18

WILDFIRE

INTRODUCTION

Although fire can benefit natural ecosystems that have evolved with occasional fire and that benefit from the stimulation of growth through the reproduction of plants and wildlife habitat, fire can also be detrimental to biological and other natural resources. In addition to having social and economic impacts, wildfires affect air quality through pollutants in smoke, and water quality through erosion and sedimentation, and changes in water chemistry and pollutants from fire retardants.

The discussion and analysis in this chapter is based largely upon the following report prepared for this analysis:

Stanford Wedge Wildland Fire Behavior Assessment, prepared by Wildland Resources Management. (included as Appendix J to this EIR.)

ENVIRONMENTAL SETTING

TERRAIN OF STANFORD WEDGE

Topographic features, such as slope, aspect, and the overall form of the land, directly and indirectly affect the intensity, direction, and spread rate of wildfires. Fires burning in flat or gently sloping areas tend to burn more slowly and to spread more horizontally than fires on steep slopes.

The terrain on the site is comprised of steep, topographic bowl, generally descending from a high of roughly 680 feet in elevation in the western portion of the site down to approximately 320 feet in elevation in the northeastern portion of the site (the development area).

Slope steepness varies across the site, with the flattest part being the area designated for residential development in the northeast. Another flatter knoll is located on the western border. Approximately 30% of the site has a slope steepness of greater than 30 percent.

VEGETATION TYPES OF STANFORD WEDGE

The vegetation map shown below (**Figure 18.1**) identifies major vegetation classes within and surrounding the target property. The majority of the Project site is best characterized by densely vegetated slopes, with several small drainages at the southern tip and a minor drainage to the north. Deciduous hardwood and evergreen hardwoods dominate throughout the Project site and extending into the surrounding area. Pockets of shrub (chamise and chaparral) exist along the western boundary and in the center of the property. There is a small amount of herbaceous grasslands, primarily in the northeastern corner, which is the location of the proposed development area.

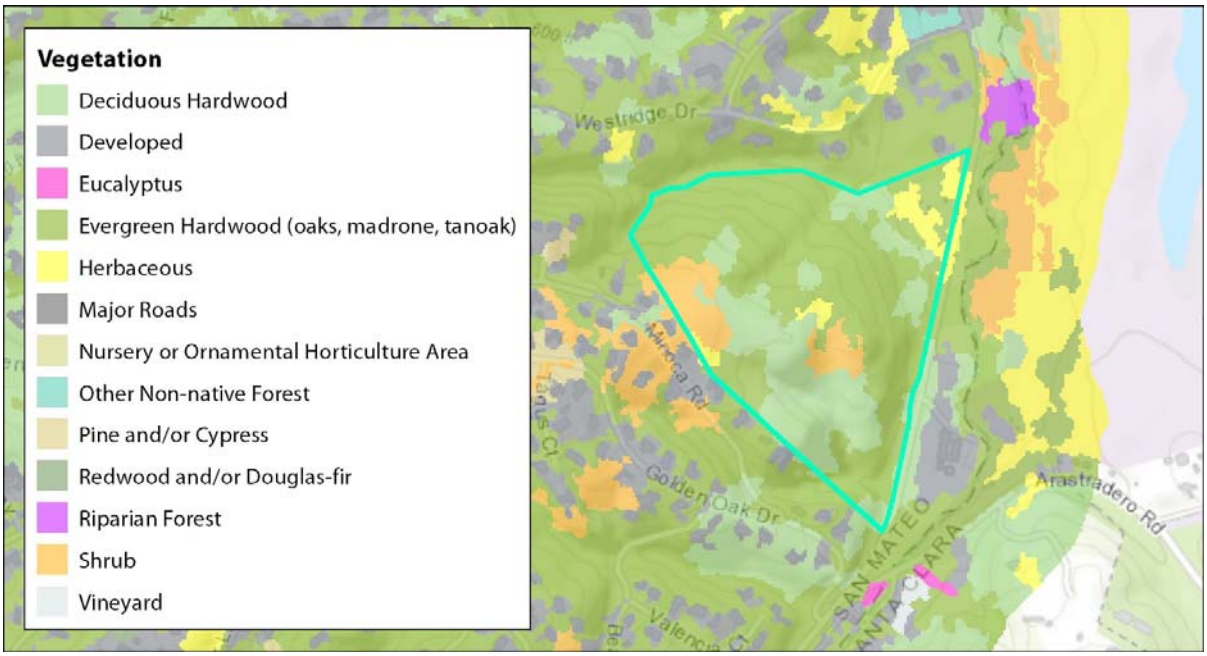


Figure 18.1: Vegetation Types

Source: Stanford Wedge Wildfire Behavior Assessment, included as Appendix J

WILDLAND VEGETATIVE FUEL TYPES OF STANFORD WEDGE

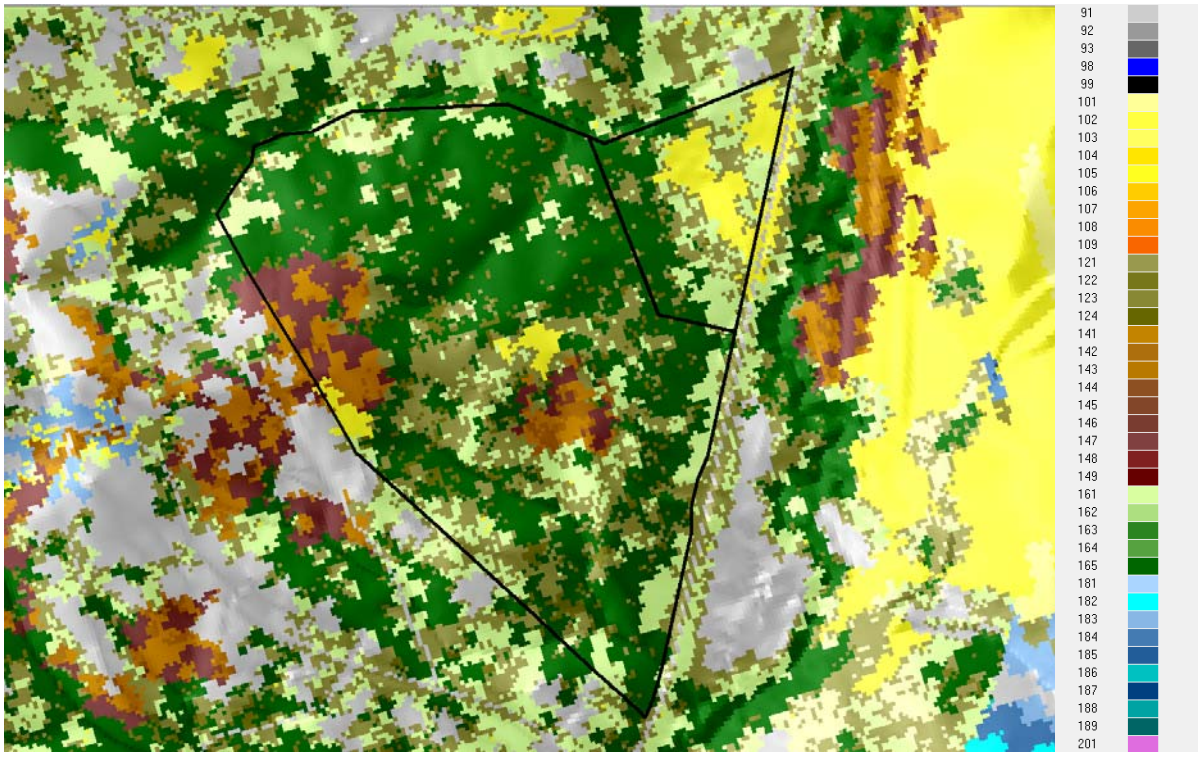
In order to predict fire behavior, vegetation is categorized into "fuel models", each of which burns in a slightly different manner. Fuel models describe such vegetation as tall and short chaparral, tall and short grass, forest with and without an understory, and oak woodlands with and without understory vegetation. The structure (or arrangement) of the vegetation is just as important as the kinds of plants that grow in the vegetation.

The six properties of fuel complexes that determine the potential fire behavior include quantity (loading), sizes (distribution of fuel particle sizes), chemistry (volatile content, silica-free ash content), moisture (percent water content, proportion of dead material in the vegetation, etc.), continuity (vertical and horizontal), and compactness (depth). These properties change over time with treatments, vegetative growth, or disturbance.

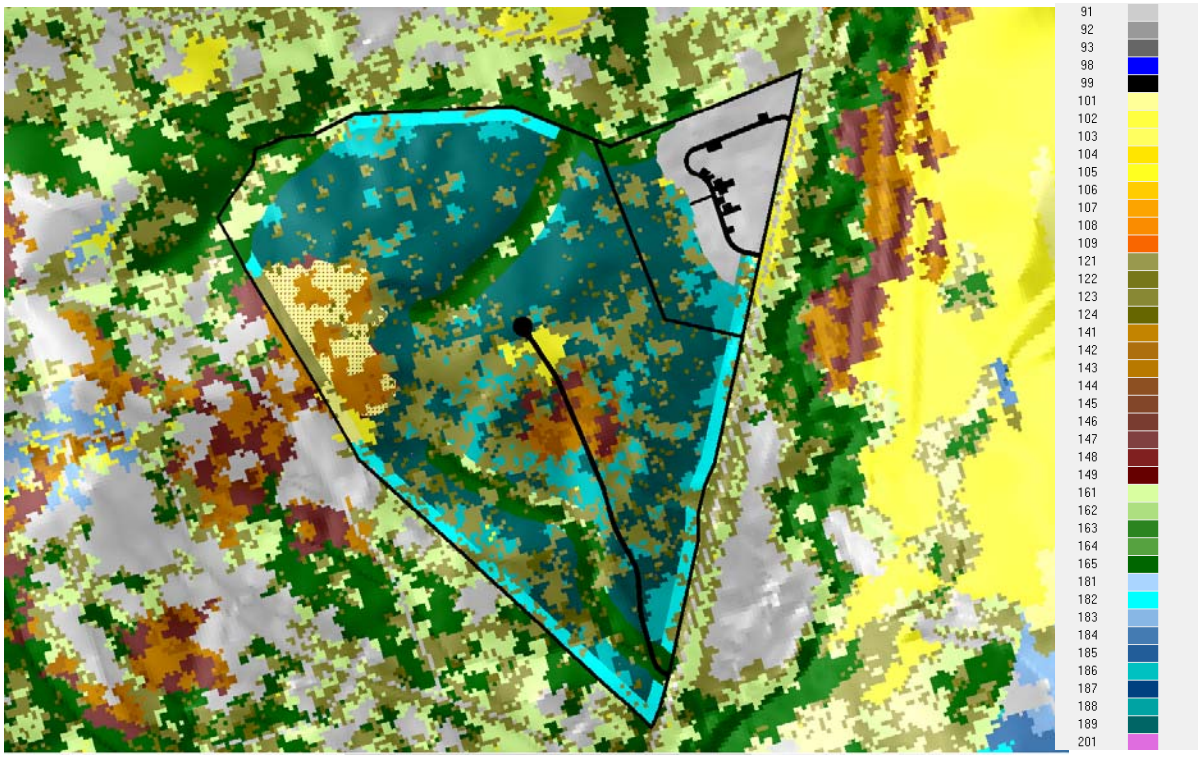
In addition, the canopy fuels are also described for fire behavior prediction. The fuels in the tree canopy are described in three ways: tree height, canopy cover, and height of live branches.

The different fuel model classes on the Project site are shown in **Figure 18.2** and described in **Table 18.1** under both existing conditions and with Project conditions.

Compared to Existing conditions, with the Project, there would be a significant increase in the Urban classification (91 - NB1) as well as a shift of forested models from the forested with understory (165 - TU5) to forested with litter (no understory, 189- TL9). There is also a reduction of tall, high fuel load shrub model (147 - SH7), and thinning of the canopy cover in the oak forests (excluding riparian areas). How this relates to Wildfire Risk is detailed in Appendix J to this EIR and summarized under the threshold 2 heading: *Exacerbate Wildfire Risk and Pollutant Exposure* in the Impacts section later in this chapter.



Existing Conditions



With Project Conditions

Figure 18.2: Fuel Model Maps, Existing and Proposed Project Conditions

Source: Stanford Wedge Wildfire Behavior Assessment, included as Appendix J
See Table 18.1 for description of applicable fuel types by number in the above key.

Table 18.1: Fuel Model Acres, Existing and With Project

				EXISTING		WITH PROJECT	
Value	**FBFM40**	**Title**	**Description**	**Acres**	**Percent**	**Acres**	**Percent**
91	NB1	Urban	Urban/Developed	0.01	0.02%	5.10	7%
99	NB9	Bare ground	Bare ground/Road	1.53	2%	1.53	2%
101	GR1	Short, Sparse Dry Climate Grass	Short, sparse dry climate grass is short, naturally or heavy grazing, predicted rate of fire spread and flame length low	2.09	3%	2.09	3%
102	GR2	Low Load, Dry Climate Grass	Low load, dry climate grass primarily grass with some small amounts of fine, dead fuel, any shrubs do not affect fire behavior	3.63	5%	0.76	1%
121	GS1	Low Load, Dry Climate Grass-Shrub	Low load, dry climate grass-shrub shrub about 1 foot high, grass load low, spread rate moderate and flame length low	14.45	19%	13.73	18%
122	GS2	Moderate Load, Dry Climate Grass-Shrub	Moderate load, dry climate grass-shrub, shrubs are 1-3 feet high, grass load moderate, spread rate high, and flame length is moderate	3.81	5%	3.57	5%
141	SH1	Low Load Dry Climate Shrub	Low load dry climate shrub, woody shrubs and shrub litter, fuelbed depth about 1 foot, may be some grass, spread rate and flame low	2.5	3%	2.24	3%
142	SH2	Moderate Load Dry Climate Shrub	Moderate load dry climate shrub, woody shrubs and shrub litter, fuelbed depth about 1 foot, no grass, spread rate and flame low	0.8	1%	0.70	1%
145	SH5	High Load, Dry Climate	High load, humid climate grass-shrub combined, heavy load with depth	0.07	0.1%	0.30	0.4%

				EXISTING		WITH PROJECT	
Value	**FBFM40**	**Title**	**Description**	**Acres**	**Percent**	**Acres**	**Percent**
		Shrub	greater than 2 feet, spread rate and flame very high				
147	SH7	Very High Load, Dry Climate Shrub	Very high load, humid climate shrub, woody shrubs and shrub litter, dense finely branched shrubs with fine dead fuel, 4-6 feet tall, herbaceous may be present, spread rate and flame high	2.98	4%	0.76	1%
161	TU1	Low Load Dry Climate Timber-Grass-Shrub	Low load dry climate timber grass shrub, low load of grass and/or shrub with litter, spread rate and flame low	11.48	15%	1.19	2%
165	TU5	Very High Load, Dry Climate Timber-Shrub	Very high load, dry climate shrub, heavy forest litter with shrub or small tree understory, spread rate and flame moderate	35.45	47%	5.73	8%
182	TL2	Low Load Broadleaf Litter	Low load broadleaf litter, broadleaf, hardwood litter, spread rate and flame low	3.95	5%	3.95	5%
186	TL6	Moderate Load Broadleaf Litter	Moderate load broadleaf litter, spread rate and flame moderate	6.36	8%	6.36	8%
189	TL9	Very High Load Broadleaf Litter	Very high load broadleaf litter, may be heavy needle drape, spread rate and flame moderate	27.10	36%	27.10	36%
201	SB1	Low Load Activity Fuel	Low load activity fuel, light dead and down activity fuel, fine fuel is 10-20 t/ac, 1-3 inches in diameter, depth < 1 foot, spread rate moderate and flame low	0.01	0.02%	0.01	0.02%

Source: Stanford Wedge Wildfire Behavior Assessment, included as Appendix J, tables 1 and 11. See Figure 18.2 for mapping of the fuel types in and around the Project site.

WEATHER CONDITIONS

A weather analysis offers insights into the frequency of fire weather and especially wind speed and direction.

The project site's location in proximity to the coast influences its weather conditions. It has the warm, dry summers and cool, moist winters characteristic of the fog belt area. Based on data from local weather stations, the area averages about 25 inches of precipitation a year, primarily in the fall and winter. Most of the measurable rainfall generally occurs during the winter months (mid-October to mid-April). Thus, the fire season (the time of highest fire danger) comprises the dry months of May to October.

Although summertime temperatures are usually warm (75 to 85°F), it is common for the fog to roll in during the early evenings and creep over the ridge tops to the site. The Project site's proximity to the bay often creates a pattern of warm days and cool nights. Fog also sometimes keeps summertime temperatures cool in the Project area.

The most important influence on fire behavior is wind. Wind can greatly affect the rate of spread and the increase in the heat output of a fire. Wind increases the flammability of fuels both by removing moisture through evaporation and by angling the flames so that they heat the fuels in the fire's path. The direction and velocity of surface winds can also control the direction and rate of the fire's spread. Aloft winds -- defined as those that blow at least 20 feet above the ground -- can carry embers and firebrands downwind. These burning fuels can ignite spot fires that precede the primary front. Gusty winds cause a fire to burn erratically and make it more difficult to contain.

Local topography influences microclimate conditions. Wind will tend to follow the pattern of least resistance and is therefore frequently deflected and divided by land forms. Summer winds are influenced by air movement into the predominant inland low from the higher-pressure area existing over the ocean. The slopes on the site produce pronounced diurnal up-canyon and down-slope winds caused by differential heating and cooling of air during the day

In the region, the wind normally blows from the west but the most severe fire conditions occur in association with strong north or northeast winds in the vicinity of the Project site, which are common in the fall. These types of winds, which originate far to the east in the Great Basin and are directed by local topography, can cause fire to spread downhill and southward with speeds that equal uphill spread under normal wind conditions. However, the Project site itself would not necessarily experience this type of wind because the air mass would necessarily flow over a body of water, and because of an absence of significant hills to the east or north of the Project site, so wind could not subside over it.

Because of the high ridges to the west of the Project site, occasional episodes consisting of several still, stagnant days formed by stationary highs would be expected to occur during summer months. During these periods—characterized by continuous high temperatures and low relative humidities—fuels can dry to a National Fire Danger Rating System rating of over 81 for the Burning Index, indicating extreme resistance to fire-control. This overall weather pattern can enhance the possibilities of ignition and extreme fire behavior.

DESCRIPTION OF NEIGHBORING PARCELS

Residential parcels surround the Project site on three sides and are generally uphill from the project site. Lots vary in size from approximately one to four acres. Most homes are located further away than 100-feet from the boundary with the Project site, however, some, especially those west of the site, have buildings within 100-feet, which makes creation and maintenance of defensible space problematic. Some of the adjacent parcels have moderate volumes of vegetation that are well-spaced

and relatively fire-safe, while others have abundant vegetative fuels. Similarly, while many residences, especially those dating after 1996, are built with ignition-resistant construction features, others, particularly the older ones, have wooden exteriors that can be readily ignited from a wildfire.

FIRE HISTORY OF THE AREA

California has long been recognized as having fire-prone natural landscapes. The State of California Hazard Mitigation Plan states that wildfire represents the third greatest source of hazard to California, behind flood and earthquake hazards, both in terms of recent state history as well as the probability of future destruction.

The Bay Area's combination of hot dry summers and strong winds, conducive topography, flammable vegetation, dense urban development, and limited fire-fighting access can present significant risks to the public and to structures and property located along the wildland-urban interface (generally defined as the zone of transition between wilderness and human development).

Luckily, wildfire is a rare occurrence in the area, and locally, the area has been spared of large, damaging wildfires. The CZU Complex reached the southern edges of San Mateo County, but did not extend into the immediate area. The Skeggs Fire in 2017 (also caused by lightning), burned 50 acres near Skyline Rd and Skeggs Point, 3 miles west of Woodside. In addition, small fires have occurred recently in the Palo Alto Arastradero Preserve.

FIRE SUPPRESSION RESPONSE

The Project area is served by the Woodside Fire Protection District, with a fire station just three minutes away from the Project site. All fire suppression personnel are certified to the California State Firefighter II level and participate in the California Incident Command Certification Program. They have responded to several large wildland fires outside their district, supporting the incident. Stations are equipped with fire response apparatus suitable for wildfire response.

REGULATORY SETTING

FEDERAL

There are no federal regulations that apply to the proposed project with regard to wildfire hazards.

STATE

California Department of Forestry and Fire Protection (Cal Fire)

Cal Fire protects the people of California from fires, responds to emergencies, and protects and enhances forest, range, and watershed values providing social, economic, and environmental benefits to rural and urban citizens.

As part of the Cal Fire team, the Office of the State Fire Marshal supports Cal Fire's mission by focusing on fire prevention. It provides support through a wide variety of fire safety responsibilities including by regulating buildings in which people live, congregate, or are confined; by controlling substances and products which may, in and of themselves, or by their misuse, cause injuries, death, and destruction by fire; by providing statewide direction for fire prevention in wildland areas; by regulating hazardous liquid pipelines; by reviewing regulations and building standards; and by providing training and education in fire protection methods and responsibilities.

Cal Fire is responsible for areas identified as State Responsibility Areas (SRAs). The Project site is within a Local Responsibility Area (LRA) and not an SRA and is served by the Woodside Fire Protection District as discussed above.

State Fire Regulations

Fire regulations for California are established in Sections 13000 et seq. of the California Health and Safety Code and include regulations for structural standards (similar to those identified in the California Building Code); fire protection and public notification systems; fire protection devices such as extinguishers and smoke alarms; standards for high-rise structures and childcare facilities; and fire suppression training.

California Strategic Fire Plan

The Strategic Fire Plan is a cooperative effort between the State Board of Forestry and Fire Protection and the California Department of Forestry and Fire Protection. While intended to provide broad, strategic direction to Cal Fire, it also acts as a source of information about state-wide trends and as a model for more localized fire plans. The current plan was finalized in 2018.

Fire Hazard Severity Zones

Public Resources Code (PRC) Sections 4201–4204 and Government Code Sections 51175–89 direct Cal Fire to map areas of significant fire hazards based on fuels, terrain, weather, and other relevant factors. These zones, referred to as fire hazard severity zones (FHSZ), define the application of various mitigation strategies to reduce risk associated with wildland fires.

CAL Fire - Fire Hazard Assessments

Mapping of the Very High FHSZs, is based on data and models of, potential fuels over a 30-50 year time horizon and their associated expected fire behavior, and expected burn probabilities to quantify the likelihood and nature of vegetation fire exposure (including firebrands) to buildings. Cal Fire created this state-wide data layer to show areas of significant fire hazard based on vegetative fuels, structure density, terrain, weather, and other relevant factors.

Cal Fire wildland fire hazard maps for cities, referred to as Local Responsibility Areas or (LRA's),[1] include "Very High", "High" and "Moderate" fire maps. The "High" and "Moderate" maps are only released in draft form, are not vetted by cities and have no legal significance.

Properties located in LRAs classified as "Very High" are subject to higher building code standards (known as California Building Code Chapter 7A[2]); mandatory real estate disclosures and mandatory vegetation clearance under State law.[3]

Fuel Hazard Assessment Study – Town of Portola Valley

The Town of Portola Valley commissioned a study by Moritz Arboriculture Consulting to provide information on relative wildfire hazards posed by different vegetation types. This study categorized the vegetation into eleven different vegetation fuel types and assigned a hazard rating to each, based on fuel models. The study assigned flame lengths to the fuel models but did not explain how they were determined. Mapping of areas, each larger than 5 acres, was done using aerial imagery, and ground reconnaissance.

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[1] Local responsibility areas are areas where cities have financial responsibility for fire protection. Public Resources Code Section 4125.

[2] Government Code Section 51178. The Portola Valley Town Council has expanded Chapter 7A to all properties in Town.

[3] Government Code Section 51182.

The conclusions of this study formed the basis of the Town's Safety Element and a suite of programs and measures. It recommended general standards and specific recommendations for vegetative treatments along eight main roads (including Alpine Road) that would serve as evacuation routes.

A History of Fire Hazard Mapping in Portola Valley

- The 2008 draft Cal Fire map showed no "Very High" fire zones in Portola Valley. On April 23, 2008, the Town Council unanimously accepted the draft map showing no "Very High" fire areas in Town.
- Subsequently, the Woodside Fire Protection District (Fire District) contested the Cal Fire map and created its own map and submitted it to Cal Fire. The Fire District) map contained 4 Very High fire areas (Westridge Hills, Alpine Hills, Ranch and majority of western hillside).
- CalFire accepted Woodside Fire's map and re-issued its draft map in May 2008 showing four "Very High" fire areas.
- The Town retained a professional fire consultant Ray Moritz of Moritz Arboricultural Consulting to survey the entire town and prepare a fuel hazard assessment study. The Moritz survey utilized eleven categories of fuel assessment, ranging from "very high" to "low." In October 2008 Moritz prepared a map showing the vegetative fuel hazard for the entire town broken down into eleven categories. This is known as the Moritz map and it is included as Attachment C.
- The Town working with Moritz, the Fire District and the Chief of Cal Fire reviewed the May 2008 map and collectively agreed to some modifications. These modifications reduced the overall area of the "Very High" fire zone.
- On November 23, 2008, Cal Fire re-issued its map (third revision) and it showed only the northern quadrant of Town as "Very High". Per meeting minutes, Cal Fire, Town staff, Woodside Fire District and Moritz were all in agreement on this final revision.
- In February 2009, the Town Attorney and Town Manager recommended the Council adopt the "Very High" fire map agreed to by everyone. Residents contested this staff recommendation and the Council ultimately decided to take no action on the designation. The Council reasoned that action was unnecessary because they had already adopted Building Code 7A town-wide and they believed the Moritz Map was more accurate than the modified Cal Fire map.
- Cal Fire uses a model to classify the zones. The latest set of maps was developed in 2007-2010. These maps did not take into account wind patterns, a substantial factor in the November 2018 Camp Fire and in the North Bay during the October 2017 fires. The new model is expected to account for severe wind and dry weather into account.
- Cal Fire was expected to release new draft maps to test in winter 2019/2020 that took new risk factors into account. So far, these maps have not been made public.

Project Site Fire Hazard Mapping

As it now stands, Cal Fire does not designate the site as a Very High FHSZ on their adopted map.[4] On the draft "High" and "Moderate" map, the Project site is mapped as a mixture of "Medium" and "High" FHSZ.[5]

[4] Cal Fire, Very High Fire Hazard Severity Zones in LRA, San Mateo County, 2007, https://osfm.fire.ca.gov/media/6800/fhszl_map41.pdf

[5] Cal Fire, Draft Fire Hazard Severity Zones in LRA, San Mateo County, 2007, available at https://osfm.fire.ca.gov/media/6801/fhszl06_1_map41.pdf.

The Town's Moritz Map designates most of the site as FPO (h+) FIRE-PRONE OAK WOODLAND, and CH (h+) CHAPARRAL, both of which are "highest" risk. The portion of the site currently occupied by the Alpine Rock Ranch horse boarding facility is considered developed land and was therefore not given a wildfire hazard risk rating on this map. The excerpted portion of the Moritz Map is included as **Figure 18.3**.[6]

The analysis included in Appendix J and reflected in this chapter are based on a focused site-specific analysis of wildfire risks performed with more updated information and to a more refined scale than the above mapping efforts and which takes into account specifics of the proposed VMP.

California Fire Code

The California Fire Code (Title 24, Part 9 of the California Code of Regulations) establishes regulations to safeguard against the hazards of fire, explosion, or dangerous conditions in new and existing buildings, structures, and premises. The Fire Code also establishes requirements intended to provide safety for and assistance to firefighters and emergency responders during emergency operations. The provisions of the Fire Code apply to the construction, alteration, movement, enlargement, replacement, repair, equipment, use and occupancy, location, maintenance, removal, and demolition of every building or structure throughout California. The Fire Code includes regulations regarding fire-resistance-rated construction, fire protection systems such as alarm and sprinkler systems, fire services features such as fire apparatus access roads, means of egress, fire safety during construction and demolition, and wildland-urban interface areas.

Senate Bill 1241

In 2012, Senate Bill 1241 added Section 66474.02 to Title 7 Division 2 of the California Government Code, commonly known as the Subdivision Map Act. The statute prohibits the legislative body of a County from approving subdivision of parcels designated very high fire hazard, or that are in a State Responsibility Area, unless certain findings are made prior to approval of the tentative map. The statute requires that a city or county planning commission make three new findings regarding fire hazard safety before approving a subdivision proposal. The three findings are, in brief: (1) the design and location of the subdivision and its lots are consistent with defensible space regulations found in PRC Section 4290-91, (2) structural fire protection services will be available for the subdivision through a publicly funded entity, and (3) ingress and egress road standards for fire equipment are met per any applicable local ordinance and PRC Section 4290. This legislation only applies to land in the unincorporated county and is therefore not applicable to the Project. Further, the Project site is neither in a State Responsibility Area nor is it officially designated as a very high fire hazard zone.

LOCAL

Woodside Fire District Fire Code (Ordinance 11)

The Woodside Fire District has adopted a Fire Code used in review of project application within the Woodside Fire District and code enforcement. The California Fire Code is incorporated into the Fire Code with local amendments. The Portola Valley Town Council ratified this Code.

Portola Valley Municipal Code

The Town of Portola Valley has adopted Chapter 7A (development in Wildland Urban Interface [WUI] areas) of the Building Code and it is applicable to all properties in town regardless of location.

[6] Moritz Arboricultural Consulting, Fuel Hazard Assessment Study, Town of Portola Valley, October 2008

Figure 18.3: Moritz Map Excerpt

On this map are the following designations:
FPO (h+) FIRE-PRONE OAK WOODLAND (highest)
CH (h+) CHAPARRAL (highest)
FPUF (h or h+ as labeled) FIRE-PRONE URBAN FOREST (high or highest)
MG (l) MOWED GRASS (low)

Source: Basemap: Town of Portola Valley, Vegetation Data Source: Moritz Arboricultural Consulting, Map: TRA Environmental Sciences, Inc., October 2008.

The Town adopted the Wildfire Preparedness Building Code amendments adopted on December 8, 2021. These amendments require additional "home hardening" measures including use of non-combustible exterior materials and construction to exclude of embers, among others. Although the Project application was submitted prior to adoption of these new requirements, the Project sponsor has agreed to implement all applicable requirements.

Portola Valley General Plan

The Portola Valley General Plan includes the following policies concerning Fire Hazards (subpolicies under policy number 4151):

1. Do not construct buildings for human occupancy, critical facilities and high value structures in areas classified as having the highest fire risk unless it is demonstrated that mitigation measures will be taken to reduce the fire risk to an acceptable level.
2. Prior to the approval of any subdivision of lands in an area of high fire risk, the planning commission should review the results of a study that includes at least the following topics:

   a. A description of the risk and the factors contributing to the risk.

   b. Actions that should be taken to reduce the risk to an acceptable level.

   c. The costs and means of providing fire protection to the subdivision.

   d. An indication of who pays for the costs involved, and who receives the benefits.
3. Homeowners should provide adequate clearance around structures to prevent spread of fire by direct exposure and to assure adequate access in times of emergency and for the suppression of fire.
4. Adopt a town program to reduce fire hazards along the town's public roads.
5. Establish a public information program regarding fire hazards and how property owners can reduce such hazards.
6. In locations identified as presenting high fire hazard, require special protective measures to control spread of fire and provide safety to occupants, including but not limited to types of construction and use of appropriate materials.
7. When reasonable and needed, make privately owned sources of water, such as swimming pools, in or adjacent to high fire risk areas, accessible to fire trucks for use for on-site fire protection.
8. Establish street naming and numbering systems to avoid potential confusion for emergency response vehicles.
9. Design and maintain all private roads to permit unrestricted access for all Woodside Fire Protection District equipment.
10. Apply Chapter 7A of the California Building Code to the entire town to increase the resistance of buildings to fire ignition, and when reviewing developments under Chapter 7A, attempt to choose those materials and colors that are consistent with the visual aspects of the town.
11. When undertaking actions to reduce fire risk by removing or thinning vegetation, homeowners should try to remove the most hazardous material while leaving some native vegetation to reduce risks of erosion, habitat loss and introduction of potentially dangerous invasive weeds.

IMPACTS AND MITIGATION MEASURES

METHODOLOGY

Three applications were used in the analysis included in full in Appendix J. Wildfire spread is normally assessing an industry standard, FARSITE, which is based on Rothermel's fire spread model. This model, in turn, is based on a set of wildland vegetative fuel models. FARSITE indicates fire growth patterns based on a specified ignition location, and BEHAVE provides tabular outputs not linked to a particular location. FlamMap is a fire analysis application that can simulate potential fire behavior characteristics (spread rate, flame length, fireline intensity, etc.), fire growth and spread and conditional burn probabilities under constant environmental conditions (weather and fuel moisture). FARSITE and FlamMap were used to predict fire behavior at near-maximum potential to determine wildfire intensity. Wildfire intensity is the primary wildfire characteristic related to the potential for harm or damage – typically, the greater the intensity, the greater the potential for harm or damage.

After running the models, the various fire prediction outputs were combined and reclassified into a low, moderate, high, and very high scale of overall Wildfire Hazard.

Potential Ignition Risk was mapped on a scale of very low to very high based on physical proximity to potential ignition sources such as proximity to housing/structures, roads, and distribution powerlines.

While the predicted Wildfire Hazard and Potential Ignition Risk increase overall risk to wildfire, the expected Wildfire Suppressions Response can lessen that risk. Response times we mapped throughout the site based on how many minutes it would take to reach any given discrete location for fire suppression.

Finally, to determine overall Wildfire Risk, the weighted results from the Wildfire Hazard analysis, the Potential Ignition Risk analysis, and the Wildfire Suppression Response were used to determine overall Wildfire Risk on a scale of 1 to 10; 1 being equal to a low risk of wildfire and 10 being the highest risk of wildfire.

This chapter includes the summary Wildfire Risk figures and data under threshold 2 heading: *Exacerbate Wildfire Risk and Pollutant Exposure* below, but the full breakdown of modeling and results by the modeling components discussed above can be found in the full Stanford Wedge Wildfire Behavior Assessment, included as Appendix J to this EIR.

THRESHOLDS OF SIGNIFICANCE

Under the CEQA Guidelines, Appendix G – Environmental Checklist Form, development of the Project site as proposed, if located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would have a significant environmental impact if it were to:

1. Substantially impair an adopted emergency response plan or emergency evacuation plan
2. Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire
3. Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment

4. Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes

The closest Cal Fire-mapped very high fire hazard severity zone is located over a mile to the northwest, across the Town of Portola Valley from the Project site, so would not be considered "near" (see the analysis in this chapter and the attached Appendix J for detailed information about timing of fire spread in the area). Note that the Project site is not located in or near a state responsibility area or lands classified as very high fire hazard severity zones, so the above topics would not necessarily apply. However, because site-specific wildfire modeling of the Project site has determined that the site contains areas of very high fire hazard under existing conditions, these topics were assessed for the Project as if it were located in or near a very high fire hazard severity zone.

EMERGENCY RESPONSE AND EVACUATION

1. Would the project substantially impair an adopted emergency response plan or emergency evacuation plan?

Impact Wildfire-1: **Reduced Wildfire Roadway Blockage**. Overall, if the Project including proposed vegetation management activities were implemented, it would result in slower spread of wildfires and resultant fewer blockages of roadways and intersections during an evacuation despite small increases in vehicles to be evacuated from Project residences. Therefore, the Project would not substantially impair emergency response or evacuation and would have a ***less than significant*** impact in this regard.

The Woodside Fire Protection District keeps on file an Evacuation Plan for the Town of Portola Valley to provide for the orderly and coordinated evacuation of all or any part of the population of Portola Valley and identifies evacuation routes. This Plan was taken into consideration during preparation of the analysis in this chapter and Appendix J.[7]

Network Analyst in ArcMap was used to determine traffic accumulations along expected routes residents would likely use to exit the area.[8] The analysis assumed two vehicles per structure and 50 vehicles at the inn/stables located on Alpine Road.[9] Evacuation destinations include three intersections along Highway 280: Sand Hill Road, Alpine Road, and Arastradero road on-ramps. Under existing conditions, a total of 3,884 vehicles were modeled from structures located within the area bounded by Arastradero Road, Portola Road, and Sand Hill Road. The analysis shows that much of the Central Portola Valley and Westridge neighborhoods heavily rely on exiting the area via Alpine Road. The intersection of Alpine Road and Westridge Road could experience up to 2,260 vehicles trying to pass through in a relatively short amount of time during an evacuation.

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[7] Woodside Fire Protection District, Evacuation Plan for the Town of Portola Valley, available at: https://www.woodsidefire.org/attachments/article/50/Town%20of%20Portola%20Valley%20Evacuation%20Plan.pdf

[8] Note that this was a project-specific analysis focusing on the evacuation routes from this Project site. A Town-wide evacuation study was being undertaken separately during preparation of this analysis, which looks more comprehensively at all Portola Valley evacuation traffic and routes.

[9] The number of cars used per household to evacuate from wildfires ranges from 0.89 cars to 1.5 cars per household. A higher assumption of 2 cars per household was utilized for a conservative analysis that could account for some of the existing units having ADUs and if anything would over-estimate cars during an evacuation.

The Project, with 39 residential units, would be expected to add about 78 vehicles during an evacuation, which were added to the existing vehicle counts above for this analysis.

Multiple fire growth scenarios were modeled to determine how each might affect expected evacuation routes. Four potential ignition scenarios were analyzed. These were chosen based on proximity to property and expected human activity and to provide a reasonable range of different scenarios.[10] The four modeled scenarios included ignitions (1) on a property off Westridge Drive, near the northern boundary of the Stanford Wedge, (2) along Minoca Road where there are well-developed brush fields on residential lots and on the Stanford Wedge property, (3) along the proposed fire access road, and (4) slightly outside the area that would be managed as defensible space. Summary conclusions are included in this section though more detailed analysis and discussion can be found in the full Stanford Wedge Wildfire Behavior Assessment, included as Appendix J to this EIR.

Under existing conditions, two of the four modeled scenarios would result in fires affecting the important evacuation route along Alpine Road within the modeling period (at 75 minutes and 3 hours) and all scenarios would affect various other area roadways.

With Project implementation including vegetation management, even without fire suppression activities, a wildfire would spread more slowly on/across the Project site. According to the modeling, in all scenarios, fires would grow to less than a tenth of an acre in the first 15 minutes, which is considered manageable with local, firefighting crews. Due to the topography of the site (with fire generally spreading uphill faster than downhill) and Project reductions in fire hazard along Alpine Road and especially in the development area, modeled wildfire scenarios would not affect the important evacuation route along Alpine Road within the modeling period (4 hours) following Project implementation. The Project would increase access to the site for fire suppression activities through provision of a residential development roadway with two connection points to Alpine Road, an access point between lots 8 and 9 to allow public safety personnel to access the open space immediately behind the project, and a fire access road within the undeveloped portion of the Project site, which would be anticipated to further reduce the potential impact of fires involving the Project site.

Under all modeled scenarios, the addition of evacuating vehicles from the Project site did not make a statistically significant difference in evacuation times.[11]

As also shown in the modeled scenarios, the slowing of fire spread due to proposed defensible space, increased fire access, and vegetation management would provide more time before area roadways including Alpine Road would be affected by fires and therefore would be generally beneficial with respect to emergency evacuation of the area.

Therefore, because fewer roads and fewer intersections would be blocked during an evacuation due to a wildfire involving the Project site and increases in evacuating vehicle counts due to Project

[10] No fire ignition scenario considered random ignitions (i.e. as in a lightning storm) because despite the recent fires caused by lighting, the proportion of ignitions from lightning is historically very low, compared to ignitions caused by human activity. Additionally, lightning strikes are usually located on ridgelines, and elevations higher than the Project site. Also, the four ignition scenarios chosen provide a reasonable range of analysis scenarios.

[11] Evacuation times are modeled in 15 minute increments. While the addition of any vehicles could lead to slightly longer evacuation times, changes from the addition of the 78 vehicles from the Project site were within the within the standard error of this type of analysis and therefore are not able to be effectively quantified but can be determined not to be statistically significant.

residents would not significantly increase evacuation times, the impact related to impairing an adopted emergency response plan or emergency evacuation plan would be ***less than significant***.

EXACERBATE WILDFIRE RISK AND POLLUTANT EXPOSURE

2. *Due to slope, prevailing winds, and other factors, would the project exacerbate wildfire risks, and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?*

3. *Would the project require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?*

Impact Wildfire-2: **Lessened On-Site Wildfire Risk but Increased Activity and Related Ignition Risk**. Overall, if the Project and proposed vegetation management activities were implemented, it would substantially lower Wildfire Risk at the Project site. However, the additional human activity creates a greater likelihood of ignition at the site if not mitigated. Therefore, the Project impact with respect to Wildfire Risk would be ***less than significant with mitigation***.

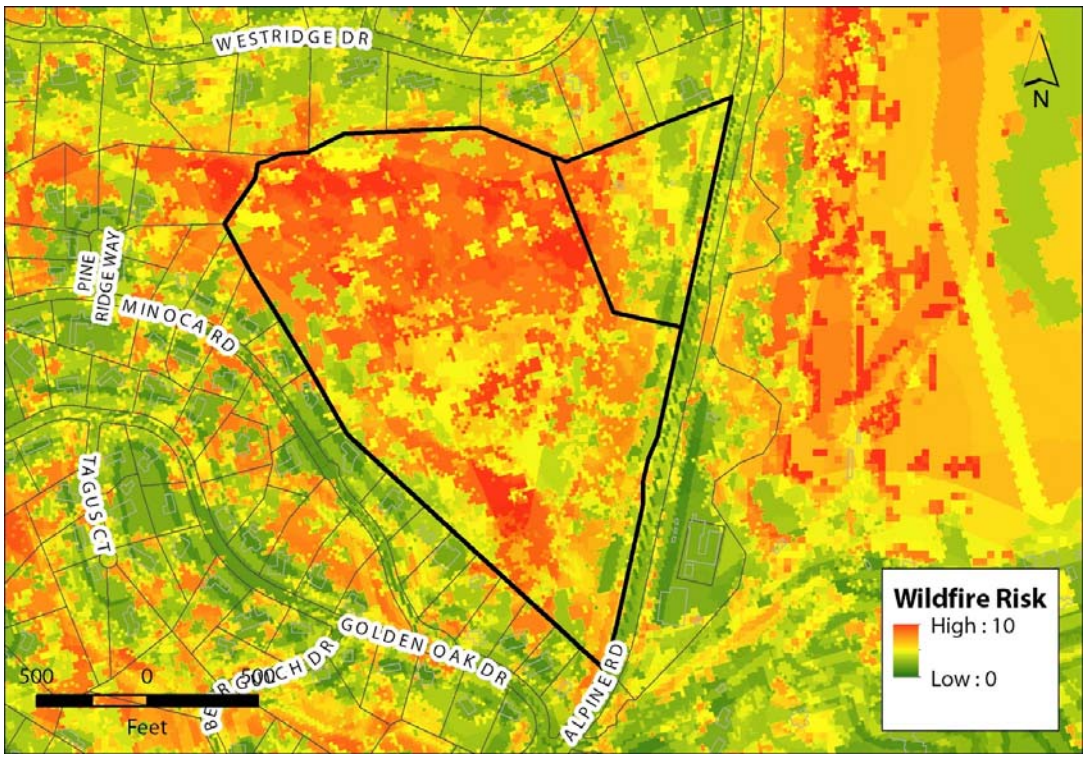
Wildfire Risk

The Wildfire Risk was determined as described in the Methodology section above and more fully detailed in the full Stanford Wedge Wildfire Behavior Assessment, included as Appendix J to this EIR. Overall Wildfire Risk is represented on a scale of 1 to 10; 1 being equal to a low risk of wildfire and 10 being the highest risk of wildfire. Wildfire Risk under existing conditions and conditions with the Project are shown in **Table 18.2** and **Figure 18.4**.

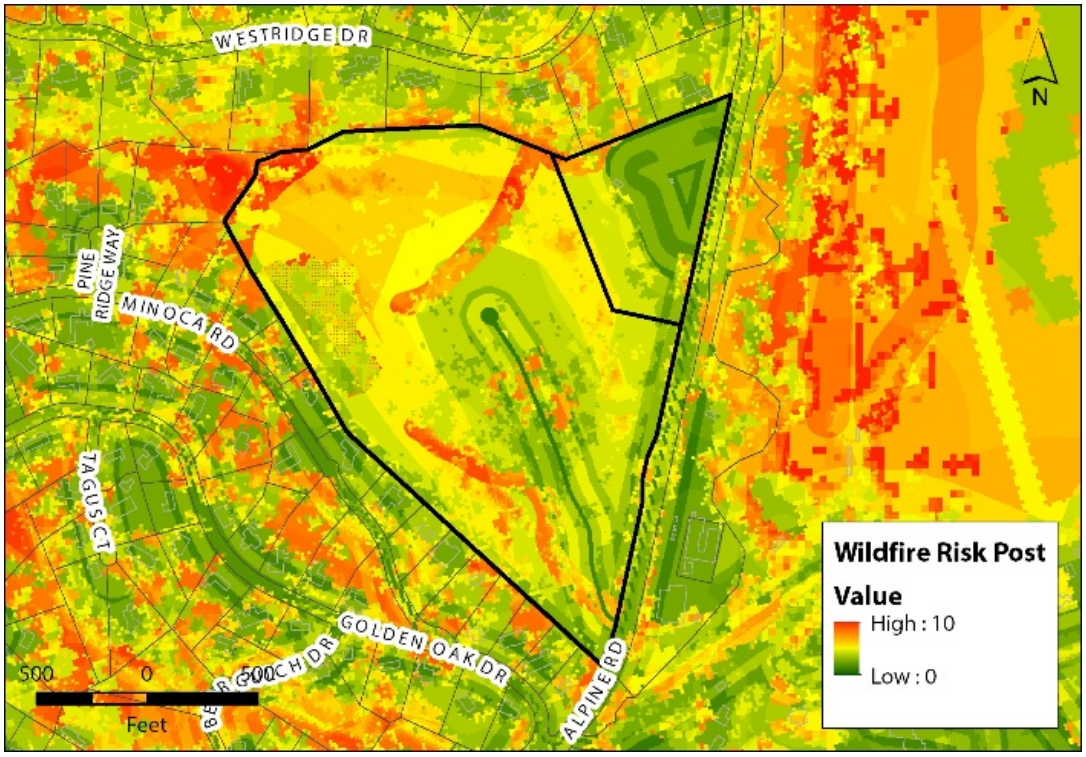
Table 18.2: Overall Wildfire Risk, Existing and With Project

	EXISTING		WITH PROJECT	
RISK CATEGORY (1-10)	Acres	Percent	Acres	Percent
0 – VERY LOW TO NONE	0.0	0%	0	0%
1 – LOW	1.1	1%	3.2	4%
2	5.1	7%	10.0	13%
3	7.3	10%	13.6	18%
4	12.6	17%	29.8	40%
5 – MODERATE	12.1	16%	10.3	14%
6	8.8	12%	3.8	5%
7	20.7	28%	2.6	4%
8 – HIGH	7.6	10%	1.5	2%
9 – VERY HIGH	0.03	0.04%	0.25	0.3%
10 – EXTREME	0.0	0%	0	0%

Source: Stanford Wedge Wildfire Behavior Assessment, included as Appendix J, tables 8 and 16.
See Figure 18.3 for mapping of overall Wildfire Risk in and around the Project site.



Existing Conditions



With Project Conditions

Figure 18.4: Overall Wildfire Risk, Existing and Proposed Project Conditions

Source: Stanford Wedge Wildfire Behavior Assessment, included as Appendix J
See Table 18.2 for description of applicable fuel types by number in the above key.

As compared to existing conditions, with the Project, there would be an overall lessening of Wildfire Risk at the site. Specifically, there would be a reduction of areas with higher Wildfire Risk ratings of 7 or more. Under existing conditions, over a third of the property experiences Wildfire Risk ratings above 7. After treatment, less than 10% of the property experiences Wildfire Risk rating above 7. In addition, the areas with lower Wildfire Risk ratings of 3 or lower has increased to 35% of the Project site from 18% under existing conditions. The resultant with-Project Wildfire Risk levels are representative of a generally well-managed wilderness area with some areas left untreated mainly due to regulatory restrictions for environmental sensitivity, such as along riparian corridors.

From a wildfire potential standpoint, the overall Wildfire Risk would be substantially reduced under Project implementation. However, untreated areas within the Project site (many due to regulatory restrictions) could remain a risk to structures within and outside the property. With Project implementation, from a fire growth standpoint, if a fire were to start within the Project area, fire spread would be much slower and the spot fire generation potential has been reduced due to treatments linked to the Project. However, Project vegetation management activities are constricted to the Project site, and untreated fuels outside of the Project site and therefore not under the control of the Project applicant would remain a threat to surrounding structures.

Human Activity and Ignition Potential

Additional human activity creates a greater likelihood of ignition if not mitigated, which in this case includes human activity due to the residential development as well as new trails and increased use of trails. The analysis of wildland fires is by definition specific to wildland areas. Structures are not incorporated into wildfire spread model. While there are fuel models that characterize grass, or chaparral, or different types of oak forests, there is no “Structure” fuel model. Some have tried to fit different types of structures into wildland fuel models, but the attempt is too speculative for application.

While not incorporated specifically into wildland fire spread modeling, research and regulations have focused primarily on reducing the potential for structures to be impacted by or contribute to the spread of wildland fires by providing “defensible space” separation from wildland areas and “hardening” homes by reducing the ignitability of roofs, siding, decks, windows and other assemblies.

The Project sponsor has indicated the following Wildfire Reduction Measures would be incorporated into the Project:

1. The project has been designed as a clustered development. The design, maintenance, and use of defensible space for fire protection is more effective when neighborhoods are developed more densely and are built to stringent fire-resistant building codes. Such neighborhoods are more compact and easier to defend with a smaller firefighting force, and help achieve goals for climate resiliency. Denser neighborhoods often have lower amounts of flammable vegetation and more pavement, making them generally less flammable than larger homes on large lots.

2. The proposed project will be located at the base of the hills and close to Alpine Road. The proposed project is not located in uphill flow of heat and flames. (Developments located on or at the top of steep slopes can be at particular risk from wildfire because fire and heat generally flow faster uphill.)

3. The project site design proposes a loop road with two points of ingress and egress to/from Alpine Road.

4. At the request of the Woodside Fire Protection District, the project has incorporated an access point between lots 8 and 9 to allow public safety personnel to access the open space immediately behind the project.

5. Electrical utilities lines serving all residences will be installed below ground.

6. Stanford has committed to constructing "all electric" homes, and the project will not provide natural gas to the homes. Therefore, the homes will not have gas water heaters or gas valves that can potentially create a fire hazard during an earthquake.

7. The project will construct "fire-hardened" homes that meet or exceed the Town of Portola Valley's Wildfire Preparedness Building Code.

8. Stanford contracted with wildfire professionals to prepare a Vegetation Management Plan (VMP) for both the developed and undeveloped portions of the property. Areas with high fire hazard are mitigated through modifications to the live vegetation and removal of dead fuels onsite to reduce the risks. Several treatments or prescriptions (the modification of vegetation to reduce a fire's potential) are available in vegetation management practice. The type of treatments to be utilized within the project parcel depend on the vegetation type, cover, and location. The VMP identified two types of vegetation cover on the project site that can exhibit extreme fire behavior, which are chaparral and oak woodland. Given the existing condition of the vegetation on-site, three treatment areas were developed in the VMP, including defensible space areas around structures and recommended maintenance activities within the oak woodland chaparral areas of the property.

9. The project has been designed to establish a defensible area around the perimeter of all homes as well as the common open space areas within the development area. This defensible area will consist of irrigated, low-fuel landscaping.

10. The project landscape plan has been designed with fire prevention in mind. In lieu of traditional solid wall fencing, the project is proposing the use of wood/wire "deer" fencing to secure the resident's rear and side yards. Fences at all residential buildings in the Portola Terrace project will be constructed so that fence material within 10' of buildings is noncombustible. Flame-resistant materials will be used as a substitute to wood mulch in common area landscaping and around all homes.

11. A wildfire buffer area, consisting of mowed and maintained natural vegetation, will surround and buffer the development area from the surrounding natural undeveloped area. This buffer area will be owned and maintained by the project homeowner's association.

12. In order to facilitate the maintenance of the undeveloped portions of the property, Stanford has proposed the construction of a fire access road. The road will provide vehicular access from Alpine Road up and into the center of the Wedge property to allow mechanized equipment to clear and remove vegetation from areas not presently accessible by crews required to hike into the property. This fire access road was prescribed by the Vegetation Maintenance Plan to improve the effectiveness of the measures called out in the VMP.

13. As part of the construction of the Project, Stanford will underground the existing PG&E overhead power line that runs along the Alpine Road frontage of the Stanford property. The undergrounding of this overhead line will eliminate a potential ignition source across the length of the property along Alpine Road.

14. As part of the project, Stanford will be extending a water line approximately 1,700 feet south along Alpine Road from the Alpine Road/Westridge Drive intersection to the project site. The project will connect to both an existing 12-inch water main and an existing 6-inch water main located near the intersection of Westridge Drive and Alpine Road. Since these two water mains are fed from two separate sources of water, Stanford will create a dual connection, providing a redundant source of water to the project site and surrounding area. The project itself will install several new fire hydrants on Stanford owned property and in the Alpine Road right-of-way, which will deliver additional fire safety for the Project and the immediate neighbors as well as providing a source of water for fire equipment in the event there is a fire event in the undeveloped portion of the site. (At present, there are no existing fire hydrants on the Project site or along Alpine Road.)

15. At the request of the Woodside Fire Protection District, Stanford is investigating the possibility of constructing a fire staging area along the Project frontage in the Alpine Road right-of-way. In case of fire incident in the vicinity, this fire staging area will allow for a variety of WFPD and/Cal Fire apparatus to stage in a safe manner. If feasible, water hydrants will be provided adjacent to this staging area.

The analysis in Appendix J concludes that with required implementation of the treatments and defensible space required by the Woodside Fire Protection District and/or proposed in Project plans and the Vegetation Management Plan, both fire hazard and risk would be substantially lowered across the Project site. In addition, the new structures at the site are proposed to recently-updated ignition-resistant standards. Combined with stringent vegetation treatments, this area can serve as a fuel break, buffering adjacent areas from fire spread.

Conclusions

As discussed above, the Project represents an overall reduction in the fire hazard or risk at the Project site. However, because of the increased development and human activity at the site, the potential for ignition of a new fire at the site would be increased requiring additional measures to minimize ignition risks and fire spread.

Mitigation Measures

Wildfire-2a: **Further Increase Effectiveness of the Vegetation Management Plan.** The Project sponsor shall implement the following measures to further increase the effectiveness of the VMP, as feasible:

i. Consideration of less thinning of the oak woodland canopy cover than the 40% thinning proposed in the VMP. This level of canopy opening can promote growth of understory shrubs and small trees - ladder fuels that contribute to tree torching, and ember production.

ii. Consideration of allowable methods to remove over-abundant fuels in riparian forests and creekbeds in consultation with the California Department of Fish and Wildlife.

iii. No mechanical equipment use on days of Red Flag Warning.

Wildfire-2b: **Ignition Reduction.** The Project sponsor shall implement the following measures to further reduce the potential for ignitions within the Residential Development Area:

i. Annual third-party inspection and certification of defensible space in HOA-property; the letter of compliance should be sent to the Woodside Fire Protection District.

ii. As feasible, obtain fuel management easements on adjacent properties where defensible space is not 100-feet from structures so that the HOA can treat fuels appropriately.

iii. Installation of non-combustible fences on sides as well as rear yards. Solid, non-combustible fences could form a radiant heat barrier rather than a source of heat.

iv. Installation and maintenance of ember-resistant zones 5-feet from side walls, per AB 3074.

v. Prohibition of smoking in common areas, outdoor fireplaces, and pizza ovens in yards and common areas, and use of mechanical equipment on hot, dry windy days. No mechanical equipment use on days of Red Flag Warning.

vi. Robust and regular education of residents regarding ignition prevention to be coordinated by the HOA.

Implementation of mitigation measure Wildfire-2a and Wildfire-2b would reduce potential impacts related to wildfire and ignition risk to a level of ***less than significant with mitigation*** through increased effectiveness of the VMP in the undeveloped portion of the Project site and additional ignition reduction measures in the Residential Development Area.

EXPOSURE TO POST-FIRE RISK

4. Would the project expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?

Impact Wildfire-3: **Post-Fire Risk.** The Project would follow applicable construction and post-development best management practices and would not create conditions that result in post-fire risk or expose people or structures to significant post-fire risks. The Project would have a ***less than significant*** impact in this regard.

Construction and operation of the Project would not create conditions that cause runoff, post-fire slope instability, or drainage changes that would expose people or structures to significant risks. The applicant would implement construction-related and post-development best management practices and comply with regulatory requirements that manage stormwater runoff and erosion. Development would not substantially alter on-site natural drainage channels and patterns. Chapter 8: Geology and Soils, and Chapter 11: Hydrology and Water Quality, provide a detailed discussion of stormwater runoff, slope stability, and drainage changes.

Therefore, the Project would not expose people or structures to significant risks as a result downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes in the Project area and the impact would be ***less than significant***.