

# Fire Behavior Analysis Report

## The Preserve at San Juan



**Applicant:**

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**Prepared for:**

**Orange County Fire Authority**  
Planning and Development Services

**Prepared By:**



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**The Preserve at San Juan**  
**FIRE BEHAVIOR ANALYSIS AND REPORT**  
**Unincorporated Orange County**

## **Introduction**

FireSafe Planning Solutions has been contracted to produce a Fire Behavior Analysis and Report for the Preserve at San Juan Project (hereafter referred to as SMA) at the request of the Orange County Fire Authority (OCFA). This plan will include the following components:

1. Fire Risk Analysis
2. Fuel Modification Plan (review and validation)
3. Fire Master Plan (review and validation)
4. Compliance with Chapter 7A of the 2010 California Building Code requirements
5. Water system requirements
6. Review of compliance with development approvals for fire protection issues

Firesafe Planning Solutions (FPS) analyzed the Preserve at San Juan project site and its applicability of code requirements. The Preserve at San Juan project will consists of individual large estate lots with potential working vineyards which is under the jurisdiction of the Orange County Fire Authority.

## General Geographic Description

The Preserve at San Juan consists of approximately 194.5 acres for Tentative Tract 17269, on the northern side of Long Canyon Road, and 388.7 acres for Tentative Tract 17270, on the southern side of Long Canyon Road, located just south of El Cariso, Riverside County, in the unincorporated eastern portion of Orange County, California. The Project entrance is located along Long Canyon Road, approximately 0.5 miles from Ortega Highway (CA-74). Long Canyon Road is approximately 21.8 miles from Interstate 5 and Ortega Highway (CA-74), and approximately 11.0 miles from Interstate 15 and Central Ave (CA-74). Figure 1 below illustrates the Regional Location and Local Vicinity of the Project site.

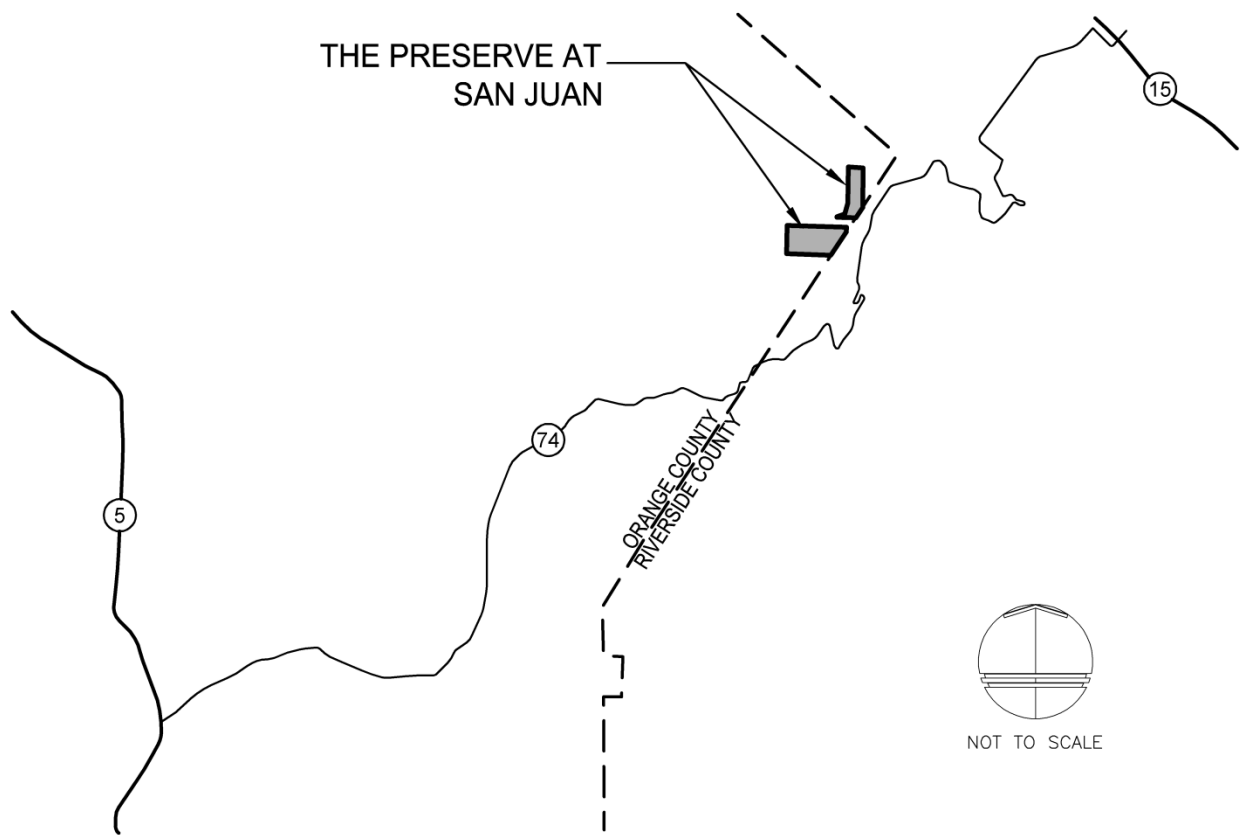
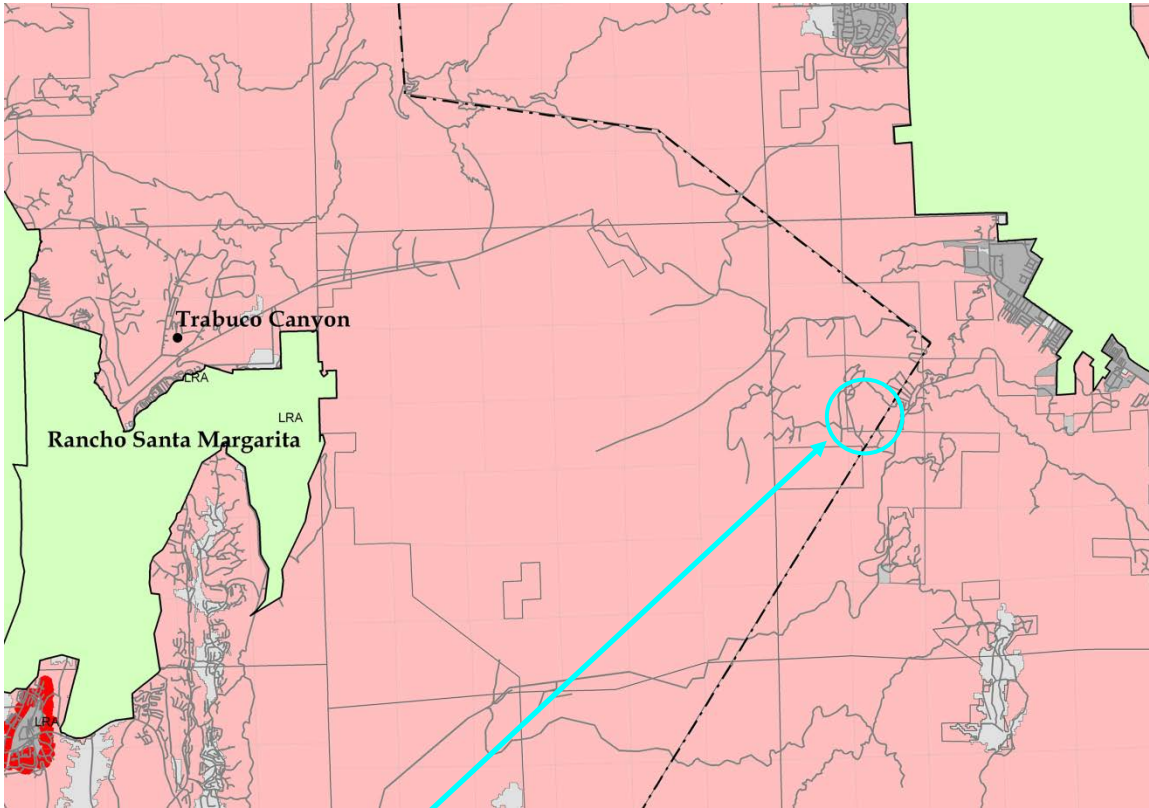
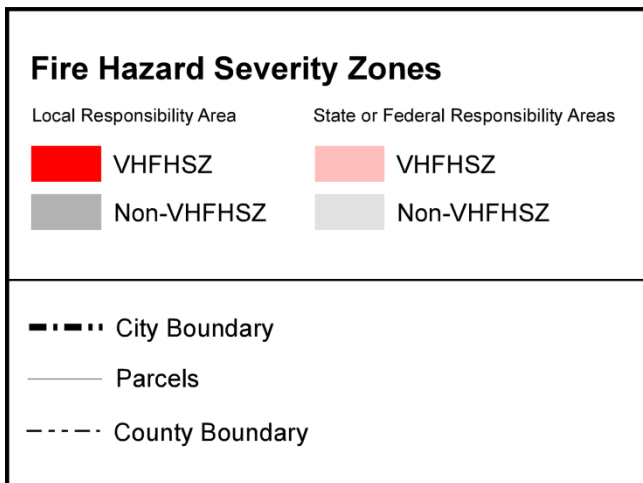


Figure 1

# CAL FIRE State Responsibility Area Fire Hazard Severity Zone Map



**Approximate Project Location**



**Figure 2**

As shown above (Figure 2), the project area, and the area around The Preserve at San Juan, are located in the CAL FIRE State Responsibility Area, and are completely within the Very High Fire Hazard Severity Zone.

## **Fire Risk Assessment**

Fire risk assessment is based on several factors. These include the fire history of the development area; the vegetation (fuel) that surrounds the project; the weather history for the general area and the specific site; the topography of the project site; and the placement of project structures relative to the factors listed above.

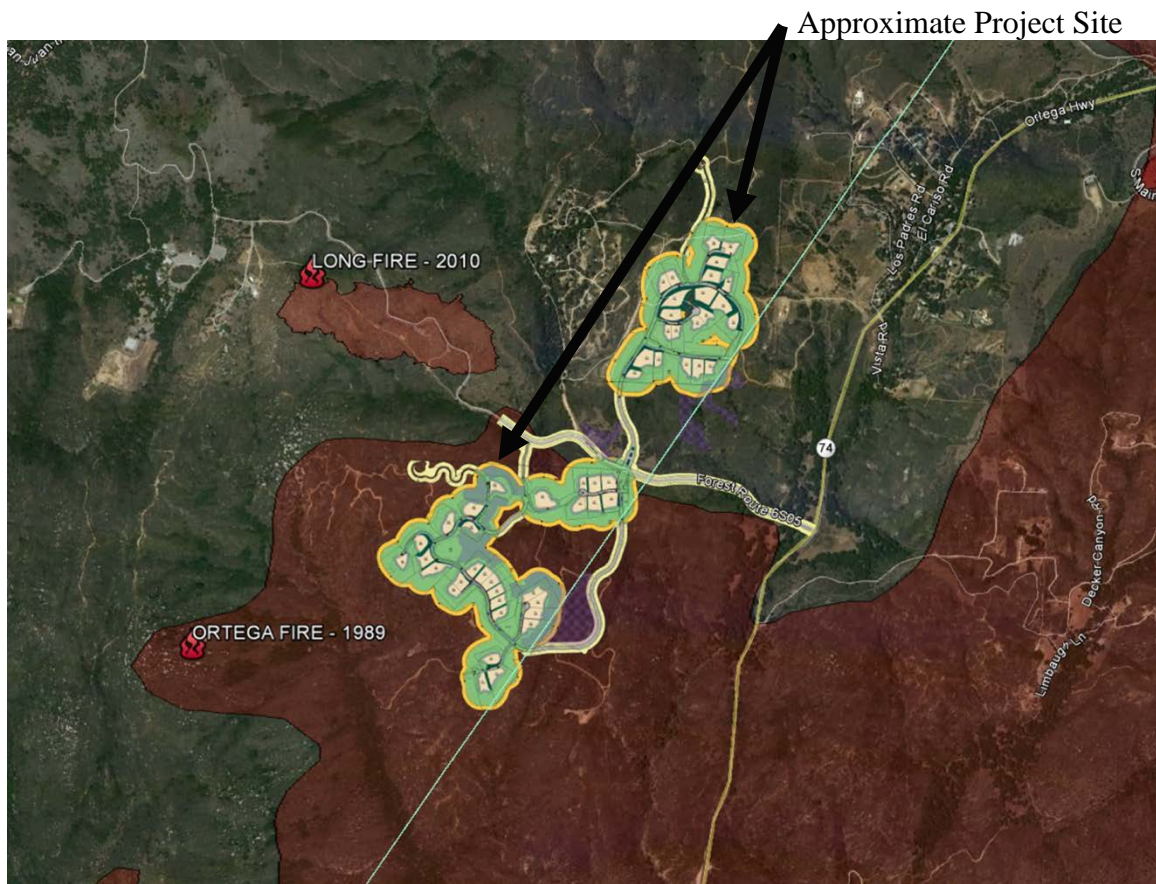
The fire behavior analysis in this report was completed to develop a performance based fire protection system from the modeling results (based on a worst case scenario) for this development. By using the worst-case scenario fire conditions, it is expected that any future fires will be equal to or less extreme than those modeled. FPS completed the fire hazard assessment, and expected wildland fire behaviors, in order to design a fuel modification plan and maintenance requirements for The Preserve at San Juan project that will provide the necessary protection in the event of a wildland fire. These plans will be reviewed by the Orange County Fire Authority and approved prior to the start of this project.

Computer projections simulate a fire burning within the native vegetative fuels directly outside the boundaries of the Fuel Modification Zones; these outermost zones are thinning zones. In the thinning zones, native plants are reduced in size, volume and continuity. Additionally, dead, dying and accumulated debris are removed. This area is designed to reduce the size and speed of a potential fire as it approaches the project site. The Fuel Modification Zones “A” and “B” are devoid of undesirable plants per OCFA Undesirable Plant List (Attachment 7 of Guideline C-05) and are planted, or replanted, with a plant palette from the OCFA approved plant list, and is fully irrigated. This will act as a “heat sink” for a potential fire as it moves into this area. When properly designed, installed and maintained, the fuel modification should prevent a fire from penetrating the “A” zone.

The fire behavior modeling is computed in the wildland areas adjacent to the project. After the maximum flame length is determined, the effect of the thinning zone(s) is applied to calculate the maximum flame length at the juncture of the thinning zone(s) and the irrigated zone (Zone B). The Zone B depth is designed to have enough depth to keep direct flame contact from burning through the entire fuel modification system. The Zone A is the noncombustible buffer zone that provides a “defensible space” for fire suppressing forces, and to help protect structures from radiant heat and convective heat. This is a systems approach that utilizes a mathematical model of fire behavior to develop a performance based plan to keep the impact from a fire, heat and ember from damaging or destroying the properties they are designed to protect. These systems are designed to function without the need of direct fire protection efforts by the fire suppression crews at the time the fire front approaches the structures.

## ***Fire History***

A review of the CalFire database (FRAP) which compiled this statewide spatial database of fire perimeters from BLM, NPS, and USFS fires 10 acres and greater in size and CAL FIRE fires 300 acres and greater in size shows the graphic below. Collection criteria for CAL FIRE fires changed in 2002 to include timber fires greater than 10 acres, brush fires greater than 50 acres, grass fires greater than 300 acres, fires destroying three or more structures, and fires causing \$300,000 or more damage. In 2008 collection criteria for CAL FIRE fires eliminated the monetary criterion and redefined the definition of structures.



**Figure 3**

As shown in Figure 3, a fire burned on the southern portion of the project site (Tract17270) in 1989. This was the Ortega Fire which consumed 7,880 acres which started on June 27, 1989. A fire on September 23, 2010 burned adjacent to the project site along Long Canyon Road. This fire started during fuel abatement work by the forest service along the roadway. It burned upslope and away from the project site.

## Wind Analysis

A Remote Automatic Weather Station, (RAWS) is located in El Cariso approximately 1.25 miles northeast of the project area. An analysis of the mean wind speed and direction can be seen in this wind rose below (Figure 4). As indicated, the strongest predominant winds in this area typically blow from the Northwest about 4% of the time, and blow at a maximum average of 25 miles per hour. The wind most often blows from the southwest about 20% of the time at speeds around 13-19 mph.

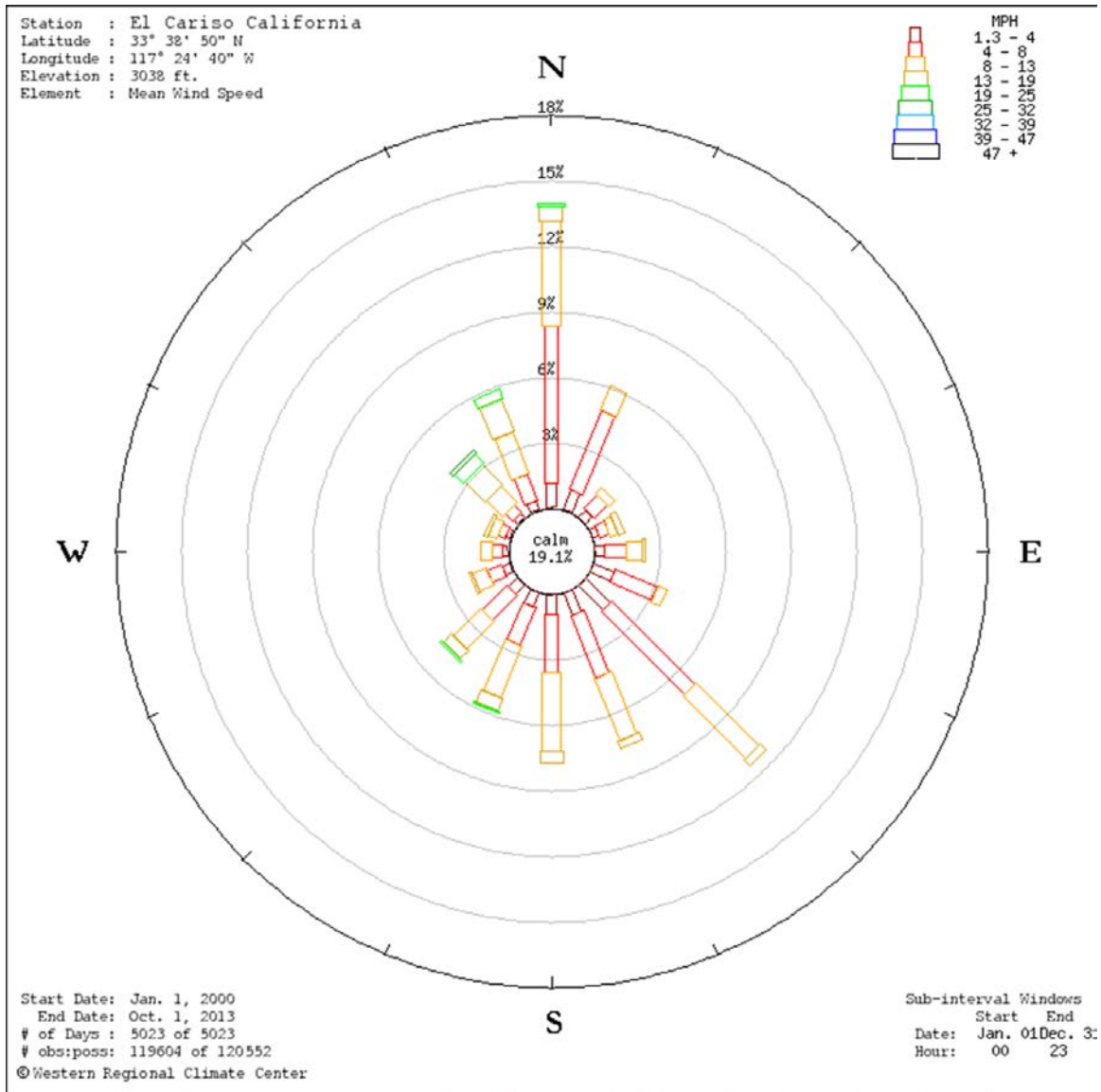
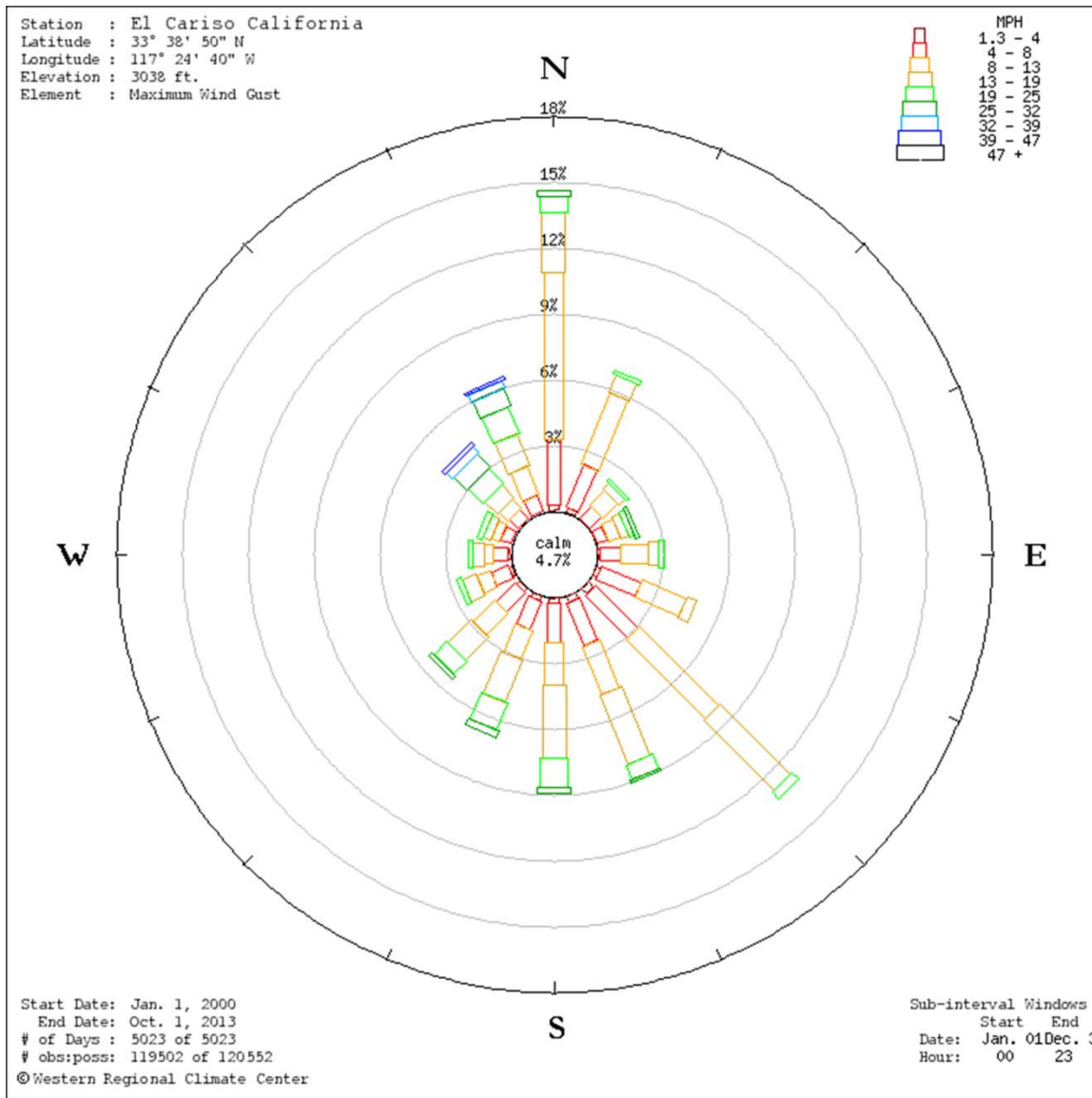


Figure 4



An analysis of the maximum wind gust speed and direction can be seen in this wind rose below (Figure 5). As indicated, the strongest wind gusts in this area typically blow from the North-North-West and Northwest about 6% to 4% of the time, respectively, at a maximum of 39-47 miles per hour. The wind most often blows from the North about 15% of the time at with gusts around 25-32 miles per hour. Traditionally, winds from the northwest are colder and bring storms in from the Pacific.

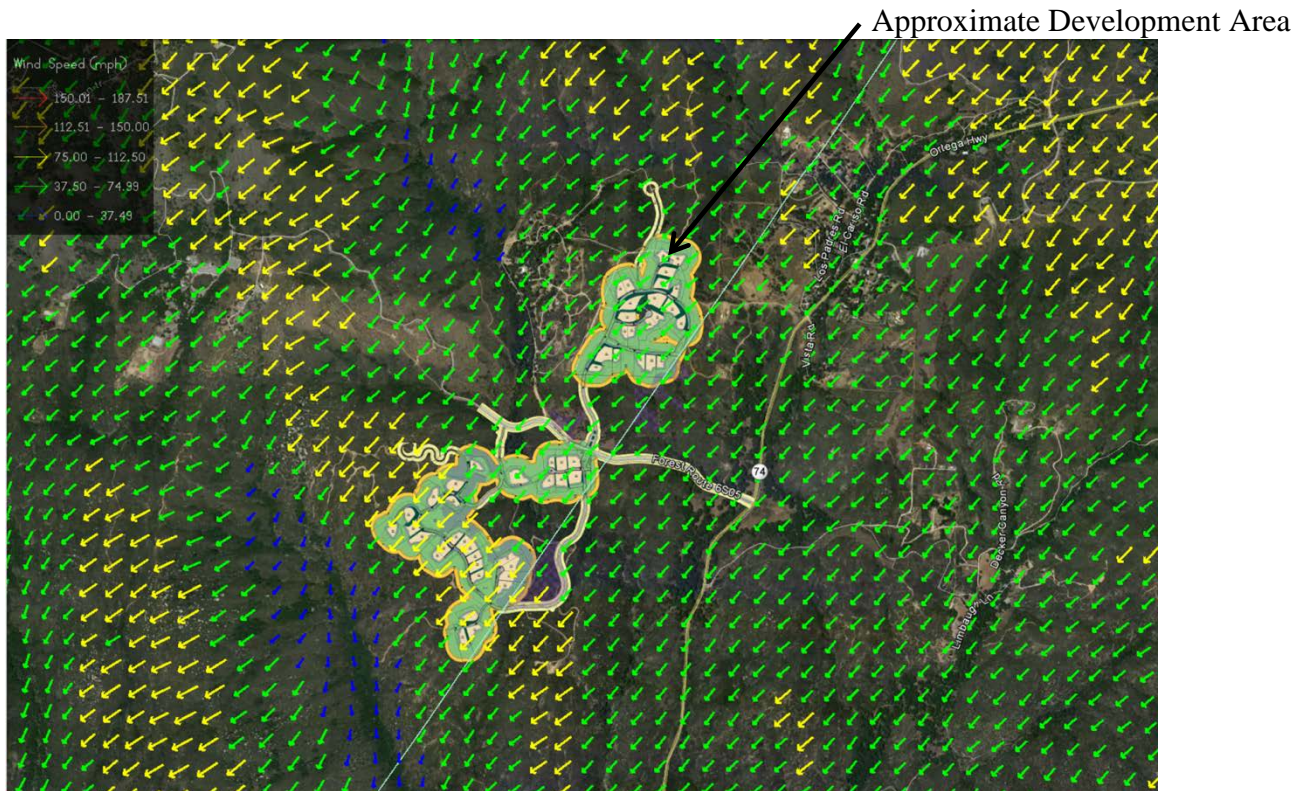


**Figure 5**

The modeling scenarios that will be used will be the predominant North wind, the traditional Northeast Santa Ana winds and Southwest winds for fire behavior analysis.

Using a computational fluid dynamics modeling program called Wind Ninja, an illustration of how winds will be affected by complex terrain is shown below for 65 mph NE winds and for 30 mph southwesterly winds. This information will then be used to simulate the fire behavior on this landscape.

### North-East winds



**Figure 6**

As is shown in Figures 6 (above) and Figure 7 (next page), the two wind scenarios that have been modeled run across the project site in a manner that does not significantly impact fire behavior (increasing or decreasing) in the areas where the structures will be constructed. The two edges of the project site, the Northeastern and Southwestern edges, will bear the brunt of a wind driven fire from these wind directions.

Winds increase over the ridgelines (yellow arrows) and decreased in the wind shielded areas (blue arrows) but relatively unaffected in the areas shown with the green arrows (developed areas of project site).

Southwest Winds

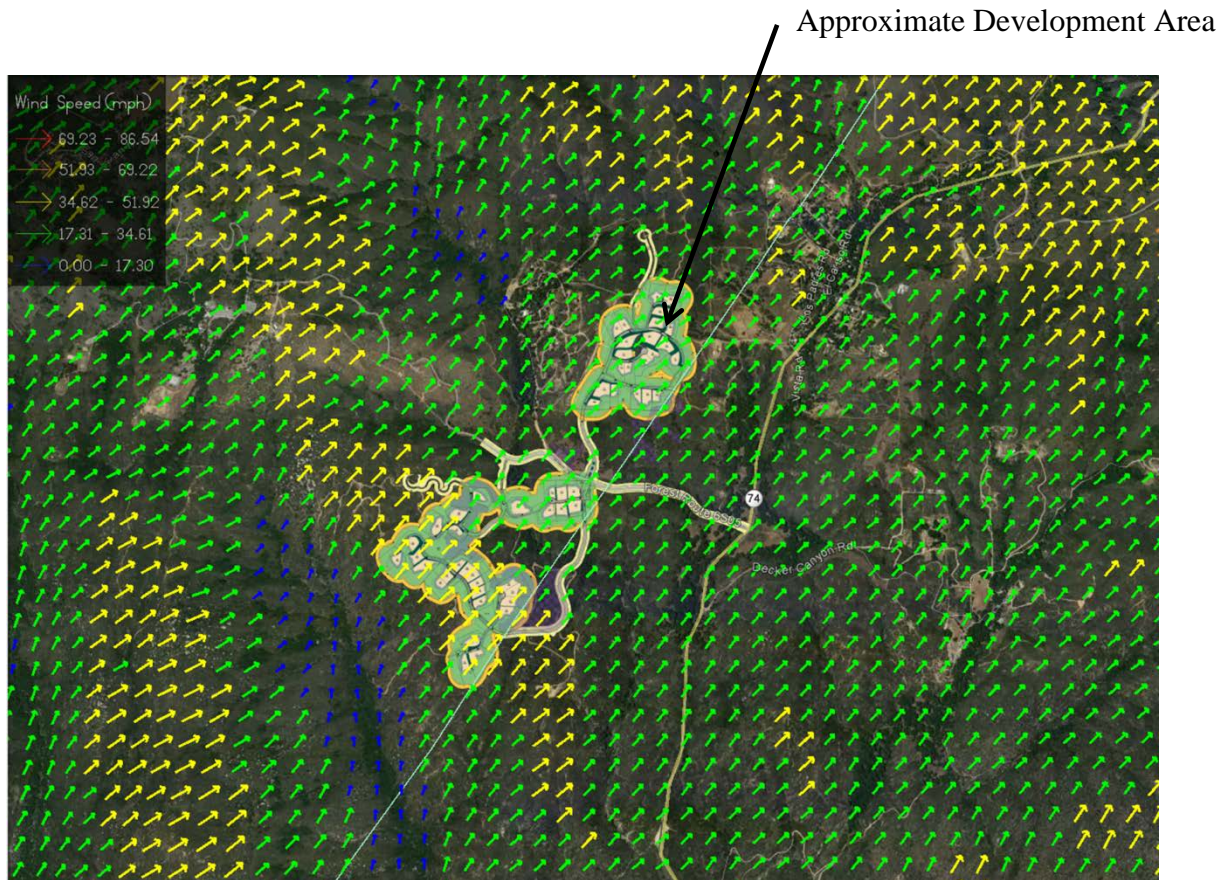


Figure 7

## ***Fire Behavior Analysis (BEHAVE)***

The BEHAVE, Fire Behavior Prediction and Fuel Modeling System is the most popular and accurate method for predicting wildland fire behavior in pre-fire defense planning. The BEHAVE fire behavior computer modeling system is utilized by wildland fire experts nationwide. Because the model was designed to predict the spread of a fire, the fire model describes the fire behavior only within the flaming front. The primary driving force in the fire behavior calculations is the dead fuel less than ¼” in diameter; these are the fine fuels that carry the fire. Fuels larger than ¼” contribute to fire intensity, but not necessarily to fire spread. The BEHAVE fire model describes a wildfire spreading through surface fuels, which are the burnable materials within 6’ of the ground and contiguous to the ground.

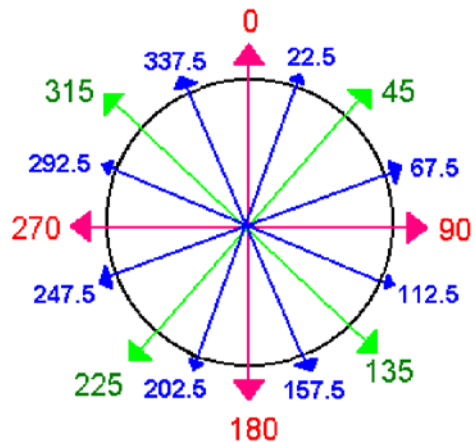
This type of modeling demonstrates the best fire defense analysis and planning for this project. The Modeling shows that the measurable fuels are further away than the most extreme flame lengths that would be produced. Using the modeling results, the Fuel Modification Plan was developed to ensure there are no direct interface areas in which a fire in the wildland will have an impact or direct flame impingement on the proposed structures.

The Fire Behavior fuel models that best represent the fuels in the area have been used for analysis; specifically grass, grass/shrub mixes and shrub models.

Worst case fire weather was used to simulate the worst case fire scenario in order to design the fire defense systems needed for this project site. These assumptions are:

- One hour dead fuel moistures were calculated at 2%, ten hour at 3% and 100 hour at 5%.
- Live Woody fuels were calculated at 50%, herbaceous fuels were assumed to be fully cured.
- Winds measured at 20 foot above terrain and fuel obstructions are assumed to be out of the N and NE at 65 mph and the SW at 30 mph.
- A wind adjustment factor of .6 was used as the project is wind shielded in its position on the slope and being on the leeward side of the mountain from the NE wind.
- Fire was modeled using a south aspect for the North wind, an East aspect for the Northeast wind and a Southwest aspect for the Southwest wind.

The compass below indicates the spread direction in degrees for the flame lengths that follow.



Full details for each model run are available in the appendixes. Version 5.05 of the BEHAVE modeling program was used for this analysis. Flame length results in Figure 8 (N wind), Figure 9 (NE Wind) and Figure 10 (SW wind) provide an overview of the flame lengths that would be expected for a worst case fire in the wildland adjacent to the project site.

As can be seen below in a North wind, with a South aspect, the greatest flame lengths (93.6 ft model 4, 47.8 ft model sh5) are in the Southern direction (180 degrees).

**The Preserve at San Juan N 65mph**  
**Flame Length (ft)**

Spread Dir deg	Fuel Model			
	4	6	sh5	sh7
15	7.2	1.9	4.4	4.2
30	7.4	2.0	4.5	4.3
45	7.7	2.0	4.7	4.5
60	8.2	2.2	5.0	4.7
75	8.9	2.3	5.4	5.1
90	9.8	2.6	6.0	5.7
105	11.3	3.0	6.9	6.5
120	13.5	3.6	8.2	7.8
135	17.2	4.5	10.4	9.9
150	24.3	6.4	14.6	13.8
165	42.6	11.1	25.0	23.4
180	93.6	22.6	47.8	42.6
195	42.6	11.1	25.0	23.4
210	24.3	6.4	14.6	13.8
225	17.2	4.5	10.4	9.9
240	13.5	3.6	8.2	7.8
255	11.3	3.0	6.9	6.5
270	9.8	2.6	6.0	5.7
285	8.9	2.3	5.4	5.1
300	8.2	2.2	5.0	4.7
315	7.7	2.0	4.7	4.5
330	7.4	2.0	4.5	4.3
345	7.2	1.9	4.4	4.2
360	7.2	1.9	4.4	4.1

**Figure 8**

As can be seen below in a Northeast wind, with an East aspect, the greatest flame lengths (100.3 ft model 4, 70.9 ft model sh5) are in the Southwest-West direction (240 degrees).

**The Preserve at San Juan NE 65mph  
Flame Length (ft)**

Spread Dir deg	Fuel Model			
	4	6	sh5	sh7
15	7.0	2.0	3.7	3.5
30	6.7	1.9	3.6	3.3
45	6.6	1.9	3.5	3.2
60	6.6	1.9	3.5	3.2
75	6.7	1.9	3.5	3.2
90	6.8	2.0	3.6	3.3
105	7.2	2.1	3.8	3.5
120	7.6	2.2	4.0	3.7
135	8.3	2.4	4.4	4.0
150	9.3	2.7	4.8	4.4
165	10.8	3.1	5.6	5.1
180	13.1	3.7	6.7	6.1
195	17.1	4.8	8.6	7.8
210	25.4	6.9	12.4	11.1
225	52.1	12.7	23.5	20.5
240	100.3	21.5	70.9	68.9
255	34.0	9.8	20.6	20.0
270	20.3	6.0	11.6	11.0
285	14.8	4.3	8.2	7.7
300	11.8	3.4	6.5	6.1
315	10.0	2.9	5.4	5.1
330	8.8	2.6	4.8	4.4
345	8.0	2.3	4.3	4.0
360	7.4	2.1	4.0	3.7

**Figure 9**

As can be seen below in a Southwest wind, with a southwest aspect, the greatest flame lengths (90.7 ft model 4, 57 ft model sh5) are in the Northeast-East direction (30 degrees).

**The Preserve at San Juan SW 30mph  
Flame Length (ft)**

Spread Dir deg	Fuel Model			
	4	6	sh5	sh7
15	38.4	10.2	22.2	21.0
30	90.7	22.1	57.0	55.1
45	47.9	12.1	26.1	23.3
60	25.8	6.7	14.1	12.7
75	17.9	4.7	9.8	8.9
90	13.9	3.7	7.6	6.9
105	11.5	3.0	6.3	5.8
120	10.0	2.6	5.5	5.0
135	9.0	2.4	4.9	4.5
150	8.2	2.2	4.5	4.1
165	7.7	2.1	4.3	3.9
180	7.4	2.0	4.1	3.7
195	7.2	1.9	4.0	3.7
210	7.1	1.9	3.9	3.6
225	7.2	1.9	4.0	3.6
240	7.3	2.0	4.1	3.7
255	7.6	2.0	4.2	3.9
270	8.1	2.1	4.5	4.1
285	8.7	2.3	4.8	4.4
300	9.6	2.6	5.4	4.9
315	11.0	2.9	6.1	5.6
330	13.1	3.5	7.3	6.7
345	16.4	4.4	9.2	8.5
360	22.8	6.1	12.9	12.0

**Figure 10**

Although some severe fire behavior with flame lengths of 93-100 feet are indicated, they are the heaviest fuel loads (model 4) however they are isolated, sparse and away from the proposed structures and away from the fuel modification zones. The fuel models, SH5 and SH7 that modeled at flame lengths ranging from 42.6 ft to 70.9 ft are more common outside the fuel modification.

The worst-case fire conditions exist when slope, aspect, fuels and wind are in full alignment with each other. Full alignment of all factors only occurs in the Southwestern edge of the project. For the balance of the project this does not occur (project is down slope from wildland and not in alignment with the N wind and has an Eastern aspect with the extreme NE Santa Ana wind condition).

In summary, the BEHAVE analysis shows that flame lengths (in the direction of the project) from the N and NE wind shall have more of an impact than the SW wind. The adjoining open space does have native wildland chaparral which is mostly coastal sage scrub type fuels. The real issue that is established by the modeling and the real life experiences in both the Santiago and Freeway Complex Fires is the fire brands and flying embers. This is why the entire project will comply or exceed the requirements set forth in 2010 California Building Code (CBC) Chapter 7A and the 2010 California Fire Code (CFC) Chapter 49 for projects constructed within in a Wildland-Urban Interface Fire Area.

The technical results provided as part of the Fire Behavior Analysis within this report were obtained using Behave Plus version 5.0.5. and Wind Ninja software.



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Tim Chavez  
Wildland Interface Specialist



## **Fuel Modification Plan**

The Fuel Modification Plan for this project is designed to be no less than the required 2200' of total fuel modification, exceeding the 170' of total fuel modification required per the OCFA adopted Guideline C-05. The fuel modification shall consist of three (3) different zones, a minimum of a 20' Zone A, a minimum 150' Zone B, and a minimum 50' Zone C. Potential vineyards may be planted within the Zone B, which will still have a minimum of a 50' Zone C on the outside and internal slopes will be designated Special Maintenance Areas. Additionally, all new landscaping plans proposed within The Preserve San Juan Community (development areas and fuel modification zones) shall be devoid of eucalyptus, juniper, cedar, cypress, washingtonia robusta (mexican fan palm), acacia (except for acacia desert carpet) and pine trees, California sagebrush, chamise, buckwheat and black and white sage (*Salvia* spp.). Additionally California Fescue (*Festuca californica*) shall not be planted or included within any seed mix. This landscape palette restriction is to be recorded as part of all applicable CC&Rs documents, and applies to all interior areas, including Private Homeowner Lots.

### Zone A - Setback Zone

The purpose of the setback zone is to provide a defensible space for fire suppression forces and to protect structures from radiant heat and convective heat. No combustible construction shall be allowed within the 20-foot setback zone (Zone A). **In no case shall the A Zone be less than 20 feet minimum.** This zone is to be located on a level graded area and shall be between Zone B and the structure. Zone A shall be cleared of all undesirable plant species from Attachment 7 of the OCFA Guideline C-05. Plant material in Zone A will be from the OCFA approved plant palette and shall comply with horizontal spacing and vertical separation requirements from Attachment 6 of the OCFA Guideline C-05.

### Zone B - Irrigated Zone

This portion of fuel modification consists of irrigated landscaping. This irrigated zone is a minimum of 150 feet to a maximum of 620 feet in width. Zone B shall be cleared of all undesirable plant species from Attachment 7 of the OCFA Guideline C-05. Zone B shall also be irrigated and planted with species from Attachment 8 of the OCFA Guideline C-05 and shall comply with horizontal spacing and vertical separation requirements from Attachment 6 of the OCFA Guideline C-05. Exceptions to save desirable species may be submitted for approval by the OCFA on a site-specific basis.

### Zone C - Thinning Zone

Zone C is 50 feet in width and requires horizontal and vertical spacing of plant groups in accordance with Attachment 6 and removal of all dead and dying vegetation and undesirable species from Attachment 7. Minimum thinning percentage of plant removal is 50%.

The thinning zones reduce the fuel load of the existing vegetative landscape area adjacent to the irrigated zones and the proposed development, reducing heat, fire brands and flying ember production from a wildland fire. Thinning zones adjoin Zone B and can extend 100 feet or more into the existing vegetative landscape areas. Sometimes a greater thinning percentage than the minimum

may be temporarily needed to meet spacing requirements from Attachment 6 or the removal of dead and undesirable species.

### Special Maintenance Area

The Special Maintenance Areas have maintenance requirements to reduce the chances of ignition from wildfires. They need maintenance just as fuel modification zones do and shall be maintained on a year round basis, with removal of all dead and dying plant material, replacement of dead or diseased species with plant material with the same growth characteristics from the approved landscape plans. Irrigation shall be verified on a regular basis to ensure it is in a working condition and the plants shall be irrigated as necessary to keep them healthy with their appropriate moisture content. A copy of the approved Landscape Plans shall be provided to the HOA by the developer and remain on record indefinitely with the HOA. Copies of plans shall be provided to the contracted maintenance company. It is the responsibility of the HOA to forward a copy of the approved Landscape Plans to any new property management company. The HOA shall inspect the special maintenance areas twice a year to ensure the special maintenance areas retain the original design of the areas.

The following are further Special Maintenance Area (SMA) requirements:

- Other than trees, a large percentage of the special maintenance area shall consist of a ground cover that naturally grows no taller than 2 feet in height.
- The areas are completely irrigated and have plants that need irrigation to retain healthy fuel moisture.
- Any dead and dying specimens and branches shall be removed.
- Leaf litter on top of vegetative cover shall be removed.
- Landscape design Plans shall be retained by the HOA indefinitely and the slopes shall always remain as they were designed.
- As plants migrate or new plants seed-in, those shall be removed to retain the original design.
- Future changes to slope designs shall be approved by OCFA.
- The maintenance requirements of the special maintenance areas shall be factored into the funding with the fuel modification zones.
- Special Maintenance Areas shall be designed and also maintained as to not provide direct flame or an excessive amount of radiant heat on structures.
- Special Maintenance Areas will have a limited use of native grasses as approved by OCFA.

### Vineyards

1. All potential vineyards shall be kept in a healthy state and maintained as described below.
2. A ten-foot firebreak (mineral earth or other noncombustible surface) shall be cleared between the perimeter of the orchard trees or row of grape vines and native vegetation or ornamental landscaping.
3. Vineyards shall be kept:
  - a. Clean of dead and/or downed trees or shrubs.
  - b. Free of combustible debris including, but not limited to, dead branches and dead foliage.
  - c. Ground litter must be removed annually prior to the start of fire season.
  - d. Free of all tree/vine trimmings: no cut wood may be staked.

4. All dead grasses between rows of trees or vines shall be removed (cut to 4" or less)
5. Only noncombustible materials may used within 100 feet of any structure. Wood stakes, trellis or other supports cannot be used in this zone.
6. Vineyards must be irrigated and/or maintained so the vegetation is maintained in a health, turgid state.
  - a. Irrigation lines for groves within the fuel management areas should be buried pvc or plastic pipe or galvanized steel pipes if above ground.

## **Building Construction Requirements**

All structures within the project site shall meet or exceed the current requirements of the 2010 California Residential Code Section R327 and the 2010 California Fire Code Chapter 49. A copy of the Section R327 and Chapter 49 is included in Appendix B of this report.

The California State Fire Marshal Wildland-Urban Interface Products List has been provided as Attachment C to this document for reference to approved material for construction within a Wildland-Urban Interface area.

## **Fire Protection Features for Access and Life Safety**

The effectiveness of the fire protection features that have been designed into this project for emergency response and firefighting operations is directly related to the proper installation and maintenance of fire access roadways, the proper sitting of hydrants, adequate water supply, and access to structures. These protection features for access and life safety have been designed into this project as is illustrated within the Fire Master Plan. Many of these features within in the Fire Mater Plan exceed the requirements set forth in the OCFA adopted Guideline B-09.

### **Fire Protection Features**

- Minimum 28' wide looped fire access roadway through project
  - Minimum 28; wide with parking on one side providing a minimum 20' unobstructed path of travel constructed of an all-weather driving surface.
- All Structures to be protected with Automatic Fire Sprinkler Systems in accordance with National Fire Protection Association (NFPA) 13-D standards, including Attic Spaces.

### **Water Supply**

The minimum Fire Flow provided for this project is a minimum of 1,500 gallons per minute for 2 hours at a minimum of 20psi. All fire hydrants are public hydrants and all will meet or exceed the public fire hydrant standards and the Orange County Fire Authority standards. Each fire hydrant will be provided with Blue Dots in accordance with OCFA.

## Fire Behavior Analysis Report and Fire Protection Plan Summary

The Preserve at San Juam Project has been designed and protected by the most effective and recently adopted codes and practices. FireSafe Planning Solutions has used the BEHAVE model analysis to measure the intensity of a fire moving towards this project to design a protection system that will ensure that the project will be safe from wildland fires even without fire department suppression activities. Flame lengths and fire intensity are ultimately reduced by the installation and maintenance of the Fuel Modification zones through the use of the irrigated Zone A and Zone B, and thinning of the vegetation within Zone C.

Based on the scientific fire behavior analysis, the proposed structures will not ignite from the exterior fire exposure from a wildland vegetation fire. This is primarily because the greatest fire energy is too far away from the structures due to the low plant densities within the fuel modification zones and the construction feature requirements.

The codes enforced by the Orange County Fire Authority for the Fuel Modification Zones were developed to handle the exact type of fuels that are interfacing with this project.

A systems approach has been used not only in the fire behavior analysis but for all aspects of the fire protection for this project. In addition to the fuel modification and vegetation management portions of this project, a fire master plan was also developed to insure that fire department access, laddering requirements, fire hydrant locations, access to wildland areas and parking plans were developed in a manner that supports the fuel modification plan and the fire department operations.

The Fuel Modification Fuel Plan, Fire Protection Plan and project design features, have been shown to provide an acceptable level of risk for the proposed development. These plans were validated using fire behavior modeling and structure ignition assessments as shown within Appendix A. It is our opinion that they meet or exceed the latest known fire-resistive standards.

This Fire Behavior Analysis and Fire Protection Plan is submitted as one component in a series of fire protection documents designed to insure that the project is constructed in a manner that make it safe for the residents and the city as a whole.

We unconditionally recommend approval of this Fire Behavior Analysis to assist in building a safer community.

Respectfully;



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Tim Chavez  
Wildland Interface Specialist

Concurrence;



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David Oatis  
Principal, Firesafe Planning Solutions

## Appendix A: Fire Modeling Results

**Inputs: SURFACE**

Description	The Preserve at San Juan N 65mph		
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**Fuel/Vegetation, Surface/Understory**

Fuel Model	4, 6, sh5, sh7		
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**Fuel Moisture**

1-h Moisture	%	2
10-h Moisture	%	3
100-h Moisture	%	5
Live Herbaceous Moisture	%	30
Live Woody Moisture	%	50

**Weather**

20-ft Wind Speed	mi/h	65
Wind Adjustment Factor		.6
Wind Direction (from north)	deg	0

**Terrain**

Slope Steepness	%	200
Aspect	deg	180

**Fire**

Spread Direction (from north)	deg	15, 30, 45, 60, 75, 90, 105, 120,
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**Run Option Notes**

Maximum reliable effective wind speed limit IS imposed [SURFACE].

Calculations are for the specified spread directions [SURFACE].

Fireline intensity, flame length, and spread distance are always  
for the direction of the spread calculations [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 Rate of Spread (ch/h) [SURFACE]

Flame Length (ft) [SURFACE]

(continued on next page)



Input Worksheet (continued)

Notes



The Preserve at San Juan N 65mph  
Surface Rate of Spread (ch/h)

Spread Dir deg	Fuel Model			
	4	6	sh5	sh7
15	6.6	2.1	3.7	2.5
30	7.0	2.2	3.9	2.6
45	7.6	2.4	4.3	2.9
60	8.6	2.7	4.9	3.3
75	10.3	3.2	5.8	3.9
90	12.9	4.0	7.3	4.9
105	17.4	5.4	9.8	6.5
120	25.7	8.0	14.5	9.6
135	43.4	13.5	24.4	16.1
150	92.0	28.4	51.1	33.6
165	313.1	94.0	164.1	105.5
180	1731.3	441.3	669.8	388.7
195	313.1	94.0	164.1	105.5
210	92.0	28.4	51.1	33.6
225	43.4	13.5	24.4	16.1
240	25.7	8.0	14.5	9.6
255	17.4	5.4	9.8	6.5
270	12.9	4.0	7.3	4.9
285	10.3	3.2	5.8	3.9
300	8.6	2.7	4.9	3.3
315	7.6	2.4	4.3	2.9
330	7.0	2.2	3.9	2.6
345	6.6	2.1	3.7	2.5
360	6.5	2.0	3.7	2.5



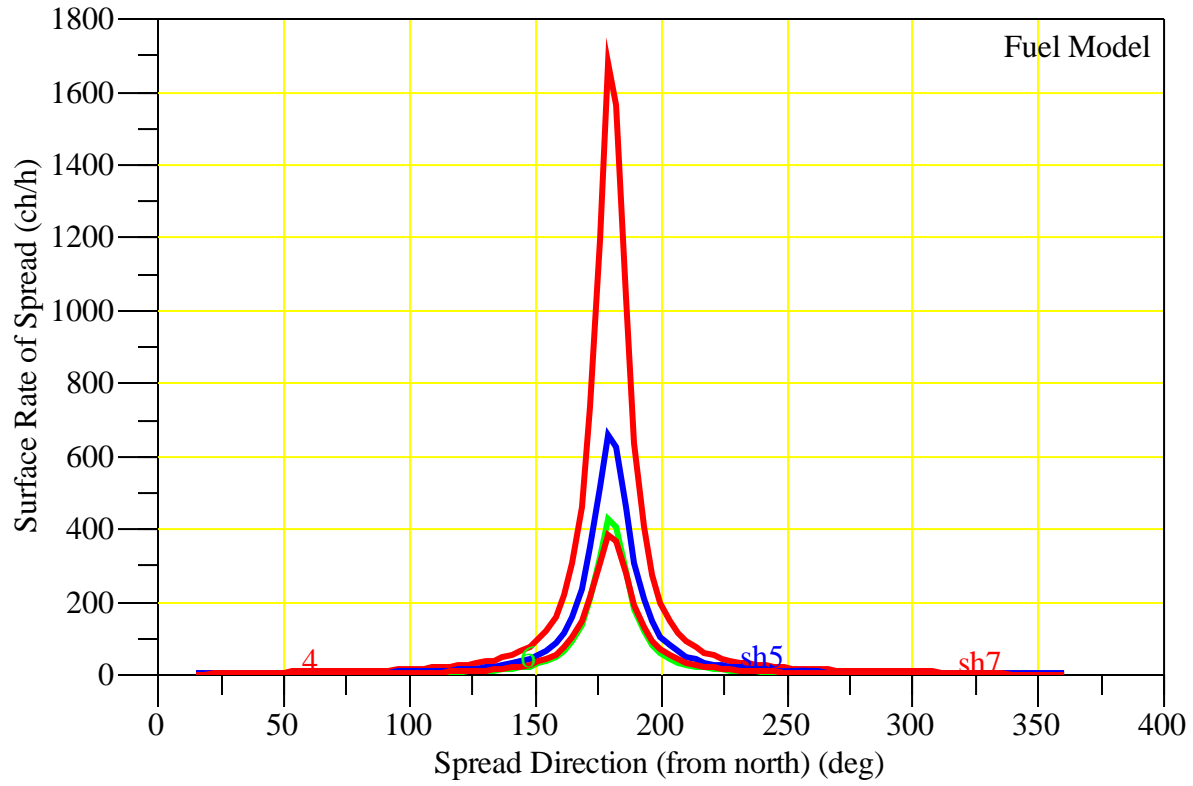


The Preserve at San Juan N 65mph  
Flame Length (ft)

Spread Dir deg	Fuel Model			
	4	6	sh5	sh7
15	7.2	1.9	4.4	4.2
30	7.4	2.0	4.5	4.3
45	7.7	2.0	4.7	4.5
60	8.2	2.2	5.0	4.7
75	8.9	2.3	5.4	5.1
90	9.8	2.6	6.0	5.7
105	11.3	3.0	6.9	6.5
120	13.5	3.6	8.2	7.8
135	17.2	4.5	10.4	9.9
150	24.3	6.4	14.6	13.8
165	42.6	11.1	25.0	23.4
180	93.6	22.6	47.8	42.6
195	42.6	11.1	25.0	23.4
210	24.3	6.4	14.6	13.8
225	17.2	4.5	10.4	9.9
240	13.5	3.6	8.2	7.8
255	11.3	3.0	6.9	6.5
270	9.8	2.6	6.0	5.7
285	8.9	2.3	5.4	5.1
300	8.2	2.2	5.0	4.7
315	7.7	2.0	4.7	4.5
330	7.4	2.0	4.5	4.3
345	7.2	1.9	4.4	4.2
360	7.2	1.9	4.4	4.1

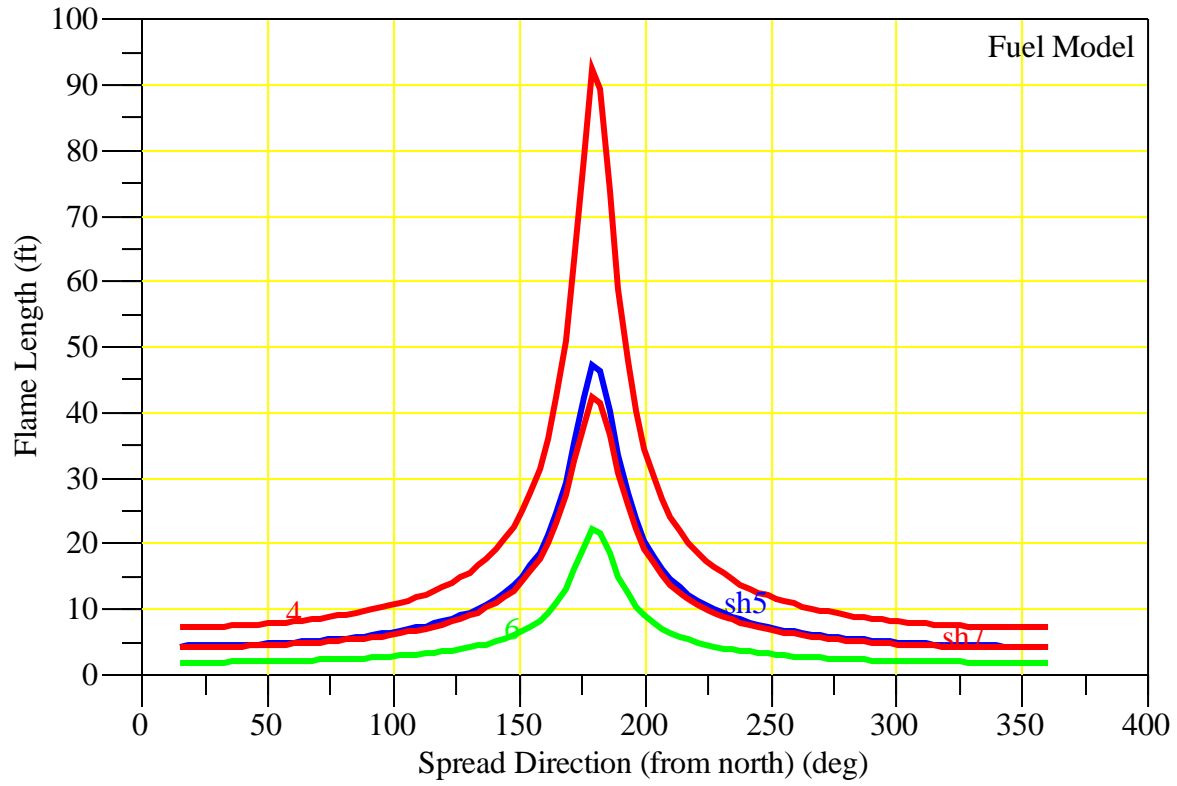


### The Preserve at San Juan N 65mph





### The Preserve at San Juan N 65mph





## Discrete Variable Codes Used The Preserve at San Juan N 65mph

### Fuel Model

- 4 Chaparral (S)
- 6 Dormant brush, hardwood slash (S)
- sh5 High load, dry climate shrub (S) (145)
- sh7 Very high load, dry climate shrub (S) (147)

**Inputs: SURFACE**

Description	The Preserve at San Juan NE 65mph		
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**Fuel/Vegetation, Surface/Understory**

Fuel Model	4, 6, sh5, sh7		
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**Fuel Moisture**

1-h Moisture	%	2
10-h Moisture	%	3
100-h Moisture	%	5
Live Herbaceous Moisture	%	30
Live Woody Moisture	%	50

**Weather**

20-ft Wind Speed	mi/h	65
Wind Adjustment Factor		.6
Wind Direction (from north)	deg	45

**Terrain**

Slope Steepness	%	200
Aspect	deg	90

**Fire**

Spread Direction (from north)	deg	15, 30, 45, 60, 75, 90, 105, 120,
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**Run Option Notes**

Maximum reliable effective wind speed limit IS imposed [SURFACE].

Calculations are for the specified spread directions [SURFACE].

Fireline intensity, flame length, and spread distance are always for the direction of the spread calculations [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 Rate of Spread (ch/h) [SURFACE]

Flame Length (ft) [SURFACE]

(continued on next page)



Input Worksheet (continued)

Notes



**The Preserve at San Juan NE 65mph**  
**Surface Rate of Spread (ch/h)**

Spread Dir deg	Fuel Model			
	4	6	sh5	sh7
15	6.1	2.3	2.6	1.6
30	5.7	2.1	2.4	1.5
45	5.4	2.0	2.3	1.4
60	5.4	2.0	2.3	1.4
75	5.5	2.1	2.3	1.4
90	5.9	2.2	2.4	1.5
105	6.5	2.4	2.7	1.7
120	7.5	2.8	3.1	1.9
135	9.0	3.3	3.7	2.2
150	11.5	4.2	4.6	2.8
165	15.8	5.8	6.3	3.8
180	24.1	8.7	9.4	5.7
195	43.0	15.1	16.2	9.6
210	101.6	33.6	35.9	20.9
225	483.3	125.8	143.3	78.9
240	2009.8	395.3	1579.4	1104.2
255	191.1	72.2	108.0	75.4
270	62.7	24.3	31.0	20.5
285	31.3	12.1	14.7	9.5
300	19.2	7.4	8.8	5.6
315	13.3	5.1	6.0	3.8
330	10.1	3.9	4.5	2.8
345	8.1	3.1	3.6	2.2
360	6.9	2.6	3.0	1.9



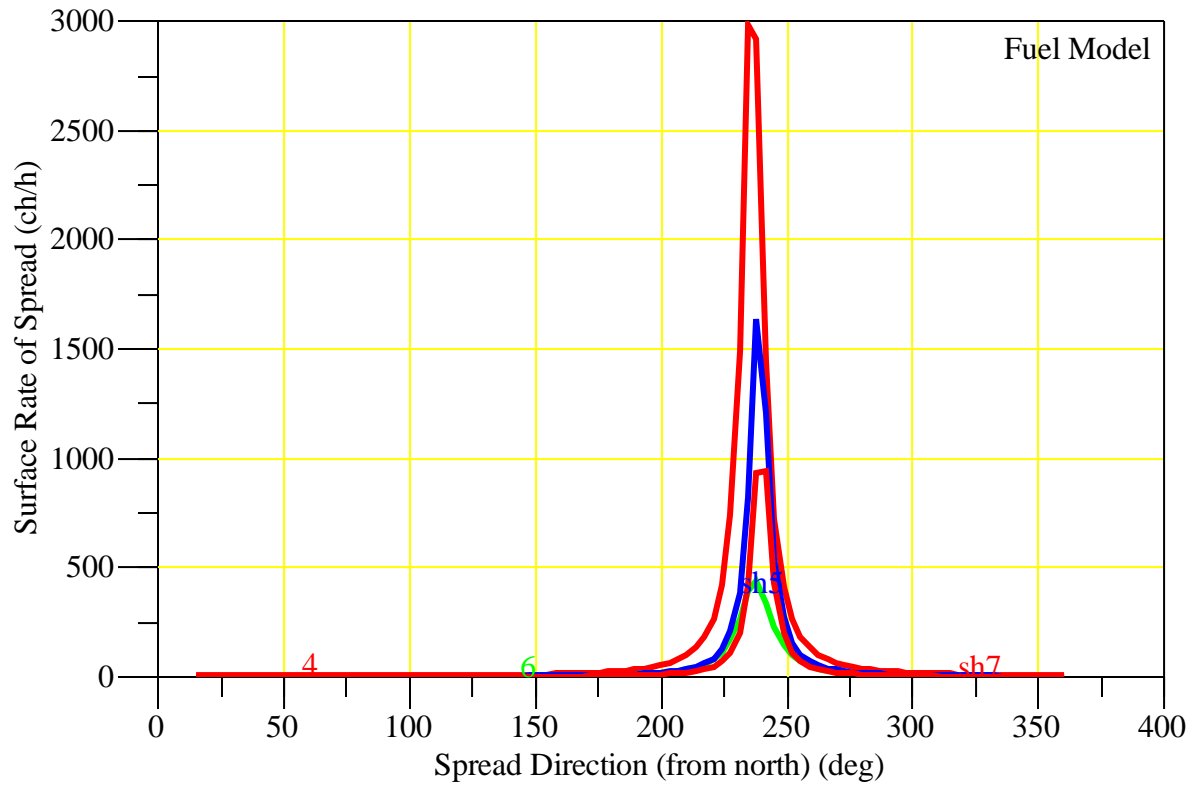
The Preserve at San Juan NE 65mph  
Flame Length (ft)

Spread Dir deg	Fuel Model			
	4	6	sh5	sh7
15	7.0	2.0	3.7	3.5
30	6.7	1.9	3.6	3.3
45	6.6	1.9	3.5	3.2
60	6.6	1.9	3.5	3.2
75	6.7	1.9	3.5	3.2
90	6.8	2.0	3.6	3.3
105	7.2	2.1	3.8	3.5
120	7.6	2.2	4.0	3.7
135	8.3	2.4	4.4	4.0
150	9.3	2.7	4.8	4.4
165	10.8	3.1	5.6	5.1
180	13.1	3.7	6.7	6.1
195	17.1	4.8	8.6	7.8
210	25.4	6.9	12.4	11.1
225	52.1	12.7	23.5	20.5
240	100.3	21.5	70.9	68.9
255	34.0	9.8	20.6	20.0
270	20.3	6.0	11.6	11.0
285	14.8	4.3	8.2	7.7
300	11.8	3.4	6.5	6.1
315	10.0	2.9	5.4	5.1
330	8.8	2.6	4.8	4.4
345	8.0	2.3	4.3	4.0
360	7.4	2.1	4.0	3.7



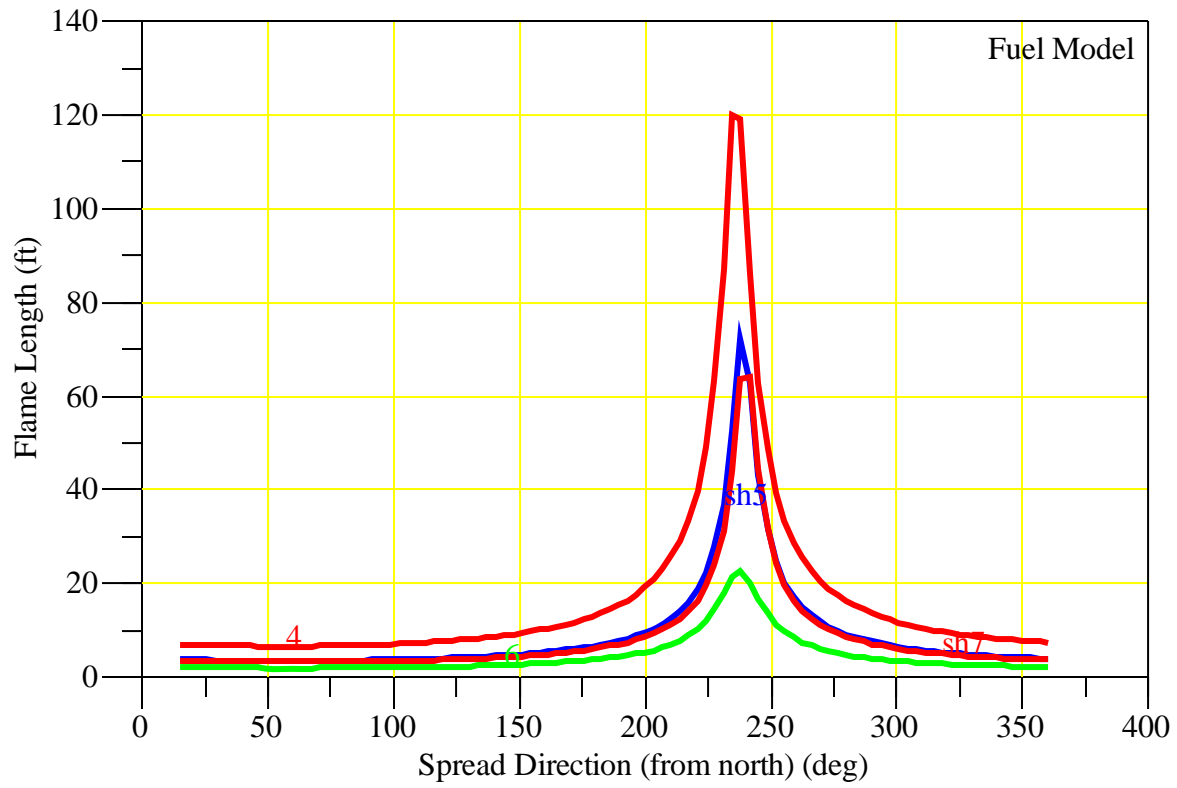


### The Preserve at San Juan NE 65mph





### The Preserve at San Juan NE 65mph





## Discrete Variable Codes Used The Preserve at San Juan NE 65mph

### Fuel Model

- 4 Chaparral (S)
- 6 Dormant brush, hardwood slash (S)
- sh5 High load, dry climate shrub (S) (145)
- sh7 Very high load, dry climate shrub (S) (147)



**Inputs: SURFACE**

Description \_\_\_\_\_ The Preserve at San Juan SW 30mph

**Fuel/Vegetation, Surface/Understory**

Fuel Model \_\_\_\_\_ 4, 6, sh5, sh7

**Fuel Moisture**

1-h Moisture % \_\_\_\_\_ 2

10-h Moisture % \_\_\_\_\_ 3

100-h Moisture % \_\_\_\_\_ 5

Live Herbaceous Moisture % \_\_\_\_\_ 30

Live Woody Moisture % \_\_\_\_\_ 50

**Weather**

20-ft Wind Speed mi/h \_\_\_\_\_ 30

Wind Adjustment Factor \_\_\_\_\_ .6

Wind Direction (from north) deg \_\_\_\_\_ 225

**Terrain**

Slope Steepness % \_\_\_\_\_ 200

Aspect deg \_\_\_\_\_ 200

**Fire**

Spread Direction (from north) deg \_\_\_\_\_ 15, 30, 45, 60, 75, 90, 105, 120,

**Run Option Notes**

Maximum reliable effective wind speed limit IS imposed [SURFACE].

Calculations are for the specified spread directions [SURFACE].

Fireline intensity, flame length, and spread distance are always for the direction of the spread calculations [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 Rate of Spread (ch/h) [SURFACE]

Flame Length (ft) [SURFACE]

(continued on next page)



Input Worksheet (continued)

Notes



The Preserve at San Juan SW 30mph  
Surface Rate of Spread (ch/h)

Spread Dir deg	Fuel Model			
	4	6	sh5	sh7
15	248.9	78.4	125.9	83.1
30	1614.6	419.0	982.6	680.5
45	402.4	114.1	179.4	104.8
60	105.4	31.8	46.9	28.0
75	47.3	14.5	21.2	12.8
90	27.3	8.4	12.3	7.5
105	18.2	5.6	8.2	5.0
120	13.4	4.2	6.1	3.7
135	10.5	3.3	4.8	2.9
150	8.8	2.7	4.0	2.5
165	7.7	2.4	3.5	2.2
180	7.0	2.2	3.2	2.0
195	6.6	2.1	3.0	1.9
210	6.4	2.0	3.0	1.8
225	6.5	2.1	3.0	1.9
240	6.8	2.2	3.1	1.9
255	7.4	2.3	3.4	2.1
270	8.4	2.6	3.9	2.4
285	9.9	3.1	4.6	2.9
300	12.4	3.9	5.7	3.6
315	16.5	5.2	7.7	4.8
330	23.9	7.6	11.2	7.0
345	39.5	12.5	18.7	11.8
360	80.3	25.5	38.6	24.7

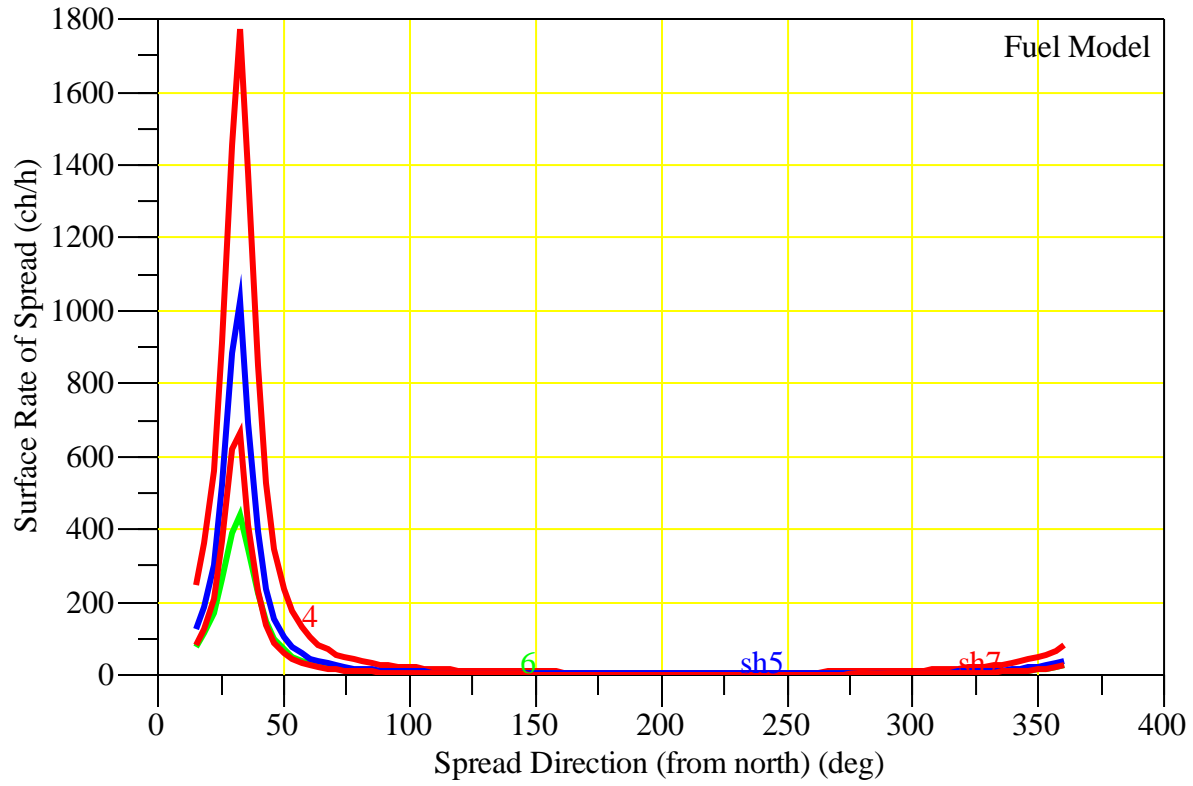


The Preserve at San Juan SW 30mph  
Flame Length (ft)

Spread Dir deg	Fuel Model			
	4	6	sh5	sh7
15	38.4	10.2	22.2	21.0
30	90.7	22.1	57.0	55.1
45	47.9	12.1	26.1	23.3
60	25.8	6.7	14.1	12.7
75	17.9	4.7	9.8	8.9
90	13.9	3.7	7.6	6.9
105	11.5	3.0	6.3	5.8
120	10.0	2.6	5.5	5.0
135	9.0	2.4	4.9	4.5
150	8.2	2.2	4.5	4.1
165	7.7	2.1	4.3	3.9
180	7.4	2.0	4.1	3.7
195	7.2	1.9	4.0	3.7
210	7.1	1.9	3.9	3.6
225	7.2	1.9	4.0	3.6
240	7.3	2.0	4.1	3.7
255	7.6	2.0	4.2	3.9
270	8.1	2.1	4.5	4.1
285	8.7	2.3	4.8	4.4
300	9.6	2.6	5.4	4.9
315	11.0	2.9	6.1	5.6
330	13.1	3.5	7.3	6.7
345	16.4	4.4	9.2	8.5
360	22.8	6.1	12.9	12.0



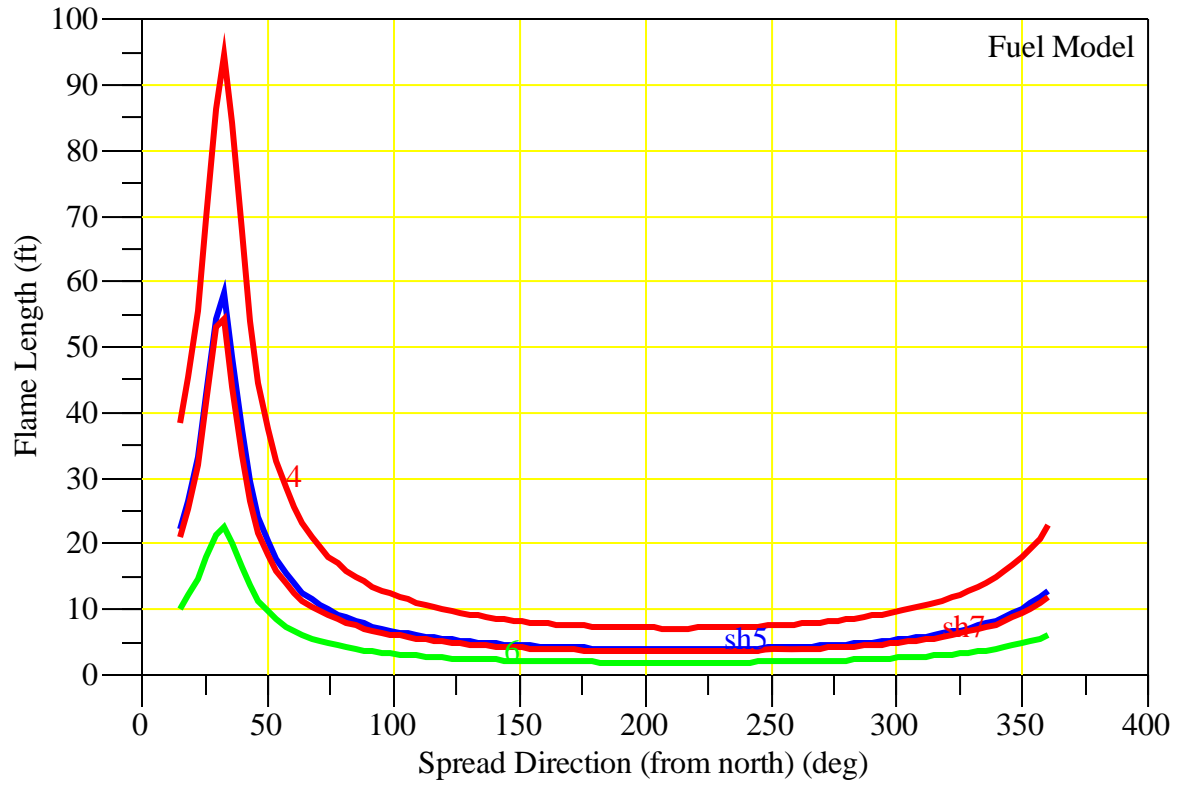
### The Preserve at San Juan SW 30mph







### The Preserve at San Juan SW 30mph





## Discrete Variable Codes Used The Preserve at San Juan SW 30mph

### Fuel Model

- 4 Chaparral (S)
- 6 Dormant brush, hardwood slash (S)
- sh5 High load, dry climate shrub (S) (145)
- sh7 Very high load, dry climate shrub (S) (147)

**Apeendix B: 2010 California Residential Code Section R327 & 2010  
California Fire Code Chapter 49**

**SECTION R327  
MATERIALS AND CONSTRUCTION METHODS FOR  
EXTERIOR WILDFIRE EXPOSURE**

**SECTION R327.1  
SCOPE, PURPOSE AND APPLICATION**

***R327.1.1 Scope.** This chapter applies to building materials, systems and or assemblies used in the exterior design and construction of new buildings located within a Wildland-Urban Interface Fire Area as defined in Section R327.2.*

***R327.1.2 Purpose.** The purpose of this Chapter is to establish minimum standards for the protection of life and prop-*

erty by increasing the ability of a building located in any Fire Hazard Severity Zone within State Responsibility Areas or any Wildland-Urban Interface Fire Area to resist the intrusion of flame or burning embers projected by a vegetation fire and contributes to a systematic reduction in conflagration losses.

**R327.1.3. Application.** *New buildings located in any Fire Hazard Severity Zone or any Wildland-Urban Interface Fire Area designated by the enforcing agency constructed after the application date shall comply with the provisions of this chapter.*

**Exceptions:**

1. *Buildings of an accessory character classified as a Group U occupancy and not exceeding 120 square feet in floor area, when located at least 30 feet from an applicable building.*
2. *Buildings of an accessory character classified as Group U occupancy of any size located least 50 feet from an applicable building.*
3. *Buildings classified as a Group U Agricultural Building, as defined in Section 202 of this code (see also Appendix C – Group U Agricultural Buildings), when located at least 50 feet from an applicable building.*
4. *Additions to and remodels of buildings originally constructed prior to the applicable application date.*

**R327.1.3.1 Application date and where required.** *New buildings for which an application for a building permit is submitted on or after July 1, 2008 located in any Fire Hazard Severity Zone or Wildland Interface Fire Area shall comply with all sections of this chapter, including all of the following areas:*

1. *All unincorporated lands designated by the State Board of Forestry and Fire Protection as State Responsibility Area (SRA) including:*
  - 1.1. *Moderate Fire Hazard Severity Zones*
  - 1.2. *High Fire Hazard Severity Zones*
  - 1.3. *Very-High Fire Hazard Severity Zones*
2. *Land designated as Very-High Fire Hazard Severity Zone by cities and other local agencies.*
3. *Land designated as Wildland Interface Fire Area by cities and other local agencies.*

**Exceptions:**

1. *New buildings located in any Fire Hazard Severity Zone within State Responsibility Areas, for which an application for a building permit is submitted on or after January 1, 2008, shall comply with all sections of this chapter.*

2. *New buildings located in any Fire Hazard Severity Zone within State Responsibility Areas or any Wildland Interface Fire Area designated by cities and other local agencies for which an application for a building permit is submitted on or after December 1, 2005 but prior to July 1, 2008 shall only comply with the following sections of this chapter:*

- 2.1. *Section R327.5 – Roofing*
- 2.2. *Section R327.6 – Vents*

**R327.1.4 Inspection and certification.** *Building permit applications and final completion approvals for buildings within the scope and application of this chapter shall comply with the following:*

1. *Building permit issuance. The local building official shall, prior to construction, provide the owner or applicant a certification that the building as proposed to be built complies with all applicable state and local building standards, including those for materials and construction methods for wildfire exposure as described in this chapter. Issuance of a building permit by the local building official for the proposed building shall be considered as complying with this section.*
2. *Building permit final. The local building official shall, upon completion of construction, provide the owner or applicant with a copy of the final inspection report that demonstrates the building was constructed in compliance with all applicable state and local building standards, including those for materials and construction methods for wildfire exposure as described in this Chapter. Issuance of a certificate of occupancy by the local building official for the proposed building shall be considered as complying with this section.*

**R327.1.5 Vegetation management compliance.** *Prior to building permit final approval, the property shall be in compliance with the vegetation management requirements prescribed in California Fire Code section 4906, including California Public Resources Code 4291 or California Government Code Section 51182. Acceptable methods of compliance inspection and documentation shall be determined by the enforcing agency and may include any of the following:*

1. *Local, state or federal fire authority or designee authorized to enforce vegetation management requirements*
2. *Enforcing agency*
3. *Third-party inspection and certification authorized to enforce vegetation management requirements*
4. *Property owner certification authorized by the enforcing agency*

## BUILDING PLANNING

### SECTION R327.2 DEFINITIONS

For the purposes of this chapter, certain terms are defined below:

**CDF DIRECTOR** means the Director of the California Department of Forestry and Fire Protection.

**EXTERIOR COVERING.** The exposed siding or cladding material applied to the exterior side of an exterior wall, roof eave soffit, floor projection or exposed underfloor framing.

**FIRE PROTECTION PLAN** is a document prepared for a specific project or development proposed for a Wildland-Urban Interface Fire Area. It describes ways to minimize and mitigate potential for loss from wildfire exposure. The Fire Protection Plan shall be in accordance with this chapter and the California Fire Code, Chapter 49. When required by the enforcing agency for the purposes of granting modifications, a fire protection plan shall be submitted. Only locally adopted ordinances that have been filed with the California Building Standards Commission or the Department of Housing and Community Development in accordance with Section 1.1.8 shall apply.

**FIRE HAZARD SEVERITY ZONES** are geographical areas designated pursuant to California Public Resources Codes Sections 4201 through 4204 and classified as Very-High, High or 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. See California Fire Code Article 86.

The California Code of Regulations, Title 14, Section 1280 entitles the maps of these geographical areas as "Maps of the Fire Hazard Severity Zones in the State Responsibility Area of California."

**HEAVY TIMBER.** A type of construction classification specified in Section 602 of the California Building Code. For use in this chapter, heavy timber shall be sawn lumber or glue laminated wood with the smallest minimum nominal dimension of 4 inches (102 mm). Heavy timber walls or floors shall be sawn or glue-laminated planks splined, tongue-and-grove, or set close together and well spiked.

**IGNITION-RESISTANT MATERIAL** A type of building material that resists ignition or sustained flaming combustion sufficiently so as to reduce losses from wildland-urban interface conflagrations under worst-case weather and fuel conditions with wildfire exposure of burning embers and small flames, as prescribed in Section R327.3 and SFM Standard 12-7A-5, Ignition-Resistant Material.

**LOCAL AGENCY VERY-HIGH FIRE HAZARD SEVERITY ZONE** means an area designated by a local agency upon the recommendation of the CDF Director pursuant to Government Code Sections 51177(c), 51178 and 5118 that is not a state responsibility area and where a local agency, city, county, city and county, or district is responsible for fire protection.

**LOG WALL CONSTRUCTION.** A type of construction in which exterior walls are constructed of solid wood members and where the smallest horizontal dimension of each solid wood member is at least 6 inches (152 mm).

**RAFTER TAIL.** The portion of roof rafter framing in a sloping roof assembly that projects beyond and overhangs an exterior wall.

**ROOF EAVE.** The lower portion of a sloping roof assembly that projects beyond and overhangs an exterior wall at the lower end of the rafter tails. Roof eaves may be either "open" or "enclosed." Open roof eaves have exposed rafter tails and an unenclosed space on the underside of the roof deck. Enclosed roof eaves have a boxed-in roof eave soffit with a horizontal underside or sloping rafter tails with an exterior covering applied to the underside of the rafter tails.

**ROOF EAVE SOFFIT.** An enclosed boxed-in soffit under a roof eave with exterior covering material applied to the soffit framing creating a horizontal surface on the exposed underside.

**STATE RESPONSIBILITY AREA** means lands that are classified by the Board of Forestry pursuant to Public Resources Code Section 4125 where the financial responsibility of preventing and suppressing forest fires is primarily the responsibility of the state.

**WILDFIRE** is any uncontrolled fire spreading through vegetative fuels that threatens to destroy life, property or resources as defined in Public Resources Code Sections 4103 and 4104.

**WILDFIRE EXPOSURE** is 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 FIRE AREA** is a geographical area identified by the state as a "Fire Hazard Severity Zone" in accordance with the Public Resources Code Sections 4201 through 4204 and Government Code Sections 51175 through 51189, or other areas designated by the enforcing agency to be at a significant risk from wildfires.

### SECTION R327.3 STANDARDS OF QUALITY

**R327.3.1 General.** Building material, systems, assemblies and methods of construction used in this chapter shall be in accordance with Section R327.3.

**R327.3.2 Qualification by testing.** Material and material assemblies tested in accordance with the requirements of Section R327.3 shall be accepted for use when the results and conditions of those tests are met. Product evaluation testing of material and material assemblies shall be approved or listed by the State Fire Marshal, or identified in a current report issued by an approved agency.

**R327.3.3 Approved agency.** Product evaluation testing shall be performed by an approved agency as defined in Section 1702 of the California Building Code. The scope of accreditation for the approved agency shall include building product compliance with code.

**R327.3.4 Labeling.** Material and material assemblies tested in accordance with the requirements of section R327.3 shall bear an identification label showing the fire test results. That identification label shall be issued by a

testing and/or inspecting agency approved by the State Fire Marshal.

1. Identification mark of the approved testing and/or inspecting agency
2. Contact and identification information of the manufacturer
3. Model number or identification of the product or material
4. Pre-test weathering specified in this chapter
5. Compliance standard as described under Section R327.3.7

#### **R327.3.5 Weathering and surface treatment protection.**

**R327.3.5.1 General.** Material and material assemblies tested in accordance with the requirements of Section R327.3 shall maintain their fire test performance under conditions of use when installed in accordance with the manufacturers instructions.

**R327.3.5.2 Weathering.** Fire-retardant-treated wood and fire-retardant-treated wood shingles and shakes shall meet the fire test performance requirements of this chapter after being subjected to the weathering conditions contained in the following standards, as applicable to the materials and the conditions of use.

**R327.3.5.2.1 Fire-retardant-treated wood.** Fire-retardant-treated wood shall be tested in accordance with ASTM D 2898, "Standard Practice for Accelerated Weathering of Fire-Retardant Treated Wood for Fire Testing (Method A)" and the requirements of Section 2303.2 of the California Building Code.

**R327.3.5.2.2 Fire-retardant-treated wood shingles and shakes.** Fire-retardant-treated wood shingles and shakes shall be approved and listed by the State Fire Marshal in accordance with Section 208(c), Title 19 California Code of Regulations.

**R327.3.5.3 Surface treatment protection.** The use of paints, coatings, stains or other surface treatments are not an approved method of protection as required in this section.

**R327.3.6 Alternates for materials, design, tests and methods of construction.** The enforcing agency is permitted to modify the provisions of this chapter for site-specific conditions in accordance with Section 1.11.2.4. When required by the enforcing agency for the purposes of granting modifications, a fire protection plan shall be submitted in accordance with the California Fire Code, Chapter 49.

**R327.3.7 Standards of quality.** The State Fire Marshal standards for exterior wildfire exposure protection listed below and as referenced in this chapter are located in the California Referenced Standards Code, Part 12 and Chapter 44 of this code.

**SFM Standard 12-7A-1, Exterior Wall Siding and Sheathing.** A fire resistance test standard consisting of a

150 kW intensity direct flame exposure for a 10 minutes duration.

**SFM Standard 12-7A-2, Exterior Windows.** A fire resistance test standard consisting of a 150 kW intensity direct flame exposure for a 8 minutes duration.

**SFM Standard 12-7A-3, Horizontal Projection Under-side.** A fire resistance test standard consisting of a 300 kW intensity direct flame exposure for a 10 minute duration.

**SFM Standard 12-7A-4, Decking.** A two-part test consisting of a heat release rate (Part A) deck assembly combustion test with an under deck exposure of 80 kW intensity direct flame for a 3 minute duration, and a (Part B) sustained deck assembly combustion test consisting of a deck upper surface burning ember exposure with a 12 mph wind for 40 minutes using a 2.2lb (1kg) burning "Class A" size 12 inch x 12 inch x 2.25inch (300 mm x 300 mm x 57mm) roof test brand.

**SFM Standard 12-7A-4A, Decking Alternate Method A.** A heat release rate deck assembly combustion test with an under deck exposure of 80 kW intensity direct flame for a 3 minute duration,

**SFM Standard 12-7A-5, Ignition-resistant Material.** A generic building material surface burning flame spread test standard consisting of an extended 30 minute ASTM E 84 or UL 723 test method as is used for Fire-Retardant-Treated wood.

### **SECTION R327.4 IGNITION RESISTANT CONSTRUCTION**

**R327.4.1 General.** The materials prescribed herein for ignition resistance shall conform to the requirements of this chapter.

**R327.4.2 Ignition-resistant material.** Ignition-resistant material shall be determined in accordance with the test procedures set forth in SFM Standard 12-7A-5 "Ignition-Resistant Material" or in accordance with this section.

**R327.4.3 Alternative methods for determining ignition-resistant material.** Any one of the following shall be accepted as meeting the definition of ignition-resistant material:

1. Noncombustible material. Material that complies with the definition for noncombustible materials in Section R202.
2. Fire-retardant-treated wood. Fire-retardant-treated wood identified for exterior use that complies with the requirements of Section 2303.2 of the California Building Code.
3. Fire-retardant-treated wood shingles and shakes. Fire-retardant-treated wood shingles and shakes, as defined in Section 1505.6 of the California Building Code and listed by State Fire Marshal for use as "Class B" roof covering, shall be accepted as an igni-

## BUILDING PLANNING

tion-resistant wall covering material when installed over solid sheathing.

### SECTION R327.5 ROOFING

**R327.5.1 General.** Roofs shall comply with the requirements of Sections R327 and R902. Roofs shall have a roofing assembly installed in accordance with its listing and the manufacturer's installation instructions.

**R327.5.2 Roof coverings.** Where the roof profile allows a space between the roof covering and roof decking, the spaces shall be constructed to prevent the intrusion of flames and embers, be firestopped with approved materials or have one layer of minimum 72 pound (32.4 kg) mineral-surfaced nonperforated cap sheet complying with ASTM D 3909 installed over the combustible decking.

**R327.5.3 Roof valleys.** Where valley flashing is installed, the flashing 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 D 3909, at least 36-inch-wide (914 mm) running the full length of the valley.

**R327.5.4 Roof gutters.** Roof gutters shall be provided with the means to prevent the accumulation of leaves and debris in the gutter.

### SECTION R327.6 VENTS

**R327.6.1 General.** Where provided, 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 shall be in accordance with Section 1203 of the California Building Code and Sections R327.6.1 through R327.6.3 of this section to resist building ignition from the intrusion of burning embers and flame through the ventilation openings.

**R327.6.2 Requirements.** 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 the following requirements:

1. The dimensions of the openings therein shall be a minimum of  $\frac{1}{16}$ th inch (1.6 mm) and shall not exceed  $\frac{1}{8}$ th inch (3.2mm).
2. The materials used shall be noncombustible.  
*Exception:* Vents located under the roof covering, along the ridge of roofs, with the exposed surface of the vent covered by noncombustible wire mesh, may be of combustible materials.
3. The materials used shall be corrosion resistant.

**R327.6.3 Ventilation openings on the underside of eaves and cornices:** Vents shall not be installed on the underside of eaves and cornices.

#### Exceptions:

1. The enforcing agency may accept or approve special eave and cornice vents that resist the intrusion of flame and burning embers.
2. Vents complying with the requirements of Section R327.6.2 may be installed on the underside of eaves and cornices in accordance with either one of the following conditions:
  - 2.1. The attic space being ventilated is fully protected by an automatic sprinkler system installed in accordance with Section 903.3.1.1 of the California Building Code or,
  - 2.2. The exterior wall covering and exposed underside of the eave are of noncombustible material, or ignition-resistant materials as determined in accordance with SFM Standard 12-7A-5 Ignition-Resistant Material and the vent is located more than 12 feet from the ground or walking surface of a deck, porch, patio, or similar surface.

### SFM-SECTION R327.7 EXTERIOR COVERING

**R327.7.1 Scope.** The provisions of this section shall govern the materials and construction methods used to resist building ignition and/or safeguard against the intrusion of flames resulting from small ember and short-term direct flame contact exposure.

**R327.7.2 General.** The following exterior covering materials and/or assemblies shall comply with this section:

1. Exterior wall covering material
2. Exterior wall assembly
3. Exterior exposed underside of roof eave overhangs
4. Exterior exposed underside of roof eave soffits
5. Exposed underside of exterior porch ceilings
6. Exterior exposed underside of floor projections
7. Exterior underfloor areas

#### Exceptions:

1. Exterior wall architectural trim, embellishments, fascias, and gutters
2. Roof or wall top cornice projections and similar assemblies
3. Roof assembly projections over gable end walls



4. Solid wood rafter tails and solid wood blocking installed between rafters having minimum dimension 2 inch (50.8 mm) nominal
5. Deck walking surfaces shall comply with Section R327.9 only

**R327.7.3. Exterior walls.** The exterior wall covering or wall assembly shall comply with one of the following requirements:

1. Noncombustible material
2. Ignition-resistant material
3. Heavy-timber exterior wall assembly
4. Log wall construction assembly
5. 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

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

1. One layer of  $\frac{5}{8}$ -inch Type X gypsum sheathing applied behind the exterior covering or cladding on the exterior side of the framing.
2. 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 Association Fire Resistance Design Manual.

**R327.7.3.1 Extent of exterior wall covering.** Exterior wall coverings shall extend from the top of the foundation to the roof, and terminate at 2 inch (50.8 mm) nominal solid wood blocking between rafters at all roof overhangs, or in the case of enclosed eaves, terminate at the enclosure.

**R327.7.4 Open roof eaves.** The exposed roof deck on the underside of unenclosed roof eaves shall consist of one of the following:

1. Noncombustible material
2. Ignition-resistant material
3. One layer of  $\frac{5}{8}$ -inch Type X gypsum sheathing applied behind an exterior covering on the underside exterior of the roof deck
4. 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

**R327.7.5 Enclosed roof eaves and roof eave soffits.** The exposed underside of enclosed roof eaves having either a boxed-in roof eave soffit with a horizontal underside, or sloping rafter tails with an exterior covering applied to the underside of the rafter tails, shall be protected by one of the following:

1. Noncombustible material
2. Ignition-resistant material
3. One layer of  $\frac{5}{8}$ -inch Type X gypsum sheathing applied behind an exterior covering on the underside of the rafter tails or soffit
4. 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
5. 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

**R327.7.6 Exterior porch ceilings.** The exposed underside of exterior porch ceilings shall be protected by one of the following:

1. Noncombustible material
2. Ignition-resistant material
3. One layer of  $\frac{5}{8}$ -inch Type X gypsum sheathing applied behind the exterior covering on the underside of the ceiling
4. The exterior portion of a 1-hour fire resistive exterior wall assembly applied to the underside of the ceiling assembly including assemblies using the gypsum panel and sheathing products listed in the Gypsum Association Fire Resistance Design Manual
5. Porch ceiling assemblies with a horizontal underside that meet the performance criteria in accordance with the test procedures set forth in SFM Standard 12-7A-3

**Exception:** Architectural trim boards.

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**R327.7.7 Floor projections.** The exposed underside of a cantilevered floor projection where a floor assembly extends over an exterior wall shall be protected by one of the following:

1. Noncombustible material
2. Ignition-resistant material
3. One layer of  $5/8$ -inch Type X gypsum sheathing applied behind an exterior covering on the underside of the floor projection
4. The exterior portion of a 1-hour fire resistive exterior wall assembly applied to the underside of the floor projection including assemblies using the gypsum panel and sheathing products listed in the Gypsum Association Fire Resistance Design Manual
5. The underside of a floor projection assembly that meet the performance criteria in accordance with the test procedures set forth in SFM Standard 12-7A-3

**Exception:** Architectural trim boards.

**R327.7.8. Underfloor protection.** The underfloor area of elevated or overhanging buildings shall be enclosed to grade in accordance with the requirements of this chapter or the underside of the exposed underfloor shall consist of one of the following:

1. Noncombustible material
2. Ignition-resistant material
3. One layer of  $5/8$ -inch Type X gypsum sheathing applied behind an exterior covering on the underside of the floor projection
4. The exterior portion of a 1-hour fire resistive exterior wall assembly applied to the underside of the floor including assemblies using the gypsum panel and sheathing products listed in the Gypsum Association Fire Resistance Design Manual
5. The underside of a floor assembly that meets the performance criteria in accordance with the test procedures set forth in SFM Standard 12-7A-3

**Exception:** Heavy-timber structural columns and beams do not require protection.

**R327.7.9 Underside of appendages.** When required by the enforcing agency the underside of overhanging appendages shall be enclosed to grade in accordance with the requirements of this chapter or the underside of the exposed underfloor shall consist of one of the following:

1. Noncombustible material
2. Ignition-resistant material
3. One layer of  $5/8$ -inch Type X gypsum sheathing applied behind an exterior covering on the underside of the floor projection
4. The exterior portion of a 1-hour fire resistive exterior wall assembly applied to the underside of the floor including assemblies using the gypsum panel and sheathing products listed in the Gypsum Association Fire Resistance Design Manual

5. The underside of a floor assembly that meets the performance criteria in accordance with the test procedures set forth in SFM Standard 12-7A-3

**Exception:** Heavy-timber structural columns and beams do not require protection.

## SECTION R327.8 EXTERIOR WINDOWS AND DOORS

### R327.8.1 General.

**R327.8.2 Exterior glazing.** The following exterior glazing materials and/or assemblies shall comply with this section:

1. Exterior windows
2. Exterior glazed doors
3. Glazed openings within exterior doors
4. Glazed openings within exterior garage doors
5. Exterior structural glass veneer

**R327.8.2.1 Exterior windows and exterior glazed door assembly requirements.** Exterior windows and exterior glazed door assemblies shall comply with one of the following requirements:

1. Be constructed of multipane glazing with a minimum of one tempered pane meeting the requirements of Section 2406 Safety Glazing, or
2. Be constructed of glass block units, or
3. Have a fire-resistance rating of not less than 20 minutes when tested according to NFPA 257, or
5. Be tested to meet the performance requirements of SFM Standard 12-7A-2.

**R327.8.2.2 Structural glass veneer.** The wall assembly behind structural glass veneer shall comply with Section R327.7.3.

**R327.8.3 Exterior doors.** Exterior doors shall comply with one of the following:

1. The exterior surface or cladding shall be of noncombustible or ignition-resistant material, or
2. Shall be constructed of solid core wood that comply with the following requirements:
  - 2.1. Stiles and rails shall not be less than  $1\frac{3}{8}$  inches thick
  - 2.2. Raised panels shall not be less than  $1\frac{1}{4}$  inches thick, except for the exterior perimeter of the raised panel that may taper to a tongue not less than  $\frac{3}{8}$  inch thick.
3. Shall have a fire-resistance rating of not less than 20 minutes when tested according to NFPA 252.
4. Shall be tested to meet the performance requirements of SFM Standard 12-7A-1.

**R327.8.3.1 Exterior door glazing.** Glazing in exterior doors shall comply with Section R327.8.2.1.

### **SECTION R327.9 DECKING**

**R327.9.1 General.** The walking surface material of decks, porches, balconies and stairs shall comply with the requirements of this section.

**R327.9.2 Where required.** The walking surface material of decks, porches, balconies and stairs shall comply with the requirements of this section when any portion of such surface is within 10 feet (3048 mm) of the building.

**R327.9.3 Decking surfaces.** The walking surface material of decks, porches, balconies and stairs shall be constructed with one of the following materials:

1. Ignition-resistant material that complies with the performance requirements of both SFM Standard 12-7A-4 and SFM Standard 12-7A-5
2. Exterior fire retardant treated wood
3. Noncombustible material
4. Any material that complies with the performance requirements of SFM Standard 12-7A-4A when attached exterior wall covering is also either noncombustible or ignition-resistant material

**Exception:** Wall material may be of any material that otherwise complies with this chapter when the decking surface material complies with the performance requirements ASTM E 84 with a Class B flame spread rating.

### **SECTION R327.10 ACCESSORY STRUCTURES**

**R327.10.1 General.** Accessory and miscellaneous structures, other than buildings covered by Section R327.1.3, which pose a significant exterior exposure hazard to applicable buildings during wildfires shall be constructed to conform to the ignition resistance requirements of this section.

**R327.10.2 Applicability.** The provisions of this section shall apply to trellises, arbors, patio covers, carports, gazebos and similar structures of an accessory or miscellaneous character.

**Exceptions:**

1. Decks shall comply with the requirements of Section R327.9.
2. Awnings and canopies shall comply with the requirements of Section 3105 of the California Building Code.

**R327.10.3 Where required.** Accessory structures shall comply with the requirements of this section.

**R327.10.3.1 Attached accessory structures shall comply with the requirements of this section.**

**R327.10.3.2** When required by the enforcing agency, detached accessory structures within 50 feet of an applicable building shall comply with the requirements of this section.

**R327.10.4. Requirements.** When required by the enforcing agency accessory structures shall be constructed of noncombustible or ignition-resistant materials.

## CHAPTER 49

# REQUIREMENTS FOR WILDLAND-URBAN INTERFACE FIRE AREAS

### SECTION 4901 GENERAL

**4901.1 Scope.** The mitigation of conditions where a wildfire burning in vegetative fuels may readily transmit fire to buildings and threaten to destroy life, overwhelm fire suppression capabilities, or result in large property losses shall comply with this chapter.

**4901.2 Purpose.** The purpose of this code is to provide minimum standards to increase the ability of a building to resist the intrusion of flame or burning embers being projected by a vegetation fire and contributes to a systematic reduction in conflagration losses through the use of performance and prescriptive requirements.

### SECTION 4902 DEFINITIONS

**4902.1 General.** For the purpose of this chapter, certain terms are defined as follows:

**CDF DIRECTOR.** The Director of the California Department of Forestry and Fire Protection.

**FIRE PROTECTION PLAN** is a document prepared for a specific project or development proposed for a Wildland-Urban Interface Fire Area. It describes ways to minimize and mitigate potential for loss from wildfire exposure.

The Fire Protection Plan shall be in accordance with this chapter. When required by the enforcing agency for the purposes of granting modifications, a fire protection plan shall be submitted. Only locally adopted ordinances that have been filed with the California Building Standards Commission in accordance with Section 101.14 or the Department of Housing and Community Development in accordance with Section 101.15 shall apply.

**FIRE HAZARD SEVERITY ZONES** are geographical areas designated pursuant to California Public Resources Codes Sections 4201 through 4204 and classified as Very High, High, or 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 the maps of these geographical areas as "Maps of the Fire Hazard Severity Zones in the State Responsibility Area of California."

**LOCAL AGENCY VERY-HIGH FIRE HAZARD SEVERITY ZONE** means an area designated by a local agency upon the recommendation of the CDF Director pursuant to Government Code Sections 51177(c), 51178 and 51189 that is not a state responsibility area and where a local agency, city, county, city and county, or district is responsible for fire protection.

**STATE RESPONSIBILITY AREA** means lands that are classified by the Board of Forestry pursuant to Public Resources

Code Section 4125 where the financial responsibility of preventing and suppressing forest fires is primarily the responsibility of the state.

**WILDFIRE** is any uncontrolled fire spreading through vegetative fuels that threatens to destroy life, property, or resources as defined in Public Resources Code Sections 4103 and 4104.

**WILDFIRE EXPOSURE** is 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 FIRE AREA** is a geographical area identified by the state as a "Fire Hazard Severity Zone" in accordance with the Public Resources Code Sections 4201 through 4204 and Government Code Sections 51175 through 51189, or other areas designated by the enforcing agency to be at a significant risk from wildfires. See Article 86B for the applicable referenced sections of the Government Code and the Public Resources Code.

### SECTION 4903 PLANS [RESERVED]

### SECTION 4904 FIRE HAZARD SEVERITY ZONES

**4904.1 General.** Lands in the state are classified by the CDF Director in accordance with the severity of wildfire hazard expected to prevail in those areas and the responsibility for fire protection, so that measures may be identified which will reduce the potential for losses to life, property and resources from wildfire.

**4904.2 Classifications.** The CDF Director classifies lands into fire hazard severity zones in accordance with California Public Resources Code Sections 4201 through 4204 for State Responsibility Areas and in accordance with Government Code Sections 51175 through 51189 for areas where a local agency is responsible for fire protection.

### SECTION 4905 WILDFIRE PROTECTION BUILDING CONSTRUCTION

**4905.1 General.** Materials and construction methods for exterior wildfire exposure protection shall be applied within geographical areas where a wildfire burning in vegetative fuels may readily transmit fire to buildings and threaten to destroy life, overwhelm fire suppression capabilities, or result in large property losses.

**4905.2 Construction methods and requirements within established limits.** Within the limits established by law, construction methods intended to mitigate wildfire exposure shall comply with the wildfire protection building construction requirements

contained in the California Building Standards Code including the following:

1. California Building Code Chapter 7A,
2. California Residential Code Section R327,
3. California Reference Standards Code Chapter 12-7A
4. and this chapter.

*Buildings and structures within the Very-High Fire Hazard Severity Zones of a Local Responsibility Areas (LRA) shall maintain defensible space as outlined in Government Code 51175 – 51189 and any local ordinance of the authority having jurisdiction.*

**4905.3 Establishment of limits.** *The establishment of limits for the Wildland-Urban Interface Fire Area's required construction methods shall be designated pursuant to the California Public Resources Code for State Responsibility areas or by a local agency following a finding supported by substantial evidence in the record that the requirements of this section are necessary for effective fire protection within the area.*

### **SECTION 4906 HAZARDOUS VEGETATION AND FUEL MANAGEMENT**

**4906.1 General.** *Hazardous vegetation and fuels shall be managed to reduce the severity of potential exterior wildfire exposure to buildings and to reduce the risk of fire spreading to buildings as required by applicable laws and regulations.*

**4906.2 Application.** *Buildings and structures located in the following areas shall maintain the required hazardous vegetation and fuel management:*

1. All unincorporated lands designated by the State Board of Forestry and Fire Protection as State Responsibility Area (SRA) including:
  - 1.1. Moderate Fire Hazard Severity Zones
  - 1.2. High Fire Hazard Severity Zones
  - 1.3. Very-High Fire Hazard Severity Zones
2. Land designated as Very-High Fire Hazard Severity Zone by cities and other local agencies.

**4906.3 Requirements.** *Hazardous vegetation and fuels around all applicable buildings and structures shall be maintained in accordance with the following laws and regulations:*

1. Public Resources Code Section 4291
2. California Code of Regulations, Title 14, Division 1.5, Chapter 7, Subchapter 3, Section 1299 (see guidance for implementation "General Guideline to Create Defensible Space")
3. California Government Code Section 51182
4. California Code of Regulations, Title 19, Division 1, Chapter 7, Subchapter 1, Section 3.07

### **SECTION 4907 DEFENSIBLE SPACE**

**4907.1 General.** *Defensible space will be maintained around all buildings and structures in State Responsibility Area (SRA) as required in Public Resources Code 4290 and "SRA Fire Safe Regulations" California Code of Regulations, Title 14, Division 1.5, Chapter 7, Subchapter 2, Section 1270.*

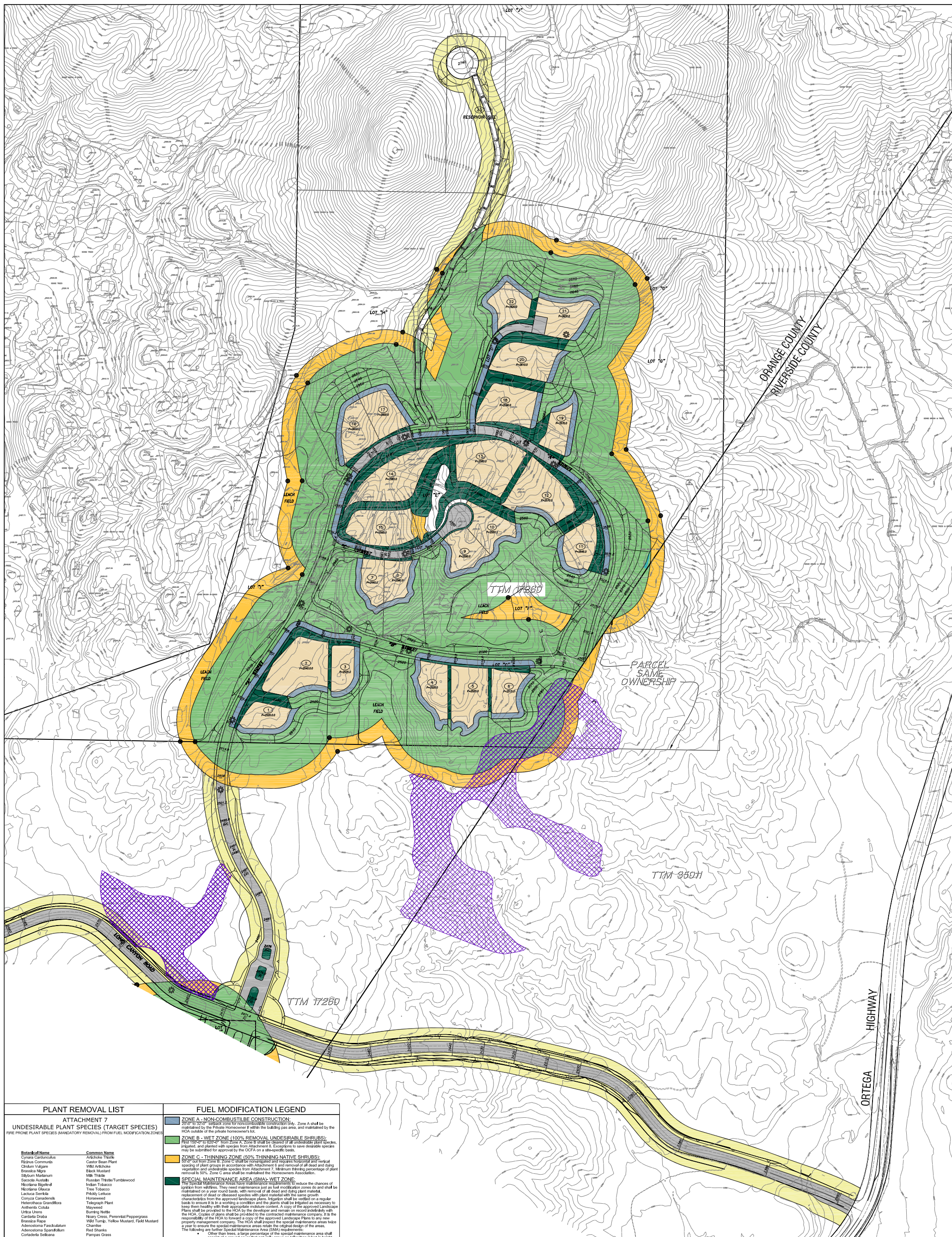
Appendix C: 11x17 Copy of the Fire Master Plan and  
Fuel Modification Plan











PLANT REMOVAL LIST	
ATTACHMENT 7 UNDESIRABLE PLANT SPECIES (TARGET SPECIES) FIRE PRONE PLANT SPECIES (MANDATORY REMOVAL) FROM FUEL MODIFICATION ZONES	
<b>Botanical Name</b>	<b>Common Name</b>
<i>Synara Carolinensis</i>	Artichoke Thistle
<i>Rhus Corchorifolia</i>	Castor Bean Plant
<i>Clarkia virginica</i>	Wild Arishole
<i>Brassica nigra</i>	Black Mustard
<i>Silphium laciniatum</i>	Milk Thistle
<i>Sarcobatus</i>	Russet Thistle/Tumbleweed
<i>Nicotiana glauca</i>	Indian Tobacco
<i>Nicotiana glauca</i>	Tree Tobacco
<i>Lactuca scariola</i>	Picky Lettuce
<i>Gnaphalium</i>	Honeyweed
<i>Heterotheca grandiflora</i>	Telegraph Plant
<i>Verbena</i>	Mayweed
<i>Urtica dioica</i>	Burning Nettle
<i>Cardaria draba</i>	Noory Cross, Parental Peppergrass
<i>Bromus tectorum</i>	Wild Tump, Yellow Mustard, Field Mustard
<i>Chenille</i>	Red Shank
<i>Adiantum species</i>	Pampas Grass
<i>Cortaderia setacea</i>	California Sagebrush
<i>Elaeagnus fasciculata</i>	Common Buckwheat
<i>Suaeda meliora</i>	Black Sage
<b>Ornamentals</b>	
<i>Convolvulus</i>	Pampas Grass
<i>Cyperus</i>	Elymus
<i>Eucalyptus</i>	Jambur
<i>Jambur</i>	Pine

FUEL MODIFICATION LEGEND	
	<b>ZONE A - NON-COMBUSTIBLE CONSTRUCTION:</b> 20'0" to 30'0" setback zone for non-combustible construction only. Zone A shall be maintained by the Private Homeowner if within the building's use area and maintained by the HOA outside of the private homeowner's lot.
	<b>ZONE B - WET ZONE (100% REMOVAL UNDESIRABLE SHRUBS):</b> 100% removal of all undesirable plant species, irrigated and planted with species from Attachment 8. Exemptions to save desirable species may be submitted for approval by the OCFA on a site-specific basis.
	<b>ZONE C - THINNING ZONE (50% THINNING NATIVE SHRUBS):</b> 50% cut from Zone B. Zone C shall be non-irrigated and requires horizontal and vertical spacing of plant groups in accordance with Attachment 8. Minimum thinning percentage of plant removal is 50%. Zone C areas shall be maintained by the Homeowner Association.
	<b>SPECIAL MAINTENANCE AREA (SMA) - WET ZONE:</b> The Special Maintenance Area (SMA) shall be established to reduce the chances of ignition from wildfires. They need maintenance just as fuel modification zones do and shall be maintained on a year-round basis with removal of all dead and dying plant material, replacement of dead or diseased species with plant material with the same growth characteristics from the approved landscape plan. Irrigation shall be installed on a regular basis to ensure it is in a working condition and the plants shall be irrigated as necessary to keep them healthy with their appropriate maintenance content. A copy of the approved Landscape Plans shall be provided to the HOA by the developer and remain on record indefinitely with the HOA. Copies of plans shall be provided to the contracted maintenance company. It is the responsibility of the HOA to forward a copy of the approved Landscape Plans to any new property management company. The HOA shall inspect the special maintenance areas twice a year to ensure the special maintenance areas match the original design of the areas. The following are further Special Maintenance Area (SMA) requirements: <ul style="list-style-type: none"> <li>Other than trees, a large percentage of the special maintenance area shall consist of a ground cover that naturally grows no taller than 2 feet in height.</li> <li>The areas are completely irrigated and have plants that need irrigation to retain healthy fuel reduction.</li> <li>Any dead and dying specimens and branches shall be removed.</li> <li>Leaf litter on top of vegetation cover shall be removed.</li> <li>Landscape design plans shall be established by the HOA indefinitely and the plants shall always remain as they were designed.</li> <li>As plants migrate or new plants seed-in, those shall be removed to retain the original design.</li> <li>Future changes to slope designs shall be approved by OCFA.</li> <li>The maintenance requirements of the special maintenance areas shall be factored into the landscaping with the fuel modification zones.</li> <li>Special Maintenance Areas shall be designed and also maintained as to not provide direct flame or an excessive amount of radiant heat on structures.</li> <li>Special Maintenance Areas will have a limited use of native grasses as approved by OCFA.</li> </ul>
	<b>ROADSIDE CLEARANCE AND PLANTING:</b> 2'-2'-2' clearance by the HOA - fuel modification consists of removal of all undesirable plant species and thinning of at least 50% of all existing vegetation beyond the right-of-way. Any plant material installed must be fully irrigated and from the approved plan list.
	<b>POTENTIAL FUTURE VINEYARDS:</b> Vineyards to be cut back after harvest per industry standards

SYMBOL LEGEND	
	<b>ACCESS POINT</b> Access points for emergency and maintenance access assessments within every 500 feet of the fuel modification area. Access assessments shall have a minimum 10-foot width; alternatively, 3-foot wide assessments provided every 250 feet may be acceptable. Any gates installed into the fuel modification area and shall be a minimum of 36 inches wide. The assessments shall be maintained free of vegetation or any structures greater than 2 inches in height.
	<b>IDENTIFICATION MARKER</b> Identification markers shall be constructed to identify the limits of applicable fuel modification zones. Marker design shall be 2'-2'-2' tall, long galvanized steel, spaced 100 feet apart. The construction of the marker shall be laid out top for Zone B and 2' tape bands at top for Zone C. Exposed pipe 2" or above diameter minimum.
	<b>LOW PROFILE VENTING</b> Structures within the Fuel Modification shall have low profile vents on the side facing the fuel modification as indicated on this plan.
	<b>CONSTRUCTION REQUIREMENTS</b> All structures within The Preserve San Juan project will be constructed per the 2010 California Residential Code Section R327. Additionally all structures shall be protected with NFPA 13D Automatic Fire Sprinklers including attic spaces.

NO.	DATE	REVISIONS
1		
2		
3		
4		

PREPARED FOR:  
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SCALE: 1" = 100'-0"

0 100' 200' 300' 400'

NORTH

THE PRESERVE AT SAN JUAN PLAN SET: "A"  
PLAN CONTROL DATE: 10/16/2013

CONCEPTUAL FUEL MODIFICATION  
**THE PRESERVE AT SAN JUAN**  
VESTING TENTATIVE TRACT 17269 & 17270  
UNINCORPORATED ORANGE COUNTY, CA  
OCFA REVISION SR# 190994  
**ORANGE COUNTY FIRE AUTHORITY**

SHEET  
**CFM-2**  
OF 2

S:\Preserve-2012\Cad Files\PreserveSJ-FuelMod.dwg , Jerry Canales P\lot date: October 25, 2013

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