

# Fire Protection Plan Escondido North

APN 224-141-23 & 24, 224-142-30 through 33



**March 4, 2022, Revised April 20, 2022, June 13, 2022**

**Applicant: Escondido North, LLC  
30200 Rancho Viejo Road, Suite B  
San Juan Capistrano, CA 92675**

**Prepared and Certified by:**

  
Melvin Johnson, Owner  
Certified CEQA Wildland Fire Consultant  
*Fire*wise 2000, LLC  
PO Box 39  
Valley Center, CA 92082  
(760) 745-3947  
info@firewise2000.com

# Escondido North Fire Protection Plan

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## **EXECUTIVE SUMMARY**

This Fire Protection Plan (FPP) evaluates the proposed Escondido North Project to ensure it does not unnecessarily expose people or structures to fire risks and hazards. The FPP identifies and prioritizes the measures necessary to adequately mitigate those impacts. The FPP has considered the property location, topography, geology, combustible vegetation (fuel types), climatic conditions and fire history. It considers water supply, access, structure ignitability and fire resistive building materials, fire protection systems and equipment, impacts to existing emergency services, defensible space and vegetation management.

This FPP also lists fuel modification requirements to mitigate the exposure of people or structures from a significant risk of loss, injury or death from wildland fires. Zone 1, the Immediate Zone is the first 5 feet from the exterior wall surface on a horizontal plane. Zone 1 will consist of hardscape or limited fire-resistant plantings approved by the AHJ from the approved County list. Zone 2A, the Intermediate Zone, is an irrigated, landscaped zone providing a safety area for fire suppression forces and protects structures from radiant and convective heat. Zone 2 extends out from Zone 1 to 50 feet from exterior wall surfaces in a horizontal plane and consists of fire resistant and maintained plantings. Zones 2B & 3, are the areas beyond Zone 2A, including manufactured slopes, biofiltration basins, and excludes all prohibited highly combustible native vegetation, but permits plantings within specific criteria and reduces the existing native vegetation by 50%. The owners will be responsible to the Escondido Fire Department Fire Marshal for the completion of all designated Fuel Modification Treatments.

## 1.0 INTRODUCTION

This Fire Protection Plan (FPP) has been prepared for the Escondido North Project. The purpose of the FPP is to assess the potential impacts resulting from wildland fire hazards and identify the measures necessary to adequately mitigate those impacts. As part of the assessment, the plan has considered the property location, topography, geology, combustible vegetation (fuel types) climatic conditions, and fire history. The plan addresses water supply, access (including secondary/emergency access where applicable), structural ignitability and fire resistive building features, fire protection systems and equipment, impacts to existing emergency services, defensible space, and vegetation management. The plan identifies and prioritizes areas for hazardous fuel reduction treatments and recommends the types and methods of treatment that will protect one or more at-risk communities and essential infrastructures. The plan recommends measures that property owners will take to reduce the probability of ignition of structures throughout the area addressed by the plan.

### General Information

**Owner/Developer** Escondido North LLC

**Approving Departments:**

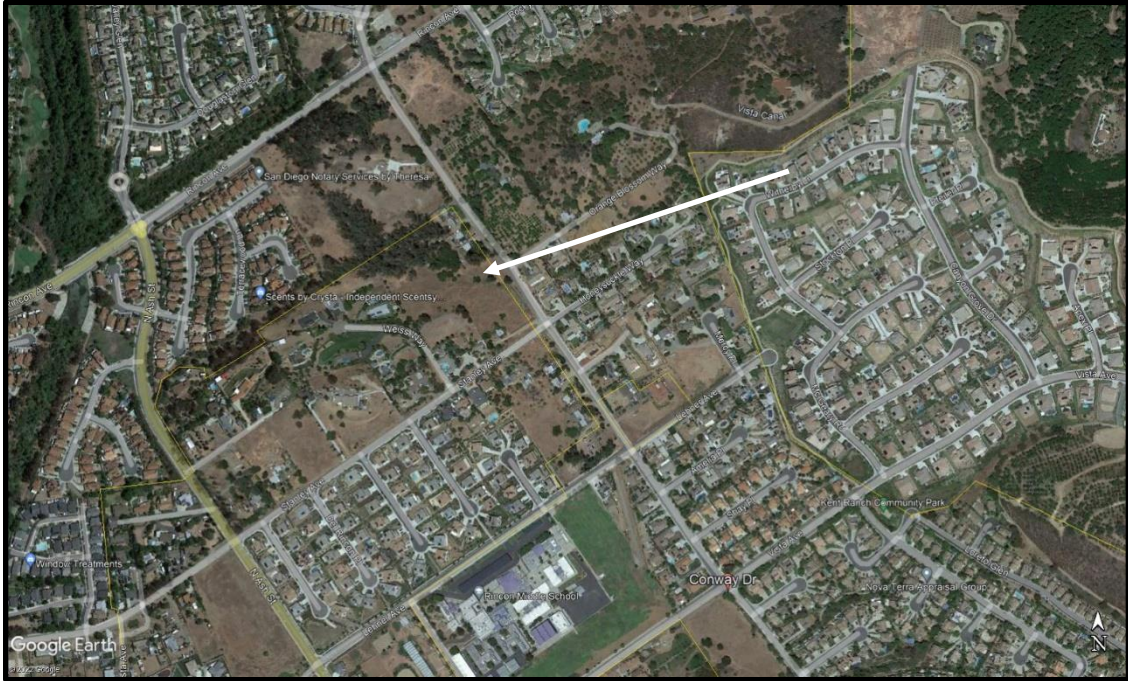
**Fire Authority:** Escondido Fire Department/

**Water:** Escondido Mutual Water Company

The FPP will be submitted to and approved by the City of Escondido Fire Department (EFD) and is based upon current requirements, as of the date of this report, of the City of Escondido regarding Wildland Fire; 2018 International Urban-Wildland Interface Code, pertinent local Fire Ordinances; 2019 California Code of Regulations Title 24, Part 9, and Title 14, section 1280; the 2019 California Fire Code and Local Amendments Including Appendices to Chapters 1 & 4 and Appendices B, F & H; Chapter 7A; , the 2019 California Building Code Chapter 7A Materials and Construction Methods for Exterior Wildland Exposure; 2019 California Residential Code; the California State and Local Responsibility Area Fire Hazard Severity Zone Map; California Government Code, sections 51175 through 51189; California Public Resources Codes sections 4201 through 4204; and the National Fire Protection Association Standards 13 and 13D. Appendices attached to this FPP provide additional information that shall be considered a part of this FPP.

**This Fire Protection Plan Includes:**

- A wildland fire hazard rating assessment and expected fire behavior of both on-site and off-site native vegetative fuels.
- A long-term perimeter vegetative fuel modification treatment and maintenance plan to minimize the potential loss of any structure due to wildland fires.
- A long-term interior open space fuel modification treatment plan and landscaping” criteria to be utilized around the planned structures.
- “Ignition Resistive Building Features” that will be required for all structures.



**Photo #1 - Aerial View of Escondido North Project Site**

**1.1 Project Location, Description and Environmental Setting**

**1.1.1 *Project Location***

The proposed Escondido North Project (herein after referred to as the Project) is located west of Conway Dr from Lehner Avenue to north of Stanley Avenue (See Photo #1). The majority of the project is within the city of Escondido with one lot currently in San Diego County that after mapped will be 6 lots that will be annexed into the city.

**1.1.2 *Project Description***

The Project site covers approximately 14.07 acres of vacant land and some existing houses. The proposed Project consists of the construction of 44 single family homes, five duplex buildings with 10 proposed units, two biofiltration basins, and two open space lots. Several existing homes within the property will be demolished.

**1.1.3 *Environmental Setting***

**1.1.3.1 *Dates of Site Inspections/Visits Conducted***

A site visit was conducted during January 2022, as well as phone calls and emails to determine pertinent information concerning the environmental setting.

**Site Visit & Purpose**

**Date**

Field Visit

January 25, 2022

Evaluate lot layout, vegetation, primary and secondary access road locations, topography, road conditions, and fire access



### 1.1.3.2 Topography

The topography of the development site is relatively flat with a slope of between five (5) and fifteen (15) percent that slopes generally to the east.

### 1.1.3.3 Climate

The climate within the Project area is characterized as a Mediterranean type of climate with generally mild, wet (14 -16 inches of rainfall per year) winters, with the bulk of the annual precipitation falling between January and March. Long, hot and very dry summer seasons frequently occur with occasional, multi-year droughts.

The most critical wind pattern to the Project area is an off-shore wind coming out of the north/northeast, typically referred to as a Santa Ana wind. Such wind conditions are usually associated with strong (> 60-MPH), hot, dry winds with very low (< 15%) relative humidity. Santa Ana winds originate over the dry desert land and can occur anytime of the year; however, they generally occur in the late fall (September through November) when non-irrigated vegetation is at its lowest moisture content.

The typical prevailing summer time wind pattern is out of the south or southwest and normally is of a much lower velocity (5-12 MPH with occasional gusts to 30-MPH) and is associated with higher relative humidity readings (> 30% and frequently more than 60%) due to a moist air on-shore flow from the ocean.

All other (northwest, south, west) wind directions may be occasionally strong and gusty. However, they are generally associated with cooler moist air and have higher relative humidity (> 40%). They are considered a serious wildland fire weather condition when wind speeds reach > 20-MPH.

Fire agencies throughout the western United States rely on a sophisticated system of Remote Automated Weather Stations (RAWS) to monitor weather conditions and aid in the forecasting of fire danger. The closest RAWS to the Project is the San Pasqual Valley RAWS. The data acquired from RAWS is important to modeling wildland fire behavior. **FIREWISE2000, LLC** determined that the San Pasqual Valley RAWS is relatively new, having only been in operation since October of 2009. Another RAWS that was evaluated was the Valley Center RAWS station. This RAWS is located north of the Project site approximately 7 miles and is located at a slightly higher elevation. The Valley Center RAWS site captured significant weather data during the major southern California fires of October 2007 with winds gust exceeding 40 mph and relative humidities less than 10%. Note: in late October, strong winds, low relative humidity are indicators of a Santa Ana wind event.

#### **1.1.3.4 On-Site Vegetation**

There is no significant on-site native wildland vegetation on the planned building site due to existing homes and mowing of annual grasses and weeds. The removal of the native vegetation allowed the introduction of non-native grasses. Long term changes in fuel types have led to dry weather grass becoming the dominate fuel type. A small stand of eucalyptus trees dominates the northern boundary that will be removed in the grading process. (See Photo #2).



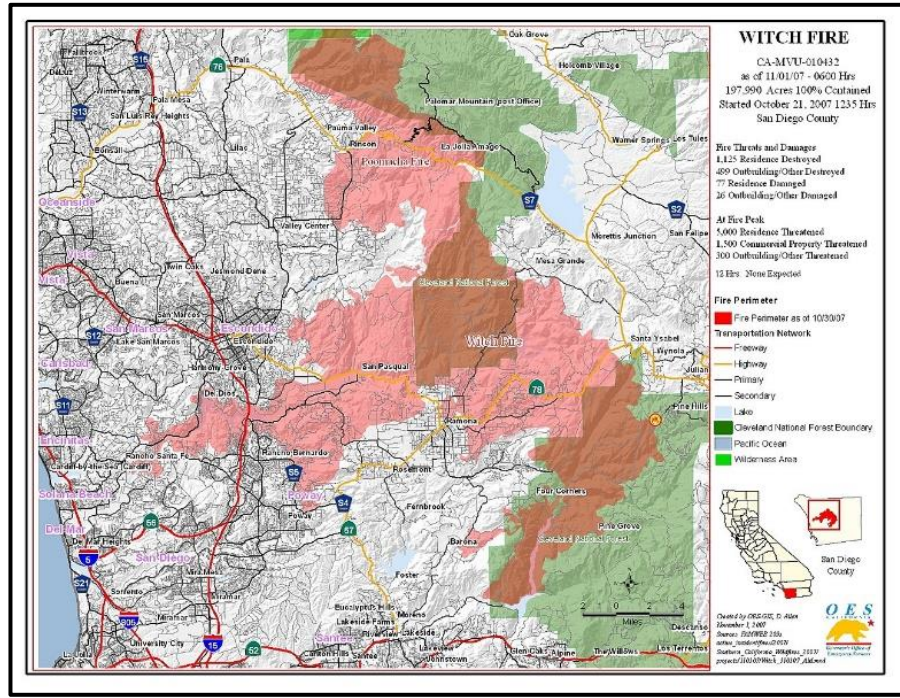
**Photo #2 - Looking at the Northern End of the Project from Conway Ave**

#### **1.1.3.5 Fire History**

The available data suggests that in the second half of the 20<sup>th</sup> Century the frequency of small fires increased in Southern California while their average size decreased. This was due primarily to human caused fires and rapid-fire suppression. In San Diego County, this has resulted in an increased rate of burning in low elevation coastal scrubland, especially the coastal sage scrub formation near the urban development areas. It also indicates over 600 large fires of over 100 acres in the foothills and mountains from 1910-1999. Recently however several years of drought have contributed to major fires (in excess of 50,000 acres) that have swept through San Diego County resulting in large losses of property and damage watershed.

The Witch Fire in October of 2007 burned over 197,990 acres, caused the evacuation of over 500,000 people, and caused two civilian fatalities. Combining with the Guejito Fire within the first day, the fires destroyed over 70 homes approximately 4 miles south on Ash Street in southern Escondido. The combined Witch and Guejito Fires rate of spread was stopped due to a change in slope and fuel type along with a sudden decrease in the Santa Ana winds.





The 2003 Paradise Fire which began northeast of Escondido, burned along the eastern boundary of the City of Escondido and through the eastern portions of the Rincon Del Diablo Fire District. The fire spread through Valley Center and crossed County Road S-6, Valley Center Rd., and began burning approximately 1 mile east east of the Project site. The Paradise Fire’s western progression was stopped by a combination of backfiring along the eastern

ridgeline of Daley Ranch and a drop in the strong east winds affecting San Diego County.

Wildland fire history in the immediate area includes fires along I-15, in the Jesmond Dene area and along Gopher Canyon Road west of the Project site. These fires burned several thousand acres and destroyed 7 homes. The Jesmond Dene fire caused the evacuation of several neighborhoods west of the Project site.

#### **1.1.3.6 On-site and Off-site Land Uses**

The existing parcel of land proposed for development is currently in a disturbed state as the vegetation has been converted to both native and non-native grasses. Existing houses also have impacted the site.

The surrounding land is either suburban, residential, dedicated roadways or undeveloped land. East of Conway Avenue lies an orange grove and a subdivision. Other homes lie to the west and south of the property, with a small area of undeveloped land to the northwest.

## **2.0 GUIDELINES FOR THE DETERMINATION OF SIGNIFICANCE**

The Escondido North FPP evaluates the potential adverse environmental effects that the Escondido North residential development may have from wildland fire and proposes appropriate mitigations for any adverse impacts to ensure that this development does not unnecessarily expose people or structures to a significant risk of loss, injury or death in regard wildland fire. The following guidelines for the determination of significance are used:

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

The Project is partially bordered by existing development and where wildlands are adjacent to the Project, fuel modification and other requirements outlined in this FPP reduce the exposure of people or structures to a less than significant risk of loss, injury or death involving wildland fires.

### **2. Would the Project result in inadequate emergency access?**

Conway Drive and Stanley Ave are both major circulation roads, the Project will be accessed off of Stanley Avenue and Lehner Avenue and not off of either major circulation roads. This design feature will reduce the impact on traffic circulation and not impede emergency access to the Project area and neighboring residences.

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

The Escondido Fire Department (EFD) currently provides fire and EMS services to the development area. The existing facilities are more than adequate to provide acceptable emergency service and response times.

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

The Project developer will be connecting to existing water service provided by the Escondido Mutual Water District.

**3.0 ANTICIPATED FIRE BEHAVIOR IN THE VICINITY**

The fire behavior calculations in Table 3.1 predict a maximum rate of spread of 305 feet/minute in the combined grass and shrub fuel model under Santa Ana winds at 60 mph and 80 feet/minute in the combined grass and timber fuel model. (See Section 4.6 and APPENDIX ‘F’ for details of the Fire Behave Modeling). Winds of 60-mph are the expected maximum velocity on the property. Due to fuel modifications and the location of buildings to adjacent fuels, the potential for wildfire exposure to buildings due to radiant heat and direct flame contact is low.

**TABLE 3.1**  
**A Comparison of Fire Conditions Under 60 mph Northeast Wind Conditions**  
**Untreated Fuels Versus Treated Fuels**

<u>Untreated Fuels gr4 &amp; sh1</u>		<u>After Fuel Treatment tl6 &amp; gr1</u>	
Rate of Spread	305 ft/min	Rate of Spread	32 ft/min
Fireline Intensity	3,022 BTU/ft/sec	Fireline Intensity	185 BTU/ft/sec
Flame Length	<b>18 Feet</b>	Flame Length	<b>5.0 Feet</b>

**A Comparison of Fire Conditions Under 60 mph East Wind Conditions**  
**Untreated Versus Treated Fuels**

<u>Untreated Fuels tl6 &amp; gr2</u>		<u>After Fuel Treatment tl6 &amp; gr1</u>	
Rate of Spread	98.6 ft/min	Rate of Spread	36 ft/min
Fireline Intensity	1,048 BTU/ft/sec	Fireline Intensity	250 BTU/ft/sec
Flame Length	<b>11 Feet</b>	Flame Length	<b>5.7 Feet</b>

One or more of the following factors start structure ignitions from wildfires: a combination of radiant heat, convective heat, direct flame contact and burning embers being projected by vegetation fire to a structure and its immediate environment. During periods of high fire intensity and strong, dry winds, convective firebrands have the capability of being transported over great distances. A fire burning to the northeast will shower the Project with embers. Accordingly, wind driven embers are addressed in this FPP. Ignition resistant building materials will be used in the construction of the structures within the Project to reduce the potential of firebrands entering the buildings or catching exterior components on fire.

## 4.0 ANALYSIS OF PROJECT EFFECTS

The Project demonstrates compliance, or offers the “*same practical effect*”, with applicable fire regulations, including but not limited to the California Fire Code, California Code of Regulations, and the Escondido Fire Code.

The comprehensive Fire Protection Plan and the Project design are consistent with the Escondido City recommendations including fuel modification and emergency response times.

### 4.1 Adequate Emergency Services

The Escondido North Project is within the City of Escondido Fire Department (EFD). The nearest fire station is located at 1220 N. Ash Street, Fire Station #7, and is 1.6 miles south of the Project which is located at Stanley Avenue and Conway Drive. The anticipated response time is less than 4 minutes. The next closest engine, Engine 133, is located at Fire Station #3, 1808 N. Nutmeg Street with a travel time of less than six (6) minutes. Staffing at Station #3 is five (5) personnel, covering an engine and a paramedic ambulance. The engine company also cross staffs a Type III engine which is available for wildland fire dispatch. Engine 132 would be the third arriving engine to the Project site responding from Fire Station #2, 421 N. Midway Drive. Staffing at Station #2 is five (5) personnel covering an engine and a paramedic ambulance. A Type III engine is also available for cross staffing purposes. The response from Fire Station #2 to the Escondido North Project is approximately 4 miles and takes less than 9 minutes to arrive on scene. Fire Station #1 located at 310 N. Quince St. would provide the fourth arriving engine company. A total of ten firefighters staff Fire Station #1, personnel cover a Type I structure firefighting engine, a Truck Company, a paramedic ambulance and a Battalion Chief. For wildland fires, the crew may staff a Type III fire engine designed for wildland firefighting and off-road driving. Normal response time for Engine 131 to the Project site is approximately nine (9) minutes based on computer modeling with a travel distance of approximately 4 miles.

The Escondido Fire Department staffs seven (7) engine companies, one truck company and 5 paramedic ambulances daily, in addition, automatic and mutual aid resources are available from fire agencies throughout San Diego County. On high or extreme wildland fire danger days there often may be multiple fire starts with multiple engine companies deployed on other incidents. First alarm wildland dispatch will include a minimum of four engines, a combination of both structure and wildland engines, a Battalion Chief and paramedic ambulance. For structure fires, 3 engines, 1 truck, 1 paramedic ambulance and a Battalion Chief are dispatched on the first alarm. The fire department also has the ability to upstaff the wildland engines with off-duty firefighters in the advent of predicted extreme wildland fire weather conditions.

Despite the relatively close proximity of the nearest fire station, there is no assurance that Engine Company 137 will be in its station when a wildfire threatens the Escondido North Project from an ignition outside the community. Engines may respond from other stations further away or from other incidents. The goal of this FPP therefore is to make the houses in the Escondido North Development as safe as possible until such time as firefighting equipment arrives and/or residents can be evacuated. With the implementation of the fuel modification, ignition resistant construction measures, and other mitigation measures described in this FPP, the Escondido North Project will be provided with a higher degree of protection from wildfire than a majority of older existing homes in San Diego County.

## **4.2 Fire Access**

The Escondido North Project will be accessed via Conway Drive to Stanley Avenue and via Conway Drive to Lehner Avenue. Road improvements may include but are not limited to widening, curbs and gutters. Roads within the Project may be constructed of asphaltic concrete if the slope does not exceed 14.9%. Roads with slopes ranging between 15% and 20% will require a concrete, heavy broom finish to improve road traction. All fire access roads within the Project shall be all-weather approved paved surfaces capable of supporting not less than 75,000 pounds. No hammerheads are planned, but should Project design change, a hammerhead or other approved turnaround method will be required and constructed to Escondido code requirements. Minimum roadway widths shall be 24 feet no parking, 28 feet with parking on one side.

No gates are planned at this time but if future gates are installed, gates shall have an “Opticom” or similar strobe light to automatically open the gates. A Knox override key switch, or similar device, must be installed outside the gate in an approved, readily visible, and unobstructed location at or near the gate to provide emergency access. Any future access road gates will be constructed to allow free egress with electronic “sensor strips” in the roadbeds. A battery backup shall be provided for all gates within the facility to allow for access/egress in case of power being shut-off to the facility.

Road name signs shall comply with the current design standards of the City of Escondido. Signs, postings, red curbs and white stencils shall conform to the requirements of Section 22500.1 of the California Vehicle Code and shall be maintained in perpetuity.

## **4.3 Water**

The Escondido North Project water supply will be provided by the Escondido Mutual Water District. Since all buildings are required to have fire sprinklers, as per the fire code, the required hydrant fire flow for the Project shall be 1500 gpm for 2 hours at 20 PSI residual pressure as per Escondido Municipal Code Ordinance 2022-04 & June 2022 Supplement. The water supply system and fire hydrants shall be installed and tested prior to bringing on site any combustible building materials. The installation and flow testing must be approved by the EFD Fire Marshal.

Fire hydrants shall be accessible to fire department apparatus by roads meeting the requirements of Escondido Municipal Code Ordinance 2022-04 & June 2022 Supplement. Fire hydrants along roadways shall be located at intervals not to exceed ~~350~~ 250-feet on alternating sides of street as approved by the EFD Fire Marshal. (See Fire Protection Plan Map, APPENDIX “C”, for proposed fire hydrant locations). Installation of a blue dot marker will be required for each fire hydrant as required by the Escondido Fire Department. Bollards shall be provided when the fire hydrant is located within 3 feet of any vehicle accessible surface.

## **4.4 Ignition-Resistant Construction and Fire Protection Systems**

All structures shall comply with ignition-resistant construction requirements of Chapter 7A of the California Fire Code (see APPENDIX ‘E’). All structures shall have automatic fire sprinklers for



interior fire protection and shall meet the requirements of National Fire Protection Standard (NFPA) 13D, those of the City of Escondido, and specifically, to the satisfaction of the Escondido Fire Department. The EFD shall review and approve fire sprinkler installations prior to the issuance of an occupancy permit.

The homeowners and the HOA of the Escondido North Project will be required to maintain the exterior of their property to Zones 1, 2A, 2B, and 3 Fuel Modification standards as outlined in Section 4.7 and will keep the roof and rain gutters free of leaves, needles, and other combustible debris. All firewood and other combustible materials must be properly stored away from the structure so that burning embers falling on or near the structure have no suitable host. The homeowners or property managers must keep all doors and windows tightly closed whenever a wildland fire is reported in the near vicinity. The integrity of all doors must be maintained, including removal of any illegally placed door stops, to reduce the chances of embers being blown through open doorways and starting a fire.

#### **4.5 Defensible Space and Vegetation Management**

Plant succession and the climax plant communities must be assessed when considering the wildland fire hazard of a particular property. The vegetation described below is the most likely climax plant community that will exist without human intervention and the one utilized for planning purposes.

##### **4.5.1 Off-Site Fire Hazard and Risk Assessment**

Currently, local off-site fuels have been severely modified due to the impacts of residential development. Northeast of the Project site is an orange grove separated by Conway Avenue. Large residential developments exist east of Conway Avenue (see Photo #3) and southwest of the project. Bordering the project on west are several homes on large parcels. Fuel treatments on these homesites vary from well-maintained to others with overgrown vegetation throughout the property (see Photo #4).



**Photo #3 - Existing Subdivision East of Conway Avenue**



**Photo #4 – Existing Homes Adjacent to the Project**

Hills and slopes further north and east are covered with moderate stands of coastal sage scrub, typically one-to-three feet high with a moderate grass load (See Photo #5). The dominant fuels in coastal sage/scrub include Coastal Sage Scrub, Buckwheat, and Mulefat Scrub. Other commonly found vegetation consists of black sage, California sagebrush, blue blossom Ceanothus, laurel sumac, lemonade berry, cactus, and toyon. Typical trees found in the creek bottoms include several species of oaks, sycamores and California peppers. Non-native eucalyptus and palm trees are found in creek bottoms throughout the Escondido foothills as both spread easily and will lead to a loss of native trees.



**Photo #5 – Brush Covered Hills to the Northeast that Could Generate Embers from a Northeast Driven Wildfire.**

The goal of any FPP is to prevent the loss of lives, homes, and personal property when wildfires do occur with the challenge of allowing well planned development interspersed with fully functioning mixed chaparral habitats. This goal is accomplished by requiring communities to



be built with fire resistant materials and properly designed and maintained fuel modification treatments that will safely mitigate the High Fire Hazard to insignificant levels. Therefore, the proposed fuel modification treatments, landscaping, and the use of ignition resistant building construction standards will mitigate the potential loss of any of the buildings and structures due to direct fire impingement, wind driven embers or radiant heat around the perimeter of the structures.

**4.5.2 On-Site Fire Hazard and Risk Assessment**

All on site vegetation as well as some of the existing houses will be removed in grading the site. Any wind or topography driven wildfire burning under Santa Ana wind conditions, with winds from the north and northeast, will create a high wildland fire hazard for the Project due to embers. Also, a typical day with a southwesterly wind pattern will create a low to moderate wildfire hazard to the development.

**4.6 Vegetative Fuels Assessment/Fire Behavior**

The BEHAVE Plus Fire Behavior Prediction and Fuel Modeling System–Burn Subsystem by Patricia L. Andrews and Collin D. Bevens, is one of the best systematic methods for predicting wildland fire behavior. The BEHAVE Plus fire model describes a wildfire spreading through surface fuels, which are the burnable materials within six (6’) feet off the ground and contiguous to the ground. Regardless of the limitations expressed, experienced wildland fire managers can use the BEHAVE Plus modeling system to Project the expected fire intensity, rate-of-spread and flame lengths with a reasonable degree of certainty for use in Fire Protection Planning purposes. Of these three fire behavior Projections, flame length is the most critical in determining structure protection requirements. The FIREWISE 2000, LLC. evaluation team used the computer based BEHAVE Plus 6.0.0: Fire Behavior Prediction and Fuel Modeling System to make the fire behavior assessments for the Escondido North Project.

Below are the fire behavior calculations for the area adjacent to the Project followed by appropriate mitigation measures. Two fire scenarios are presented in the tables below based on “worst case” San Diego County fire weather assumptions with 60 mph northeast and east winds. Each table displays the expected Rate of Fire Spread (expressed in feet per minute), Fireline Intensity (expressed in British Thermal Units per foot per second) and Flame Length (expressed in feet) for two (2) separate BEHAVE Plus fire behavior predictions. The tables also include the calculation inputs used in the BEHAVE Plus program which were obtained from Project site observations and fuel moisture levels typically observed during the local fire season. (See APPENDIX “F” for calculations)

**Table 4.6.1**

<b><i>Fire Scenario #1 Northwest Boundary Fire Approaching from the North or Northeast (Late Fire Season With 60 MPH North or Northeast Wind Conditions)</i></b>	
<b>Fire Behavior Calculation Input Data</b>	<b>Anticipated Fuel Moistures</b>
<ul style="list-style-type: none"> <li>• 5 percent slope</li> <li>• 60 mph 20-foot wind speed</li> <li>• 160° slope aspect from north</li> <li>• 45° wind direction from north</li> </ul>	<ul style="list-style-type: none"> <li>* 1-Hour Fine Fuel Moisture of.....2%</li> <li>* 10-Hour Fuel Moisture of.....2%</li> <li>* 100-Hour Fuel Moisture of.....4%</li> <li>* Live Herbaceous Fuel Moisture of.....30%</li> <li>* Live Woody Fuel Moisture of.....45%</li> </ul>

<b>Expected Fire Behavior</b>	
Combined Fuel Model [gr4 –moderate load, dry climate grass (85%) and sh1 – low load dry climate shrub (15%)]	
Rate of Spread	- 305 ft/min
Fireline Intensity	- 3,022 BTU/ft/s
Flame Length	- <b>18.0</b> feet
<b>Expected Fire Behavior in Treated Fuels</b>	
Combined Fuel Model - [tl6 – moderate load broadleaf littler (50%) and gr1 – sparse short, dry climate grass (50%)]	
Rate of Spread	- 32 ft/min
Fireline Intensity	- 185 BTU/ft/s
Flame Length	- <b>5.0</b> feet

Table 4.6.2

<b><u>Fire Scenario #2 Northeast Boundary</u></b> <b><u>Fire Approaching from the Northeast</u></b> <b><i>(Late Fire Season With 60 MPH East Wind Condition)</i></b>	
<b>Fire Behavior Calculation Input Data</b>	<b>Anticipated Fuel Moistures</b>
<ul style="list-style-type: none"> <li>• 15 percent slope</li> <li>• 60 mph 20-foot wind speed</li> <li>• 250° slope aspect from north</li> <li>• 45° wind direction from north</li> </ul>	<ul style="list-style-type: none"> <li>* 1-Hour Fine Fuel Moisture of.....2%</li> <li>* 10-Hour Fuel Moisture of.....2%</li> <li>* 100-Hour Fuel Moisture of.....4%</li> <li>* Live Herbaceous Fuel Moisture of.....30%</li> <li>* Live Woody Fuel Moisture of.....60%</li> </ul>
<b>Expected Fire Behavior</b>	
Combined Fuel Model [tl6–Moderate load, broadleaf litter (60%) and gr2 – low load , dry climate grass (40%)]	
Rate of Spread	- 98.6 ft/min
Fireline Intensity	- 1,048 BTU/ft/s
Flame Length	- <b>11.0</b> feet
<b>Expected Fire Behavior in Treated Fuels</b>	
Combined Fuel Model - [tl6 – moderate load broadleaf littler (50%) and gr1 – sparse short, dry climate grass (50%)]	
Rate of Spread	- 35.6 ft/min
Fireline Intensity	- 250 BTU/ft/s
Flame Length	- <b>5.7</b> feet

The fire behavior calculations in Tables 4.6.1 & 4.6.2 predict a maximum rate of spread greatly reduced under the maximum expected wind conditions when treated.

#### **4.7 Required Fuel Modification Zones for Structures, Bio-retention Areas and Access Roads**

Projects located in Hazardous Fire Areas shall include Fuel Treatment Zones (FTZ) surrounding all structures that are greater than 250 square feet in size. A Landscaping Plan has been developed for the Project and shall include plants selected from the County of San Diego Acceptable Plants for Defensible Space in Fire Prone Areas list. (See APPENDIX 'A'). Plants not on the County list shall be approved by the EFD.

The Escondido Fire Code stipulates that the FTZ be a minimum of 100-foot area surrounding and extending in all directions from all structures, in which flammable vegetation or other combustible growth is cleared away or modified, **except for:**

- Single specimens of trees or other vegetation that are well-pruned and maintained
- Grass and other vegetation located more than 50 feet from the structure and less than 18 inches in height above the ground
- All ornamental landscaping that is consistent with the customized Wildland Interface plant list (See APPENDIX 'A')

Below are the detailed definitions and required treatments for the Fuel Modification Zones within the Project. See Fire Protection Plan Map, Section 5.3, for all fuel treatments. There are three fuel treatment or modification zones required for the Escondido North facility, a zone consisting of hardscape or limited fire-resistant plantings, an irrigated zone extending out 50 feet from the exterior wall surface of the building, and a 50% thinning zone extending from the outer edge of Zone 2 to 100' from the exterior wall surface. Treatments in Zone 3 include the removal of target species, limbing of trees 6' off the ground on mature trees, and thinning of existing plants and weed whipping grasses and weeds, for a total of 100 feet of continuous fuel treatment on the property.

All distances in this plan are measured horizontally. These distances are depicted on the Fire Protection Plan Map included herein in APPENDIX "C". (A fully scalable APPENDIX 'C' map is attached at the end of the document.) Prior to construction on any building site, all roads (primary and secondary) for this development shall be accepted by the Escondido Fire Marshal.

The responsibility for the fuel modification maintenance defined below shall remain with the current owners and any subsequent owners, and as such shall run with the land. In the event the Project is repossessed or sold, the unit/agency holding title to Escondido North will be responsible for such maintenance. (See Fuel Treatment Map -Section 5.3 and APPENDIX 'C').

#### **Fuel Modification Zone 1, Immediate Zone 0" – 5" (Homeowner Responsibility - (Shown as No Color on the Fire Protection Plan Map)**

##### **Defined:**

Zone 1 comprises the first 5 feet around a structure (front, back and side yards) and is commonly called the Immediate Zone. Within Zone 1, only hardscape or limited fire-resistant plantings acceptable to the EFD, shall be allowed. The use of flammable mulch and other combustible materials is prohibited within Zone 1. Fuel Treatment Zone 1 is measured from the exterior walls of the structure or from the most distal point of a combustible Projection, an attached accessory structure, or an accessory structure within 10 feet of a habitable structure. It provides the best protection against the high radiant heat produced by a wildfire and a generally open area in which



fire suppression forces can operate during wildfire events. This zone includes a level or level-graded area around the structure.

**Required Landscaping:**

- Zone 1 will be composed of hardscaping, either concrete, gravel, rock, or pavers surrounding the perimeter of each structure.
- Limited fire-resistant plantings approved by the FAHJ may be permitted within the zone.
- Plants in this zone need to be fire resistant and shall not include any pyrophytes that are high in oils and resins.
- Plants used in fuel modification zones should exhibit the following qualities to be the most “fire resistant: thick, succulent or leathery leaf species with high moisture content; tendency to produce limited litter; the presence of high salt levels or similar compounds which may contribute to fire resistance; ability to withstand drought; and the ability to withstand severe pruning. Refer to APPENDIX ‘B’ for the EFD Prohibited Plant list.
- Landscaping shall be irrigated and primarily consist of fire-resistant, maintained native or ornamental plantings.
- All plant material must be selected from an approved drought tolerant, fire-resistant list.

**Required Maintenance:**

The property identified as a part of this FPP shall be maintained year-round by the property owner, or any subsequent owner(s) as required by this FPP or the EFD. Firewood and combustible materials such as flammable mulch, shall not be allowed within the zone. Any low-growing plant material in Zone 1 must be trimmed to 6’ to 18” in height.

**Fuel Modification Zone 2A Intermediate Zone 5’ to 50’ (Owner Responsibility - (Shown as No Color on the Fire Protection Plan Map)**

**Defined:**

Zone 2A, the Intermediate Zone, is the area beginning at the outer edge of Zone 1 and extending an additional 45 feet out on a horizontal plane (front, back and side areas including access roads and planted sections) and is commonly called the Intermediate Zone. It is an irrigated zone and shall be free of all combustible construction and materials. Vegetation within this zone shall not exceed 10’ in height. Trees shall not exceed 30’ in height. Flammable native vegetation shall be removed and replanted with drought tolerant, fire resistive, irrigated and non-irrigated plantings from the San Diego County Approved plantings list. (See APPENDIX ‘A’).

**Required Landscaping:**

- Zone 2A will be cleared of all existing native vegetation and replanted with drought tolerant and irrigated fire-resistant lawns, ground covers or shrubs.
- Landscaping shall be irrigated and primarily consist of fire resistant, maintained native or ornamental plantings usually less than 18 inches in height.
- This zone may contain occasional fire-resistant trees, and single well-spaced ornamental shrubs up to 48 inches in height, intermixed with ground covers and lawn.
- Shrubs and groundcovers may be located no closer than 5 feet from the structure provided these plants will not carry fire to the structure.
- Non-flammable concrete patios, driveways, swimming pools, walkways, boulders, rock, and gravel can be used to break up fuel continuity within Zone 2.
- Plants in this Zone need to be fire resistant and should not include any pyrophytes that are high in oils and resins such as pines, eucalyptus, cedar, cypress, or juniper species. Thick, succulent, or leathery leaf species with high moisture content are the most “fire resistant”.

- Refer to APPENDIX ‘A’ County of San Diego’s Desirable Plant List and APPENDIX ‘B’ for prohibited plants for plant selection.
- Any retained trees and all newly planted trees must be sited so that when they reach maturity the tips of their branches are at least 10 feet away from any structure, 20 feet from the crown of an adjacent tree, and must have a minimum of 6 feet of vertical separation from low growing irrigated vegetation beneath the canopy of the tree.

**Required Maintenance:**

The building/property owner(s), and any subsequent owner shall maintain year-round Zone 2A area to the requirements listed in this FPP and the City of Escondido Fire Code.

- Shrubs and trees are to be annually maintained free of dead material.
- Trees will be maintained so that their crown cover will be more than ten (10) feet from any structure.
- Tree crowns will be separated by twenty (20) feet or more on steep slopes and maintained to keep a separation of 6 feet between the ground fuels (shrubs and groundcovers) and the lower limbs.
- Any trees within Zone 2 should be irrigated, limbed up to 6-feet from the ground, pruned of dead wood, grass understory weed-whipped, and leaf drop removed to prevent large accumulations of dead material under the trees.
- All trees must be maintained to the current ANSI A300 standards [Tree, Shrub, and Other Woody Plant Maintenance —Standard Practices (Pruning)] ([www.treecareindustry.org/public/gov\\_standards\\_a300.htm](http://www.treecareindustry.org/public/gov_standards_a300.htm)).

**Fuel Modification Zone 2B (HOA Responsibility - (Shown as Green on the Fire Protection Plan Map)**

**Defined:**

This area includes manufactured slopes adjacent to the biofiltration basins.

**Required Landscaping & Maintenance**

Same as Zone 2A

**Fuel Modification Zone 3 (HOA Responsibility) - (Shown as Orange on the Fire Protection Plan Map)**

**Defined:**

Zone 3 begins at the edge of Zone 2B, in a horizontal plane and excludes all prohibited highly combustible native vegetation. Zone 3 is partially, or non-irrigated and includes the bottom of the biofiltration basins. The goal within Zone 3 is the reduction or selective clearing of existing native vegetation and dense chaparral by 50%

**Required Landscaping:**

All exotic and flammable native plants (see San Diego County prohibited plant list in APPENDIX ‘B’) shall be removed with the resulting 50 feet temporarily irrigated or non-irrigated except for areas where existing trees are to be retained.

**Required Maintenance:**

Zone 3 and the area within the bio-retention basin will be maintained as needed to remove 50% of the ground level fuels covering the zone.

- Native annual and perennial grasses will be allowed to grow and produce seed during the winter and spring. As grasses begin to cure (dry out), they will be cut to 4 inches or less in height.
- Low growing plants and shrubs will be maintained to a height of 18” or less.
- Non-native species will be removed, tree canopy’s will be limbed to 6-feet off the ground.
- A reduction of 100% of the dead and down material is required. Fire codes require that any existing or planted trees located within Zone 3 be pruned to 6 feet above ground level and irrigated.
- Maintenance will be ongoing throughout the year as needed.

#### **4.8 Cumulative Impact Analysis**

The combination of San Diego County’s weather, fuel, and terrain has often contributed to intense, uncontrolled wildland fires. This was evident in the devastating Cedar, Paradise and Otay Fires of October 2003 and Witch Creek and Rice Fires of November 2007 and most recently, the Lilac Fire in 2017.

Typically, the areas of greatest concern are adjacent to urbanized areas (wildland urban interface) or where residences are spread throughout the hills and valleys (wildland intermix). As the population of San Diego County increases and the Wildland Urban Interface (WUI) expands, fire hazards and risks will continue to be encountered. The risks associated with this Project, will not significantly increase the risk of increased human activity. A slight increase in human activity in the immediate area may occur, but the removal of flammable fuels, removal of flammable vegetation and increased security should lesson the impacts of the development.

The approval of this proposal in addition to the already approved developments in the area, and future development will increase the concern of wildland fires as the area becomes more urbanized. At present, the density of development in this area of Escondido includes a significant number of properties compliant with the fuel modification and weed abatement requirements of the City of Escondido Fire Department.

### **5.0 MITIGATION MEASURES AND DESIGN CONSIDERATIONS**

Several mitigation measures have been designed to improve the overall safety of the Project. The following list describes the proposed mitigation measures.

1. Fire sprinklers as required by California Codes
2. Fuel treatments required throughout the Project.
3. All structures within the Escondido North Project shall be designed and constructed with ignition resistant construction standards and design features as per the current City of Escondido Building Code. For a summary description of these construction requirements see APPENDIX ‘E’.
4. All combustible building materials, decks, balconies, patios, covers, gazebos, and fences will be permanently prohibited in Zones 1 and 2. These structures may be allowed if constructed with Ignition Resistant materials as per the City of Escondido Fire and Building Codes. The owners are not restricted from having concrete patios or walkways within these zones, provided the lot is large enough. Refer to APPENDIX ‘D’ for photos and descriptions of non-combustible decks, patio covers, and railings.

#### **5.1 Additional Requirements**

1. Brush removal shall be completed prior to commencing any flammable construction.

2. During construction at least 50 feet of clearance around the structures shall be kept free of all flammable vegetation as an interim fuel modification zone during construction of structures.
3. Any trimmings produced by thinning and pruning will be removed from the site.
4. This plan and its requirements shall be incorporated by reference into the final Project Conditions of Approval.

### **5.3 Fire Protection Plan Map**

Attached to this FPP is the Fire Protection Plan Map depicting the location of all proposed fuel treatment locations, lot lines, roads, fire hydrants, fire department connections, and mitigation measures for the Escondido North development. The Fire Protection Plan Map is located in APPENDIX 'C'. (A fully scalable APPENDIX 'C' map is attached at the end of the document.)

## **6.0 CONCLUSIONS**

This FPP evaluated the adverse environmental effects that the proposed commercial development may have from wildland fire and identified means to properly mitigate those impacts to ensure that this development does not unnecessarily expose people or structures to a significant risk of loss, injury or death involving wildland fires.

- The requirements of this FPP provide the fuel modification standards to mitigate the exposure of people or structures to a significant risk of loss, injury or death. Zone 1, the area immediately adjacent to the buildings will be clear of all flammable and combustible materials. Zone 2A provides the defensible space zone for fire suppression forces and will protect the two structures from radiant and convective heat. This zone will be a landscaped zone that is permanently irrigated and consists of fire resistant and maintained plantings. Zones 2B & 3 are the next 50-100 feet from a structure, includes all manufactured slopes, biofiltration basins, and requires irrigation or the removal of 50 percent of the native vegetation at a minimum, including all prohibited highly combustible native vegetation, but permits plantings with specific criteria.
- The development will have adequate emergency access in terms of access and construction standards for roadways and streets. EFD, CAL FIRE and nearby fire departments through automatic and mutual aid, will provide fire protection. The following mitigating factors will more than mitigate the fire threat to the planned community.
  - Quick response times,
  - Fire sprinklers as required by California Codes
  - Fuel treatment zones throughout the development site

## **7.0 LIST OF PREPARERS, PERSONS & ORGANIZATIONS CONTACTED**

### **7.1 List of Preparers**

The principal author and preparer of this Fire Protection Plan is Melvin Johnson, Owner **FIREWISE 2000, LLC.**, a San Diego County DPLU Certified Wildland Fire Consultant. Other **FIREWISE 2000, LLC.** members contributed to this plan with comments and peer review. These members include Peter Montgomery, Wildland Fire Associate.

### **7.2 Persons and Organizations Contacted**

- |                   |                                                      |
|-------------------|------------------------------------------------------|
| 1. Dylan Bird     | Escondido North, LLC                                 |
| 2. John Kaye      | Escondido North, LLC                                 |
| 3. LaVona Koretke | Deputy Fire Marshal, Escondido Fire Department       |
| 4. Ryan Waufle    | Associate Principal, Pasco Laret Suiter & Associates |

## 8.0 DEFINITIONS

For the purposes of this Fire Protection Plan, the following definitions apply to the terms used in this document. Where terms are not included, common usage of the terms shall apply.

**ASPECT** - Compass direction toward which a slope face.

**AUTHORITY HAVING JURISDICTION (AHJ)** – An organization, office, or individual responsible for enforcing the requirements of a code or standard, or for approving equipment, materials, an installation, or a procedure.

**CLIMAX VEGETATION** - The final stage in ecological plant succession in which a relatively constant environment is reached and species composition no longer changes in a directional fashion, but fluctuates about some mean, or average, community composition.

**COMBUSTIBLE** – Any material that, in the form in which it is used and under the conditions anticipated will ignite and burn or will add appreciable heat to an ambient fire.

**COMBUSTIBLE VEGETATION** – Means material that in its natural state will readily ignite, burn, and transmit fire from native or landscape plants to any structure or other vegetation. Combustible vegetation includes dry grass, brush, weeds, litter or other flammable vegetation that creates a fire hazard.

**DEFENSIBLE SPACE** – Is an area either natural or man-made, where material capable of allowing a fire to spread unchecked has been treated, cleared or modified to slow the rate and intensity of an advancing wildfire and to create an area for fire suppression operations to occur.

**EXTREME FIRE BEHAVIOR** – "Extreme" implies a level of fire behavior characteristics that ordinarily precludes methods of direct control action. One or more of the following is usually involved: high rate of spread, prolific crowning and/or spotting, presence of fire whirls, strong convection column. Predictability is difficult because such fires often exercise some degree of influence on their environment and behave erratically, sometimes dangerously.

**FIRE BEHAVIOR** – The manner in which a fire reacts to the influences of fuel, weather and topography.

**FIRE HAZARD SEVERITY ZONES** – Are geographical areas designated pursuant to California Public Resources Code sections 4201 through 4204 and classified as Very High, High and Moderate in State Responsibility Areas or as Local Agency Very High Fire Hazard Severity Zones designated pursuant to California Government Code sections 51175 through 51189. The California Code of Regulations, Title 14, Section 1280 entitles maps of these geographical areas as "Maps of the Fire Hazard Severity Zones in the State Responsibility Area of California."

**FIRE RESISTIVE PLANTS** – Plants that do not readily ignite from a flame or other ignition sources. These plants can be damaged or even killed by fire; however, their foliage and stems do not significantly contribute to the fuel and, therefore, the fire's intensity.



**FLAME LENGTH** – The distance between the flame tip and the midpoint of the flame depth at the base of the flame (generally the ground surface); an indicator of fire intensity.

**FUEL MOISTURE** – The quantity of moisture in vegetative fuels expressed as a percentage of the weight when thoroughly dried at 212 degrees F.

**FUEL MODEL** – Simulated fuel complex (or combination of vegetation types) for which all fuel descriptors required for the solution of a mathematical rate of spread model have been specified. Fuel models are utilized in the BehavePlus Fire Model to aid in forecasting fire behavior.

**FUEL MODIFICATION** – Any manipulation or removal of fuels to reduce the likelihood of ignition or the resistance to fire control.

**GROUND FUELS** - All combustible materials such as grass, duff, loose surface litter, tree or shrub roots, rotting wood, leaves, peat, or sawdust that typically support combustion.

**LADDER FUELS** – Fuels which provide vertical continuity between strata, thereby allowing fire to carry from surface fuels into the crowns of trees or shrubs with relative ease. They help initiate and assure the continuation of crowning.

**MITIGATION** – Action that moderates the severity of a fire hazard or risk.

**ONE-HOUR FUEL** - 1-hour fuels consist of those portions of vegetation that are < 0.625 cm (0.25 in.) in diameter. 1-hour fuels are the most important for carrying surface fires and their moisture content governs fire behavior.

**RADIANT HEAT** – Transfer of heat in straight lines through a gas or vacuum other than by heating of the intervening space.

**RELATIVE HUMIDITY** – A weather term, the amount of moisture in the air as a percentage of the maximum the air will hold at a given temperature. The amount of moisture in a given parcel of air expressed as a percentage of the maximum amount that parcel of air could hold at the same air temperature.

**REMOTE AUTOMATED WEATHER STATION** – Is a combination of sensors, radios and related electronic equipment installed in wildland areas that are designed to monitor the weather and provide weather data that assists land management agencies with a variety of Projects such as monitoring air quality, fire danger rating, and providing information for research applications.

**SHALL** - Indicates a mandatory requirement.

**RISK** – The measure of the probability of ignition and severity of adverse effects that result from an exposure to a wildland fire (direction flames, radiant heat, or firebrands (embers).

**SLOPE** – Is the variation of terrain from the horizontal; the number of feet, rise or fall per 100 feet, measured horizontally, expressed as a percentage.

**TEN-HOUR FUELS** – 10-hour fuels are those portions of plant material that are between (0.625 - 2.5 cm (0.25 to 1 in.) in diameter. Ten-hour fuels are readily consumed when dead fuel moistures are low.

**WILDFIRE** – Is any uncontrolled fire spreading through vegetative fuels that threaten to destroy life, property, or resources as defined in Public Resources Code sections 4103 and 4104.

**WILDFIRE EXPOSURE** – One or a combination of radiant heat, convective heat, direct flame contact and burning embers being Projected by vegetation fire to a structure and its immediate environment.

**WILDLAND-URBAN INTERFACE** – The line, area or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels.

## 9.0 REFERENCES

1. *Standard Fire Behavior Fuel Models: A Comprehensive Set for Use with Rothermel's Surface Fire Spread Model*, General Technical Report RMRS-GTR-153. June 2005. Joe H. Scott, Robert E. Burgan, United States Department of Agriculture - Forest Service, Rocky Mountain Research Station, Missoula, Montana.
2. *Behave Plus Fire Modeling System, Version 5.0.5*, General Technical Report RMRS-GRT-106WWW Revised. July 2008. Patricia L. Andrews, Collin D. Bevins, Robert Seli. United States Department of Agriculture - Forest Service, Rocky Mountain Research Station, Missoula, Montana.
3. National Fire Protection Association - NFPA 1144 *Standard for Reducing Structure Ignition Hazards from Wildfire*.
4. National Fire Protection Association - NFPA 13 *Standard for the Installation of Sprinkler Systems in One and Two-Family Dwellings and Manufactured Homes*, 13-R & 13-D
5. 2019 California Code of Regulations, Title 14, section 1280 and Title 24 Part 9
6. 2019 California Public Resources Codes sections 4201 through 4204
7. California Government Code, sections 51175 through 51189
8. 2019 California Fire Code including Local Amendments and Appendices to Chapters 1 & 4 and Appendices B, F & H
9. 2021 International Wildland-Urban Interface Code
10. International Fire Code 2021
11. *County of San Diego. Plant List and Acceptable Plants for a Defensible Space in Fire Prone Areas. Department of Planning and Land Use, December 1998*
12. *2019 Chapter 7A-California Building Code*
13. *The California State and Local Responsibility Area Fire Hazard Severity Zone Map*
14. City of Escondido Fire Department Requirements *Ordinance No. 2019-17*
15. Escondido Weed Abatement *Standards*
16. Escondido Fire Prevention Requirements
17. Escondido Wildland/Urban Interface Standard Development Guidelines

18. Escondido Municipal Code Ordinance 2022-04 & June 2022 Supplement
19. County of San Diego. *Guidelines for Determining Significance and Report Format and Content Requirements Wildland Fire and Fire Protection*. Land Use and Environment Group - Department of Planning and Land Use and the Department of Public Works. December 19, 2008. 19 pages.
20. Western Region Climate Center. *Historic Climate Data from Remote Automated Weather Stations*. RAWS USA Climate Archive. Reno, NV. Data for all Remote Automated Weather Stations is available at the following web site: <http://www.raws.dri.edu/index.html>

# **APPENDIX 'A'**

## **Recommended Plant List**

# APPENDIX 'A'

## COUNTY OF SAN DIEGO ACCEPTABLE PLANTS FOR DEFENSIBLE SPACE IN FIRE PRONE AREAS

**ALL NATIVE PLANTS ON THE FOLLOWING LIST** are considered to be drought-tolerant in the particular climate zone they are found. Those that grow best in riparian areas, as indicated by the "R", are generally the least drought-tolerant plants on the list.

**SPECIAL NOTE:** When planting, it is necessary to water deeply to encourage the plant roots to seek natural moisture in the soil. This watering should continue for at least three years to allow the plants to naturalize. More water should be provided in summer and less (if any) in the winter. These plants should be weaned off the supplemental irrigation and become less dependent on it over the establishment period.

No plant is totally fire resistant. The plants listed were chosen to due to their high-water content, minimum amount of flammable resins and/or low fuel volume.

### Definitions:

**Drought-Tolerant Plant Materials:** Trees, shrubs, groundcovers, and other vegetation capable of sustained growth and reproduction with only natural moisture. Occasional supplemental irrigation is necessary only in extreme drought situations.

**Establishment Period:** The time it takes for a plant to become drought resistant. This is usually a period of three years and is the time when supplemental irrigation is necessary.

**Native or Naturalizing Plant Species:** Plant species native to the region or introduced which, once established, are capable of sustaining growth and reproduction under local climatic conditions without supplemental irrigation.

***FIREWISE 2000, LLC.* Note:** The plant list which follows was developed using the plants found on the San Diego County approved plant list. This list was then compared to those plants which are suitable for the climatic zone in which the Project is located. Only those plants suitable for the Project area are listed below. The list is therefore shorter than that provided by the County. By providing this custom list, plants that are likely to be killed or seriously damaged by frost or will not perform in hot dry conditions have been eliminated. ***FIREWISE 2000, LLC.*** believes that the planting of species suited to the site is essential to fire management goals and is an environmentally sound practice.



**San Diego County**  
**Customized Acceptable Plant List**  
**For the Escondido North Project**

<b>No.</b>	<b><u>Type</u></b>	<b><u>Genus</u></b>	<b><u>Species</u></b>	<b><u>Common Name</u></b>
1	Annual	Lupinus spp.	nanus	Lupine
2	Groundcover	Achillea	millefolium	Yarrow
3	Groundcover	Aptenia	cordifolia	Aptenia
4	Groundcover	Arctostaphylos spp.		Manzanita
5	Groundcover	Cerastium	tomentosum	Snow-in-Summer
6	Groundcover	Coprosma	kirkii	Creeping Coprosma
7	Groundcover	Cotoneaster spp.		Redberry
8	Groundcover	Drosanthemum	hispidum	Rosea Ice Plant
9	Groundcover	Dudleya	brittonii	Britton's Chalk Dudleya
10	Groundcover	Dudleya	pulverulenta	Chalk Dudleya
11	Groundcover	Dudleya	virens	Island Live-Forever
12	Groundcover	Eschscholzia	californica	California Poppy
13	Groundcover	Ferocactus	viridescens	Coast Barrel Cactus
14	Groundcover	Gaillardia	grandiflora	Blanket Flower
15	Groundcover	Gazania spp.		Gazania
16	Groundcover	Helianthemum spp.		Sunrose
17	Groundcover	Lantana spp.		Lantana
18	Groundcover	Lasthenia	californica	Common Goldfields
19	Groundcover	Lasthenia	glabrata	Coastal Goldfields
20	Groundcover	Lupinus spp.		Lupine
21	Groundcover	Myoporum spp.		Myoporum
22	Groundcover	Pyracantha spp.		Firethorn
23	Groundcover	Rosmarinus	officinalis	Rosemary
24	Groundcover	Santolina	chamaecyparissus	Lavender Cotton
25	Groundcover	Santolina	virens	Santolina
26	Groundcover	Trifolium	frageriferum	O'Connor's Legume
27	Groundcover	Verbena	rigida	Verbena
28	Groundcover	Viguiera	laciniata	San Diego Sunflower
29	Groundcover	Vinca	major	Periwinkle
30	Groundcover	Vinca	minor	Dwarf Periwinkle
31	Perennial	Coreopsis	gigantea	Giant Coreopsis
32	Perennial	Coreopsis	grandiflora	Coreopsis
33	Perennial	Coreopsis	maritima	Sea Dahlia
34	Perennial	Coreopsis	verticillata	Coreopsis
35	Perennial	Heuchera	maxima	Island Coral Bells
36	Perennial	Iris	douglasiana	Douglas Iris
37	Perennial	Kniphofia	uvaria	Red-Hot Poker
38	Perennial	Lavandula spp.		Lavender
39	Perennial	Limonium	californicum perezii	Coastal Statice
40	Perennial	Limonium	californicum var. mexicanum	Coastal Statice
41	Perennial	Oenothera spp.		Primrose
42	Perennial	Penstemon spp.		Penstemon
43	Perennial	Satureja	douglasii	Yerba Buena
44	Perennial	Sisyrinchium	bellum	Blue-Eyed Grass

45	Perennial	Sisyrinchium	californicum	Golden-Eyed Grass
46	Perennial	Solanum	xantii	Purple Nightshade
47	Perennial	Zauschneria	'Catalina'	Catalina Fuschia
48	Perennial	Zauschneria	californica	California Fuschia
49	Perennial	Zauschneria	cana	Hoary California Fuschia
50	Shrub	Agave	americana	Desert Century Plant
51	Shrub	Agave	Amorpha fruticosa	False Indigobush
52	Shrub	Agave	deserti	Shaw's Century Plant
53	Shrub	Agave	shawii	NCN
54	Shrub	Agave		Century Plant
55	Shrub	Arctostaphylos spp		Manzanita
56	Shrub	Atriplex	canescens	Hoary Saltbush
57	Shrub	Baccharis	pilularis	Coyote Bush
58	Shrub	Baccharis	salicifolia	Mule Fat "R"
59	Shrub	Carissa	macrocarpa	Natal Plum
60	Shrub	Ceanothus spp.		California Lilac
61	Shrub	Cistus spp.		Rockrose
62	Shrub	Cneoridium	dumosum	Bush rue
63	Shrub	Comarostaphylis	diversifolia	Summer Holly
64	Shrub	Convolvulus	cneorum	Bush Morning Glory
65	Shrub	Dalea	attenuata v orcuttii	Orcutt's Delea
66	Shrub	Elaeagnus	pungens	Silverberry
67	Shrub	Encelia	californica	Coast Sunflower
68	Shrub	Encelia	farinosa	White Brittlebush
69	Shrub	Eriobotrya	deflexa	Bronze Loquat
70	Shrub	Eriophyllum	confertiflorum	Golden Yarrow
71	Shrub	Escallonia spp.		Escallonia
72	Shrub	Feijoa	sellowiana	Pineapple Guava
73	Shrub	Fremontodendron	californicum	Flannelbush
74	Shrub	Fremontodendron	mexicanum	Southern Flannelbush
75	Shrub	Galvezia	juncea	Baja Bush-Snapdragon
76	Shrub	Galvezia	speciosa	Island Bush-Snapdragon
77	Shrub	Garrya	elliptica	Coast Silktassel
78	Shrub	Garrya	flavescens	Ashy Silktassel
79	Shrub	Heteromeles	arbutifolia	Toyon
80	Shrub	Lantana spp.		Lantana
81	Shrub	Lotus	scoparius	Deerweed
82	Shrub	Mahonia spp.		Barberry
83	Shrub	Malacothamnus	clementinus	San Clemente Island Bush Mallow
84	Shrub	Malacothamnus	fasciculatus	Mesa Bushmallow
85	Shrub	Melaleuca spp.		Melaleuca
86	Shrub	Mimulus spp.		Monkeyflower
87	Shrub	Nolina	parryi	Parry's Nolina
88	Shrub	Photinia spp.		Photinia
89	Shrub	Pittosporum	crassifolium	NCN
90	Shrub	Pittosporum	rhubifolium	Queensland Pittosporum
91	Shrub	Pittosporum	tobira 'Wheeleri'	Wheeler's Dwarf
92	Shrub	Pittosporum	undulatum	Victorian Box
93	Shrub	Pittosporum	viridiflorum	Cape Pittosporum
94	Shrub	Plumbago	auriculata	Cape Plumbago

95	Shrub	Prunus	caroliniana	Carolina Laurel Cherry
96	Shrub	Prunus	ilicifolia	Hollyleaf Cherry
97	Shrub	Prunus	lyonii	Catalina Cherry
98	Shrub	Punica	granatum	Pomegranate
99	Shrub	Pyracantha spp.		Firethorn
100	Shrub	Quercus	dumosa	Scrub Oak
101	Shrub	Rhamus	alaternus	Italian Buckthorn
102	Shrub	Rhamus	californica	Coffeeberry
103	Shrub	Rhaphiolepis spp.		Rhaphiolepis
104	Shrub	Rhus	continus	Smoke Tree
105	Shrub	Rhus	integrifolia	Lemonade Berry
106	Shrub	Rhus	laurina	Laurel Sumac
107	Shrub	Rhus	ovata	Sugarbush
108	Shrub	Rhus	trilobata	Squawbush
109	Shrub	Romneya	coulteri	Matilija Poppy
110	Shrub	Rosa	californica	California Wild Rose
111	Shrub	Rosa	minutifolia	Baja California Wild Rose
112	Shrub	Salvia spp.		Sage
113	Shrub	Sambucus spp.		Elderberry
114	Shrub	Symphoricarpos	mollis	Creeping Snowberry
115	Shrub	Syringa	vulgaris	Lilac
116	Shrub	Tecomaria	capensis	Cape Honeysuckle
117	Shrub	Teucrium	fruticans	Bush Germander
118	Shrub	Verbena	lilacina	Lilac Verbena
119	Shrub	Xylosma	congestum	Shiny Xylosma
120	Shrub	Yucca	schidigera	Mojave Yucca
121	Shrub	Yucca	whipplei	Foothill Yucca
121	Tree	Acer	macrophyllum	Big Leaf Maple
122	Tree	Acer	saccharinum	Silver Maple
123	Tree	Alnus	rhombifolia	White Alder "R"
124	Tree	Arbutus	unedo	Strawberry Tree
125	Tree	Archontophoenix	cunninghamiana	King Palm
126	Tree	Brahea	armata	Blue Mexican Palm
127	Tree	Brahea	edulis	Guadalupe Palm
128	Tree	Ceratonia	siliqua	Carob
129	Tree	Cercis	occidentalis	Western Redbud
130	Tree	Cornus	stolonifera	Redtwig Dogwood
131	Tree	Eriobotrya	japonica	Loquat
132	Tree	Erythrina	caffra	Kaffirboom Coral Tree
133	Tree	Gingko	biloba "Fairmount"	Fairmount Maidenhair Tree
134	Tree	Juglans	californica	California Walnut
135	Tree	Lagerstroemia	indica	Crape Myrtle
136	Tree	Ligustrum	lucidum	Glossy Privet
137	Tree	Liquidambar	styraciflua	Sweet Gum
138	Tree	Liriodendron	tulipifera	Tulip Tree
139	Tree	Lyonothamnus	floribundus asplenifolius	Fernleaf Catalina Ironwood
140	Tree	Melaleuca spp.		Melaleuca
141	Tree	Myoporum spp.		Myoporum
142	Tree	Nerium	oleander	Oleander
143	Tree	Parkinsonia	aculeata	Mexican Palo Verde

144	Tree	Pistacia	chinensis	Chinese Pistache
145	Tree	Pistacia	vera	Pistachio Nut
146	Tree	Pittosporum	phillyreoides	Willow Pittosporum
147	Tree	Pittosporum	viridiflorum	Cape Pittosporum
148	Tree	Platanus	acerifolia	London Plane Tree
149	Tree	Platanus	racemosa	California Sycamore "R"
150	Tree	Populus	alba	White Poplar
151	Tree	Populus	fremontii	Western Cottonwood "R"
152	Tree	Populus	trichocarpa	Black Cottonwood "R"
153	Tree	Prunus	caroliniana	Carolina Laurel Cherry
154	Tree	Prunus	cersifera 'Newport'	Newport Purple-Leaf Plum
155	Tree	Prunus	ilicifolia	Hollyleaf Cherry
156	Tree	Prunus	lyonii	Catalina Cherry
157	Tree	Prunus	xblireiana	Flowering Plum
158	Tree	Quercus	agrifolia	Coast Live Oak
159	Tree	Quercus	engelmannii	Engelmann Oak
160	Tree	Quercus	suber	Cork Oak
161	Tree	Rhus	lancea	African Sumac
162	Tree	Salix spp.		Willow "R"
163	Tree	Tristania	conferta	Brisbane Box
164	Tree	Ulmus	parvifolia	Chinese Elm
165	Tree	Ulmus	pumila	Siberian Elm
166	Tree	Umbellularia	californica	California Bay Laurel "R"
167	Vine	Antigonon	leptopus	San Miguel Coral Vine
168	Vine	Distictis	buccinatoria	Blood-Red Trumpet Vine
169	Vine	Keckiella	cordifolia	Heart-Leaved Penstemon
170	Vine	Lonicera	japonica 'Halliana'	Hall's Honeysuckle
171	Vine	Lonicera	subspicata	Chaparral Honeysuckle
172	Vine	Solanum	jasminoides	Potato Vine

For plants to be used in fuel treatment Zones A or B that are not found on this list, acquire approval from your local fire department first before installing them. Only "firewise" plants can be used in these zones.

# **APPENDIX 'B'**

## **Prohibited/Invasive Plant List**

## UNDESIRABLE PLANT LIST

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

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

\*\* San Diego County native species



## **APPENDIX 'B' References:**

Gordon, H. White, T.C. 1994. Ecological Guide to Southern California Chaparral Plant Series. Cleveland National Forest.

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City of Vista, California 1997. Undesirable Plants. Section 18.56.999. Landscaping Design, Development and Maintenance Standards.

[www.bewaterwise.com](http://www.bewaterwise.com). 2004. Fire-resistant California Friendly Plants.

[www.ucfpl.ucop.edu](http://www.ucfpl.ucop.edu). 2004. University of California, Berkeley, Forest Products Laboratory, College of Natural Resources. Defensible Space Landscaping in the Urban/Wildland Interface. A Compilation of Fire Performance Ratings of Residential Landscape Plants.

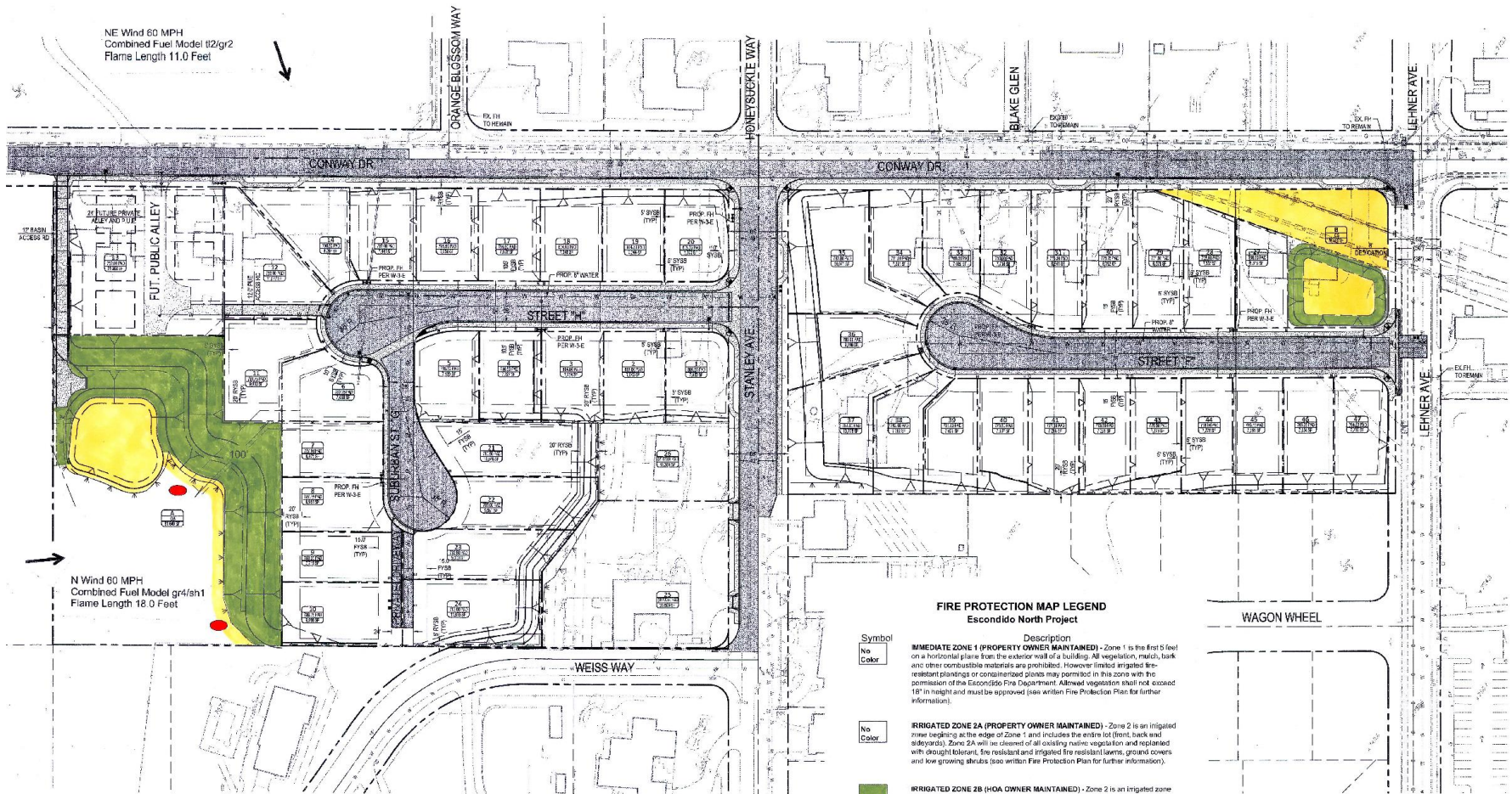
County of Los Angeles Fire Department. 1998. Fuel Modification Plan Guidelines. Appendix I, Undesirable Plant List, and Appendix II, Undesirable Plant List.

# **APPENDIX 'C'**

## **Fire Protection Plan Map**

NE Wind 60 MPH  
 Combined Fuel Model t2/gr2  
 Flame Length 11.0 Feet

N Wind 60 MPH  
 Combined Fuel Model gr4/sh1  
 Flame Length 18.0 Feet



**FIRE PROTECTION MAP LEGEND**  
 Escondido North Project

Symbol	Description
No Color	<b>IMMEDIATE ZONE 1 (PROPERTY OWNER MAINTAINED)</b> - Zone 1 is the first 5 feet on a horizontal plane from the exterior wall of a building. All vegetation, mulch, bark and other combustible materials are prohibited. However, limited irrigated fire-resistant plantings or containerized plants may be permitted in this zone with the permission of the Escondido Fire Department. Allowed vegetation shall not exceed 18" in height and must be approved (see written Fire Protection Plan for further information).
No Color	<b>IRRIGATED ZONE 2A (PROPERTY OWNER MAINTAINED)</b> - Zone 2 is an irrigated zone beginning at the edge of Zone 1 and includes the entire lot (front, back and sideyards). Zone 2A will be cleared of all existing native vegetation and replanted with drought tolerant, fire resistant and irrigated fire resistant lawns, ground covers and low growing shrubs (see written Fire Protection Plan for further information).
Green	<b>IRRIGATED ZONE 2B (HOA OWNER MAINTAINED)</b> - Zone 2 is an irrigated zone beginning at the property line and includes manufactured slopes. Zone 2 will be cleared of all existing native vegetation and replanted with drought tolerant, fire resistant and irrigated fire resistant lawns, ground covers and low growing shrubs (see written Fire Protection Plan for further information).
Light Green	<b>THINNING ZONE 3 (HOA MAINTAINED)</b> - Zone 3 is a non-irrigated thinning zone beginning at the edge of Zone 2 includes all natural and manufactured slopes and biofiltration basins. The intent is to thin shrub vegetation to 50% of the original canopy cover, trim up trees, and annually remove of all dead and dying vegetation, flammable vegetation, prohibited invasive species, and outcrops when cored. (see written Fire Protection Plan for further information).
Red Dot	<b>Zone Markers</b> - Permanent ground markers for the purpose of guiding annual fuel treatment and inspections (see written Fire Protection Plan for further information).
Black Diamond	<b>Hydrants</b> - Proposed hydrant location, final location to be determined by Escondido Fire.

**Certified By**  
 Melvin A. Johnson, Owner Date: 3/4/2022  
 Certified CEQA Wildland Fire Consultant  
**FIREWISE2000, LLC**  
 PO Box 338  
 Lower Lake, CA 95457  
 Telephone: 707.745.3947  
 info@firewise2000.com  
 This Exhibit is found to be compliant with  
 The Fire Protection Plan dated 3/4/2022

**FIREWISE2000, LLC**  
 Certified CEQA Wildland Fire Consultant  
 (707) 745-3947 (no cal office/call)  
 (707) 893-4343 (no cal office)  
 info@firewise2000.com  
 www.firewise2000.com



# **APPENDIX 'D'**

## **Non-Combustible & Fire-Resistant Building Materials**

## APPENDIX 'D'

### Non-Combustible & Fire-Resistant Building Materials For Balconies, Carports, Decks, Patio Covers and Floors

**Note:** The Office of the State Fire Marshal (SFM) Fire Engineering Division administers licensing programs and performs engineering functions affecting consumer services and product evaluation, approval and listing. The following link is to the State Fire Marshal's office for more information on the Building Material List for non-combustible and fire resistant building materials: <https://osfm.fire.ca.gov/divisions/fire-engineering-and-investigations/building-materials-listing/bml-search-building-materials-listing>.

Examples of non-combustible & fire-resistant building materials for balconies, carports, decks, patio covers, and floors are as follows (these are only examples and materials listed here must meet local fire and building codes:

#### I. NON-COMBUSTIBLE HEAVY GAGE ALUMINUM MATERIALS - *Metals USA Building Products Group - Ultra-Lattice*



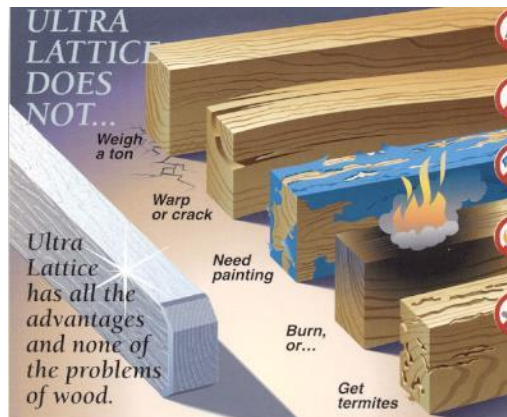
**Ultra-Lattice Stand Alone Patio  
Cover**



**Ultra-Lattice Attached Patio  
Cover**



**Ultra-Lattice Solid Patio Cover**



**Ultra-Lattice Vs. Wood**



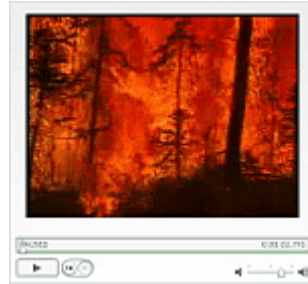
## II. FRX Exterior Fire-Retardant Treated Wood

### Exterior Fire Retardant Treated (FRT) Wood

FRX® fire retardant treated wood may be used in exterior applications permitted by the code where: public safety is critical, other materials would transfer heat or allow fires to spread, sprinkler systems cannot easily be installed, corrosive atmospheres necessitate excessive maintenance of other materials, or fire protection is inadequate or not readily available. Local Building, Residential and Urban-Wildland Interface Codes and regulations, permit the use of fire retardant treated wood in specific instances. See below for typical exterior uses and typical residential uses.

#### *Typical Exterior Uses*

- Wall coverings
- 
- Balconies
- 
- Decks
- 
- Stairways
- 
- Fences
- 
- Sheds
- 
- Gazebos
- 
- Roof coverings
- 
- Open-air roof systems
- 
- Canopies and awnings
- 
- Storefronts and facades
- 
- Eaves, soffits and fascia
- 
- Agricultural buildings and horse stalls
- 
- Scaffolding and scaffold planks
- 
- Construction staging
- 
- Various other residential and commercial uses

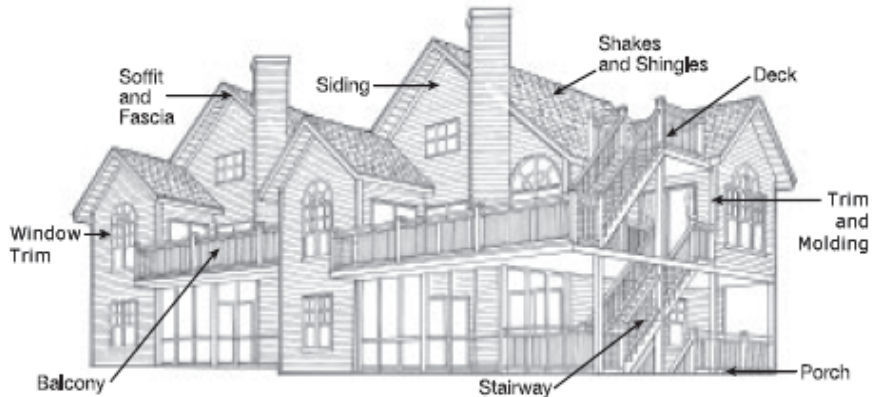


Property owners and Architects: See this [2 minute video](#) and the illustration below.





*Typical Residential Uses*

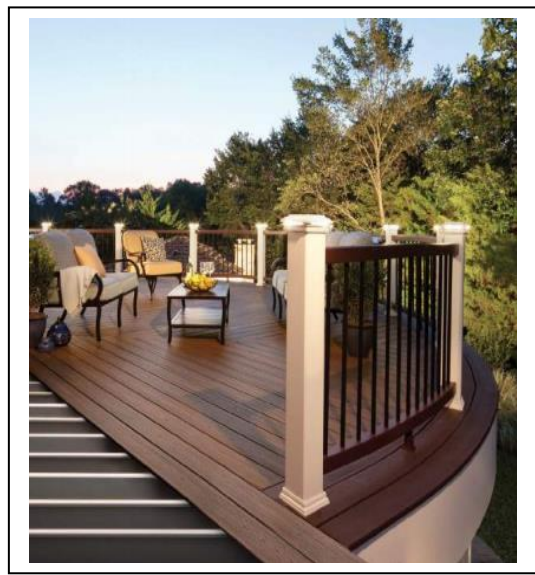


Rising concerns over fire damage and the adoption of urban-wildland interface codes have increased the use of FRT wood in residential structures.

For information on fire retardant treated wood for exterior uses, visit [www.frxwood.com](http://www.frxwood.com).

**III. TREX COMPANY, INC.** – “Trex Transcend®, Trex Select® and Trex Enhance® wood and polyethylene composite deck board, nominal ranging in size from 1” x 5-1/2” to 1-3/8” x 5-1/2” installed per manufacturer maximum edge-to-edge gap of 3/16”. All Trex decking products meet or exceed the SFM 12-7A-4A testing protocol.

Trex combines both beauty and fire defense. A few examples of installations are shown below:





#### **IV. SOLID “WOOD” DECKING**

Company Name: Various Manufacturers

Product Description: Solid “Wood” decking, when installed over minimum 2” x 6” solid “Douglas Fir” or better joists, space 24” or less on center, and decking and joints comply with American Softwood Lumber Standard PS20 as follows:

Minimum nominal 5/4”thick and nominal 6” wide decking boards with a maximum 3/8” radius edges made of solid wood species “Redwood”, “Western Red Cedar”, “Incense Cedar”, “Port Orford Cedar”, or “Alaska Yellow Cedar” having a Class B Flame Spread rating when tested in accordance with ASTM E84. Lumber grades; construction common, commercial or better grade for Redwood; 3 common, commercial or better grades for Cedars.

## V. Vents

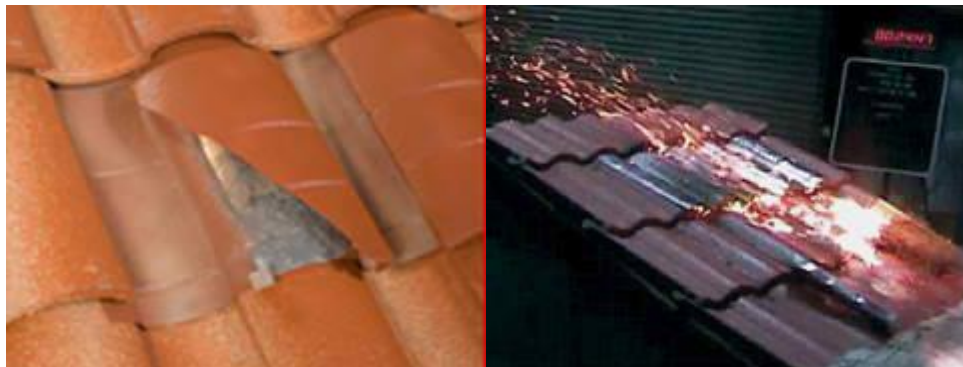
Examples of Approved Vents

### Brandguard



### O'Hagin Fire & Ice® Line – Flame and Ember Resistant

An available option for all O'Hagin attic ventilation products, this attic vent not only features all the same design, construction elements and color choices as the O'Hagin Standard Line, but also features an interior stainless-steel matrix that resists the intrusion of flames and embers. This patent-pending attic vent is accepted for use by many local fire officials for installation in Wildland Urban Interface (WUI) zones.



### Vulcan Vents

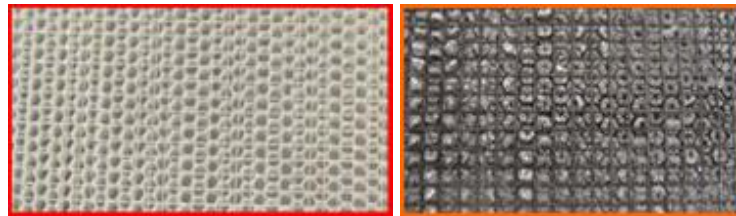
The founders of Gunter Manufacturing have been working closely over the last two years, with the scientists and inventors of Vulcan Technologies to bring to market this incredible product.

Combining our quality vent products with the fire-stopping honeycomb matrix core designed by Vulcan has produced unique and remarkable results.

At Gunter manufacturing has over 50 years of combined sheet metal manufacturing experience. Special orders are not a problem. Their vent frames are industry standard frames so there is little or no learning curve for installers and contractors. Their stated goal is to provide people with the vents they need to secure their homes with additional safety against wildfires and give them piece of mind from knowing that their home or structure is protected by a product that works!

---

The core of their fire and ember safe vents are manufactured out of hi-grade aluminum honeycomb and coated with an intumescent coating made by [FireFree Coatings](#). The intumescent coating is designed to quickly swell up and close off when exposed to high heat. The expanded material acts as an insulator to heat, fire, and embers



**Before**

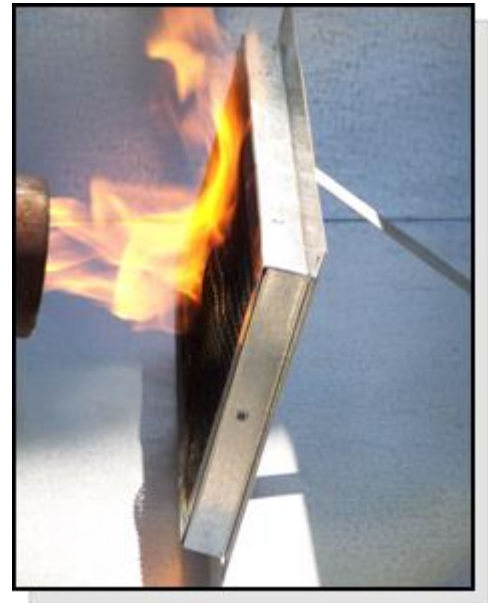
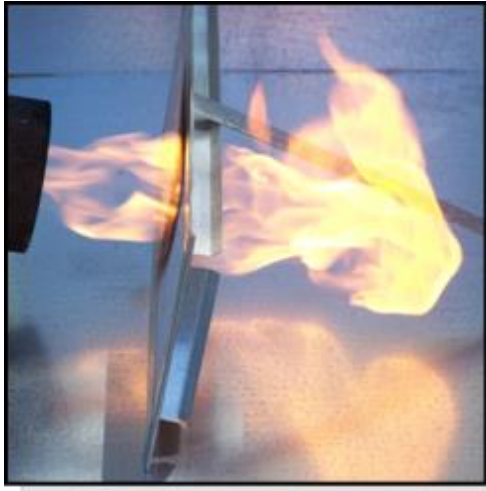
**After**

After the cells close off, they are extremely well insulated, and fire or embers cannot penetrate. Even before the cells close off, the vent is designed to protect against flying embers. In many cases embers will attack a structure before fire ever comes near, so this feature is very important.



**Close-up of the coated honeycomb matrix.**





Fire easily passes through a standard vent, on the left, but stops cold when it comes up against a Vulcan Vent shown on right.

# **APPENDIX 'E'**

## **Ignition Resistant Construction**



## **Appendix 'E'**

### **Ignition Resistant Construction**

The following is a summary of the current requirements for ignition resistant construction for high fire hazard areas under Chapter 7A of the California Building Code (CBC) 2019 edition. However the requirements listed below are not all inclusive and all exterior building construction including roofs, eaves, exterior walls, doors, windows, decks, and other attachments must meet the current CBC, Chapter 7A ignition resistance requirements, the California Fire Code, and any additional County and/or City codes in effect at the time of building permit application. See the current applicable codes for a detailed description of these requirements and any exceptions.

1. All structures will be built with a Class A Roof Assembly and shall comply with the requirements of Chapter 7A and Chapter 15 of the California Fire Code. Roofs shall have a roofing assembly installed in accordance with its listing and the manufacturer's installation instructions.
2. Roof valley flashings shall be not less than 0.019-inch (0.48 mm) No. 26 gage galvanized sheet corrosion-resistant metal installed over not less than one layer of minimum 72-pound (32.4 kg) mineral-surfaced nonperforated cap sheet complying with ASTM D3909, at least 36-inch-wide (914 mm) running the full length of the valley.
3. Attic or foundation ventilation louvers or ventilation openings in vertical walls shall be covered with a minimum of 1/16-inch and shall not exceed 1/8-inch mesh corrosion-resistant metal screening or other approved material that offers equivalent protection.
4. Where the roof profile allows a space between the roof covering and roof decking, the spaces shall be constructed to resist the intrusion of flames and embers, be fire stopped with approved materials or have one layer of a minimum 72 pound (32.4 kg) mineral-surfaced nonperforated cap sheet complying with ASTM D3909 installed over the combustible decking.
5. Enclosed roof eaves and roof eave soffits with a horizontal underside, sloping rafter tails with an exterior covering applied to the under-side of the rafter tails, shall be protected by one of the following:
  - Non-combustible material
  - Ignition-resistant material
  - One layer of 5/8-inch Type X gypsum sheathing applied behind an exterior covering on the underside of the rafter tails or soffit
  - The exterior portion of a 1-hour fire resistive exterior wall assembly applied to the underside of the rafter tails or soffit including assemblies using the gypsum panel and sheathing products listed in the Gypsum Association Fire Resistance Design Manual

- Boxed-in roof eave soffit assemblies with a horizontal underside that meet the performance criteria in Section 707A.10 when tested in accordance with the test procedures set forth in ASTM E2957.
- Boxed-in roof eave soffit assemblies with a horizontal underside that meet the performance criteria in accordance with the test procedures set forth in SFM Standard 12-7A-3.

**Exceptions:** The following materials do not require protection:

1. Gable end overhangs and roof assembly Projections beyond an exterior wall other than at the lower end of the rafter tails.
2. Fascia and other architectural trim boards.

6. The exposed roof deck on the underside of unenclosed roof eaves shall consist of one of the following:

- Non-combustible material, or
- Ignition-resistant material, or
- One layer of 5/8-inch Type X gypsum sheathing applied behind an exterior covering on the underside exterior of the roof deck, or
- The exterior portion of a 1-hour fire resistive exterior wall assembly applied to the underside of the roof deck designed for exterior fire exposure including assemblies using the gypsum panel and sheathing products listed in the Gypsum Association fire Resistance Design Manual.

**Exceptions:** The following materials do not require protection:

1. Solid wood rafter tails on the exposed underside of open roof eaves having a minimum nominal dimension of 2 inch (50.8 mm).
2. Solid wood blocking installed between rafter tails on the exposed underside of open roof eaves having a minimum nominal dimension of 2 inch (50.8 mm).
3. Gable end overhangs and roof assembly Projections beyond an exterior wall other than at the lower end of the rafter tails.
4. Fascia and other architectural trim boards.

7. Vents - ventilation openings for enclosed attics, enclosed eave soffit spaces, enclosed rafter spaces formed where ceilings are applied directly to the underside of roof rafters, and underfloor ventilation openings shall be fully covered with metal wire mesh, vents, other materials or other devices that meet one of the following requirements:

A. Vents listed to ASTM E2886 and complying with all the following:

- i. There shall be no flaming ignition of the cotton material during the Ember Intrusion Test.
- ii. There shall be no flaming ignition during the Integrity Test portion of the Flame Intrusion Test.
- iii. The maximum temperature of the unexposed side of the vent shall not exceed 662°F (350°C).

B. Vents shall comply with all of the following:

- i. The dimensions of the openings therein shall be a minimum of 1/16-inch (1.6 mm) and shall not exceed 1/8-inch (3.2 mm).

- ii. The materials used shall be non-combustible.  
**Exception:** Vents located under the roof covering, along the ridge of roofs, with the exposed surface of the vent covered by non-combustible wire mesh, may be of combustible materials.
- iii. The materials used shall be corrosion resistant.

8. Vents shall not be installed on the underside of eaves and cornices.

**Exceptions:**

1. Vents listed to ASTM E2886 and complying with all the following:
  - There shall be no flaming ignition of the cotton material during the Ember Intrusion Test.
  - There shall be no flaming ignition during the Integrity Test portion of the Flame Intrusion Test.
  - The maximum temperature of the unexposed side of the vent shall not exceed 662°F (350°C).
2. The enforcing agency shall be permitted to accept or approve special eave and cornice vents that resist the intrusion of flame and burning embers.
3. Vents complying with the requirements of Section 706A.2 shall be permitted to be installed on the underside of eaves and cornices in accordance with either one of the following conditions:
  - 3.1. The attic space being ventilated is fully protected by an automatic sprinkler system installed in accordance with Section 903.3.1.1 or,
  - 3.2. The exterior wall covering, and exposed underside of the eave are of noncombustible materials, or ignition-resistant materials, as determined in accordance with SFM Standard 12-7A-5 Ignition-Resistant Material and the requirements

9. All chimney, flue or stovepipe openings that will burn solid wood will have an approved spark arrester. An approved spark arrester is defined as a device constructed of nonflammable materials, having a heat and corrosion resistance equivalent to 12-gauge wire, 19-gauge galvanized steel or 24-gauge stainless steel. or other material found satisfactory by the Fire Protection District, having ½-inch perforations for arresting burning carbon or sparks nor block spheres having a diameter less than 3/8 inch (9.55 mm). It shall be installed to be visible for the purposes of inspection and maintenance and removeable to allow for cleaning of the chimney flue.

10. All residential structures will have automatic interior fire sprinklers installed according to the National Fire Protection Association (NFPA) 13D 2019 edition - Standard for the Installation of Sprinkler Systems in One and Two-family Dwellings and Manufactured Homes. Fire sprinklers are not required in unattached non-habitable structures greater than 50 feet from the residence.

11. The exterior wall covering, or wall assembly shall comply with one of the following requirements:

- Noncombustible material, or

- Ignition resistant material, or
- Heavy timber exterior wall assembly, or
- Log wall construction assembly, or
- Wall assemblies that have been tested in accordance with the test procedures for a 10-minute direct flame contact expose test set forth in ASTM E2707 with the conditions of acceptance shown in Section 707A.3.1 of the California Building Code, or
- Wall assemblies that meet the performance criteria in accordance with the test procedures for a 10-minute direct flame contact exposure test set forth in SFM Standard 12-7A-1.

**Exception:** Any of the following shall be deemed to meet the assembly performance criteria and intent of this section including;

- One layer of 5/8-inch Type X gypsum sheathing applied behind the exterior covering or cladding on the exterior side of the framing, or
- The exterior portion of a 1-hour fire resistive exterior wall assembly designed for exterior fire exposure including assemblies using the gypsum panel and sheathing products listed in the Gypsum Associate Fire Resistance Design Manual.

12. Exterior walls shall extend from the top of the foundation to the roof and terminate at 2-inch nominal solid blocking between rafters at all roof overhangs, or in the case of enclosed eaves, terminate at the enclosure.

13. Gutters shall be provided with the means to prevent the accumulation of leaf litter and debris within the gutter that contribute to roof edge ignition.

14. No attic ventilation openings or ventilation louvers shall be permitted in soffits, in eave overhangs, between rafters at eaves, or in other overhanging areas.

15. All Projections (exterior balconies, decks, patio covers, unenclosed roofs and floors, and similar architectural appendages and Projections) or structures less than five feet from a building shall be of non-combustible material, one-hour fire resistive construction on the underside, heavy timber construction or pressure-treated exterior fire-retardant wood. When such appendages and Projections are attached to exterior fire-resistive walls, they shall be constructed to maintain same fire-resistant standards as the exterior walls of the structure.

16. Deck Surfaces shall be constructed with one of the following materials:

- Material that complies with the performance requirements of Section 709A.4 when tested in accordance with both ASTM E2632 and ASTM E2726, or
- Ignition-resistant material that complies with the performance requirements of 704A.3 when tested in accordance with ASTM E84 or UL 723, or
- Material that complies with the performance requirements of both SFM Standard 12-7A-4 and SFM Standard 12-7A-5, or
- Exterior fire retardant treated wood, or

- Non-combustible material, or
    - Any material that complies with the performance requirements of SFM Standard 12-7A-4A when the attached exterior wall covering is also composed of noncombustible or ignition-resistant material.
17. Accessory structures attached to buildings with habitable spaces and Projections shall be in accordance with the Building Code. When the attached structure is located and constructed so that the structure or any portion thereof Projects over a descending slope surface greater than 10 percent, the area below the structure shall have all underfloor areas and exterior wall construction in accordance with Chapter 7A of the Building Code.
18. Exterior windows, skylights and exterior glazed door assemblies shall comply with one of the following requirements:
- Be constructed of multiplane glazing with a minimum of one tempered pane meeting the requirements of Section 2406 Safety Glazing, or
  - Be constructed of glass block units, or
  - Have a fire-resistance rating of not less than 20 minutes when tested according to NFPA 257, or
  - Be tested to meet the performance requirements of SFM Standard 12-7A-2.
19. All eaves, fascia and soffits will be enclosed (boxed) with non-combustible materials. This shall apply to the entire perimeter of each structure. Eaves of heavy timber construction are not required to be enclosed as long as attic venting is not installed in the eaves. For the purposes of this section, heavy timber construction shall consist of a minimum of 4x6 rafter ties and 2x decking.
20. Detached accessory buildings that are less than 120 square feet in floor area and are located more than 30 feet but less than 50 feet from an applicable building shall be constructed of noncombustible materials or of ignition-resistant materials as described in Section 704A.2 of the California Building Code.  
**Exception:** Accessory structures less than 120 square feet in floor area located at least 30 feet from a building containing a habitable space.
21. All rain gutters, down spouts and gutter hardware shall be constructed from metal or other noncombustible material to prevent wildfire ignition along eave assemblies.
22. All side yard fence and gate assemblies (fences, gate and gate posts) when attached to the home shall be of non-combustible material. The first five feet of fences and other items attached to a structure shall be of non-combustible material.
23. Exterior garage doors shall resist the intrusion of embers from entering by preventing gaps between doors and door openings, at the bottom, sides and tops

of doors, from exceeding 1/8 inch. Gaps between doors and door openings shall be controlled by one of the methods listed in this section.

- Weather-stripping products made of materials that:
  - (a) have been tested for tensile strength in accordance with ASTM D638 (Standard Test Method for Tensile Properties of Plastics) after exposure to ASTM G155 (Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Non-Metallic Materials) for a period of 2,000 hours, where the maximum allowable difference in tensile strength values between exposed and non-exposed samples does not exceed 10%; and (b) exhibit a V-2 or better flammability rating when tested to UL 94, Standard for Tests for Flammability of Plastic Materials for Parts in Devices and Appliances.
- Door overlaps onto jambs and headers.
- Garage door jambs and headers covered with metal flashing.

24. Exterior doors shall comply with one of the following:

1. The exterior surface or cladding shall be of noncombustible material or,
2. The exterior surface or cladding shall be of ignition-resistant material or,
3. The exterior door shall be constructed of solid core wood that complies with the following requirements:
  - 3.1. Stiles and rails shall not be less than 1-3/8 inches thick.
  - 3.2. Panels shall not be less than 1-1/4 inches thick, except for the exterior perimeter of the panel that shall be permitted to taper to a tongue not less than 3/8 inch thick.
4. The exterior door assembly shall have a fire-resistance rating of not less than 20 minutes when tested according to NFPA 252 or,
5. The exterior surface or cladding shall be tested to meet the performance requirements of Section 707A.3.1 when tested in accordance with ASTM E2707 or,
6. The exterior surface or cladding shall be tested to meet the performance requirements of SFM Standard 12-7A-1.

**CITY OF ESCONDIDO GENERAL REQUIREMENTS:**

1. All awnings attached to any structure shall meet the 15-foot structure setback requirement and be identified as fire rated. Additionally, the awning shall be contained in a metal, self-enclosing or box-protected cover.
2. Portable awnings shall have UL Approved Fire-Retardant Rating and be no closer than 20 feet from any combustible structures.
3. The following requirements apply to both pool heating and power supply. Solar panels located less than 20 feet to a combustible structure shall have a metal frame, otherwise the size and type of materials of the entire solar panel system will determine the separation distance to combustible structures. All solar panels placed on a roof top shall comply with the Class "A" roof assembly and materials requirements.



4. Trash enclosures or trash can storage shall be located at least 10 feet or more from any structure. Trash enclosures trellis or roof should be non-combustible or made of heavy timber.
5. Small storage buildings shall be located at least 20 feet from any structure.
6. Clearance too combustibles shall be kept a minimum of 10 feet from any propane tanks or containers.
  - a. 100-foot Fuel Modification Zone extends from the attached structure perimeter.
  - b. Maximize the use of non-combustible material. Columns must be non-combustible masonry and/or stucco or pre-cast concrete.
  - c. Nominal timber size requirements (4"x 6") for fire resistive construction will be required.
  - d. Attached structure may not extend into the pre-determined, structure setbacks.
  - e. Any covered area shall be required to be protected with fire sprinkler system when the dimension from the wall of the structure to the edge of the covered area exceeds ten feet.

#### Escondido Fire Department Requirements

#### **AUXILLARY STRUCTURES: PAVILIONS, TRELLISES, ARBORS, PERGOLAS, CABANAS, PALAPAS, AND PLAYGROUND EQUIPMENT**

- Auxiliary Structures are evaluated for a fire event (i.e., type of combustible materials, size of structure, distance from house and intended use). In addition, if structure is more than 50% covered, a Class A noncombustible roof is required.

**ATTACHED, AUXILLARY STRUCTURE TO HOME;** i.e., Overhead covers and decking not enclosed on three sides:

**Detached Auxiliary Structures Less Than 250 Square Feet;** i.e., small playground equipment, gazebos, shed, trellis, palapas and arbor:

1. When structure is 250 square feet or less, the 100-foot Fuel Modification Zone extends from the house outwards, not the auxiliary structure.
2. The structures shall be a minimum of 20 feet from other combustible structures.
3. Maximize the use of non-combustible material. Columns must be non-combustible Masonry and/or stucco or pre-cast concrete.
4. Nominal timber size requirements (4"x 6") for fire resistive construction will be required
5. Structure may not extend into the fuel modification setbacks from top of slope.
6. The canvas awnings for playground equipment shall be identified and maintained, annually, as fire retardant.
7. Structures enclosed on three or more sides may require an automatic fire sprinkler system.

8. All palapas with thatched roof shall be at a minimum 30 feet from any combustible structure. Roofing materials shall be applied with a fire-retardant chemical. Proof of application and UL rating of fire-retardant chemical shall be provided to Fire District prior to installation of palapas.


**Detached Auxiliary Structures Greater Than 250 Square Feet;** i.e., large playground equipment (e.g., *King Kong Clubhouse*), guesthouse, cabana, palapas and pool house)

1. When structure is 250 square feet or greater, the 100-foot Fuel Modification Zone extends from the auxiliary structure.
2. The structures shall be a minimum of 30 feet from other combustible structures, unless otherwise permissible by local zoning requirements.
3. Maximize the use of non-combustible material. Columns must be non-combustible masonry and/or stucco or pre-cast concrete.
4. Nominal timber size requirements (4"x 6") for fire resistive construction will be required.
5. Structure may not extend into the fuel modification setbacks from top of slope.
6. The canvas awnings for playground equipment shall be identified and maintained, annually, as fire retardant.
7. Structures enclosed on three or more sides may require an automatic fire sprinkler system. 10-30-2007 – cfh/ms.

# **APPENDIX 'F'**


## **Behave Plus 6.0.0 Fire Behavior Calculations**

## Inputs: SURFACE, SPOT

Description  NE Exp. - Escondido Northwest 60 MPH NE Wind


## Fuel/Vegetation, Surface/Understory


First Fuel Model  t16


Second Fuel Model  gr2

First Fuel Model Coverage %  60


## Fuel/Vegetation, Overstory


Canopy Cover %  50


Canopy Height ft  15


Crown Ratio fraction  0.7


## Fuel Moisture

1-h Fuel Moisture %  2


10-h Fuel Moisture %  2


100-h Fuel Moisture %  4

Live Herbaceous Fuel Moisture %  30


Live Woody Fuel Moisture %  60


## Weather

20-ft Wind Speed mi/h  60


Wind Direction (from north) deg  45

## Terrain

Slope Steepness %  15

Site Aspect deg  250

## Fire

Surface Fire Spread Direction (from north) deg  225

## Run Option Notes

Maximum effective wind speed limit IS imposed [SURFACE].

Two fuel model weighting method: two-dimensional spread [SURFACE].

Fire spread is in the HEADING direction only [SURFACE].

Wind is in specified directions [SURFACE].

Wind and spread directions are degrees clockwise from north [SURFACE].

Wind direction is the direction from which the wind is blowing [SURFACE].


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### NE Exp. - Escondido Northwest 60 MPH NE Wind




#### Head Fire

Surface Fire Rate of Spread	98.6 ft/min
Surface Fireline Intensity	1048 Btu/ft/s
Surface Fire Flame Length	11.0 ft






**Inputs: SURFACE, SPOT**Description  NE Exp. - Escondido Northwest 60 MPH NE Wind Treat**Fuel/Vegetation, Surface/Understory**

First Fuel Model		t16
Second Fuel Model		gr1
First Fuel Model Coverage	% 	50



**Fuel/Vegetation, Overstory**

Canopy Cover	% 	50
Canopy Height	ft 	15
Crown Ratio	fraction 	0.7



**Fuel Moisture**

1-h Fuel Moisture	% 	2
10-h Fuel Moisture	% 	2
100-h Fuel Moisture	% 	4
Live Herbaceous Fuel Moisture	% 	30
Live Woody Fuel Moisture	% 	60


**Weather**

20-ft Wind Speed	mi/h 	60
Wind Direction (from north)	deg 	45

**Terrain**

Slope Steepness	% 	15
Site Aspect	deg 	250

**Fire**

Surface Fire Spread Direction (from north)	deg 	225
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**Run Option Notes**

Maximum effective wind speed limit IS imposed [SURFACE].  
 Two fuel model weighting method: two-dimensional spread [SURFACE].  
 Fire spread is in the HEADING direction only [SURFACE].  
 Wind is in specified directions [SURFACE].  
 Wind and spread directions are degrees clockwise from north [SURFACE].  
 Wind direction is the direction from which the wind is blowing [SURFACE].

**Output Variables**

Surface Fire Rate of Spread (ft/min) [SURFACE]  
 (continued on next page)



NE Exp. - Escondido Northwest 60 MPH NE Wind Treated

Head Fire

Surface Fire Rate of Spread	35.6 ft/min
Surface Fireline Intensity	250 Btu/ft/s
Surface Fire Flame Length	5.7 ft

**Inputs: SURFACE, SPOT**

Description ➤ North Exp. - Escondido Northwest 60 MPH NE Wind

**Fuel/Vegetation, Surface/Understory**

First Fuel Model ➤ gr4

Second Fuel Model ➤ sh1

First Fuel Model Coverage % ➤ 85

**Fuel/Vegetation, Overstory**

Canopy Cover % ➤ 40

Canopy Height ft ➤ 80

Crown Ratio fraction ➤ 0.7

**Fuel Moisture**

1-h Fuel Moisture % ➤ 2

10-h Fuel Moisture % ➤ 2

100-h Fuel Moisture % ➤ 4

Live Herbaceous Fuel Moisture % ➤ 30

Live Woody Fuel Moisture % ➤ 45

**Weather**

20-ft Wind Speed mi/h ➤ 60

Wind Direction (from north) deg ➤ 45

**Terrain**

Slope Steepness % ➤ 5

Site Aspect deg ➤ 160

**Fire**

Surface Fire Spread Direction (from north) deg ➤ 225

**Run Option Notes**

Maximum effective wind speed limit IS imposed [SURFACE].

Two fuel model weighting method: two-dimensional spread [SURFACE].

Fire spread is in the HEADING direction only [SURFACE].

Wind is in specified directions [SURFACE].

Wind and spread directions are degrees clockwise from north [SURFACE].

Wind direction is the direction from which the wind is blowing [SURFACE].


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North Exp. - Escondido Northwest 60 MPH NE Wind

Head Fire

Surface Fire Rate of Spread	304.6 ft/min
Surface Fireline Intensity	3022 Btu/ft/s
Surface Fire Flame Length	18.0 ft




## Inputs: SURFACE, SPOT

Description  North Exp. - Escondido Northwest 60 MPH NE Wind






## Fuel/Vegetation, Surface/Understory

First Fuel Model		t16
Second Fuel Model		gr1
First Fuel Model Coverage	% 	50



## Fuel/Vegetation, Overstory

Canopy Cover	% 	40
Canopy Height	ft 	80
Crown Ratio	fraction 	0.7



## Fuel Moisture

1-h Fuel Moisture	% 	2
10-h Fuel Moisture	% 	2
100-h Fuel Moisture	% 	4
Live Herbaceous Fuel Moisture	% 	30
Live Woody Fuel Moisture	% 	45


## Weather

20-ft Wind Speed	mi/h 	60
Wind Direction (from north)	deg 	45

## Terrain

Slope Steepness	% 	5
Site Aspect	deg 	160

## Fire

Surface Fire Spread Direction (from north)	deg 	225
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## Run Option Notes

Maximum effective wind speed limit IS imposed [SURFACE].  
 Two fuel model weighting method: two-dimensional spread [SURFACE].  
 Fire spread is in the HEADING direction only [SURFACE].  
 Wind is in specified directions [SURFACE].  
 Wind and spread directions are degrees clockwise from north [SURFACE].  
 Wind direction is the direction from which the wind is blowing [SURFACE].

## Output Variables

Surface Fire Rate of Spread (ft/min) [SURFACE]  
 (continued on next page)

**NW Exp. - Escondido Northwest 60 MPH NE Wind Treated****Head Fire**

Surface Fire Rate of Spread	32.3 ft/min
Surface Fireline Intensity	185 Btu/ft/s
Surface Fire Flame Length	5.0 ft