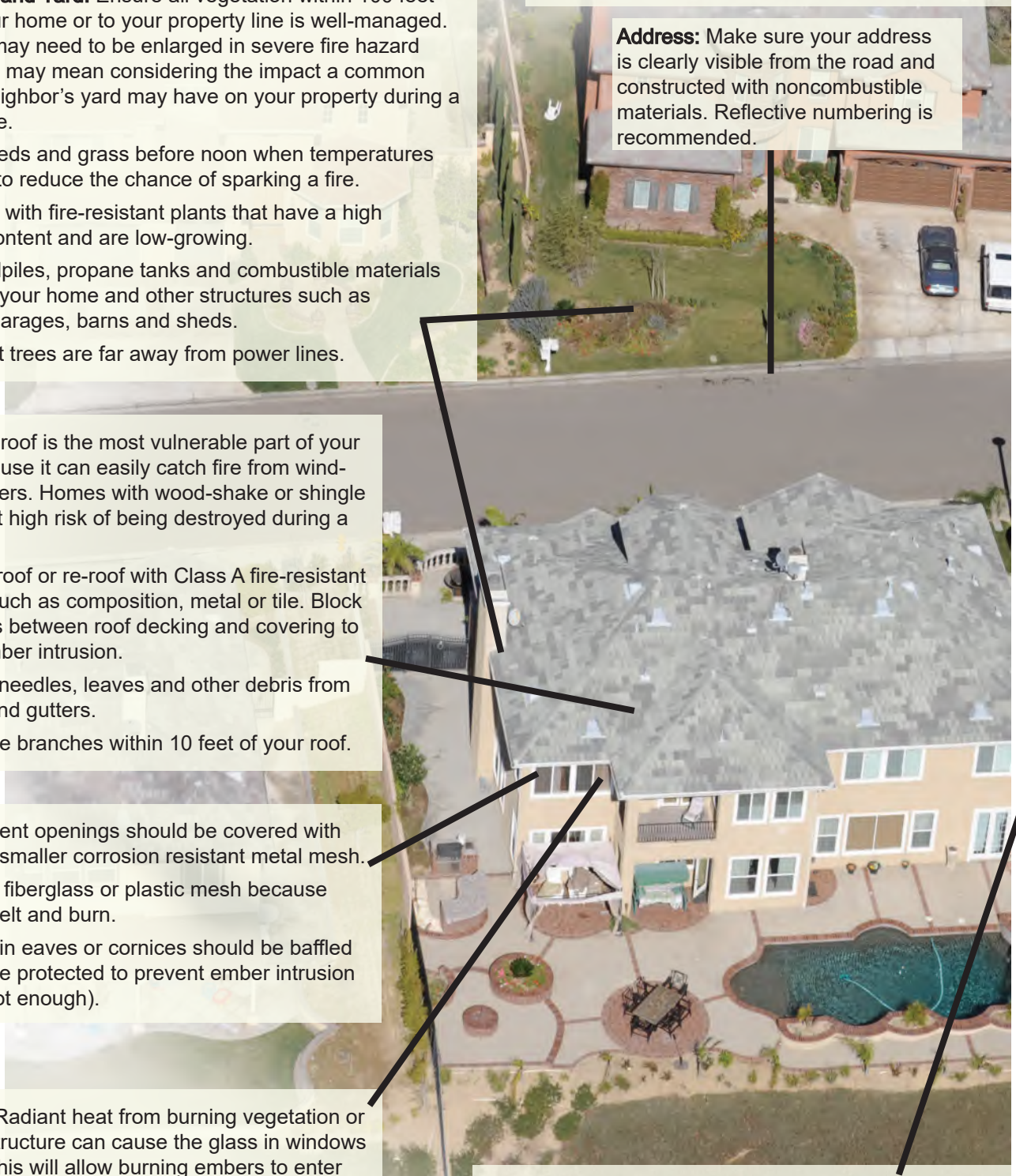
Install dual-paned windows with a minimum of one pane being tempered glass to reduce the chance of breakage during a fire.

Limit the size and number of windows in your home that face large areas of vegetation.

Inside: Keep working fire extinguishers on hand.

Install smoke alarms on each level of your home and near bedrooms. Test them monthly and change the batteries twice a year.

Address: Make sure your address is clearly visible from the road and constructed with noncombustible materials. Reflective numbering is recommended.



Walls: Wood products, such as boards, panels or shingles, and common siding materials are combustible and not good choices for fire-prone areas.

Build or remodel with ignition-resistant or noncombustible building materials, such as brick, cement, masonry or stucco.

Be sure to extend materials from foundation to roof.

Garage: Have a fire extinguisher and tools such as a shovel, rake, bucket and hoe available for fire emergencies.

Install a solid door with self-closing hinges between living areas and the garage. Install weather stripping around and under door to prevent ember intrusion.

Store all combustibles and flammable liquids away from ignition sources.

Driveways and Access Roads: Driveways should be designed to allow fire and emergency vehicles and equipment to reach your house.

Access roads should have a minimum 10-foot clearance on either side of the traveled section of the roadway and should allow for two-way traffic.

Ensure that all gates open inward and are wide enough to accommodate emergency equipment.

Trim trees and shrubs overhanging the road to a minimum of 14 feet to allow emergency vehicles to pass.

Fencing: Make sure to use non-combustible fencing to protect your home during a wildfire. Area at the base of the fence should be kept clear of debris.

Eaves: Box in eaves with non-combustible materials to prevent accumulation of embers.

Gutters: Screen or enclose rain gutters with a flat noncombustible device. If possible, the device should follow the slope of the roof. Remove debris from gutters at least twice a year, or more if necessary.

Water: Have multiple garden hoses that are long enough to reach any area of your home and other structures on your property.

If you have a pool or well, consider a pump.

Deck/Patio Cover: Use heavy timber or noncombustible construction material for decks.

Enclose the underside of balconies and decks with fire-resistant materials to prevent embers from blowing underneath.

Keep your deck clear of combustible items, such as baskets, dried flower arrangements and other debris. Combustible materials should not be stored under your deck.

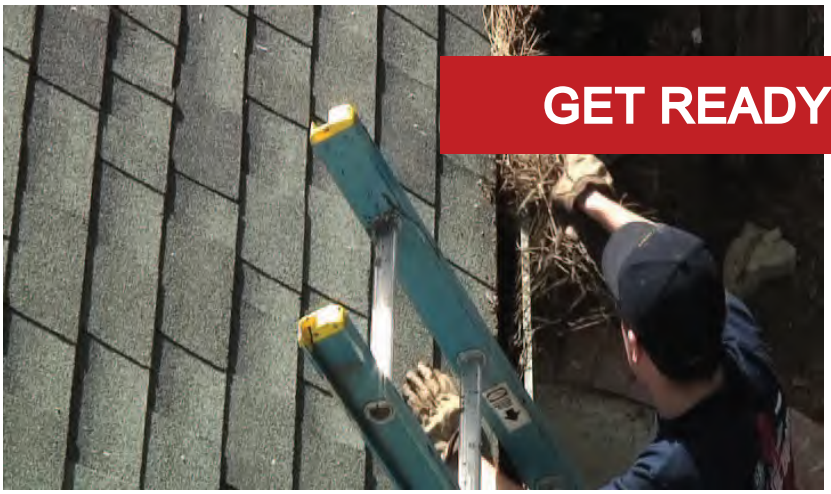
Chimney: Cover chimney and stovepipe outlets with a noncombustible screen of 1⁄4-inch wire mesh to reduce the size of embers leaving the chimney.

Make sure that tree branches are at least 10 feet away from your home.

Ready, Set, Go!

Now that you've done everything you can to protect your house, it's time to prepare your family. Your Wildfire Action Plan must be prepared with all members of your household well in advance of a fire.

Use these checklists to help you prepare your Wildfire Action Plan. Each family's plan will be different, depending on their situation. Rehearse your plan with your entire family regularly.



GET READY | Prepare Your Family

- ☐ Create a Family Disaster Plan that includes meeting locations and communication plans and rehearse it regularly. Include the evacuation of large animals, such as horses in your plan.
- ☐ Have fire extinguishers on hand and teach your family how to use them.
- ☐ Ensure that your family knows where your gas, electric, and water main shut-off controls are and how to use them.
- ☐ Plan and practice several different evacuation routes.
- ☐ Designate an emergency meeting location outside the fire hazard area.
- ☐ Assemble an emergency supply kit as recommended by the American Red Cross. Keep an extra kit in your vehicle.
- ☐ Appoint an out-of-area friend or relative as a point of contact so you can communicate with family members.
- ☐ Maintain a list of emergency contact numbers in your emergency supply kit.
- ☐ Have a portable radio or scanner so you can stay updated on the fire and weather emergency announcements.

GET SET | As the Fire Approaches

- ☐ Evacuate as soon as you are set!
- ☐ Alert family and neighbors.
- ☐ Dress in appropriate clothing (i.e., clothing made from natural fibers, such as cotton, and work boots). Have goggles and a dry bandana or particle mask handy.
- ☐ Ensure that you have your emergency supply kit on hand that includes all necessary items, such as a battery powered radio, spare batteries, emergency contact numbers, and ample drinking water.
- ☐ Stay tuned to your TV or local radio stations for updates, or check the fire department Web site.
- ☐ Remain close to your house, drink plenty of water and keep an eye on your family and pets until you are ready to leave.

INSIDE CHECKLIST

- ☐ Shut all windows and doors, leaving them unlocked.
- ☐ Remove flammable window shades and curtains and close metal shutters.
- ☐ Remove lightweight curtains.
- ☐ Move flammable furniture to the center of the room, away from windows and doors.
- ☐ Shut off gas at the meter. Turn off pilot lights.
- ☐ Leave your lights on so firefighters can see your house under smoky conditions.
- ☐ Shut off the air conditioning.

OUTSIDE CHECKLIST

- ☐ Gather up combustible items from the exterior of the house and bring them inside (e.g., patio furniture, children's toys, door mats, etc.) or place them in your pool.
- ☐ Turn off propane tanks.
- ☐ Don't leave sprinklers on or water running - they can waste critical water pressure.
- ☐ Leave exterior lights on.
- ☐ Back your car into the driveway. Shut doors and roll up windows.
- ☐ Have a ladder available.
- ☐ Patrol your property and extinguish all small fires until you leave.
- ☐ Seal attic and ground vents with pre-cut plywood or commercial seals if time permits.

IF YOU ARE TRAPPED: SURVIVAL TIPS

- ☐ Shelter away from outside walls.
- ☐ Bring garden hoses inside house so embers don't destroy them.
- ☐ Patrol inside your home for spot fires and extinguish them.
- ☐ Wear long sleeves and long pants made of natural fibers such as cotton.
- ☐ Stay hydrated.
- ☐ Ensure you can exit the home if it catches fire (remember if it's hot inside the house, it is four to five times hotter outside).
- ☐ Fill sinks and tubs for an emergency water supply.
- ☐ Place wet towels under doors to keep smoke and embers out.
- ☐ After the fire has passed, check your roof and extinguish any fires, sparks or embers.
- ☐ Check inside the attic for hidden embers.
- ☐ Patrol your property and extinguish small fires.
- ☐ If there are fires that you can not extinguish with a small amount of water or in a short period of time, call 9-1-1.

GO! | Leave Early

By leaving early, you give your family the best chance of surviving a wildland fire. You also help firefighters by keeping roads clear of congestion, enabling them to move more freely and do their job in a safer environment.

WHEN TO LEAVE

Do not wait to be advised to leave if there is a possible threat to your home or evacuation route. Leave early enough to avoid being caught in fire, smoke, or road congestion. If you are advised to leave by local authorities, do not hesitate!

WHERE TO GO

Leave to a predetermined location (it should be a low-risk area, such as a well-prepared neighbor or relative's house, a Red Cross shelter or evacuation center, motel, etc.)

HOW TO GET THERE

Have several travel routes in case one route is blocked by the fire or by emergency vehicles. Choose the safest route away from the fire.

WHAT TO TAKE

Take your emergency supply kit containing your family and pet's necessary items.

EMERGENCY SUPPLIES LIST

The American Red Cross recommends every family have an emergency supply kit assembled long before a wildland fire or other emergency occurs. Use the checklist below to help assemble yours. For more information on emergency supplies visit www.redcross.org/get-help.

- ☐ Three-day supply of water (one gallon per person per day).
- ☐ Non-perishable food for all family members and pets (3 day supply).
- ☐ First aid kit.
- ☐ Flashlight, battery-powered radio, and extra batteries.
- ☐ An extra set of car keys, credit cards, cash or traveler's checks.
- ☐ Sanitation supplies.
- ☐ Extra eyeglasses or contact lenses.
- ☐ Important family documents and contact numbers including insurance documents.
- ☐ Map marked with evacuation routes.
- ☐ Prescriptions or special medications.
- ☐ Family photos, valuable and other irreplaceable items that are easy to carry.
- ☐ Personal electronic devices and chargers.

Note: Keep a pair of old shoes and a flashlight handy in case of a sudden evacuation at night.

My Personal WildlandFire ACTION PLAN

Write up your Wildland Fire Action Plan and post it in a location where every member of your family can see it. Rehearse it with your family.

During high-fire-danger days in your area, monitor your local media for information and be ready to implement your plan.
Hot, dry, and windy conditions create the perfect environment for a wildland fire.

IMPORTANT PHONE NUMBERS

Out-of-Area Contact _____ Phone: _____

Work _____ _____ _____

School _____ _____ _____

Other _____ _____ _____

EVACUATION ROUTES

1 _____

2 _____

3 _____

WHERE TO GO

_____

_____

_____

_____

LOCATION OF EMERGENCY SUPPLY KIT(S)

_____

NOTES

_____

_____

_____

_____

_____

Contact your local fire department for more tips to prepare before a wildland fire.

My Personal WildlandFire ACTION PLAN

Residential Safety Checklist

Tips To Improve Family and Property Survival During A Wildland Fire

Ready — Get ready

- ☑ Dispose of or relocate combustible material from around your home.
- ☑ Trim trees & bushes allowing ample space between your home & landscape vegetation.

Set — Be prepared

- ☑ Arrange your 'Go-Kit' with prescription medication, emergency supplies, important documents, and other essential items.
- ☑ Create your own action plan; involve your family & practice exit plans from the home & neighborhood frequently.
- ☑ Be sure you're familiar with local emergency notification systems & evacuation systems.

Go! — Act early

- ☑ Get your 'Go-Kit' and leave well before the threat approaches following a planned accessible route.
- ☑ Stay aware of the situation and follow your plan.
- ☑ Cooperate with local authorities during evacuation & re-entry processes.

Ready, Set, Go!

www.wildlandfireRSG.org

www.sandiego.gov/fire

FEMA

SAN DIEGO FIRE RESCUE FOUNDATION

of 6

Su Guia de Accion
en Caso de Incendio Forestal

¡En Sus Marcas

Listos

Fuera!

READY, SET, GO!

6 EDICIÓN

¡En Sus Marcas, Listos, Fuera!

Salvando vidas a través de la planificación

Esta publicación fue preparada por el programa ¡EN SUS MARCAS, LISTOS, FUERA! del International Association of Fire Chiefs y U.S.D.A. Forest Service, U.S. Department of the Interior, y U.S. Fire Administration. Agradecemos especialmente a los Departmentos de Bomberos de Austin, San Diego y Santa Fe por sus contribuciones al mensaje y contenido. Para aprender más sobre el programa ¡EN SUS MARCAS, LISTOS,

Contenido

En muchas áreas, la temporada de incendios forestales es durante todo el año, lo que requiere que los bomberos y ciudadanos se mantengan alertas ante esta amenaza.

Cada año, los incendios forestales destruyen cientos de hogares en áreas del Interfaz Urbano Forestal (IUF). Estadísticas indican que el 80% de casas perdidas en estos incendios se podrian haber salvado si sus propietarios hubieran puesto en práctica algunos pasos de seguridad contra incendios. Por otra parte, las muertes relacionadas a los incendios forestales ocurren cuando los residentes de las áreas afectadas esperan demasiado tiempo para evacuar sus hogares.

El cuerpo de bomberos de su área toma todas las precauciones necesarias para proteger su vida y propiedad de los incendios forestales. Sin embargo, la realidad es que en la mayoría de estos incendios no habrá suficientes bomberos ni recursos para defender cada hogar.

Prepararse correctamente en caso de un incendio forestal le permite tomar responsabilidad propia para usted, su familia y su propiedad. Con este Guía de Acción esperamos compartir recomendaciones de preparación ante la amenaza de incendios forestales, tal como tener conocimiento situacional al comenzar el incendio y actuar pronto al ser dirigido por las autoridades.

El programa ¡EN SUS MARCAS, LISTOS, FUERA! funciona como complemento en colaboración con el programa Firewise® Communities y otros programas de seguridad. Al utilizar bomberos dentro estos programas se amplifica el mensaje para que la ciudadanía logre la meta común de preparación contra incendios forestales.

Preparación de la Communidad para Incendios (“Community Wildfire Readiness” conocido como CWR) le ofrece a los residentes, bomberos, personal de emergencia, dueños de negocios, constructores, grupos civiles y líderes locales las herramientas, recursos, dirección y apoyo para prepararse ante la amenaza de incendios forestales. Los recursos de CWR ayudan a crear una comunidad cooperativa en donde todas las partes están involucradas en adaptarse exitosamente. Visite www.wildfireready.org para obtener más información sobre CWR.

Usted puede ser líder al crear el cambio. Usted y los miembros de su comunidad pueden tomar pasos sencillos para aumentar su preparación en caso de incendios forestales. Su conocimiento y acciones podrían motivar a otras personas a seguir sus pasos, aumentado la seguridad y potencialmente disminuir la perdida y daño de sus propiedades. El estar preparado es vital durante el incendio ya que los recursos del personal de emergencia pueden ser escasos. El tomar acción personal resulta en mayor seguridad para todos los involucrados.

Los incendios pueden ocurrir de manera natural en las áreas forestales. Los montes, cañones y bosques se incendiaban periódicamente mucho antes de que se construyeran viviendas. Estos incendios son alimentados con vegetación seca e impulsados por vientos secos y cálidos que causan que los incendios sean extremadamente peligrosos y difíciles de controlar. Muchas personas han construido sus hogares en el IUF y han ajardinado sus terrenos sin comprender el impacto que un incendio forestal puede tener. Poca gente ha preparado a su familia adecuadamente para salir rápidamente en caso de evacuacion.

No se trata de si ocurrirá, sino cuándo ocurrirá un incendio forestal en nuestra área. Con planificación, conocimiento y preparación, podemos colaborar para solucionar los problemas de incendios forestales. Las recomendaciones de las próximas páginas están diseñadas para fomentar su conocimiento y crear un ambiente más seguro para usted, su familia y para los bomberos.


Espacio defendible


Zona de seguridad


Daño de brasa voladora

Vivir en la Interfaz Urbano Forestal y en la zona de brasas

¡En Sus Marcas, Listos, Fuera!

comienza con preparar su casa para que los bomberos la puedan defender

¡El espacio defendible funciona!

Si usted vive enseguida de una área con vegetación natural, conocida como Interfaz Urbano Forestal, debe preparar su propiedad y modificar la vegetación para tener el espacio defendible que los bomberos necesitan para proteger su hogar.

Esta zona de seguridad creada al alternar hierbas, plantas y otras vegetaciones ayudan a mantener el fuego alejado de su casa y reduce el riesgo de brasas que vuelan.

Aunque usted no viva en el interfaz urbano-forestal, puede estar dentro de la Zona de Brasas. Una casa con una distancia de una milla de un área natural puede estar dentro de la zona de brasas.

Las brasas que vuelan con el viento ponen a su casa en riesgo, ya que pueden volar e incendiar casas o vecindades que se encuentran lejos del fuego.

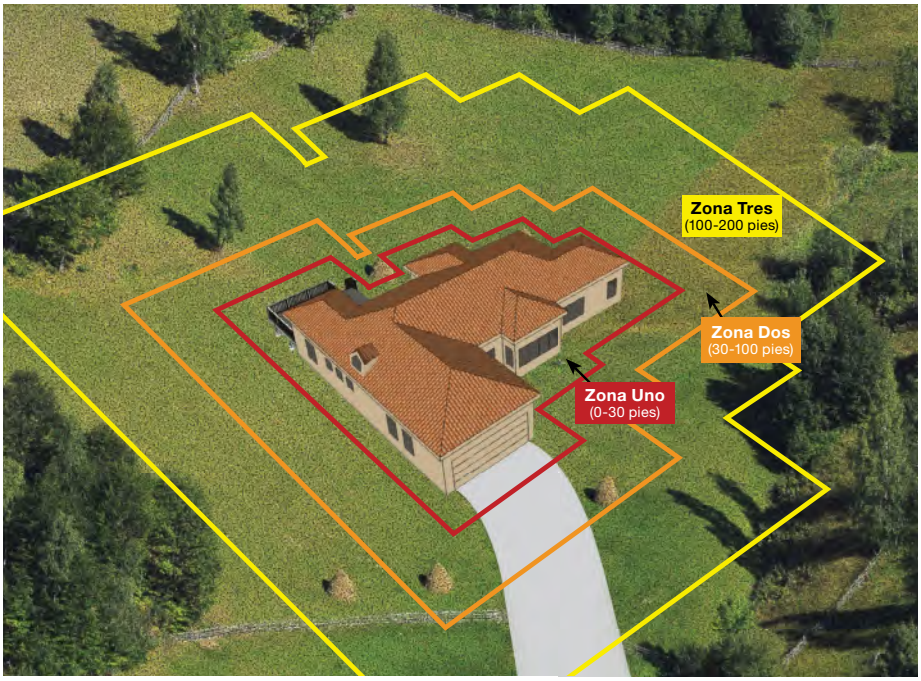
Considere Esto

La vegetación no controlada entre y alrededor de las casas aumenta el riesgo de incendios forestales que pueden extenderse por la comunidad, poniendo en peligro vidas y propiedades. La planeación antes de los incendios, el manejo de combustibles y el tener suficientes espacios libres en donde no hay combustibles les permite a los bomberos tener el espacio que necesitan para evitar que el incendio llegue a la comunidad.

Programas de preparación contra incendios ofrecen una valiosa orientación sobre mejoras de propiedad.

Crear un espacio defendible

El espacio defendible es el espacio requerido entre una estructura y el fuego que, bajo condiciones normales, crea un área de seguridad para reducir o detener la propagación del fuego hacia la estructura. Previene que la estructura se incendie a causa del contacto directo con las llamas o del calor radiante. El espacio defendible es esencial para la supervivencia de estructuras durante las condiciones de incendio forestal.



ZONA UNO

0-30 pies alrededor de su casa

- Use superficies no-combustibles como concreto o grava de 0 a 5 pies de su casa.
- Use vegetación que no sea leñosa o tallos herbáceos. Las plantas suculentas y el césped son buenas opciones.
- Almacene su leña y otros materiales combustibles por lo menos a 30 pies de su casa, cochera o cualquier estructura.
- Mantenga una distancia mínima de 10 pies entre el techo y las ramas.

ZONA DOS

30-100 pies alrededor de su casa o propiedad

- Interrumpa los combustibles continuos al crear “islas” de grupos de vegetación.
- Elimine los “combustibles en escalera” al crear separación entre la vegetación baja y las ramas de los árboles para prevenir que el fuego escale los árboles (vea la descripción de “combustibles en escalera”).
- Mantenga su patio limpio de hojas y desechos.
- Mantenga el pasto y las flores silvestres a una altura menor de 8 pulgadas.

ZONA TRES

100-200 pies alrededor de su casa o propiedad

- Mantenga un espacio mínimo de 10 pies entre los topes de los árboles.
- Elimine los “combustibles en escalera” al crear separación entre vegetación baja y las ramas de los árboles para prevenir que el fuego escale los árboles (vea la descripción de “combustibles en escalera”).
- Elimine los árboles y arbustos muertos.

Combustibles en Escalera

Los combustibles en escalera son aquellos que permiten que el fuego se propague de los combustibles de piso hacia las partes superiores de los árboles. Estos se eliminan al incrementar la separación horizontal y vertical entre la vegetación.

Qué es una casa fortalecida?

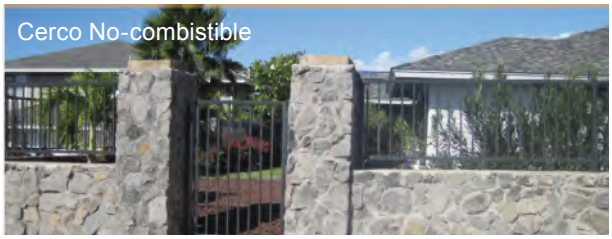
Los materiales de construcción de su casa y la calidad del espacio defendible que la rodea es lo que le ofrece la mejor probabilidad de sobrevivir un incendio forestal. Las brasas de estos incendios pueden encontrar algún punto débil dentro de la seguridad de la estructura y tomar ventaja. Aunque no pueda realizar todas las medidas de la siguiente lista, cada una que realice aumentará la seguridad de su hogar y de su familia durante un incendio forestal.

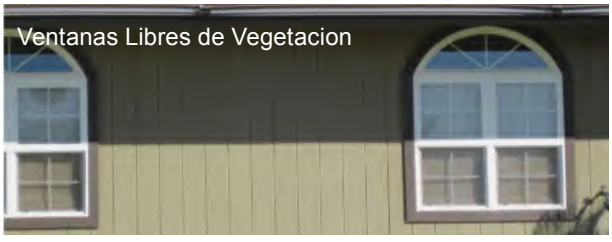

Sistema de Rociadores Residenciales


Canaletas Cubiertas


Aleros Cubiertos


Respiraderos con Malla


Cerco No-combistible


Ventanas Libres de Vegetacion

Mejoras para el hogar

BALCONES Y TERRAZAS

Las brasas se pueden acumular en los materiales combustibles dentro o debajo de los balcones o terrazas, encenderlos y propagarse al interior de la estructura por las paredes o ventanas.

Para fortalecer su hogar, considere protegerlo con un sistema de rociadores contra incendio. Aparte de poder extinguir un incendio causado por las brasas que entran a su hogar, les protegerá a usted y a su familia durante todo el año de cualquier incendio dentro su casa.

TECHOS

El techo es la parte más vulnerable de su casa. Debido a la gran superficie, las brasas pueden caer sobre él y encender los materiales combustibles y desechos como las hojas y agujas de los árboles. Limpie regularmente los valles del techo, los espacios abiertos de las tejas y las canaletas de lluvia.

ALEROS

Las brasas pueden caer debajo de los aleros abiertos y encender la madera o los materiales expuestos. Los aleros cubiertos ofrecen mejor protección.

RESPIRADEROS

Las brasas pueden entrar al ático o a otros espacios cubiertos por los respiraderos y puntos de ventilación y encender los materiales combustibles. Los respiraderos en los aleros y cornisas son particularmente vulnerables al igual que cualquier respiradero sin malla.

PAREDES

Los revestimientos de paredes de materiales combustibles o con superficies sobrepuestas tienen rendijas donde las brasas se pueden atorar y causar un incendio.

Casa preparada contra incendio forestal

Terreno y patio: Asegúrese de tener 100 pies de vegetación controlada alrededor de su casa o propiedad. En las áreas de alto riesgo se necesitará extender esta área. Esto puede requerir ver más allá de su propiedad para determinar qué impacto le puede causar alguna área común o de sus vecinos a su propiedad. Recuerde la importancia del mantenimiento rutinario. Mantenga los bultos de madera, tanques de gas propano y otros materiales combustibles alejados de su casa y de otras estructuras como cocheras, establos o cobertizos. Asegúrese de que los arboles estén alejados de los cables de alta tensión.

Interior: Mantenga extintores a la mano. Instale detectores de humo en cada nivel de su casa y cerca de las recamaras. Cada mes asegurese que funcionen y cámbie las baterías dos veces al año.

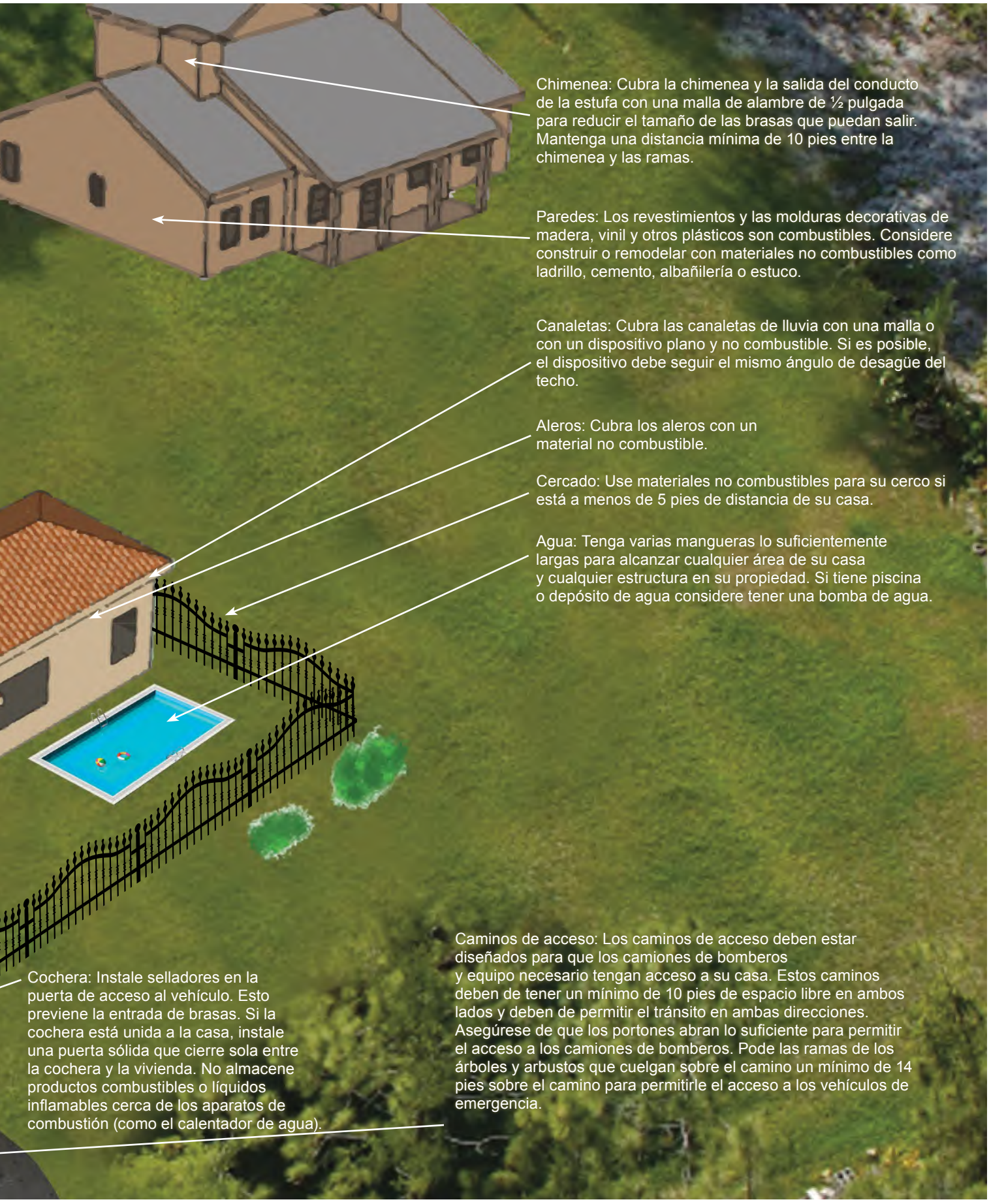
Dirección: Asegúrese que la dirección se vea claramente desde la calle. Se le recomienda que tenga números reflectantes.

Techo: Use una cobertura de techo de materiales contra incendio tipo A, como tejas de composición, teja de barro o metal. Al poner o cambiar el material del techo, tape los espacios entre la cobertura y el entablado para evitar que le entren brasas. Mantenga el techo y las canaletas de lluvia libre de hojas y desechos de árboles. Mantenga una distancia mínima de 10 pies entre el techo y las ramas.

Terraza/patio cubierto: Use madera pesada o materiales no combustibles para las terrazas. Encierre el lado inferior de los balcones con materiales resistentes al fuego para evitar que le entren brasas. Mantenga su terraza libre de artículos combustibles como canastas, arreglos florales y otros materiales.

Respiraderos: Como mínimo, toda apertura de ventilación debe taparse con una malla de alambre anticorrosiva de 1/8 de pulgada.

Ventanas: El calor radiante de los incendios cercanos puede causar que se quiebre el cristal de las ventanas. Esto permite que puedan entrar las brasas o el fuego y que se encienda el interior de la estructura. Las ventanas sencillas y las ventanas grandes son vulnerables a quebrarse con más facilidad. Instale ventanas de doble panel con un mínimo de un panel de cristal templado para reducir la posibilidad de que se quiebre durante un incendio. Limite el tamaño y la cantidad de ventanas que den hacia areas con mucha vegetacion.


Chimenea: Cubra la chimenea y la salida del conducto de la estufa con una malla de alambre de ½ pulgada para reducir el tamaño de las brasas que puedan salir. Mantenga una distancia mínima de 10 pies entre la chimenea y las ramas.
Paredes: Los revestimientos y las molduras decorativas de madera, vinil y otros plásticos son combustibles. Considere construir o remodelar con materiales no combustibles como ladrillo, cemento, albañilería o estuco.
Canaletas: Cubra las canaletas de lluvia con una malla o con un dispositivo plano y no combustible. Si es posible, el dispositivo debe seguir el mismo ángulo de desagüe del techo.
Aleros: Cubra los aleros con un material no combustible.
Cercado: Use materiales no combustibles para su cerco si está a menos de 5 pies de distancia de su casa.
Agua: Tenga varias mangueras lo suficientemente largas para alcanzar cualquier área de su casa y cualquier estructura en su propiedad. Si tiene piscina o depósito de agua considere tener una bomba de agua.
Cochera: Instale selladores en la puerta de acceso al vehículo. Esto previene la entrada de brasas. Si la cochera está unida a la casa, instale una puerta sólida que cierre sola entre la cochera y la vivienda. No almacene productos combustibles o líquidos inflamables cerca de los aparatos de combustión (como el calentador de agua).
Caminos de acceso: Los caminos de acceso deben estar diseñados para que los camiones de bomberos y equipo necesario tengan acceso a su casa. Estos caminos deben de tener un mínimo de 10 pies de espacio libre en ambos lados y deben de permitir el tránsito en ambas direcciones. Asegúrese de que los portones abran lo suficiente para permitir el acceso a los camiones de bomberos. Pode las ramas de los árboles y arbustos que cuelgan sobre el camino un mínimo de 14 pies sobre el camino para permitirle el acceso a los vehículos de emergencia.

¡En Sus Marcas, Listos, Fuera!

Cree su propio guía de acción en caso de incendio forestal

Ahora que hizo todo lo necesario para preparar su hogar, es hora de preparar a su familia. Su Guía de Acción se debe de preparar con todos los miembros de su hogar mucho antes de un incendio. Use estas listas para ayudarle a prepararse.

En sus Marcas – ¡Prepárate!

- ☐ Haga un plan de desastre familiar que incluya puntos de reunión y planes de comunicación. Ensáyen regularmente. También incluya la evacuación de mascotas y ganando.
- ☐ Tenga extintores a la mano y asegúrese de que su familia sepa usarlos.
- ☐ Asegúrese de que su familia sepa la ubicacion de las llaves de gas, de agua e interruptor electrico y como se cierran y apagan. Procure nunca abrir la llave de paso del gas después de cerrarla. Contacte a su compañia de gas para que lo hagan correctamente y se aseguren que todos los pilotos funcionen de manera segura.
- ☐ Planeen y practiquen diferentes rutas de evacuación.
- ☐ Designe un punto de reunión fuera del área de riesgo.
- ☐ Prepare un equipo de provisiones de emergencia como lo recomienda la Cruz Roja Americana. Guarde otro equipo adicional en su automóvil.
- ☐ Designe a una amistad o un familiar que se encuentre fuera del área como el punto de contacto para poder comunicarse con los miembros de su familia.
- ☐ Mantenga una lista con los números de contacto de emergencia dentro de su equipo de provisiones de emergencia.
- ☐ Tenga una radio portátil o escáner para mantenerse al tanto del incendio.