FIRE PROTECTION PLAN
University Villages – Villages 3 North and Portion of Village 4

Prepared for:

SSBT LCREV, LLC c/o:
Meadow Lane, LLC
1392 East Palomar Street, Suite 202
Chula Vista, California 91913

Prepared by:

DUDEK
605 Third Street
Encinitas, California 92024

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EXECUTIVE SUMMARY

This document addresses fire protection for the University Villages – Village 3 North and a Portion of Village 4 Project in Chula Vista, San Diego County, California. This Fire Protection Plan (FPP) provides measures for fire protection that meet Chula Vista Fire and Building Codes. Fire protection measures are provided based on code requirements and the analyzed fire risk associated with the Project's proposed land uses. The fire risk analysis forms the basis for identifying requirements for fuel modification, building design and construction and other pertinent development infrastructure criteria for fire protection. The primary focus of this FPP is providing an implementable framework for suitable protection of the planned structures and the people living and utilizing them. Tasks completed in the preparation of this FPP include data review, code review, site fire risk analysis, land use plan review, fire behavior modeling, and site-specific recommendations.

Where possible, this FPP incorporates principles of sustainability that are an important component of the project. Preservation and conservation of resources, including native plant communities, energy and water, along with conservation and maintenance of the site's aesthetics, are important components of the proposed Project and have been duly considered and integrated in this FPP, where possible, without compromising fire safety.

This FPP provides details regarding site-specific policies and implementation measures concerning fire protection. Further, the FPP outlines a “systems approach” to fire prevention, protection, suppression, and emergency relocation to ensure proposed improvements and uses will reduce potential risks associated with fire hazard. The structures in this community will include ignition resistant materials per the latest (2013) Chula Vista Fire and Building Codes. Structure protection will be complemented by a system of improved water availability, capacity and delivery; fire department access; monitored defensible space/fuel modification; interior fire sprinkler systems in all structures, monitored interior sprinklers in applicable structures; and other components to provide properly equipped and maintained structures with a high level of fire ignition resistance. Most of these features are required by code, but are specifically included because they address vulnerabilities noted in recent mega-fires in San Diego County and elsewhere. Structures built to the current fire and building codes are much less likely to be involved with fire and typically suffer much less damage from fire than structures built under less–stringent codes.

The site fire risk analysis conducted for this project resulted in the determination that wildfire may occur in the open space preserve areas within the Project area, but with moderate overall intensity. This FPP outlines defensible space requirements based on the potential risk and predicted fire behavior. The modeling and fire risk analysis of the Project

site helps assess its unique fire risk and fire behavior, and this process helped determine that a 100-foot wide fuel modification zone will be suitable for anticipated fire intensity. The fuel modification zones perform as designed if they are maintained to original specifications; therefore, the fuel modification zones will be maintained in perpetuity by a Community Facilities District or Homeowner's Association (or similarly funded entity), ensuring the required inspections and fuel reduction work occur annually.

The City's current threshold for fire emergency response is 6 minutes for 80% of the responses (2010 Growth Management Oversight Committee Annual Report) and includes dispatch and turnout time, which are commonly provided 1 minute each (resulting in a 4 minute travel time). A recently City Council-approved study by the Fire Department (2012 Fire Facility, Equipment, and Deployment Master Plan - FFMP) analyzes the need for new fire stations and the most efficient response coverage using the existing NFPA standard of 4 minutes travel time to 90% of incidents (6 minutes response time including dispatch and turnout) with that of a 5-minute response travel time (7 minutes with dispatch and turnout) for application in Chula Vista. As the FFMP is implemented over the next 15 years, three new fire stations are constructed and funding becomes available, the City plans to implement a customized response standard (hybrid of the Growth Management and Oversight Commissions' and NFPA 1710's response standards) which would include a 7 minute response (5 minute travel time plus 1 minute for dispatch and 1 minute for turnout) for 90% of calls. The anticipated population and number of structures associated with the Project and the corresponding, calculated medical and fire calls will affect the response capabilities of CVFD's nearest existing stations. However, the Project is located in an area with nearby existing Chula Vista fire stations (Stations 3 and 7) as well as planned stations in Village 8 West and the Eastern Urban Center (EUC) that would enable a 5-minute travel time standard for 90% of the project site (consistent with the approved FFMP) and the 4-minute travel time standard for approximately 65% of the project site, substantially in conformance with the existing goals and NFPA standard.

1.0 INTRODUCTION

This Focused Fire Protection Plan (FPP) was prepared for Village 3 North and Portion of Village 4 and provides specific measures for fire protection which meet Chula Vista Fire Department (CVFD) Fire and ignition resistant Building Codes. It also identifies the fire risk associated with proposed land uses, and identifies requirements for fuel modification, building design and construction and other pertinent development infrastructure criteria for fire protection. The primary focus of this FPP is providing an implementable framework for suitable protection of the planned structures and the people living and utilizing them.

The purpose of an FPP, as described in the International Code Council: Urban-Wildland Interface Code (Section 202) is:

> *Fire Protection Plan: A document prepared for a specific project or development proposed for the urban-wildland interface area. It describes ways to minimize and mitigate the fire problems created by the project or development, with the purpose of reducing impact on the community's fire protection delivery system.*

This FPP utilizes a "systems approach" for specifying fire protection measures. The measures consist of the components of fuel modification, passive and active structural protection, water supply, fire protection systems, access (ingress/egress), and emergency response. This FPP also provides additional details regarding wildfire risk assessment, fire history, fire behavior modeling, and construction and fire protection features that will be provided within this community.

1.1 Fire Protection Plan Summary

This FPP will guide the design, construction, and management of project-related improvements in compliance with applicable fire codes. When properly implemented and managed, the requirements and recommendations detailed herein are designed to result in fire hazard risk reduction and minimize the impact on the CVFD's fire protection system. To that end, preparation of this FPP reflects completion of the following tasks:

1. On-site risk assessment
2. Fire history analysis
3. Fire behavior modeling
4. Review of project site land use plans
5. Review of Chula Vista Fire Department's 2012 FFMP
6. Review and incorporation of Chula Vista Fire, Building (Chapter 7A), and Wildland Urban Interface Codes, as applicable

7. Emergency Response Travel Time Analysis
8. Generation of project-specific requirements and alternatives for fire protection.

1.2 Intent

The intent of this FPP is to provide management guidance and requirements for reducing fire risk and demand for fire protection services associated with Village 3 North and Portion of Village 4. To that end, the fire protection "system" detailed in this FPP includes a redundant layering of measures including: pre-planning, fire prevention, fire protection, passive and active suppression and related measures proven to reduce fire risk. The fire safety system that will be enacted by the proposed Project has proven through real-life wildfire encroachment examples to significantly reduce the fire risk associated with this type of project.

1.3 Applicable Codes/Existing Regulations

This FPP demonstrates compliance with 2013 Chula Vista Fire Code requirements, namely Title 15 – Building and Construction, Sections 15.34 (Fire Zones), 15.36 (Fire Code adopting the 2013 California Fire Code), and 15.38 (Urban Wildland Interface Code adopting the 2000 Urban Wildland Interface Code) and Section 15.08 adopting the 2013 California Building Code, specifically, Chapter 7A for development in wildland urban interface areas. Additionally, this FPP is consistent with the Chula Vista Fire Department's Fire Prevention Division's Fire Safety Detail and Specification Sheets. Additionally, this FPP conforms to the City's MSCP Sub Area Plan Brush Management Guidelines and Resource Management Plan Preserve Edge Requirements. The project will comply with the applicable adopted codes in place at the time of construction.

1.4 Project Description

The Village 3 North and Portion of Village 4 land plan proposes approximately 1,597 homes arranged in a mixed use village core surrounded by multi-family attached and detached neighborhoods. Village 3 North also includes an elementary school and neighborhood park site as well as small, private recreation sites that extend recreational opportunities into residential neighborhoods. Land adjacent to the existing landfill remains classified as Industrial. The proposed mix of land use designations for Village 3 North includes: Single Family Residential, Multi-Family Residential, Mixed Use, Office/Commercial, Parks, Private Open Space, School, Community Purpose Facilities, Industrial, Open Space, Preserve, and Circulation. Industrial buildings will be maximum 35 feet or two stories. Buildings including retail on the first floor and residential above will be up to 60 feet (four stories). A portion of Village 4 is included in the project for a community park site.

2.0 RISK ANALYSIS METHODS

2.1 Field Assessment

A field assessment of the Village 3 North and Portion of Village 4 project area was conducted to document existing site conditions and for gathering necessary information to support overall fire risk evaluation. Assessments of the area's topography, natural vegetation and fuel loading, available setback areas, and general susceptibility to wildfire formed the basis of the site risk assessment.

Site photographs were collected (Attachments A) and fuel conditions were mapped using 100-scale aerial images. Field observations were utilized to augment existing site data in generating the fire behavior models and formulating the requirements provided in this FPP.

2.2 Site Characteristics

2.2.1 Location

As depicted in Figure 1 and Attachment 1 (site photograph exhibit), Village 3 North and Portion of Village 4 is located directly north of the intersection of existing Main Street, Heritage Road and Wiley Road in southern Chula Vista. The site is roughly 2 miles west of the South Bay Expressway (SR 125) and roughly 1.2 miles south of Olympic Parkway.

2.2.2 Access

Access to the Village 3 North portion of the project will be provided at three locations from an extension of Heritage Road. The Heritage Road extension would connect generally north to south through the northern portion and along the western boundary of the site. Northbound access is provided via an internal surface street that links to Heritage Road. Access to the residential neighborhood located south of Main Street is provided directly from Main Street. For the Village 4 portion of the site, access is provided via an internal surface street which connects to La Media Road (off-site).

2.2.3 Topography

Village 3 North and Portion of Village 4 is located on a broad, gently sloping parcel that is located north of the Otay River Valley. The property slopes north to south and includes several north-south trending, small drainage valleys that empty to the Otay River Valley. Elevations range from roughly 200 feet above mean sea level (amsl) in the southwestern drainage valley bottom to nearly 450 feet amsl at the extreme north-central property boundary. Overall gradients are inclined up to 10%. Local sections are inclined at 30% or steeper along the eastern portion of the property.

2.2.4 Flammable Vegetation

Figure 2 provides Village 3 North and Portion of Village 4 and surrounding area vegetation mapping results. Attachment 1 provides photographs of the site and adjacent vegetation. The dominant vegetation type on site is non-native grassland which encompasses roughly 60.3% of the site. Non-native grassland occurs throughout the property where development will occur. The slopes of the drainage valleys, especially on the eastern and western periphery of the project, contain stands of native coastal sage scrub habitat. Coastal sage scrub cover on the site is limited to 19.7% of the property. Other vegetation occurring on the site includes: maritime succulent scrub (10.5%), agriculture (6.5%), disturbed land (1.7%), mulefat scrub (>0.1%), cismontane alkali marsh (0.1%), valley needlegrass grassland (0.2%), developed land (0.5%), and tamarisk scrub (0.2%). Adjacent to the site, in areas that will not be converted to urban landscapes, there is a mix of coastal sage scrub and riparian habitat to the south in Otay River Valley, coastal sage scrub to the southeast and east, and patches of coastal sage scrub and maritime succulent scrub to the east.

2.2.5 Climate

Throughout Southern California, including at the Project site, climate has a large influence on fire risk. Local climate is typical of a Mediterranean area, with warm, dry summers and wetter winters. Precipitation typically occurs between December and March. The prevailing wind is an on-shore flow with fall Santa Ana winds from the northeast that may gust to 50 miles per hour (mph) or higher. Drying vegetation (fuel moisture of less than 5% for 1-hour fuels is possible) during the summer months becomes fuel available to advancing flames should an ignition occur. Extreme conditions, used in fire modeling for this site, include 92°F temperatures in summer and winds of up to 50 mph during the fall. Relative humidity of 12% or less is possible during fire season.

2.3 Fire History and Hazard

Fire history is an important component of FPPs. Fire history information can provide an understanding of fire frequency, fire type, most vulnerable areas, and significant ignition sources. In turn, this understanding of why fires occur in an area and how they typically behave can be used for pre-planning and designing defensible communities. There have been numerous fires recorded by California Department of Forestry and Fire Protection (CAL FIRE) in their Fire and Resource Assessment Program (FRAP) database in the vicinity of the Project site, although no recorded fires have burned on site.

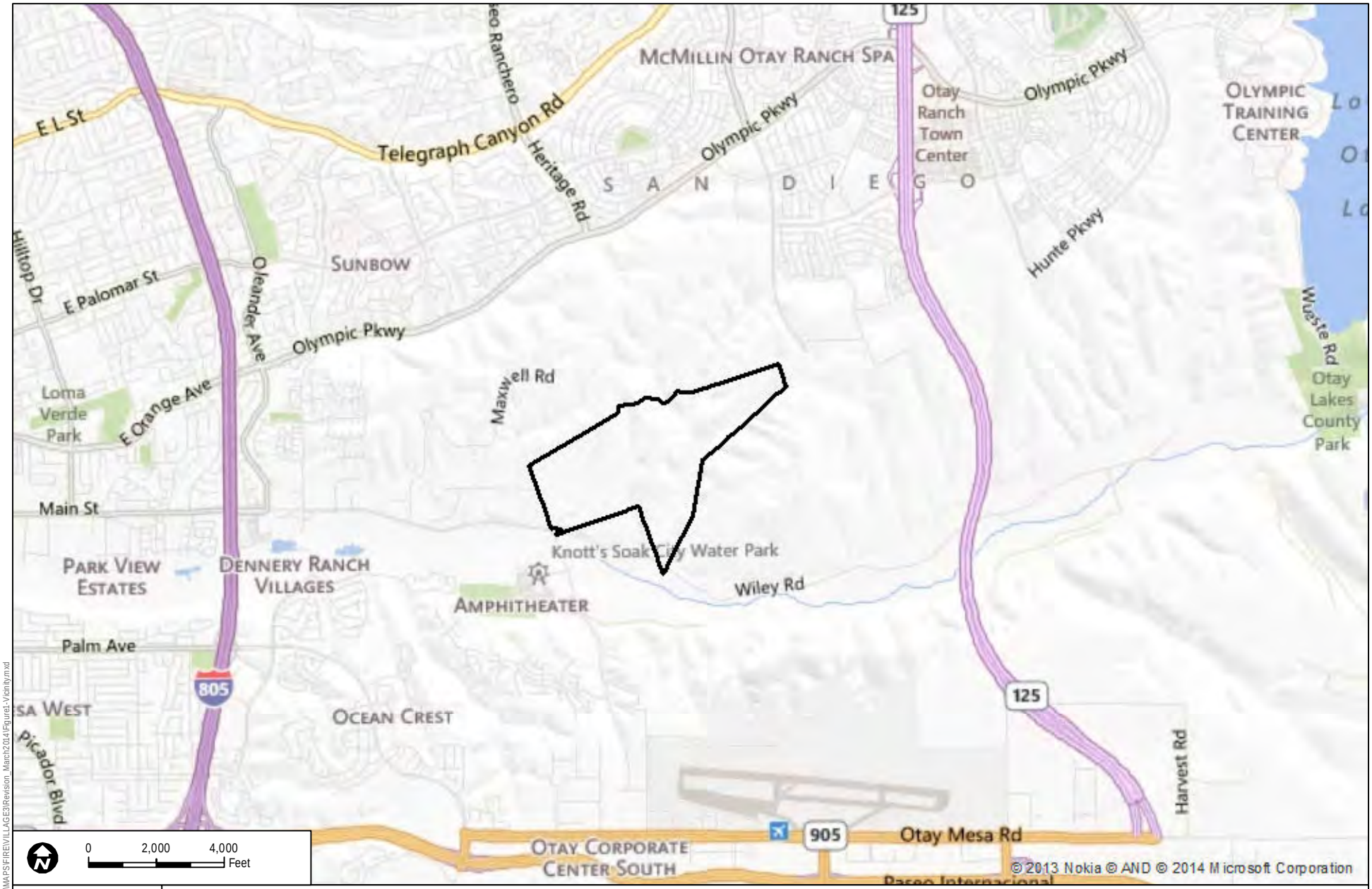

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FIGURE 1

Vicinity Map

FIRE PROTECTION PLAN - VILLAGE 3 NORTH AND PORTION OF VILLAGE 4

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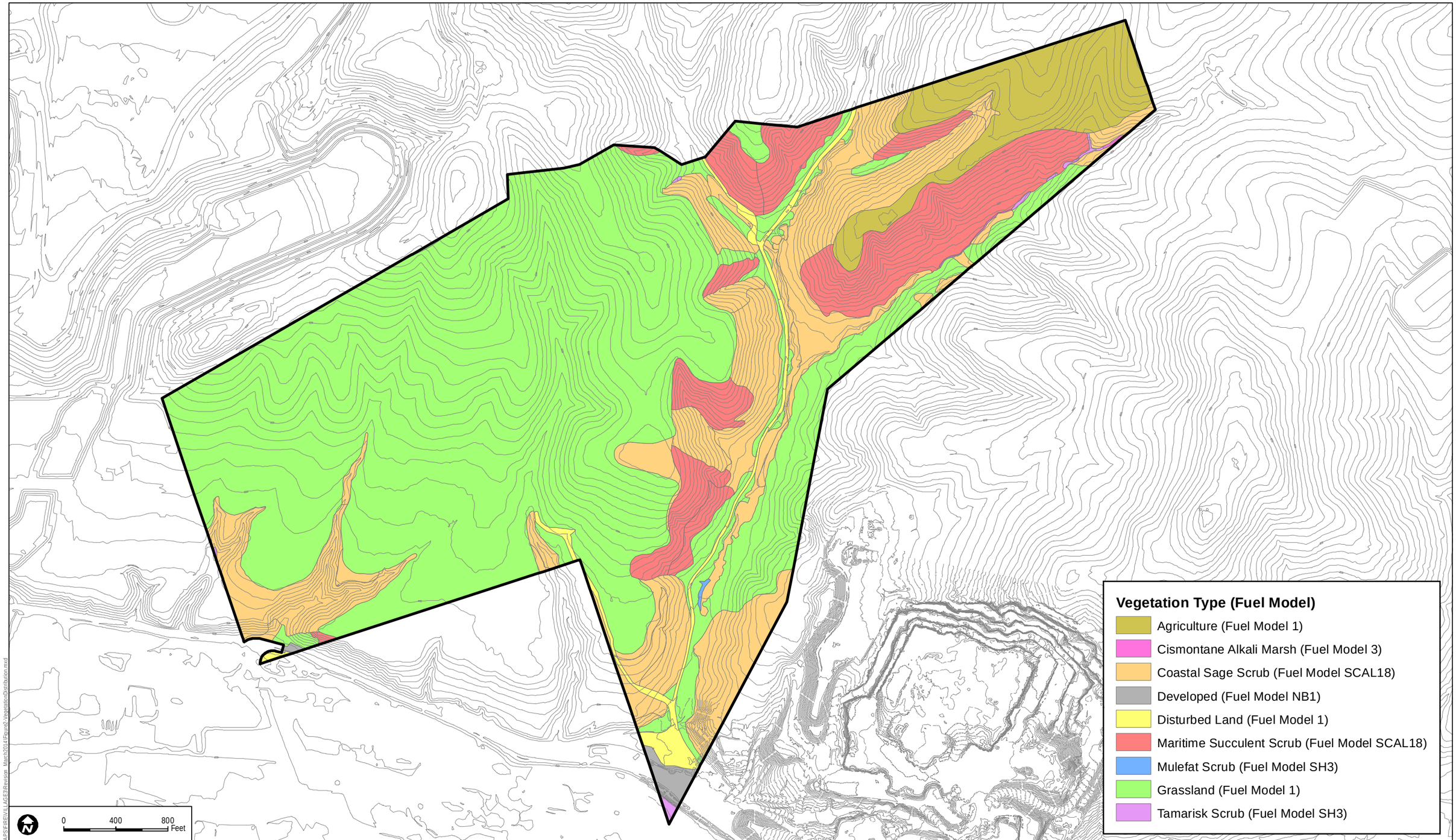

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FIGURE 2

Vegetation/Fuels Distribution

FIRE PROTECTION PLAN - VILLAGE 3 NORTH AND PORTION OF VILLAGE 4

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The lack of a fire history does not indicate that fire cannot occur in the vegetation that will be adjacent to the project. It is expected that fires have not consistently spread into the Project area due to several factors: 1) the position of urban development to the north which is newer and ignition resistant, 2) the position of Otay Lake to the east, presenting a very wide fuel break, 3) the position of the Otay River valley to the south, where fire spread is inhibited due to higher vegetation moisture and less ignition prone vegetation types, and 4) the narrow opening south of Otay Lake and north of the Otay River Valley which can be more easily defended under typical fire conditions.

The nearest wildfires to the Village 3 North and Portion of Village 4 site include the 1984 Maxwell Fire (approximately 0.6 miles to the northwest of Village 3 North and Portion of Village 4), the 1980 Assist #14 Fire (approximately 0.4 miles to the south of Village 3 North and Portion of Village 4), an un-named 1945 fire (approximately 1.3 miles to the north of Village 3 North and Portion of Village 4) and the 1969 Telegraph Fire (approximately 1.7 miles to the north of Village 3 North and Portion of Village 4). Figure 3, Fire History Exhibit, presents fire history in the Project vicinity and provides a graphical representation of the quantity of times the landscape has burned in the area.

2.4 FlamMap Analysis

FlamMap software was utilized to graphically depict fire behavior modeling results for the Project area, which includes the Project site and the area within one-half mile of the site. FlamMap utilizes the same fire spread equations built into the BehavePlus software package, but allows for a geographical presentation of fire behavior outputs as it applies the calculations to each pixel in the associated GIS landscape (Finney 1998). Both summer weather conditions (on-shore flow) and more extreme fall weather conditions (off-shore, Santa Ana conditions) were modeled.

2.4.1 FlamMap Fuel Model Inputs

FlamMap software requires a minimum of five separate input files that represent field conditions in the Project area, including elevation, slope, aspect, fuel model, and canopy cover. Each of these files was created as a raster GIS file using ArcGIS 9.3.1 software, exported as an ASCII grid file, then utilized in creating a FARSITE (Finney 1998) Landscape file that served as the base for the FlamMap runs. The resolution of each grid file and associated ASCII file that was used in the models for Project area is 30 meters, based on digital terrain data available from the San Diego Association of Governments (SANDAG 2010).

In addition to the Landscape file, wind and weather data are incorporated into the model inputs. For the FlamMap analysis, gridded wind speed and direction data was generated and incorporated into the model. Utilizing the WindNinja computer program (v. 2.0.3), ASCII grid files were generated for incorporation into the FlamMap analysis to better evaluate the effect of topography on wind flow (speed and direction).

The output files chosen for each of the modeling runs included flame length (feet) and fireline intensity (Btu/foot/second). The following provides descriptions of the input variables used in processing the FlamMap models. In addition, data sources are cited and any assumptions made during the modeling process are explained.

Elevation

Elevations were derived from digital terrain data available from SANDAG, projected in the UTM coordinate system, Zone 11 with units in meters. The resolution of the file was 30 meters and elevation within the Project area ranges from 34 meters (112 feet) to 197 meters (646 feet).[1] These data were utilized to create an elevation grid file, using units of meters above sea level. The elevation data are a necessary input file for FlamMap runs and are necessary for adiabatic adjustment of temperature and humidity and for conversion of fire spread between horizontal and slope distances.

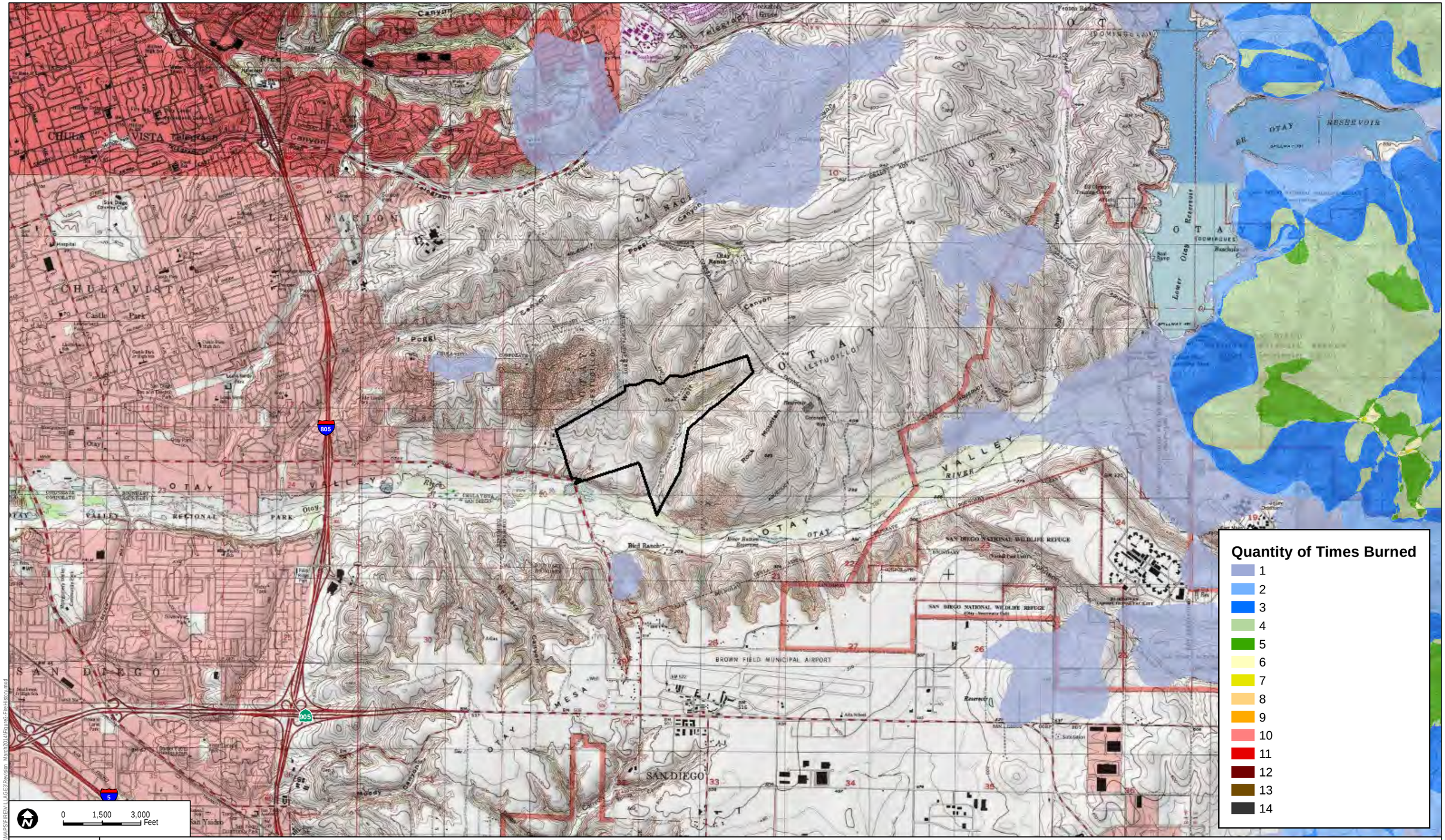
Slope

Using ArcGIS Spatial Analyst tools, a slope grid file was generated from the elevation grid file described above. Slope measurements utilized values in degrees of inclination from horizontal. Slope values in the Project area range from 0–27 degrees. The slope input file is necessary for computing slope effects on fire spread and solar radiance.

Aspect

Using ArcGIS Spatial Analyst tools, an aspect grid file was generated from the elevation grid file described above. The aspect values utilized were azimuth degrees. Aspect values are important in determining the solar exposure of grid cells.

[1] Villages 3 North, a portion of Village 4, and nearby Villages 8 East and 10 were modeled comprehensively; hence, the site elevations described here reflect the high and low elevations over the four villages. The actual topography of the site is described in Section 2.2.3 and falls within this range.



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SOURCE: FRAP 2013

FIGURE 3

Fire History

FIRE PROTECTION PLAN - VILLAGE 3 NORTH AND PORTION OF VILLAGE 4

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Fuel Model

Vegetation coverage data in the form of a GIS shapefile were used in this analysis to create a fuel model file, which was derived from vegetative cover type mapping data for the Project area (SanGIS 2010). Using the Community type category, each vegetation type was coded with a unique fuel model value as described in Table 1. Vegetation mapping data was utilized in field efforts to classify vegetation cover type with an appropriate fuel model. The result includes seven separate fuel models utilized for the Project area, of which, one is a non-combustible types (e.g., water, agriculture, development). Once fuel model values were assigned to general vegetation types, the vector-based vegetation data file was converted to a grid file for inclusion in FlamMap modeling. Table 1 outlines the fuel model values applied to the general vegetation types found in the Project area.

Table 1
General Vegetation Types and Related Fuel Model Assignments in Vicinity of Project

General Vegetation Type	Fuel Model	Canopy Cover	Acreage	Percentage Cover
Non-Native Vegetation	GS2	0	74.6	3.39%
Disturbed Habitat*	1	0	62.4	2.84%
Urban/Developed	NB1	0	658.2	29.93%
Extensive Agriculture - Field/Pasture, Row Crops	1	0	289.5	13.17%
Maritime Succulent Scrub	SCAL18	0	64.2	2.92%
Diegan Coastal Sage Scrub	SCAL18	0	396.9	18.05%
Valley and Foothill Grassland	1	0	398.9	18.14%
Non-Native Grassland	1	0	160.3	7.29%
Freshwater Marsh	3	0	10.0	0.45%
Coastal and Valley Freshwater Marsh	3	0	0.7	0.03%
Southern Riparian Scrub	SH3	0	0.2	0.01%
Mulefat Scrub	SH3	0	10.2	0.46%
Southern Willow Scrub	9	0	6.7	0.30%
Tamarisk Scrub	SH3	0	66.2	3.01%
		Total	**2,199.0**	**100.00**

* Assumes conversion to grassland-type fuels

Canopy Cover

Canopy Cover is a required raster file for FlamMap operations. It is necessary for computing shading and wind reduction factors for all fuel models. Canopy cover is measured as the horizontal fraction of the ground that is covered directly overhead by tree canopy. Crown closure refers to the ecological condition of relative tree crown density. Stands can be classified as

"closed" to recruitment of canopy trees but still only have 40% or 50% canopy cover. Coverage units can be categories (0–4) or percentage values (0–100).

For the purposes of the FlamMap analysis, Dudek utilized vegetation type classifications to determine canopy cover assignments. For the purposes of this analysis, tree-dominated vegetation types (e.g., coast live oak woodland, riparian forest) were assigned a value of "3," while non-tree vegetation types were assigned a value of "0." Canopy classifications by vegetation type are presented in Table 1.

Weather

In order to evaluate specific weather variables for the Project area, data from the San Miguel Remote Automated Weather Station (RAWS) was analyzed. The San Miguel RAWS is the closest RAWS, located approximately 5.8 miles due north of the Project area, in a similar inland position and estimated to include consistent weather conditions as the Project area. The location and available data range for the San Miguel station is:

- San Miguel RAWS
  - Latitude: 32.68611
  - Longitude: -116.97833
  - Elevation: 425 feet
  - Data years: 2002 to 2010

Utilizing the FireFamily Plus v. 4.0.2 (FireFamily Plus 2008) software package, data from the San Miguel RAWS was processed and analyzed to determine 50th (typical) and 97th (extreme) percentile wind and fuel moisture conditions to be used in the fire behavior modeling efforts conducted for the Project area. Fuel moisture information was analyzed and incorporated into the Initial Fuel Moisture file used as an input in FlamMap, as well as directly input into the focused BehavePlus runs discussed in Section 2.5. Wind speed (20-foot) values for all fire behavior modeling runs were used as inputs into the WindNinja analysis in order to create the wind flow grids to be used in FlamMap. Two separate wind scenarios were analyzed in WindNinja and incorporated into the FlamMap model: summer fire (50th percentile values from June 1 to August 31) with 8 mph on-shore winds, and fall fire (97th percentile values from September 1 to November 30) with 50 mph winds (representing maximum wind gust speed). The use of 50 mph winds in modeling efforts is intended to represent wind gusts rather than sustained maximum wind speeds. The maximum RAWS wind speed for the San Miguel RAWS during the 97th percentile weather period (September 1 to November 30) was 20 mph, which represents a 10-minute average wind speed, not the maximum gust speed. As FlamMap presents a static

representation of fire behavior, the inclusion of gust speed is appropriate to evaluate worst-case fire behavior outputs. Table 2 presents the weather and fuel moisture input variables used for all fire behavior modeling conducted for this FPP.

Table 2
Fire Behavior Weather and Fuel Moisture Inputs

Model Variable	50th Percentile (Onshore Flow)	97th Percentile (Offshore/Santa Ana conditions)
1 h fuel moisture	8%	2%
10 h fuel moisture	10%	3%
100 h fuel moisture	15%	7%
Live herbaceous moisture	90%	60%
Live woody moisture	122%	92%
20-ft. wind speed (mph)	8 mph	50 mph (representing max. gust)
Wind direction	Onshore, 270˚ for FlamMap	Offshore, 90˚ for FlamMap

2.4.2 FlamMap Fuel Model Outputs

Two output grid files were generated for each of the two FlamMap runs, and include representations of flame length (feet) and fireline intensity (BTU/foot/second). The aforementioned fire behavior variables are an important component in understanding fire risk and fire agency response capabilities. Flame length, the length of the flame of a spreading surface fire within the flaming front, is measured from midway in the active flaming combustion zone to the average tip of the flames (Andrews, Bevins, and Seli 2004). It is a somewhat subjective and non-scientific measure of fire behavior, but is extremely important to fire personnel in evaluating fireline intensity and is worth considering as an important fire variable (Rothermel 1991). Maps depicting flame length and fireline intensity for the 50th and 97th percentile weather scenarios are included in Figures 4 through 7. The fire behavior analysis results for the Project area vary depending on topography and fuel type. As FlamMap utilizes site-specific digital terrain data (including slope, vegetation, aspect, and elevation data) slight variations in predicted flame length values can be observed based on fluctuations of these attributes across the landscape. As presented, wildfire behavior in each of the fuel types varies depending on weather conditions. Maximum flame lengths may exceed 45 feet in some sections of the analysis area under worst-case conditions. As presented in Figures 4 through 7, expected fire behavior during extreme, Santa Ana wind-driven fires is closely correlated with fuel type and topography. Areas with light, flashy fuels (grasses) exhibit lower flame lengths and resulting fireline intensities but will promote fire spread at faster rates than heavier chaparral and sage scrub fuels, which exhibit higher flame lengths and resulting intensities. In general, the grasslands throughout much of the village areas exhibits lower flame length of less than 8 feet

and lower fireline intensity potential due to lower fuel loads and more gently sloping topography. The areas that include a sage scrub element result in higher flame lengths from 11–45 feet and higher intensities, but are still considered "moderate" in terms of overall fire severity. Off-site, adjacent fire behavior varies with vegetation and terrain and includes predominantly flame lengths under 20 feet, with areas of higher flame length associated with sage vegetation. Roughly 75% of the off-site adjacent fuels would produce flame lengths lower than 20 feet, while the remaining 25%, mostly in the northeastern area of the Village, would produce greater than 30 foot flame lengths under worst-case weather input conditions. Fireline intensity is a measure of heat output from the flaming front, and also affects the potential for a surface fire to transition to a crown fire. The information in Table 3 presents an interpretation of these fire behavior variables as related to fire suppression efforts.

Table 3
Fire Suppression Guidelines

Flame Length (feet)	Fireline Intensity (Btu/ft/s)	Interpretations
Under 4	Under 100	Fires can generally be attacked at the head or flanks by persons using hand tools. Hand line should hold the fire.
4–8	100–500	Fires are too intense for direct attack on the head by persons using hand tools. Hand line cannot be relied on to hold the fire. Equipment such as dozers, pumpers, and retardant aircraft can be effective.
8–11	500–1,000	Fires may present serious control problems—torching out, crowning, and spotting. Control efforts at the fire head will probably be ineffective.
Over 11	Over 1,000	Crowning, spotting, and major fire runs are probable. Control efforts at head of fire are ineffective.

Source: BehavePlus 5.0.2 fire behavior modeling program (Andrews, Bevins, and Seli 2004)

Note: The fire behavior results described herein depict values based on inputs to the FlamMap software. Localized changes in slope, weather, or pockets of different fuel types are not accounted for in this analysis, but assumed (averaged) across the landscape based on the available data resolution. Further, this modeling analysis assumes a correlation between the available vegetation data and fuel model characteristics. Recent fire activity may temporarily alter fuel beds, but fire behavior modeling efforts conducted for this project assume natural succession of burned areas to more mature stand conditions, resulting in a conservative (near worst-case) estimate of fire behavior. Since fire behavior for a given location will be affected by many factors, including unique weather patterns, small-scale topographic variations, or changing vegetation patterns, modeling results are applicable as a basis for planning, but need to be considered in context with other site variables.

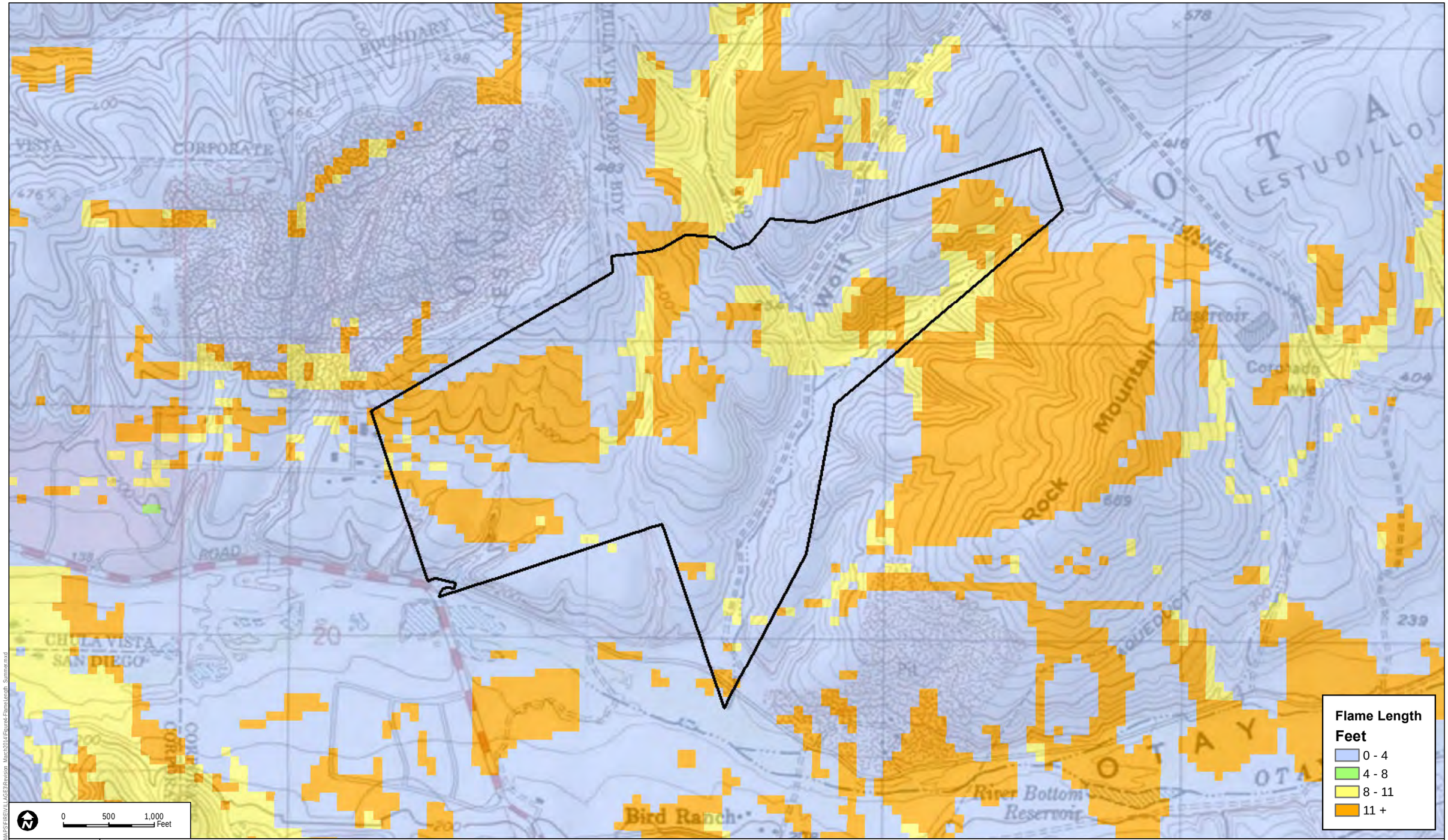

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FIGURE 4

FlamMap Flame Length Analysis – Summer Fire

FIRE PROTECTION PLAN - VILLAGE 3 NORTH AND PORTION OF VILLAGE 4

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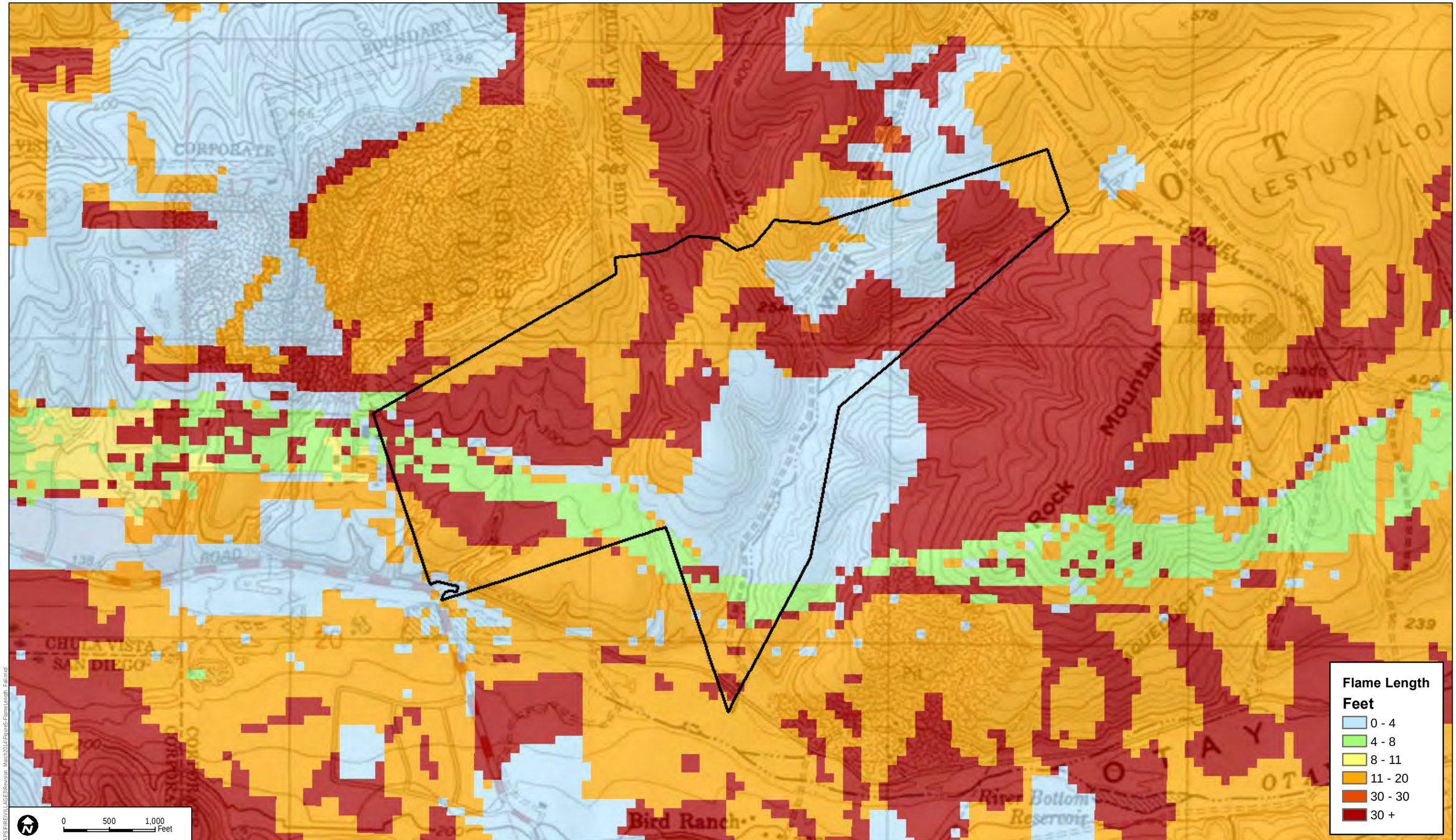

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FIGURE 5

FlamMap Flame Length Analysis – Fall Fire

FIRE PROTECTION PLAN - VILLAGE 3 NORTH AND PORTION OF VILLAGE 4

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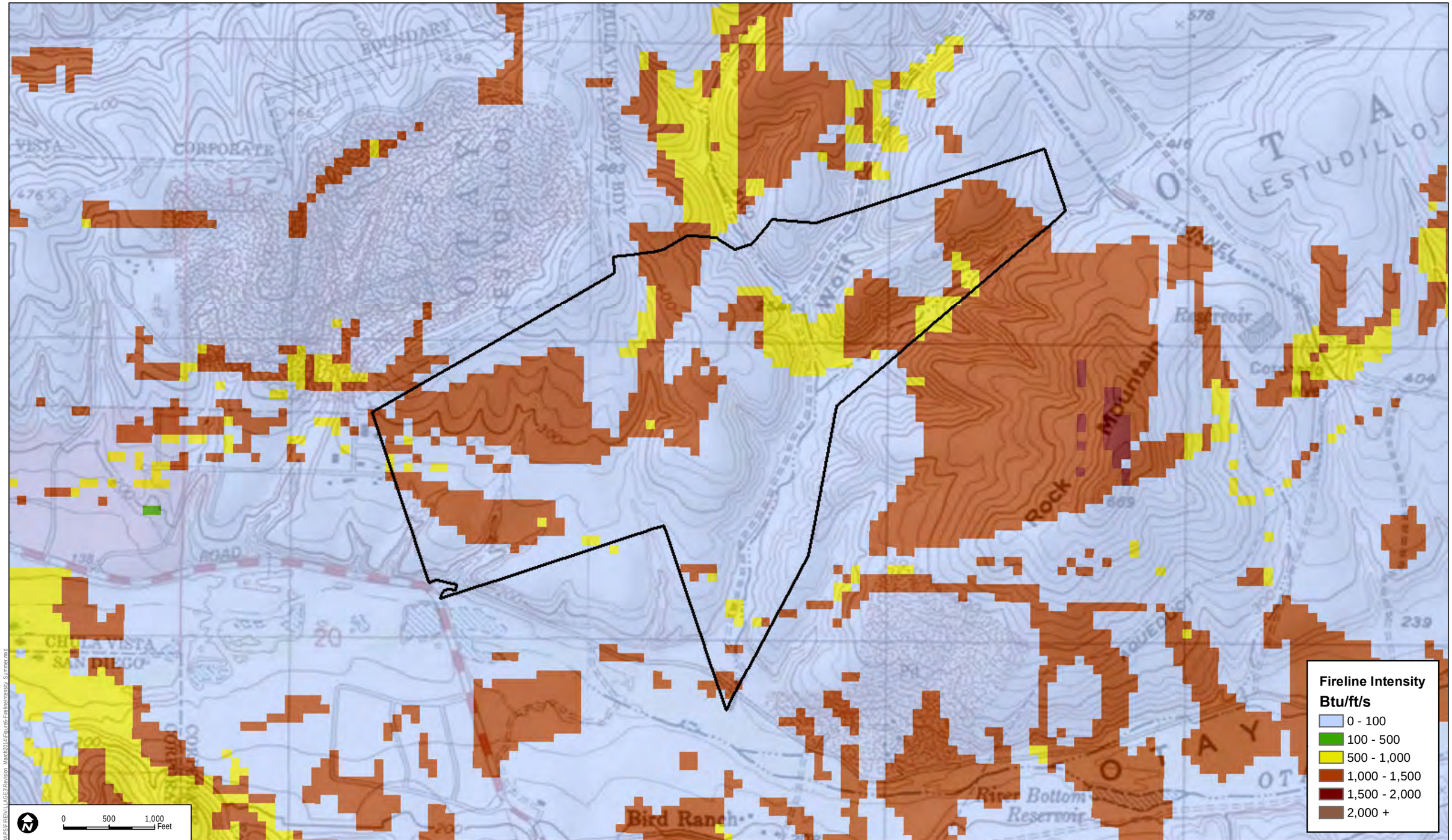

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FIGURE 6

FlamMap Fireline Intensity – Summer Fire

FIRE PROTECTION PLAN - VILLAGE 3 NORTH AND PORTION OF VILLAGE 4

Z:\Projects\1016.1101\MAPDOC\MAPS\FIREVILLAGE3\Revision_March2014\Figure6-FirelineIntensity_Summer.mxd

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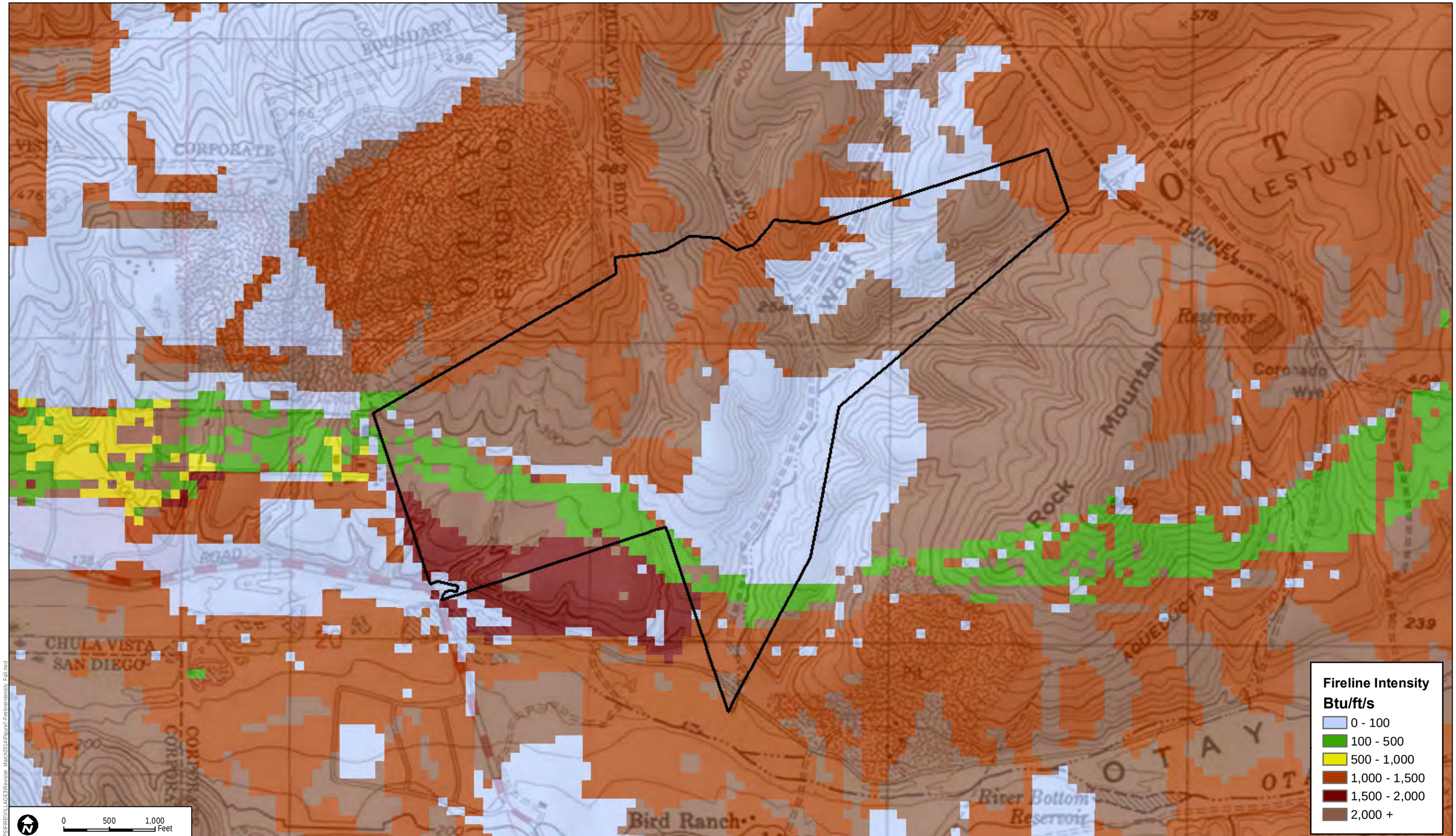

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FIGURE 7

FlamMap Fireline Intensity – Fall Fire

FIRE PROTECTION PLAN - VILLAGE 3 NORTH AND PORTION OF VILLAGE 4

Z:\Projects\161010\MAPD\OCUMAPS\FIREVILLAGE\Revision_March2014\Figure7-FirelineIntensity_Fall.mxd

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2.5 BehavePlus Fire Behavior Modeling

In addition to the FlamMap fire behavior modeling conducted for the Village 3 North and Portion of Village 4 site, more focused fire behavior modeling utilizing BehavePlus 5.0.2 was conducted for Village 3 North and Portion of Village 4. Similar to the FlamMap modeling, two weather scenarios were evaluated with BehavePlus. All fuel moisture and weather inputs remain consistent between the FlamMap and BehavePlus modeling efforts conducted in support of this FPP. Fuel model typing was completed in the field concurrent with site hazard evaluations. Based on field analysis, two different fire scenarios were evaluated for Village 3 North and Portion of Village 4.

- **Scenario 1**: Typical fire weather with on-shore wind and fire burning in preserved opens space along the southern project boundary.
- **Scenario 2**: Extreme fire weather with off-shore, Santa Ana winds and fire burning in the preserve open space to the east and south of the project.

2.5.1 BehavePlus Fuel Model Inputs

BehavePlus software requires site-specific variables for surface fire spread analysis, including fuel type, fuel moisture, wind speed, and slope data. The output variables used in this analysis include flame length (feet), fireline intensity (BTU/feet/second), and spotting distance (miles). The following provides a description of the input variables used in processing the BehavePlus models for Village 3 North and Portion of Village 4. The unique terrain and fuel models used for BehavePlus modeling at Village 3 North and Portion of Village 4 are presented in Table 4, and the results of modeling efforts are provided in Table 5. Locations of BehavePlus model runs are presented graphically in Figure 8.

Weather

The same historical fuel moisture and wind speed data that was analyzed and used in the FlamMap analysis discussed previously were used for all BehavePlus runs prepared for this FPP. Table 2 presents the fuel moisture and wind speed values used for the BehavePlus analyses included in this FPP.

As wind speed values derived from RAWS data represent 20-foot wind speeds, BehavePlus includes a wind adjustment factor. In the case of the BehavePlus analyses completed in support of this FPP (which occur in shrub vegetation types), a wind speed adjustment factor of 0.5 was utilized to account for vertical differences in wind speed from the 20-foot recording height to mid-flame height prior to BehavePlus modeling efforts. A conservative wind adjustment factor of 0.5 indicates a fuel bed that is unsheltered from the wind with a fuel bed depth greater than 2.7 feet. It should be noted that mid-flame wind speeds may be only 10% of the wind speeds recorded or predicted at 20 feet, resulting in a conservative calculation.

Topography

Elevation data were derived from digital topographic files available for Village 3 North and Portion of Village 4. This data source was evaluated in ArcGIS software in order to determine specific site elevation ranges and slope gradients. Elevation and slope are important components in fire behavior analysis as they affect temperature, humidity, solar radiance, and fire spread rates.

Fuel Model

Fuel model assignments for each of the BehavePlus modeling runs were based on field observations documented during the fire hazard assessments conducted in support of this FPP. Fire behavior model variables for BehavePlus modeling efforts are presented in Table 4.

Table 4
Village 3 North and Portion of Village 4 Fire Behavior Model Variables

Scenario	Fuel Model(s)	Slope	Aspect
1	Grass (1)	20%	South
2	Maritime succulent scrub (SCAL18)	32%	East

2.5.2 BehavePlus Fuel Model Results

Based on the BehavePlus analysis, expected flame lengths for Scenario 1 reach 3.6 feet during 50th percentile weather conditions with wind speeds of 8 mph, with fireline intensities reaching 90 BTU/feet/second and, a spread rate of 0.1 mph, and spotting up to 0.1 mile. A fire originating east of Village 3 North and Portion of Village 4 and pushed by winds from the northeast/east (Scenario 2) results in flame lengths reaching 37.7 feet and fireline intensities reaching 15,181 BTU/feet/second and a spread rate of 2.4 mph. Spotting distance for this extreme fire weather scenario reaches 2.2 miles. The results from the BehavePlus fire behavior modeling scenarios are presented in Table 5.

Table 5
Village 3 North and Portion of Village 4 BehavePlus Fire Behavior Model Results

Scenario	Flame Length (feet)	Fireline Intensity (BTU/feet/second)	Spread Rate (mph)	Spotting Distance (miles)
Scenario 1: Grassland on south-facing, 20% slope				
On-shore (50th Percentile)	3.6	90	0.7	0.1
Scenario 2: Maritime succulent scrub on east-facing, 32% slope				
Santa Ana (97th percentile with 50mph gusts)	37.7	15,181	2.4	2.2

Note: The results presented in Table 2 depict values based on inputs to the BehavePlus software. Changes in slope, weather, or pockets of different fuel types are not accounted for in this analysis. Model results should be used as a basis for planning only, as actual fire behavior for a given location will be affected by many factors, including unique weather patterns, small-scale topographic variations, or changing vegetation patterns.

Modeling Inputs:

50th Percentile Weather (RUN 1):
1h Fuel Moisture – 8%
10h Fuel Moisture – 10%
100h Fuel Moisture – 15%
Live Herbaceous Moisture – 90%
Live Woody Moisture – 122%
20-foot Wind Speed – 8 mph
Wind Adjustment Factor – 0.5

97th Percentile Weather (RUN 2):
1h Fuel Moisture – 2%
10h Fuel Moisture – 3%
100h Fuel Moisture – 7%
Live Herbaceous Moisture – 60%
Live Woody Moisture – 92%
20-foot Wind Speed – 50 mph (gust)
Wind Adjustment Factor – 0.5

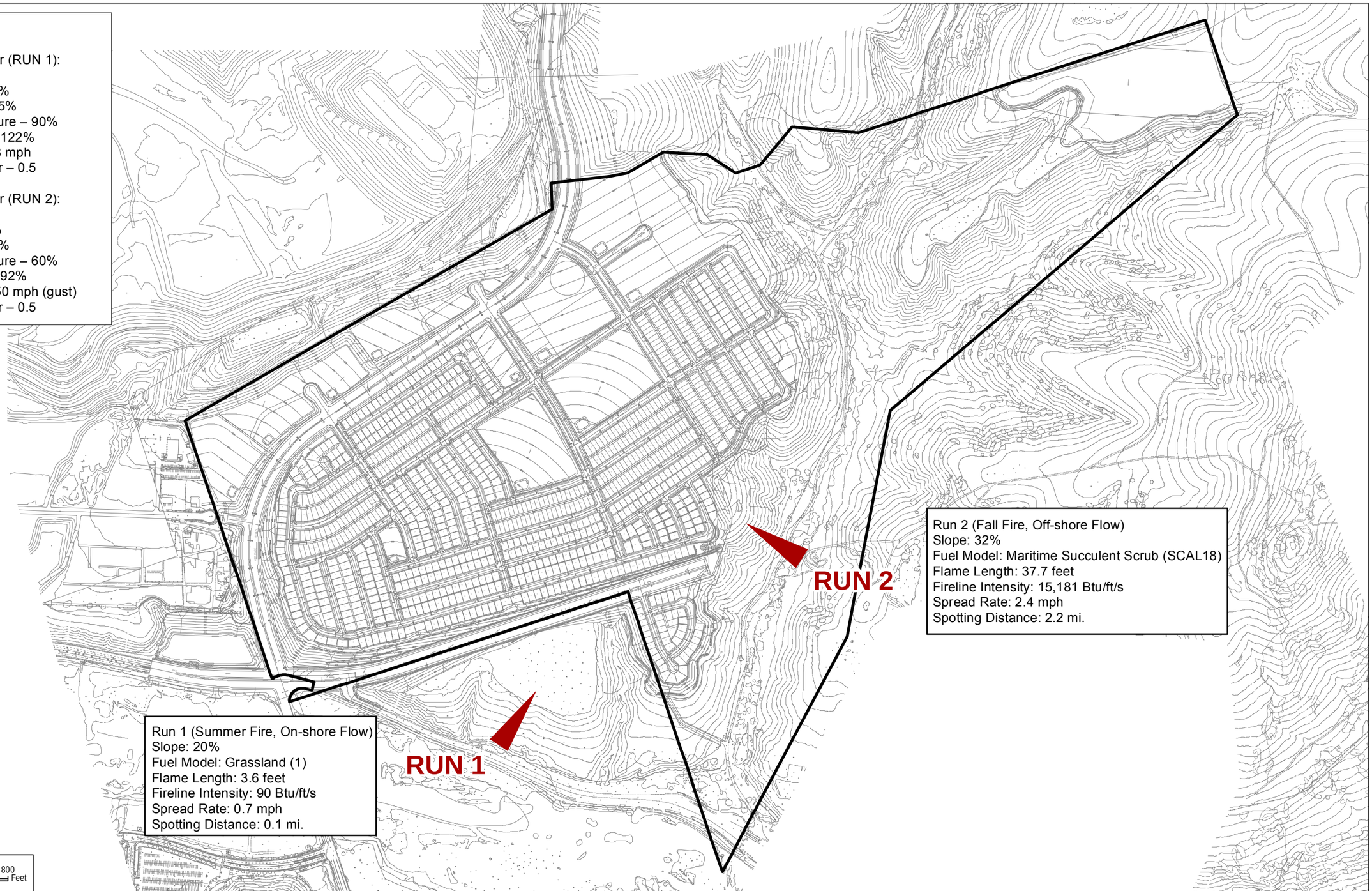

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FIGURE 8

BehavePlus Fire Behavior Modeling/Conceptual Site Plan

FIRE PROTECTION PLAN - VILLAGE 3 NORTH AND PORTION OF VILLAGE 4

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2.6 Result – Exposure to Wildland Fire

Given the climatic, vegetation, ignition sources, wildland-urban interface location, and topography characteristics along with the fire history, ignition sources and fire behavior modeling results previously discussed in this FPP, the Project site is determined to be potentially exposed to wildfire encroaching on the perimeter of the development or spotting into the preserve areas to the south and east of the site, especially from up-wind fires driven by on-shore or Santa Ana type winds funneled into the Otay River Valley. Based on this information and the recorded history of fires in the area, along with the persistence of naturally vegetated open space on two Village 3 North and Portion of Village 4 exposures, it is expected that wind driven wildfires could occur near this site in the future.

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3.0 FIRE RESPONSE CAPABILITIES

3.1 Estimated Calls and Demand for Service from the Project

This section analyzes the Village 3 North and Portion of Village 4 Project in terms of current CVFD Fire Service capabilities and resources to provide Fire Protection and Emergency Services. The analysis that follows examines the ability of the existing fire stations as well as fire stations planned in the approved FFMP to serve the area and ensure the timely provision of local fire protection and emergency service facilities. Response times were evaluated using build-out conditions. It was assumed that phased construction would include access roads to the newly constructed dwelling units and that the shortest access route to those dwellings would be utilized.

The nearest existing stations (Stations 3 and 7) vary with regard to their current call volume. The following call volumes were estimated from the Chula Vista Fire Department's FFMP. Station 3 included responses from engine 53 (800 calls) and rescue unit 53 (1,250 calls) and Station 7 responses included engine 57 (1,100 calls) and truck 57 (350 calls).

These call volumes can be used to calculate average daily call volume. Based on the total number of calls handled in 2009 by each of these stations, the average daily call volume for each of the units within Stations 3 and 7 were:

- **Station 3:** engine 53 – 2.1 calls per day, rescue 53 – 3.4 calls per day
- **Station 7:** engine 57 – 3.0 calls per day, truck 57 – 1.0 call per day

As shown in Table 6, using the CVFD estimate of 67 annual calls per 1,000 population (2009 data), the Project's estimated 5,126 residents and visitors would generate approximately 343 calls per year (about 0.94 calls per day), roughly 80– 85% of which (0.8) call per day are expected to be medical emergencies, based on past call statistics.

Table 6
Calculated Call Volume Associated with the University Villages

Emergency Calls per 1,000 (2009 Chula Vista Data)	Estimated Population	Avg. No. Calls per Year (8,180\1,000)x67	Avg. No. Calls per Day (548/365)
67	5,126	343	0.94

Type of call	Per capita call generation factor	Number of estimated annual calls
Total Calls	100%	343
Total Fires	1.2%	4.1
Total EMS/Rescue Calls	85.9%	295
Total Other Calls	12.9%	44.2

The City predicts a population increase in the Otay Ranch Sub Area of some 53,000 people at build out. This corresponds to a calculated call volume increase of nearly 3,500 calls per year, or roughly 10 calls per day. This call volume added to existing call volume from existing stations that would respond to this area as first responder or as Effective Fighting Force (EFF) would represent a significant increase. Additional stations would be necessary, as identified by the City in its FFMP, to adequately absorb the increased demand from build out of Otay Ranch. With the addition of two planned fire stations in the area, as described in Section 3.2, and the currently low call volume at Station 7, the additional calls associated with build out can be absorbed and still result in better than adequate emergency response. Only a small number (estimated at 4.1 calls per year) of fire related calls would be potentially realized at build out while the majority of calls would be medical related.

Based on the relatively low call volumes from existing, nearby fire stations, there is capacity to respond to a higher call volume. The stations are currently considered somewhat average based on their roughly five or fewer calls per day. A typical station averages around five calls per day and a busy station responds to about ten calls per day. Table 7 presents estimated call volume increases based on the demand from Village 3 North and Portion of Village 4. The estimated call volume increase assumes that each station would respond to the calculated 0.9 calls/day given the proximity of stations.

Table 7
Calculated Call Volume Increase Per Station Associated with Village 3 North and Portion of Village 4

Chula Vista Fire Station	Current Daily Call Volume	Estimated Daily Call Volume Increase	Estimated Total Daily Call Volumes with proposed Project
3	2.1 (engine) + 3.4 (rescue)	0.94	6.4
7	3 (engine) + 1 (truck)	0.94	4.9

If based only on call volume, the existing stations would be able to respond to Village 3 North and Portion of Village 4 call volume increases. However, response times and cumulative call volume increases in Chula Vista's developing areas must also be considered when determining whether existing resources are adequate, or whether additional resources are necessary. Longer response times to structural fire emergencies may be partially mitigated based on the mandate of interior sprinklers in all structures. Sprinklers extend the fire flashover time or extinguish most room fires, thus compensating for a longer response. The measures outlined in Section 4 of this FPP would mitigate potential longer response times by limiting the spread of and minimizing risks associated with fires.

3.2 Emergency Response

The Project Site is located within the City of Chula Vista Fire Department jurisdictional area. Village 3 North and Portion of Village 4 would be serviced by existing Fire Station 7, located 2.9 miles from the furthest point in the project along with existing Fire Station 3, located 3.6 miles from the project. If constructed as anticipated in the approved Chula Vista FFMP, the proposed Village 8 West Fire Station located 3.5 miles (to the most remote portion of the village) from the project area would also respond to emergency calls for service. Existing Fire Station 4 (3.7 miles from the project) and the approved EUC Fire Station (4.9 miles from the project) would possibly also respond. Dudek conducted GIS based emergency response modeling from existing and planned fire stations to the project to determine potential response coverage. The modeling utilized CVFD input variables that are consistent with the FFMP. Emergency travel time for first arriving engines from each station are provided in Table 8. Automatic and/or Mutual Aid agreements with surrounding fire departments are in place and would result in additional resources not analyzed in this FPP.

Table 8
Village 3 North and Portion of Village 4 CVFD Emergency Response Analysis

Chula Vista Fire Department Station No.	Total Mileage to Village 3 North and Portion of Village 4 (furthest point)	Estimated Response Travel Time (minutes)	% of Village within 5-minute travel time
		First Arriving	*First Arriving*
7	2.9	5:35	90%
3	3.6	6:46	0%
4	3.7	6:56	0%
Proposed Village 8 West	3.5	6:36	15%
Approved EUC**	4.9	8:59	5%

* Table 8 presents results of response travel time utilized the ISO formula (T=.65+1.7D) that discounts speed to account for slowing along the response route whereas Figures 9 through 11 illustrate model runs with a constant speed of 35 mph which results in faster overall coverage times and 100% coverage under 5 minutes.

** Note that the EUC B station was used for modeling prior to selection by the City of EUC A station. Response time differences from EUC A are minimal.

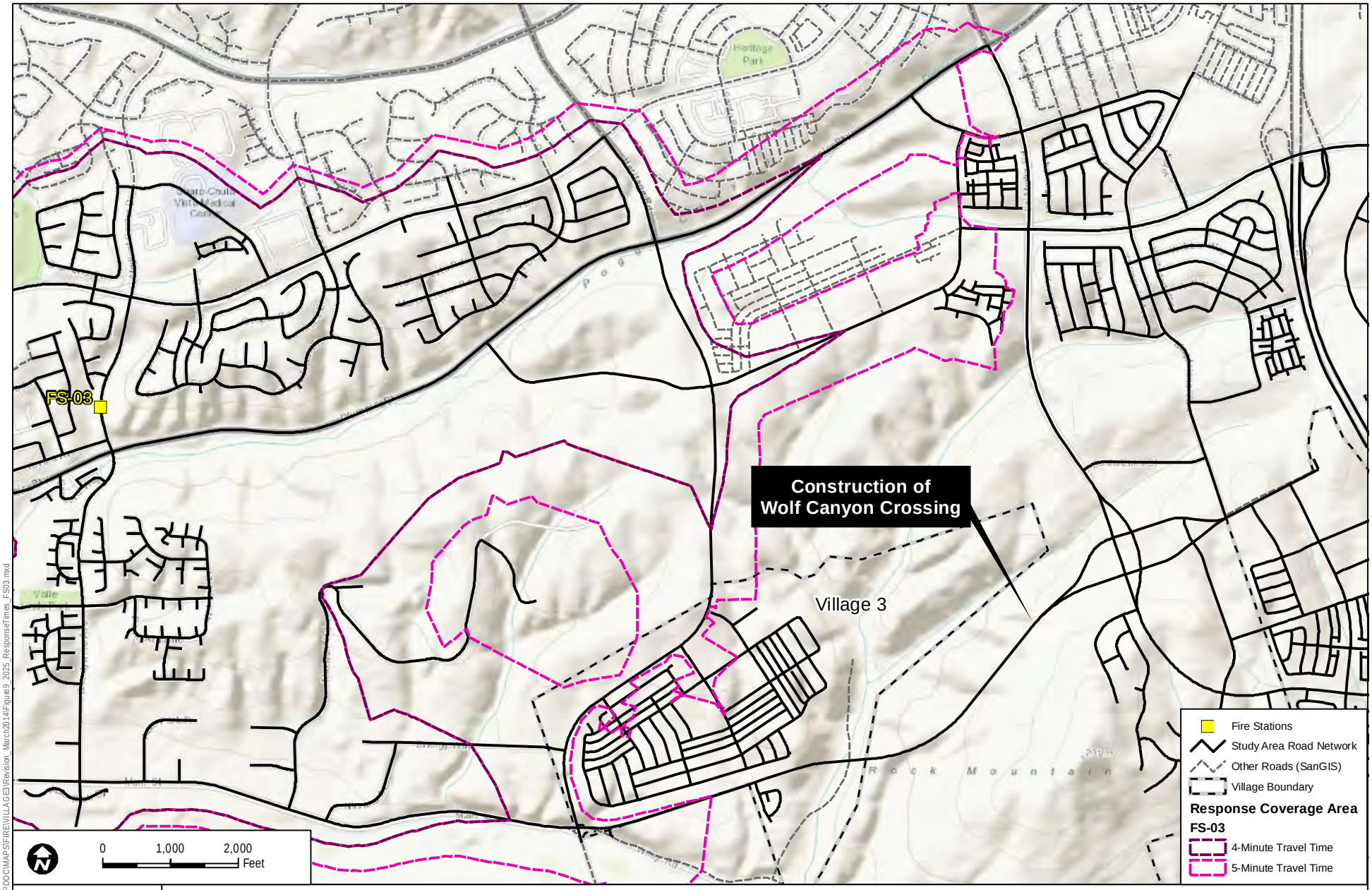
As indicated in Table 8 and Figures 9 through 11, the first arriving engine from Station 7 achieves a 5-minute travel time throughout nearly 90% of the development, substantially conforming with the approved goal of 7 minutes 90% of the time (5 minutes travel + dispatch + turnout). The 90% achievement is based on a study of the number of lots in the project and the percentage of those lots that can be reached within 5 minutes travel using the Insurance Service Office's travel time forumula. The Effective Fighting Force (first 3 engines, 1 truck and battalion chief) could be on-scene within roughly 6:56 travel time from three existing stations and within 6:36 minutes (to the furthest village extent) from the proposed Village 8 West station. In this case, the proposed Village 8 West station does not provide significant time savings, as both EFF responses are under the 8-

minute travel time goal. Even with proposed stations, travel time response at 4-minutes or less is only achievable in all portions of Village 3 North and Portion of Village 4 from Station 7.

Station 7 can successfully achieve response to 90% of Village 3 North and Portion of Village 4 within 5 minutes 7.5 seconds travel time and the remainder areas within 5 minutes 35 seconds. Achievement of 90% coverage in just over 5 minutes is considered substantially conforming to the City's standard and the number of homes beyond 5 minutes totals 209 lots, which would not be expected to generate high numbers of calls. The proposed Village 8 West Station, as well as Stations 3 and 4, can respond within roughly 6:56 minutes, rounding out the EFF. NFPA 1710 sets the 4-minute response travel time standard, but includes a 90% qualifier, meaning 90% of the responses should include a 4-minute travel time for fire and medical responses. Paramedics (ALS) are not required to arrive until 8 minutes driving time for 90% of incidents, if there is a Basic Life Support (BLS) engine company with AED on scene sooner. Chula Vista includes paramedics on each engine and therefore, exceeds NFPA 1710 to Village 3 North and Portion of Village 4. Based on the portion of Village 3 North and Portion of Village 4 that is not within the 4-minute travel time coverage and the number of emergency calls anticipated from those areas, the net effect on the City's ability to meet a 4-minute travel time, 90% of the time will not be significantly affected.

Based on the available firefighting resources from existing stations, the call volume currently experienced along with that generated by Village 3 North and Portion of Village 4, and the response times achievable by the existing stations, it is expected that overall response will substantially conform with NFPA 1710, at existing response resource levels. Call volume at Stations 7, 3, and 4 are currently estimated at 1,200, 1,500, and 1,400 per year, respectively (extrapolation from Chula Vista FFMP). The additional 0.94 call per day expected to be generated by Village 3 North and Portion of Village 4 would not significantly stress existing emergency response capabilities of existing stations, but when considered cumulatively with surrounding development and related calls, would have the potential to result in a significant impact.

Medical response does not meet the 5.5–6-minute critical time standards for first arriving including dispatch and turnout for the entire Village, but does cover a substantial portion of Village 3 within that total response timeframe. With build-out of the area, Station 7 may not be available to respond to every medical emergency at Village 3 North and Portion of Village 4, thus a slower response may be realized. None of the fire station locations provides an ideal solution to reduce travel times. However, with the addition of the proposed Village 8 West station, Station 7 may be more available to respond to medical and other emergencies in Village 3 North and Portion of Village 4, resulting in maintenance of a reasonable response travel time (under 7-minutes for first responding) and adequate resources available to respond to typical wildfire and structure fires. Medical emergencies may be slower, unless contract ambulance response can be used to enhance medical emergency response.



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SOURCE: ESRI 2013, SanGIS 2013, Hunsaker 2012, Hale Engineering 2012

FIGURE 9

Village 3 Proposed 2025 Road Network - FS-03 Fire Station Response Times

FIRE PROTECTION PLAN - VILLAGE 3 NORTH AND PORTION OF VILLAGE 4

NOTE: Assumes average roads network speeds of 35 MPH.

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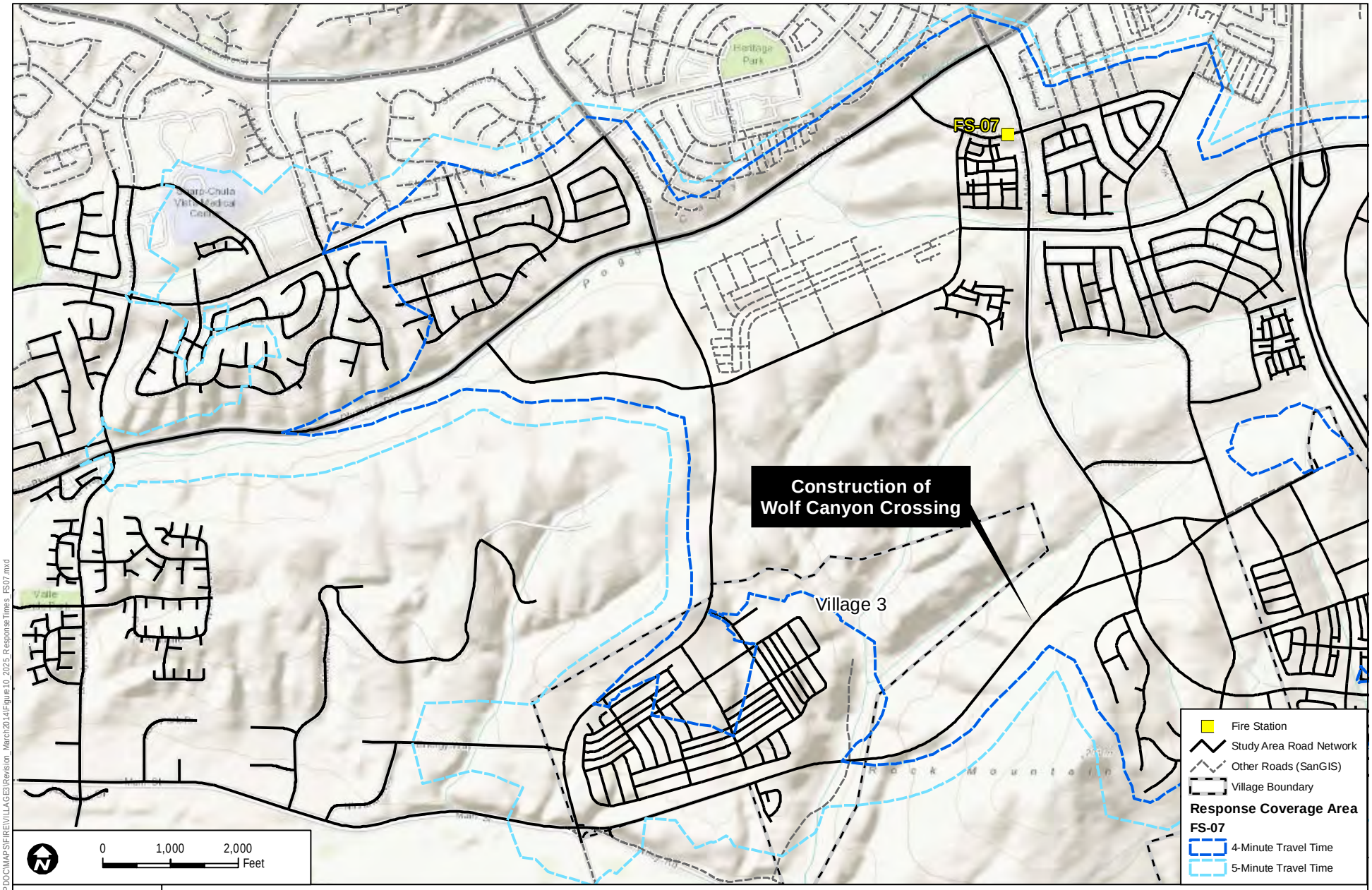

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SOURCE: ESRI 2013, SanGIS 2013, Hunsaker 2012, Hale Engineering 2012

FIGURE 10

Village 3 Proposed 2025 Road Network - FS-07 Fire Station Response Times

FIRE PROTECTION PLAN - VILLAGE 3 NORTH AND PORTION OF VILLAGE 4

NOTE: Assumes average roads network speeds of 35 MPH.

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SOURCE: ESRI 2013, SanGIS 2013, Hunsaker 2012, Hale Engineering 2012

FIGURE 11

Village 3 Proposed 2025 Road Network - VLG 8-A Fire Station Response Times

FIRE PROTECTION PLAN - VILLAGE 3 NORTH AND PORTION OF VILLAGE 4

NOTE: Assumes average roads network speeds of 35 MPH.

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3.3 Impacts and Mitigation

3.3.1 Fire Response

The Village 3 North and Portion of Village 4 Project includes a substantial number of new single- and multi-family housing units and associated schools, commercial and light industrial structures, and up to 5,126 people. Service level requirements could, in the absence of additional fire facilities and resources improvements, cause a decline in the CVFD response times and capabilities. The requirements described in this FPP are intended to aid fire-fighting personnel and minimize the demand placed on the existing emergency service system.

Cumulative impacts from this type of project can cause fire response service decline and must be analyzed for each project. The Village 3 North and Portion of Village 4 Project represents an increase in service demand due to the number of new structures and people living in or using the community. Based on the calculations presented in the preceding sections, and the estimated calls per day generated by the project, Village 3 north and Portion of Village 4 is anticipated to have a moderate impact on the response capability of the existing CVFD Fire Stations.

A second potential impact resulting from development in a Wildland Urban Interface (WUI) setting is related to the potential for increased exposure of residents to wildland fire. More people in a given area results in more opportunity for fire starts and subsequent exposure to dangerous conditions. The inclusion of homes adjacent to preserved open space areas and the potential for wildfire indicates the need for measures to minimize the likelihood of fire ignition and specialized wildland firefighting apparatus nearby should wildland fire occur.

The potential impacts to the firefighting and response resources and to the residents residing within this area are considered insignificant with respect to wildland fire. The project's inclusion of the most recent fire safety codes and a layered fire protection system, designed to reduce demands placed on the fire responders while minimizing exposure of humans to potentially harmful fire environments, will result in wildfire exposure levels that are below the significant threshold.

Features which are required and are therefore typically not considered mitigation, but that are relatively new Code requirements and play a critical role in minimizing structure ignition are; ignition resistant construction including roofs, walls and decks, vent restrictions, interior fire sprinklers, windows (dual pane/tempered), and fuel reduction areas. Although fire agencies do not provide "credit" for these features since they are required in the code, they do provide measureable safety improvements when used and are in the Code because they are so effective. Among other features that provide fire protection to Village 3 North and Portion of Village 4 are:

1. Specialized firefighting apparatus within the CVFD fleet for wildland and structure fires along with highly trained firefighters;

2. Customized fuel modification zones that will be managed and maintained throughout the year; The term "customized fuel mod zone" refers to fuel modification zones that are customized to this project based on results of fire behavior, ignition sources, weather, and fire risk.
3. Highly restrictive Fire and Building Codes for both residential and commercial/industrial buildings; and
4. Robust mutual and automatic aid agreements that provide a large arsenal of firefighters, and ground- and aerial- based firefighting apparatus.

Even with these fire protection features, the project and the Otay Ranch Sub Area will require construction, staffing and equipping of the two proposed fire stations discussed above to meet the demands created by build out of the Otay Ranch and enable CVFD to respond within the new CVFD goal of 5-minute travel timeframe to 90% of incidents (first unit) and to assemble an EFF within 8 minutes. Overall phasing of the project and nearby projects (which all provide funding to these stations on a fair-share basis) will determine when additional fire stations are constructed. The Village 3 North and Portion of Village 4 Public Facilities Finance Plan includes a detailed analysis of fire facility phasing and funding. The Project must comply with the approved Chula Vista FFMP (2012), as approved by the Chula Vista City Council. With the two proposed fire stations, construction of which will be supported on a fair share basis by the Project through property tax and payment of the Chula Vista Public Facility Development Impact Fee, City' new goal of 5 minutes driving time to 90% of all structure fires and medical emergency calls will be substantially conforming. An appropriate trigger will be negotiated and included in the Village 3 North and portion of 4 Public Facilities Finance Plan with regard to fair-share funding and commencement of any fire station necessary to serve the project.

3.3.2 Medical Response

The number of estimated EMS calls per day represents a significant impact on current response capabilities and to the people who could require fast medical response for a variety of emergency medical situations. Response times will increase, given the potential for up to 0.94 calls per day associated with Village 3 North and Portion of Village 4 and especially with build-out of the area without additional resources. The combination of two additional fire stations with paramedic units, as proposed by Chula Vista Fire Department, along with ambulance service unit increases is anticipated to result in sufficient resources to respond throughout the Otay Ranch Sub Area, including Village 3 North and Portion of Village 4 at build out.

Medical emergency response times cannot be mitigated for the most serious medical emergencies such as cardiac related emergencies. Advanced life support provided by paramedics on responding engines must arrive as quickly as possible, within 5.5–6 minutes to improve survivability (8

minutes if basic life support can be provided sooner). Six minutes includes the time to notify 911, for 911 to dispatch the closest engine, for the firefighters to "turnout", travel to the incident, locate the victim and engage medical treatments. It is common to require 60–90 seconds for dispatch and another 60–90 seconds for turnout. Travel times vary, but for Village 3 North and Portion of Village 4, would be less than 5-minutes 35 seconds.

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4.0 FIRE SAFETY REQUIREMENTS

The Chula Vista area experiences periodic wildfire and there are dedicated preserve areas that provide wildland fuels adjacent Village 3 North and Portion of Village 4. Although Village 3 North and Portion of Village 4 has not burned during the recorded fire history period, it is expected that wildfire could burn or spot onto the site. Additionally, structural fires and medical emergencies occur in urbanized areas and require response. As such, this FPP provides a summary of proposed and required infrastructure and special measures to provide fire protection.

4.1 Fuel Modification

WUI fire protection requires a systems approach, which includes the components of infrastructure and water, structural safeguards, and adequate fuel modification areas. This section provides fuel modification details for Village 3 North and Portion of Village 4. Figure 12 illustrates the Village 3 North Fuel Modification Zones while Figure 12-1 illustrates the typical edge condition at Village 3's community park.

4.1.1 Fuel Modification Zones

Definition

Fuel Modification Zone: A brush management area from the perimeter structures extending outwards towards Preserve areas. All brush management zones and related fuel modification activities shall occur outside of the Preserve.

General Criteria

1. Vegetation included on the Prohibited Plant List (Attachment 3) is prohibited in any Fuel Modification Zone.
2. All plant and seed material in Zones 1 and 2 to be locally sourced to the greatest extent possible to avoid genetically compromising the existing Preserve Vegetation
3. Plant 50%–70% of the overall fuel modification zone with deep rooting plant material.
4. Maintain all plant material in irrigated zones in a hydrated condition.
5. Remove debris and trimmings produced by thinning and pruning from the site, except for larger woody debris that may be chipped and left on site for weed and erosion control.
6. Hedging of shrubs is prohibited.
7. All trees must be limbed to six feet or 3x the height of understory plants, whichever is greater.
8. Plant shrubs in clusters not exceeding a total of 400 square feet.

9. Provide a distance of no less than the width of the largest shrub's mature spread between each shrub cluster.
10. Provide "Avenues" devoid of shrubs a minimum width of 6 feet and spaced a distance of 200 linear feet on center to provide a clear access route from toe of slope to top of slope.
11. Combustible materials, including chipped biomass, bark, wood chips should be no closer than 30 feet to structures unless of size and type shown to reduce potential ignitions.
12. Provide a minimum 30 foot distance between mature canopies on slopes that exceed 40%.

Zone 1 (0–50 feet from structure)

Zone 1 – Definition:

All public and private areas located between a structure's edge and 50 feet outward. These areas may be located on public slopes, private open-space lots, public streets, as defined in the landscape fuel modification exhibits.

Zone 1 – Specific Criteria:

1. Provide a permanent irrigation system within this irrigated wet zone.
2. Only those trees on the approved plant list and those approved by the Development Services Director as not being invasive are permitted within this zone.
3. Tree limbs shall not encroach within 10 feet of a structure or chimney, including outside barbecues or fireplaces.
4. Provide a minimum of 10 feet between tree canopies.
5. Additional trees (excluding prohibited or highly flammable species) may be planted as parkway trees on single loaded streets.
6. Limit 75% of all groundcover and sprawling vine masses to a maximum height of 18 inches.
7. 25% of all groundcover and sprawling vine masses may reach a maximum height of 24 inches.
8. Ground covers must be of high-leaf moisture content.
9. Shrubs shall be less than 2 feet tall and planted on 5-foot centers.
10. Randomly place approved succulent type plant material may exceed the height requirements, provided that they are spaced in groups of no more than three and a minimum of five feet away from described "clear access routes."
11. Vegetation/Landscape Plans shall be in compliance with this FPP.

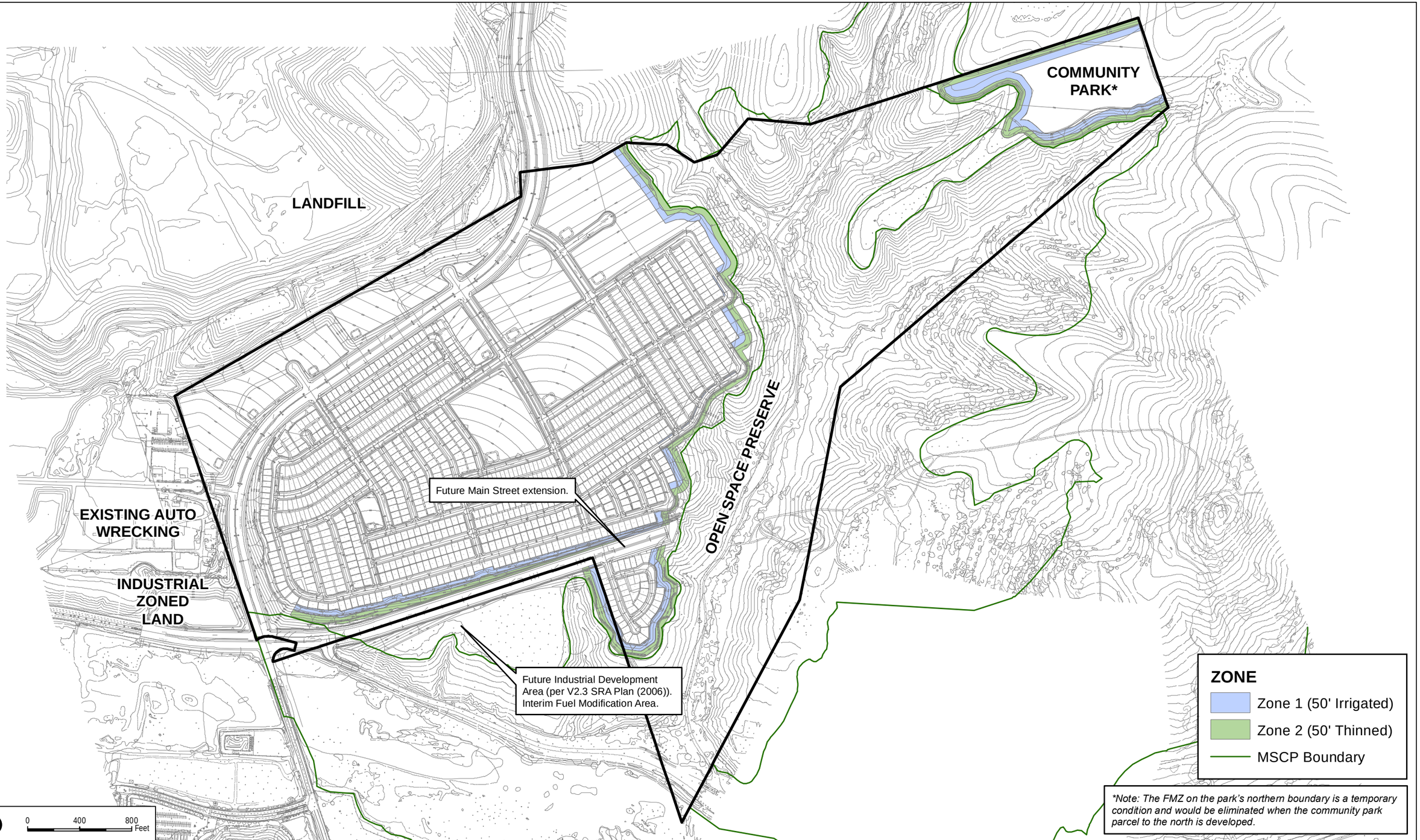

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FIGURE 12

Fuel Modification Zone Exhibit

FIRE PROTECTION PLAN - VILLAGE 3 NORTH AND PORTION OF VILLAGE 4

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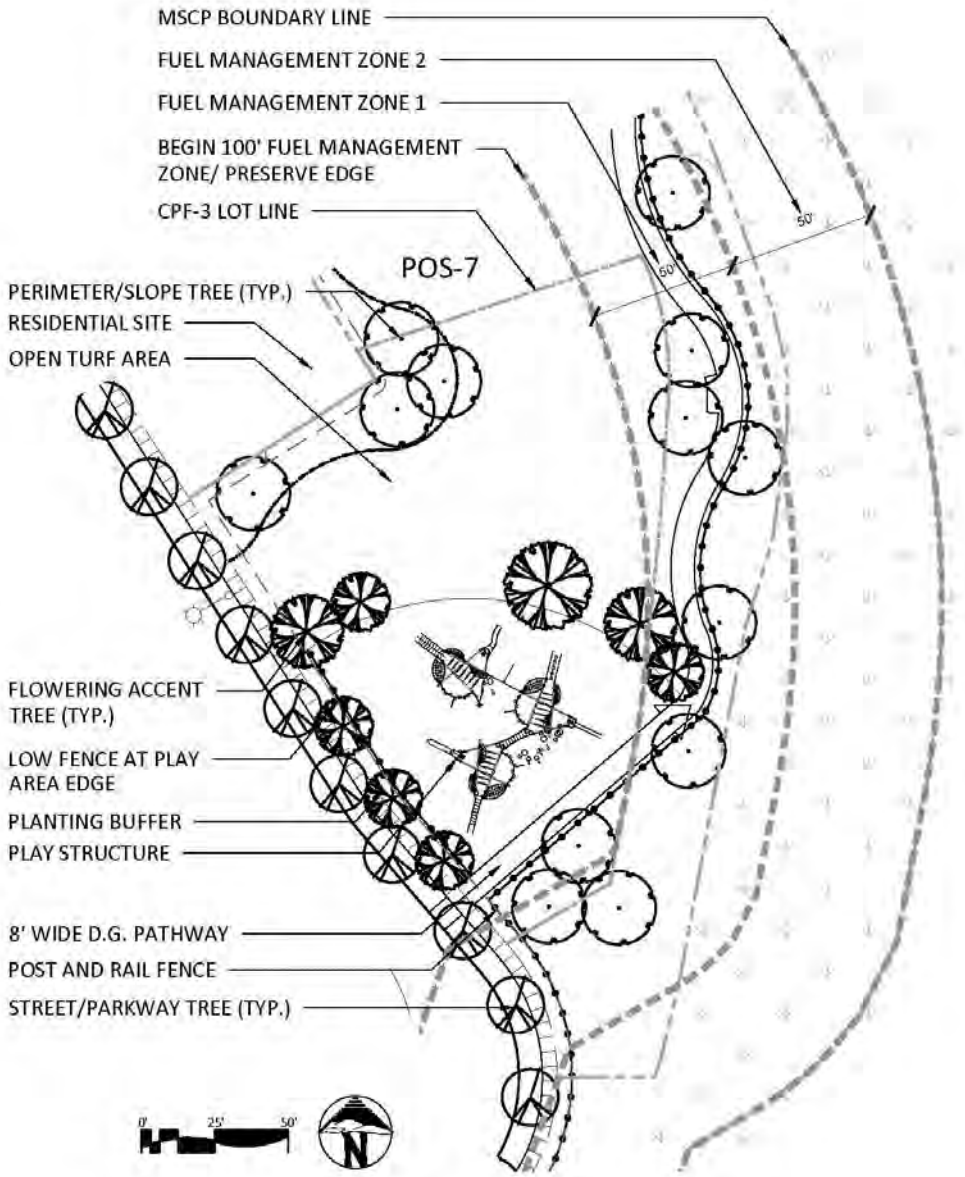
Figure 12-1 Typical Edge Condition at Village 3 Park Facility 3



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Zone 2 (51–100 feet from structure)

Zone 2 – Definition:

All public and private areas located between the outside edge of Zone 1 and 50 feet outward to 100 feet, per this FPP. These areas may be located on public slopes, private open-space lots, public streets, as defined in the landscape fuel management exhibits.

Zone 2 – Specific Criteria:

1. Utilize temporary irrigation to ensure the establishment of vegetation intended to stabilize the slopes and minimize erosion.
2. Trees may be located within this zone, provided they are planted in clusters of no more than three. A minimum distance of no less than 30 feet shall be maintained between the tree cluster's mature canopies.
3. Only those trees on the approved plant list and those approved by the Development Services Director as not being invasive shall be permitted within this zone.
4. 100% of all groundcover and sprawling vine masses shall be limited to a maximum height of 36 inches.
5. Shrubs may be planted in clusters not exceeding a total of 400 sq ft.
6. Provide a distance of no less than the width of the largest shrub's mature spread between each shrub cluster.
7. Provide “Avenue” devoid of shrubs a minimum width of 6 feet and spaced a distance of 200 linear feet on center to provide a clear access route from toe of slope to tope of slope.
8. When shrubs or other plants are planted underneath trees, the tree canopy shall be maintained at a height no less than three times the shrub or other plant's mature height (break up any fire laddering effect).
9. Hedging of shrubs is prohibited.

Village 3 North and Portion of Village 4 Specific Criteria

Fuel modification for Village 3 North and Portion of Village 4 provides at least 100 feet of defensible space. In addition, the fuel modification zones will consist of non-traditional, but effective placement of low-flammability land uses that function as fuel modification (e.g., parking, swimming pools, tennis courts, irrigated green space) on the perimeter of the development footprint. Details follow:

1. Fuel modification will include at least 100 feet of modified fuels with a Zone 1 consisting of 50 feet of irrigated and restricted planting zone, and Zone 2, consisting of 50 feet of temporary irrigation reduced fuel and planting.

2. The Project must comply with the landscape and fuel modification plant palette contained in Attachment 2, Approved Plant List.
3. The community park proposed along the eastern boundary of the Village 3 North and Portion of Village 4 site (technically a part of Village 4), includes placement of parking areas and community recreation facilities (swimming pool(s), tennis court(s)) and irrigated green spaces, at the perimeter of the park. No structures are proposed for this area, but fuel modification is provided around its perimeter. Note that the FMZ on the park's northern boundary is a temporary condition and would be eliminated when the community park parcel to the north is developed. Additionally, the irrigated and maintained vegetation within the remaining portions of the park will function as an extended fire buffer.
4. Fuel modification to the north of Village 3 North and Portion of Village 4 will tie into existing/proposed development area landscaping. There will be no true interface to the north.
5. The interface to the west is bisected by Heritage Road, which provides a 165-foot non-flammable boundary between residential structures and non-maintained fuels.
6. The remaining fuel modification zones provide at least 100 feet of defensible space, including at least a 50-foot irrigated Zone 1 and a 50-foot thinned Zone 2. The provided fuel modification represents nearly 3-times the modeled worst-case flame lengths for the site.
7. Engineered retaining walls (Figures 13 through 15) on the perimeter of the project (within fuel modification areas) will be plantable walls that are irrigated and include a fuel modification consistent plant palette (Attachment 2). In addition, the walls will be maintained free of dead/dying and undesirable species through annual maintenance of the fuel modification zone. To facilitate maintenance, a 10' maintenance access route will be provided at the base of the wall(s). These walls will provide benefits of breaking up vertical fuel continuity, deflecting heat and flames, and augmenting the function of the fuel modification zones.

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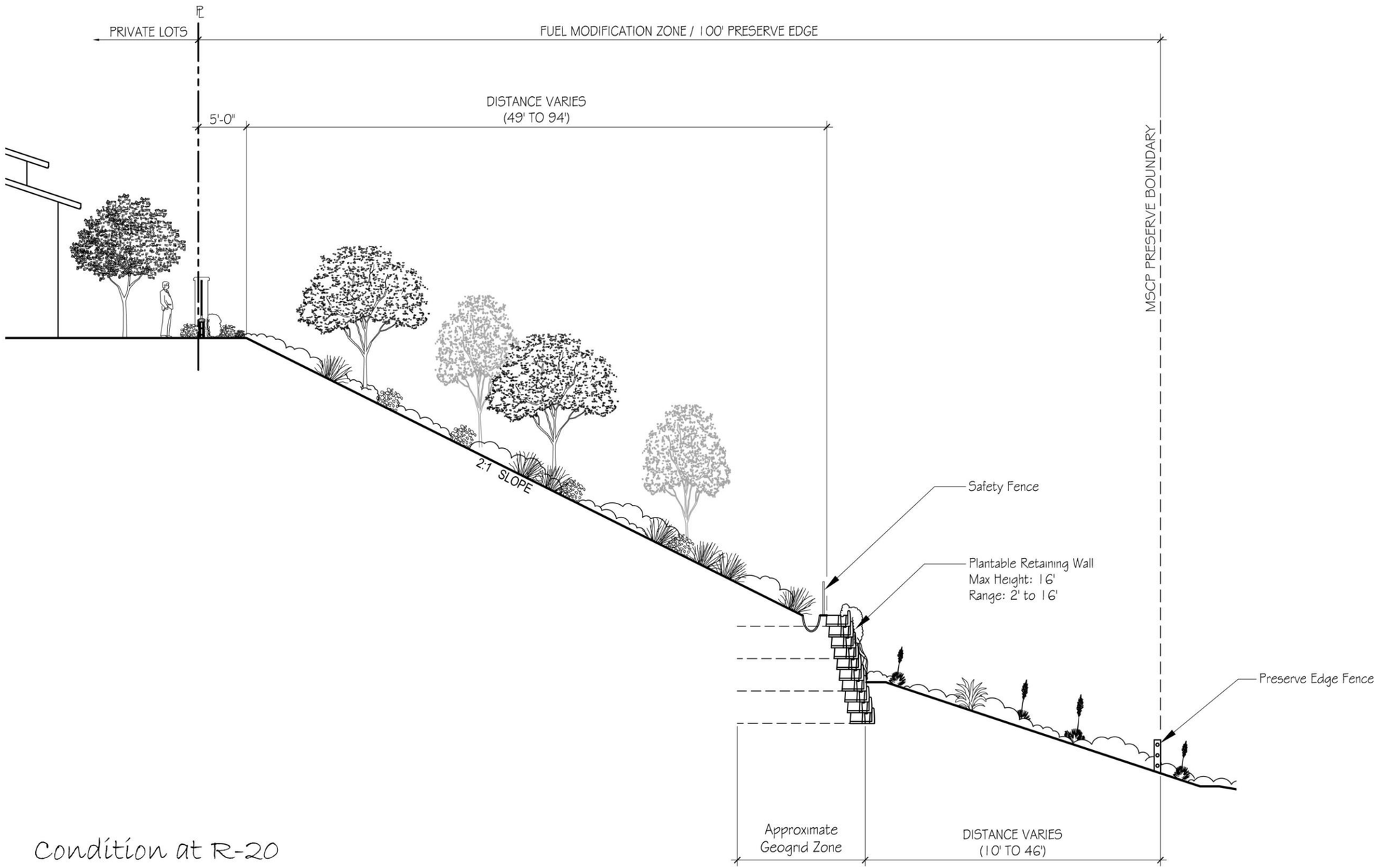
Figure 13 Profile View of Plantable Retaining Wall within Fuel Modification Zones (Street CC)



Condition at R-20

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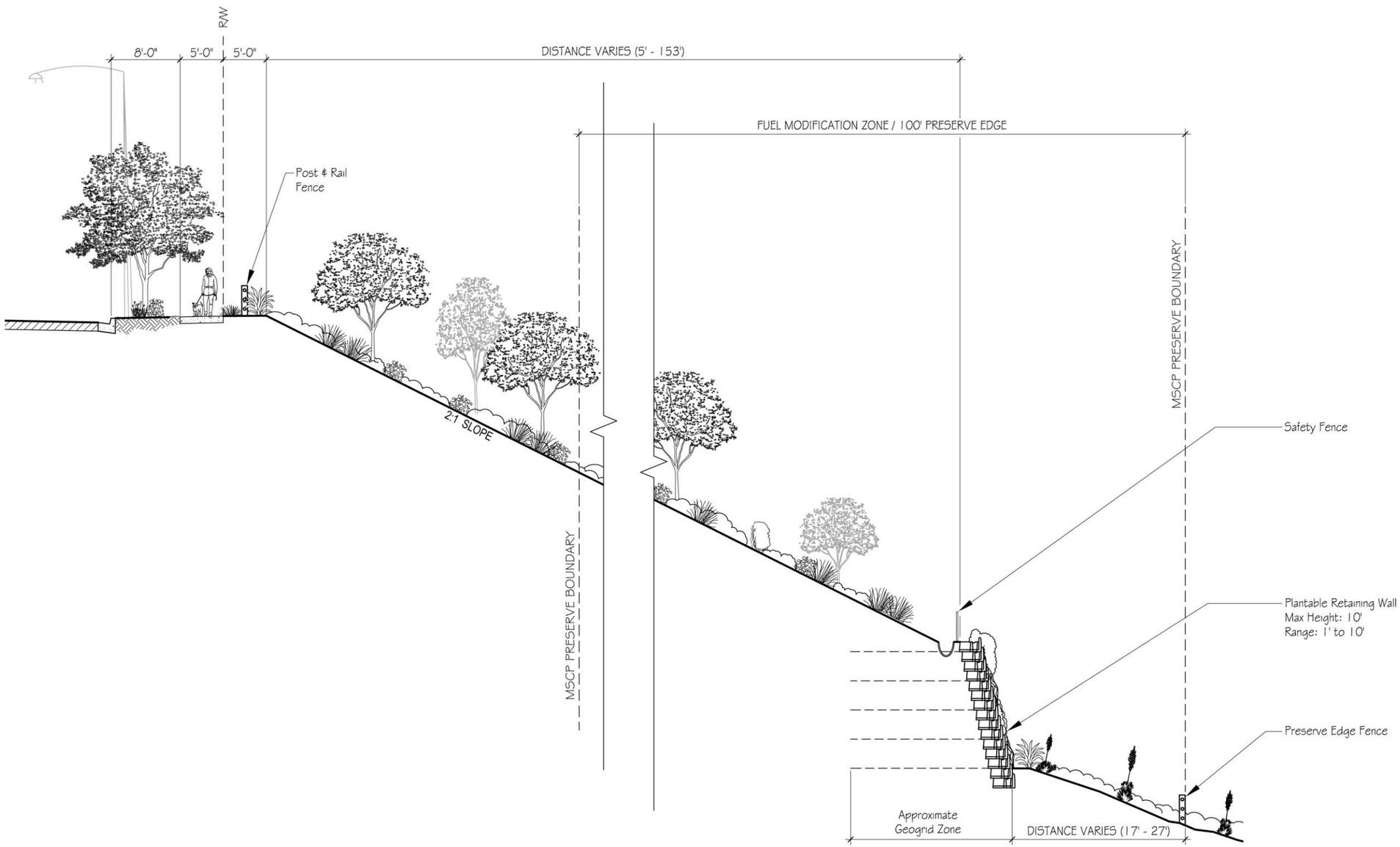
Figure 14 Profile View of Plantable Retaining Wall within Fuel Modification Zones (R20)



Condition at Street "F"

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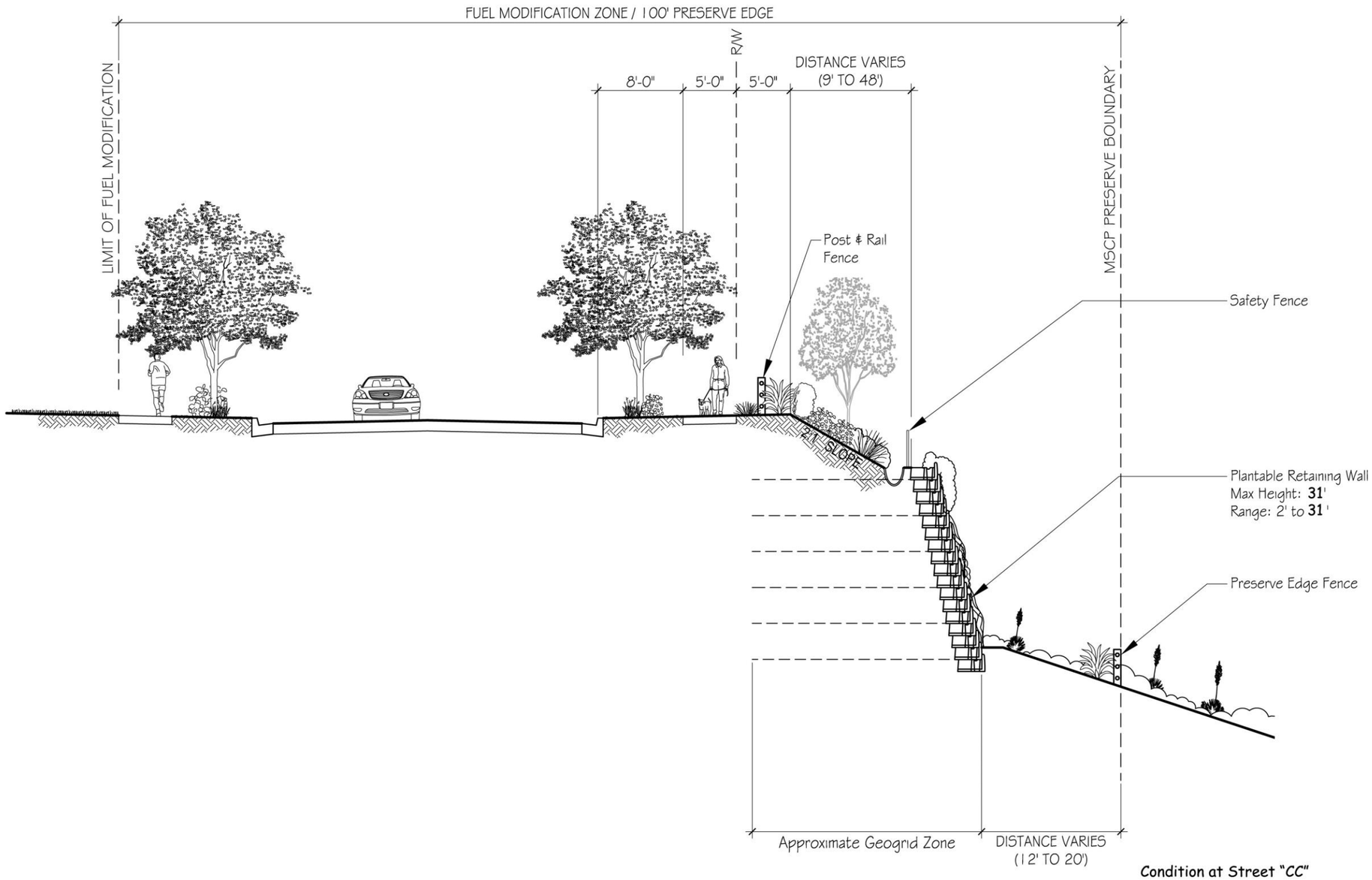
Figure 15 Profile View of Plantable Retaining Wall within Fuel Modification Zones (Street F)



Condition at Street "CC"

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4.1.2 Other Vegetation Management

A. Construction Period Vegetation Management

Vegetation management requirements will be implemented at commencement and throughout the construction phase. Vegetation management will be performed pursuant to CVFD requirements on all lots or areas prior to the start of work and prior to any import of combustible construction materials. Adequate fuel reductions will occur through thinning, mowing, or blading around all grading, site work, and other construction activities in areas where there is flammable vegetation In addition to the requirements outlined above, the project will comply with the following important risk reducing vegetation management guidelines:

1. All new power lines will be underground, for fire safety during high wind conditions or during fires on a right of way which can expose aboveground power lines. Temporary overhead power/utility lines are permitted in construction zones.
2. Fuel modification zones will not extend into biological open space or other sensitive biological areas, or other areas controlled by the City and/or resource agencies without first having written formal permission from all applicable agencies.
3. Caution must be used to avoid erosion or ground (including slope) instability or water runoff due to vegetation removal, vegetation management, maintenance, landscaping, or irrigation. No uprooting of treated plants is necessary.
4. Vegetation management activities associated with facilities under construction within the MSCP Preserve shall be limited to the impact area identified and analyzed in the Village 3 North and Portion of Village 4 Project EIR. No vegetation management activities are permitted within the Preserve. Emergency brush management activities within the MSCP Preserve must comply with the Chula Vista MSCP Subarea Plan, Section 7.4.4.3 Emergency Brush Management.
5. All structures will be in strict, ongoing compliance with all Fire and Building Code requirements.

B. Roadside Fuel Modification Zones (Including Driveways)

1. High BTU producing flammable vegetation including shrubs and trees shall be cleared and are prohibited.
2. Tree and shrub canopies shall be spaced such that interruptions of tree crowns occur and horizontal spacing of 20 feet between mature canopies of trees or tree groups is maintained.
3. Mow/trim grass to 4 inches.

4. Single tree specimens, fire resistive shrubs, or cultivated ground cover such as green grass, succulents or similar plants used as ground covers may be used, provided they do not form a means of readily transmitting fire.
5. All roads in the development will have vegetation clearance of flammable vegetation on each side, as follows:
   a. Fire Access Roads – 30 feet from edge of pavement
   b. New roads/driveways – 30 feet from edge of pavement
   c. Existing roads/driveways – 20 feet from edge of pavement.
6. Trees are permitted within the Roadside Vegetation Management Zones subject to following criteria:
   a. Provide 20 feet between mature tree canopies (30 feet if adjacent to a slope steeper than 41%).
   b. Limb trees up to one-third the height of mature tree or 6 feet, whichever is greater.
   c. Tree canopies lower than 13 feet 6 inches are prohibited over roadways.
   d. Tree trunks may not intrude into roadway width.
   e. Comply with the Prohibited Plant List (Attachment 3) .
   f. Remove flammable understory beneath trees.
   g. Maintain vegetation under trees to 2 feet in height or below, and no more than one third the height of the lowest limb/branch on the tree, in order to keep the area fire resistive.

C. Parks, Open Space, etc.

1. Parks and open space landscape areas must comply with the guidelines in this FPP.
2. Remove flammable vegetation.
3. Maintain and mow/trim grasses to 4 inches.
4. Trees, plants, and shrubs must comply with the criteria in the FPP and the Approved Plant List (Attachment 2).
5. Comply with the Prohibited Plant List (Attachment 3) .
6. Remove down and dead vegetation as observed.
7. Properly plant and maintain trees consistent with this FPP.

D. Vacant Parcels and Lots

1. Vegetation management will not be required on vacant lots until construction begins. However, perimeter Vegetation Management Zones must be implemented prior to commencement of construction utilizing combustible materials.
2. Vacant lots adjacent to active construction areas/lots will be required to implement vegetation management if they are within 30 feet of the active construction area. Perimeter areas of the vacant lot shall be maintained as a Vegetation Management Zone extending 30 feet from roadways and adjacent construction areas.
3. Prior to issuance of a permit for any construction, grading, digging, installation of fences, etc., the 30 feet at the perimeter of the lot is to be maintained as a Vegetation Management Zone. However, this 30 foot vegetation management zone may not extend into the MSCP Preserve.
4. In addition to the establishment of a 30-foot-wide vegetation management zone prior to combustible materials being brought on site, existing vegetation on the lot shall be reduced by at least 60% upon commencement of construction.
5. Dead fuel, ladder fuel (fuel which can spread fire from ground to trees), and downed fuels shall be removed and trees/shrubs shall be properly limbed, pruned and spaced per this plan.

E. Preserve Areas

At the time of this FPP, there is no anticipated need to conduct vegetation management within adjacent Preserve areas. However, should conditions arise due to unforeseen or uncontrollable circumstances that leads to unsafe conditions, emergency brush management activities within the MSCP Preserve must comply with the Chula Vista MSCP Subarea Plan, Section 7.4.4.3 Emergency Brush Management.

F. Alternative Methods

As fire protection technology continues to evolve and application of fire protection and suppression systems, materials, and methods become acceptable to fire agencies, this FPP provides an alternate means of providing defensible space. Builders or private lot owners may submit a site specific risk assessment and detailed Vegetation Management Plan (VMP) with an Alternative Materials and Methods justification, to the CVFD proposing alternative methods of fire protection and providing justification for any variance from the recommended vegetation management zones, if there is a practical difficulty, or environmental constraint, in providing the entire size of the necessary vegetation management zone detailed herein. The VMP will need to fully justify any alternative means and methods/mitigation measures proposed for reductions in

the fuel modification areas and the CVFD Fire Marshal shall have full authority to approve or deny the requested variance.

G. Private Lots

This FPP provides direction for selecting lower flammability plant material along with planting and maintenance requirements. The 100 feet fuel modification zone is required to use low flammability plantings consistent with this FPP. In addition, it is recommended that none of the plant materials listed in the "Prohibited Plant List" (Attachment 3) in this plan or otherwise known to be especially flammable be planted on private lots. This FPP or a summary of its key points will be provided to all buyers in a private property owner's guide to living in a fire environment. Deed restrictions will be recorded indicating the fuel modification zones on each private lot, as appropriate. Deed restrictions shall run with the land and be conveyed to any subsequent owner of the private lot. In addition, the project Codes, Covenants, and Regulations (CC&Rs) shall include a reference to the FPP to ensure compliance with the FPP.

All subsequent landscape plans and associated plant pallets prepared for areas located adjacent to the preserve are subject to the review and approval of the MSCP Section of the Development Services Department.

4.1.3 Maintenance

Vegetation management shall be completed annually by May 1 of each year and more often as needed for fire safety, as determined by the CVFD. Homeowners and private lot owners shall be responsible for all vegetation management on their lots, in compliance with this FPP which is consistent with CVFD requirements. The "Approved Maintenance Entity" shall be responsible for and shall have the authority to ensure long term funding, ongoing compliance with all provisions of this FPP, including vegetation planting, fuel modification, vegetation management, and maintenance requirements on all private lots, multifamily residences, commercial, school (CVFD may inspect schools and enforce fuel modification requirements), parks, common areas, roadsides, and open space under their control (if not considered biological open space). Any water quality basins, flood control basins, channels, and waterways should be kept clear of flammable vegetation, subject to Section 4.1.2.D. The Approved Maintenance Entity shall obtain an inspection and report from a CVFD–authorized Wildland Fire Safety Inspector, in May of each year, certifying that vegetation management activities throughout the Project Site have been performed pursuant to this FPP and CVFD standards. This report will be funded by the Approved Maintenance Entity and submitted to CVFD Fire Marshal for approval.

Note: non-emergency brush management within Zone 2 (zone closest to the preserve) shall be performed outside the bird breeding season, to the extent practical for consistency with the MSCP and the Migratory Bird Treaty Act. Brush management activities within this zone are subject to review by the MSCP Section of the Development Services Department and may require additional technical information including pre-implementing bird surveys and noise monitoring. Maintenance activities in any environmentally sensitive areas that contain sensitive habitat including jurisdictional waters/wetlands are subject to the prior review and approval of the City and appropriate resource agency (i.e., California Department of Fish and Game, U.S. Fish and Wildlife Service, Army Corps of Engineers).

4.2 Infrastructure

4.2.1 Access

Site access, including fire lane, driveway, and entrance road widths, primary and secondary access, gates, turnarounds, turning radius, dead end lengths, signage, aerial fire apparatus access, surface, and other requirements will comply with the requirements of the Chula Vista Fire Code (including 2013 Fire Code {Appendix D} and 2000 Urban-Wildland Interface Code {Section 403}) or will be reviewed and approved by CVFD.

Open Space/Canyon Access for firefighters will be provided every 1,000 lineal feet on the perimeter of the project adjacent Preserve areas.

4.2.2 Secondary Access

1. Village 3 North includes three primary ingress/egress roadways, while the portion of Village 4 included in this FPP includes one primary ingress/egress roadway.
2. Dead end roads longer than 150 feet shall have approved provisions for fire apparatus turnaround.
3. Cul-de-sac bulbs are required on dead-end roads in residential areas where roadways serve more than two residences and per City standards.
4. Fire apparatus turnarounds to include turning radius of a minimum 35 feet, measured to inside edge of improved width, (CVFC and Section 31 Standard Operational Guidelines).
5. The longest dead-end road (cul-de-sac) allowed by the CVFC is 800 feet for this community. No dead-end cul-de-sac lengths will exceed 800 feet.
6. Roadways and/or driveways will provide fire department access to within 150 feet of all portions of the exterior walls of the first floor of each structure.

7. Roadway design features (e.g., speed bumps, humps, speed control dips, planters, fountains) that could interfere with emergency apparatus response speeds and required unobstructed access road widths will not be installed or allowed to remain on roadways (CVFC). Traffic Calming features (i.e., raised intersections, intersection neck downs, roundabouts and parallel bay parking with landscape pop-outs) shall be allowed, subject to approval by the CVFD.
8. Vertical clearance of vegetation along roadways will be maintained at 13 feet, 6 inches. Vertical clearance in the commercial, school, and multi-family structure areas to be clear to the sky to allow aerial ladder truck operation. There shall be no power or utility lines over roadway.
9. Angle of driveway/roadway approach/departure will not exceed 7° (12%) per CVFD.
10. Road grades will not exceed 10%, unless approved by the Fire Chief.
11. Developer will provide information illustrating the new roads, in a format acceptable to the Fire District, for updating of Fire District maps (CVFC).
12. Any roads that have traffic lights shall have Fire District–approved traffic preemption devices (Opticom) compatible with devices on the Fire Apparatus.

4.2.3 Gates

Access gates will comply with CVFC requirements applicable at the time of building plan approval.

4.2.4 Driveways

Any structure that is 150 feet or more from a common road in the development shall have a paved driveway meeting CVFC requirements:

4.2.5 Water Supply

Water service will be provided by the Otay Water District. Water supply requirements specified in the Chula Vista Fire Code (Section 404 of the Wildland-Urban Interface Code and Appendix B – Fire Flow Requirements for Buildings, Appendix C – Fire Hydrant Locations and Distribution {Chula Vista revisions – Sections 15.36.050 and 15.36.055}) including for hydrants and interior sprinklers will be provided for Village 3 North and Portion of Village 4.

4.3 Structure Requirements

4.3.1 Ignition-Resistance

Village 3 North and Portion of Village 4 structures will include single family detached, multi-family, light industrial, commercial, and a school. Each of these structures will include the latest wildland urban interface construction methods and materials required by the latest building or fire code (Chapter 7A of the 2013 Building Code and Chapter 5 of the Urban-Wildland Interface Code).

While these standards will provide a high level of protection to structures in this development, and should reduce the potential for ordering evacuations in a wildfire, there is no guarantee that compliance with these standards will prevent damage or destruction of structures by fire in all cases.

4.3.2 Fire Protection System Requirements

All structures within Village 3 North and Portion of Village 4 will include interior sprinklers, per code requirements (Section R313.3 of the 2013 California Residential Code, Chapter 9, Section 903 of the 2013 Chula Vista Fire Code, and Section 602 of the Urban-Wildland Interface Code). Sprinklers will be specific to each occupancy type and based on the most recent NFPA 13, 13R, or 13D, requirements.

4.3.3 Additional Requirements and Recommendations Based on Occupancy Type

This section includes conceptual occupancy-specific recommendations based on the type of occupancy.

Additional Building Requirements for High Occupancy and Higher Hazard Potential Buildings

All CVFC and CVBC requirements for higher occupancy structures will be provided to Village 3 North buildings that include higher occupancies. Included in the high occupancy category are multi-family residences over three units, attached condominiums, multi-story buildings over two stories, industrial, commercial, and schools.

Schools

Building Plans will be subject to approval of the State Architect. Construction in this area should comply with CBC, Chapter 7-A, structures should be no more than two-stories, and shall comply with other state requirements for fire safety. Access, water supply and hydrant plans are subject to CVFD approval.

4.3.4 Wildfire Education

Village 3 North residents and visitors of commercial and property facilities will be provided on-going education regarding wildfire, the City evacuation plan, and this FPP's requirements. This educational information will be prepared by the community HOA, reviewed by the CVFD, and will support the fire safety and relocation features/plans designed for this community. Informational handouts, community Web-site page, mailers, fire safe council participation, inspections, and seasonal reminders, are some methods that will be used to disseminate wildfire and relocation awareness information. CVFD will review and approve all wildfire educational material/programs before the HOA printing and distribution.

5.0 CONCLUSION

This FPP for the proposed Village 3 North and Portion of Village 4 complies with the requirements of Chula Vista Fire Department and its adopted Fire Codes (2013 California Fire Code and 2000 Urban-Wildland Interface Code) and Building Codes (Chapter 7A).

This FPP utilizes a "systems approach" for specifying fire protection measures. The measures consist of the components of fuel modification, structural protection, water supply, fire protection systems, access (ingress/egress), and well-planned emergency response. This FPP provides details regarding the general fire protection features as well as the site specific, restrictive policies that will govern Village 3 North and Portion of Village 4 with regards to fire protection. In addition, this FPP incorporates and relies on the proposed fire station locations outlined in the 2014 Council-approved, Chula Vista FFMP. Village 3 North and Portion of Village 4 must comply with this plan.

The requirements and recommendations provided in this FPP have been designed specifically for the proposed improvements adjacent to the wildland urban interface zone at Village 3 North and Portion of Village 4.

Ultimately, it is the intent of this FPP to guide the fire protection efforts for Village 3 North and Portion of Village 4 in a comprehensive manner. Implementation of the measures detailed in this FPP will reduce the risk of wildfire at this site, will improve the ability to safely relocate people from the area during wildfire events or temporarily shelter them under emergency conditions, and will improve the ability to fight fires on the properties and protect property and neighboring resources irrespective of the cause or location of ignition.

It must be noted that during extreme fire conditions, there are no guarantees that a given structure will not burn. Precautions and minimizing actions identified in this report are designed to reduce the likelihood that fire will impinge upon Village 3 North and Portion of Village 4 assets or threaten its residents or visitors. Additionally, there are no guarantees that fire will not occur in the area or that fire will not damage property or cause harm to persons or their property. Implementation of the required enhanced construction features provided by the applicable codes and the fuel modification requirements provided in this FPP will reduce the site's vulnerability to wildfire. It will also help accomplish the goal of this FPP to assist firefighters in their efforts to defend existing structures and reduce overall fire risk.

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6.0 MAINTENANCE AND LIMITATIONS

In order to ensure that the proposed improvements and uses are provided suitable fire protection that will minimize risks associated with fire, all components of the fire protection system must be maintained and in place. This FPP, when approved, provides the direction and nexus for that maintenance to occur. Specifically, the HOA or other funded management entity will be funded and authorized to ensure that at least annual inspections of the fuel modification areas, construction features, fire protection systems, and infrastructure to ensure that they meet the requirements specified in this FPP.

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7.0 REFERENCES

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ATTACHMENT 1

Select Project Area Photographs

Photograph 1

Photograph 2

Photograph 3

Photograph 4

Photograph 5

Photograph 6

Photograph 7

Photograph 8

Photograph 9

Photograph 10

Photograph 11

Photograph 12

Photograph 13

Photograph 14

Photograph 15

Photograph 16

Photograph 17

Photograph 18

Photograph 19

Photograph 20

Photograph 21

Photograph 22

Photograph 23

Photograph 24

Photograph 25

Photograph 26

Photograph 27

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Project Area Photographs

FIRE PROTECTION PLAN - VILLAGE 3 NORTH AND PORTION OF VILLAGE 4

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ATTACHMENT 2

Village 3 North and Portion of Village 4
Landscape Plant Palette

VILLAGE 3N/4 APPROVED MASTER PLANT LIST
JULY 2014

FUEL MODIFICATION ZONE 1

BOTANICAL NAME	COMMON NAME	NOTES

Plant and seed material should be locally sourced to the greatest extent possible to avoid genetically compromising existing Preserve vegetation

Trees:

Heteromeles arbutifolia	Toyon	May be planted within Fuel Management Zone 1 up to 10% of the plant palette mix. No single mass shall exceed 400 sf. These shall be spaced such that the nearest shrub is no closer than the tallest shrub height (at maturity)
Metrosideros exelsus (un-cut leader)	New Zealand Christmas Tree	
Plantanus racemosa	California Sycamore	
Quercus agrifolia	Coast Live Oak	
Rhus lancea	African Sumac	Plant acceptable on a limited basis (Max. 30% of the area at the time of planting)

Shrubs, Cacti & Groundcovers:

Acalypha californica	California Copperleaf	
Agave Shawii	Coastal Agave	
Arctostphylos 'Emerald Carpet'	Emerald Carpet Mazanita	
Baccharis Pilularis	Coyote Brush	Only local native shrub species will be utilized. No cultivars shall be permitted.
Bloomeria Crocea	Common goldstar	
Ceanothus verrocosus	Wartystem Ceanothus	Plant acceptable on a limited basis (Max. 30% of the area at the time of planting)
Comarostaphylis diversifolia	Summer Holly	
Cotoneaster dammeri 'Lowfast'	Bearberry Cotoneaster	
Cotoneaster horizontalis	Rock Cottoneaster	
Cylindropuntia prolifera	Coast Cholla	
Dudleya pulverulenta	Chalk Lettuce	
Encielia californica	California Encelia	
Epilobium californicum	California Fushcia	
Euphorbia misera	Cliff Spurge	
Galvezia speciosa	Bush Snapdragon	
Helianthemum scoprium	Sun Rose	

VILLAGE 3N/4 APPROVED MASTER PLANT LIST
JULY 2014

BOTANICAL NAME	COMMON NAME	NOTES
Isomeris arborea	Bladder Pod	
Iva hayesiana	San Diego Marsh Elder	
Lupinus succulentus	Arroyo Lupine	
Lycium californicum	Box Thorn	
Malachothamnus fasciculatus	Chaparrel Bushmallow	
Malamosa laurina	Hollyleaf Cherry	
Nassella pulchra	Purple Needlegrass	
Opuntia littoralis	Coastal Prickly Pear Cactus	Plants must be locally sourced
Opuntia oricola	No Common Name	Plants must be locally sourced
Rhamnus crocea	Redberry	
Rhus Integrifolia	Lemonade Berry	
Ribes speciosum	Fuschia Flowering Gooseberry	
Salvia apiana	White Sage	May be planted in limited quantities and must be properly spaced. *S. mellifera* is a prohibited species
Simmondsia chinesnsis	Jojoba	May be planted in limited quantities and must be properly spaced
Sisyrinchium bellum	Blue-Eyed Grass	
Thymus serphyllum 'Reiters'	Creeping Thyme	Restricted to 30% of area at time of planting. Use in irrigated areas only
Yucca schidigera	Mojave Yucca	
Yucca whipplei	Our Lord's Candle	

Hydroseed Mix:

Baccharis Pilularis	Coyote Brush	Only local native shrub species will be utilized. No cultivars shall be permitted.
Ceanothus verrocosus	Wartystem Ceanothus	Plant acceptable on a limited basis (Max. 30% of the area at the time of planting)
Encielia californica	California Encelia	
Hazardia squarrosa	Sawtooth Goldenfields	
Isomeris arborea	Bladder Pod	
Iva hayesiana	San Diego Marsh Elder	
Layia platyglossa	Tidy tips	
Lupinus succulentus	Arroyo Lupine	
Malachothamnus fasciculatus	Chaparrel Bushmallow	

VILLAGE 3N/4 APPROVED MASTER PLANT LIST
JULY 2014

BOTANICAL NAME	COMMON NAME	NOTES
Malamosa laurina	Hollyleaf Cherry	
Nassella pulchra	Purple Needlegrass	
Phacelia campanularia	California Blue Bells	
Rhamnus crocea	Redberry	
Rhus Integrifolia	Lemonade Berry	
Salvia apiana	White Sage	
Sisyrinchium bellum	Blue-Eyed Grass	
Viguiera laciniata	San Diego Sunflower	
Yucca whipplei	Our Lord's Candle	

Hydroseed Mix (Plantable Retaining Walls):

Baccharis Pilularis	Coyote Brush	Only local native shrub species will be utilized. No cultivars shall be permitted.
Camissonia cheiranthifolia	Beach Evening Primrose	
Ceanothus verrocosus	Wartystem Ceanothus	Plant acceptable on a limited basis (Max. 30% of the area at the time of planting)
Clarkia bottae	Botta's Clarkia	
Eriophyllum confertiflorum	Golden Yarrow	
Hazardia squarrosa	Sawtooth Goldenfields	
Lasthenia californica	California Gold Rush	
Mimulus aurantiacus	Sticky Monkey Flower	Plants must be locally sourced
Salvia apiana	White Sage	May be planted in limited quantities and must be properly spaced. *S. mellifera is a prohibited species*
Sisyrinchium bellum	Western Blue-Eyed Grass	
Viguiera laciniata	San Diego Sunflower	
Yucca whipplei	Our Lord's Candle	

VILLAGE 3N/4 APPROVED MASTER PLANT LIST
JULY 2014

FUEL MODIFICATION ZONE 2

BOTANICAL NAME	COMMON NAME	NOTES

Plant and seed material should be locally sourced to the greatest extent possible to avoid genetically compromising existing Preserve vegetation

Trees:

Quercus agrifolia	Coast Live Oak	

Shrubs, Cacti & Groundcovers:

Acalypha californica	California Copperleaf	
Agave shawii	Coastal Agave	
Aristida pupurea	Purple Three-Awn	
Chlorogalum parviflorum	Smallflower Soap Plant	
Cotoneaster dammeri 'Lowfast'	Bearberry Cotoneaster	
Cylindropuntia prolifera	Coast Cholla	
Deinandra fasciculata	Fascicled Tarplant	
Dodonaea viscose	Hop Bush	Plant acceptable on a limited basis (Max. 30% of the area at the time of planting)
Dudleya pulverulenta	Chalk Lettuce	
Encelia californica	Coastal Sunflower	
Epilobium californicum	California Fushcia	
Euphorbia misera	Cliff Spurge	
Grindelia robusta	Gum Plant	
Helianthemum scoprium	Sun Rose	
Isomeris arborea	Bladderpod	
Lupinus succulentus	Arroyo Lupine	
Lycium californicum	Box Thorn	
Malachothamnus fasciculatus	Chaparrel Bushmallow	
Mirabilis californica	Wishbone Bush	
Nassella pulchera	Purple Needlegrass	
Opuntia littoralis	Coastal Prickly Pear Cactus	Plants must be locally sourced
Opuntia oricola	No Common Name	Plants must be locally sourced
Prunus ilicifolia	Hollyleaf Cherry	
Rhamnus crocea	Redberry	
Rhus integrefolia	Lemonade Berry	
Ribes speciosum	Fuschia Flowering	

BOTANICAL NAME	COMMON NAME	NOTES
	Gooseberry	
Salvia apiana	White Sage	May be planted in limited quantities and must be properly spaced. *S. mellifera is a prohibited species*
Simmondsia chinesnsis	Jojoba	
Sisyrinchium bellum	Western Blue-Eyed Grass	
Yucca schidigera	Mojave Yucca	
Yucca whipplei	Foothill Yucca	

Hydroseed Mix:

Bloomeria crocea	Common Goldstar	
Encelia californica	Coastal Sunflower	
Eriophyllum confertiflorum	Golden Yarrow	
Gnaphalium bicolor	Bicolor Cudweed	
Hazardia squarrosa	Sawtooth Goldenfields	
Heteromeles arbutifolia	Toyon	
Isomeris arborea	Bladderpod	
Isocoma menziesii	Coast Goldenbush	
Lasthenia californica	Goldfields	
Layia platyglossa	Tidy tips	
Lupinus bicolor	Miniature Lupine	
Lupinus succulentus	Arroyo Lupine	
Nassella pulchera	Purple Needlegrass	
Phacelia campanularia	California Blue Bells	
Plantago erecta	Dot-Seed Plantain	
Rhamnus crocea	Redberry	
Rhus integrefolia	Lemonade Berry	
Salvia apiana	White Sage	May be planted in limited quantities and must be properly spaced. *S. mellifera is a prohibited species*
Sisyrinchium bellum	Blue-Eyed Grass	
Sphaeralcea ambigua	Desert Mallow	
Viguiera laciniata	San Diego Sunflower	
Yucca whipplei	Foothill Yucca	

Hydroseed Mix (Plantable Retaining Walls - irrigated):

VILLAGE 3N/4 APPROVED MASTER PLANT LIST
JULY 2014

BOTANICAL NAME	COMMON NAME	NOTES
Clarkia bottae	Botta's Clarkia	
Eriophyllum confertiflorum	Golden Yarrow	
Eschscholzia californica	California Poppy	
Hazardia squarrosa	Sawtooth Goldenfields	
Lasthenia californica	Goldfields	
Mimulus aurantiacus	Sticky Money Flower	
Sisyrinchium bellum	Blue-Eyed Grass	
Viguiera laciniata	San Diego Sunflower	

ATTACHMENT 3

Village 3 North and Portion of Village 4
Prohibited Plant List

PROHIBITED PLANT SPECIES

Certain plants are considered to be undesirable in the landscape due to characteristics that make them highly flammable and/or incompatible with the adjacent MSCP Preserve. The Chula Vista MSCP Subarea Plan, Appendix K provides a comprehensive list of plants that are prohibited adjacent to Preserve areas. These characteristics can be either physical or chemical. Physical properties that would contribute to high flammability include large amounts of dead material retained within the plant, rough or peeling bark, and the production of copious amounts of litter. Chemical properties include the presence of volatile substances such as oils, resins, wax, and pitch. Certain native plants are notorious for containing these volatile substances. Plants with these characteristics shall not be planted in any of the fuel modification zones. Should these species already exist within these areas, they shall be removed because of the potential threat they pose to any structures. They are referred to as target species since their complete removal is a critical part of hazard reduction. These fire-prone plant species include, but are not limited to, the following:

Botanical Name/Common Name

Cynara cardunculus/Artichoke Thistle

Ricinus communis/Castor Bean Plant

Cirsium vulgare/Wild Artichoke

Cytisus spp./Broom

Brassica nigra/Black Mustard

Silybum marianum/Milk Thistle

Sacsola austails/Russian Thistle or Tumbleweed

Nicotiana bigelevil/Indian Tobacco

Nicotiana glauca/Tree Tobacco

Lactuca serriola/Prickly Lettuce

Conyza canadensis/Horseweed

Heterothaca grandiflora/Telegraph Plant

Anthemix cotula/Mayweed

Urtica urens/Burning Nettle

Cardaria draba/Noary Cress or Perennial Peppergrass

Brassica rapa/Wild Turnip, Yellow Mustard, or Field Mustard

Adenostoma fasciculatum/Chamise

Adenostoma sparsifolium/Red Shanks

Cortaderia selloana/Pampas Grass

Artemisia californica/California Sagebrush

Eriogonum fasciculatum/Common Buckwheat

Salvia mellifera/Black Sage

Ornamental:

Cortaderia selloana/Pampas Grass

Cupressus spp./Cypress

Eucalyptus spp./Eucalyptus

Juniperus spp./Juniper

Pinus spp./Pine

Washingtonia spp./Palm