APPENDIX K

Wildfire Background Information

Dana Reserve
Fire Protection Plan

DANA RESERVE

Fire Protection Plan

July 7, 2021

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Dana Reserve Fire Protection Plan

July 7, 2021

Prepared by

San Luis Obispo, CA

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Contents

Executive Summary

Resolute Associates performed an in-depth analysis of the fire protection factors related to Dana Reserve project. The purpose of this analysis was to assess the risks for this site and surrounding area, to identify prevention and mitigation methods to provide the highest level of fire risk mitigation possible to both the developed and open space areas within the project. The result of this in-depth analysis is contained in this Fire Protection Plan.

The project analysis that went into completing this Plan utilized the information within the Dana Reserve Specific Plan April 2021(DRSP), the San Luis Obispo County Strategic Community Wildfire Protection Plan (CWPP), the Strategic Plan for San Luis Obispo County Fire Department February 2021, applicable fire and building codes, accepted fire modeling principles and software and fire protection best management practices.

The key components of this Plan are creating fire protection at the community level, the neighborhood level and at the individual residence and business level.

Community Level Protection

- Adequate emergency ingress and egress
- Fire protection system requirements (e.g. hydrants)
- Community alerting
- Fire resistive construction requirements throughout the project
- Fire ignition prevention
- Community outreach and education
- Open space best management practices
- Master HOA fire protection requirements
- Access and egress

Neighborhood Level Protection

- Temporary refuge areas
- Fire resistive landscaping near open space areas
- Clear street and monument signage identifying building complexes

Individual Residence and Business Level

- Fire resistive construction
- Fire protection systems (e.g. fire sprinklers and alarms)
- Clear addressing
- Defensible space

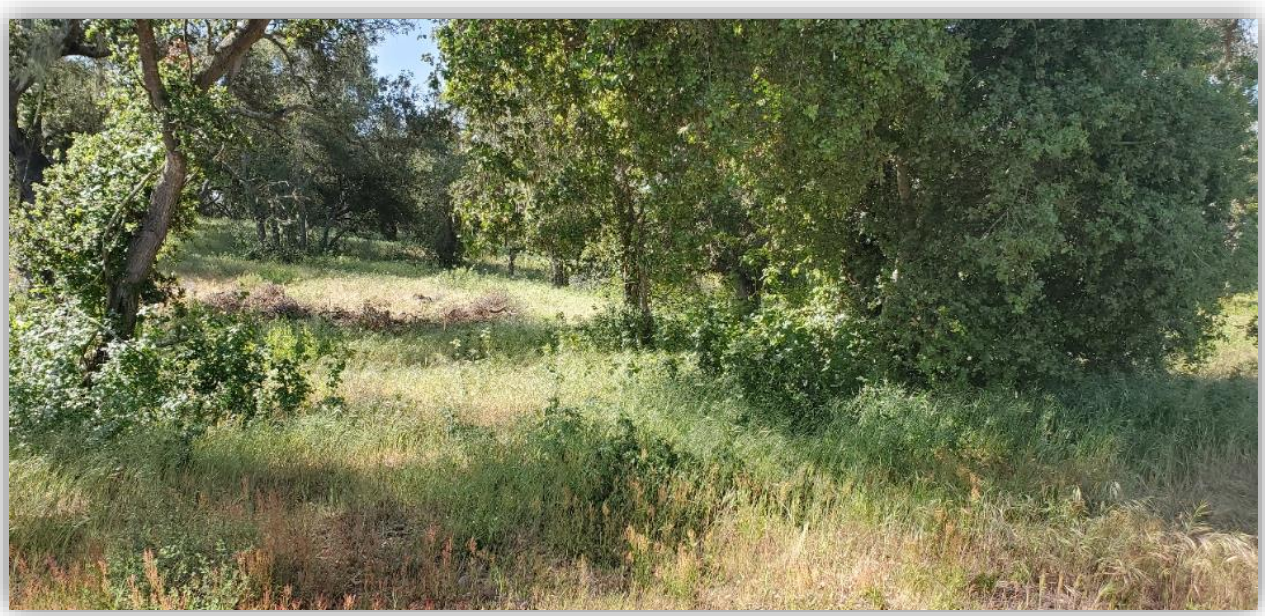
Concept Master Plan from Dana Reserve Specific Plan (DRSP)April 2021

Introduction & Background

The Dana Reserve is a master-planned community on approximately 288 acres adjacent to the town of Nipomo, California. The Dana Reserve will consist of 1,291 single and multi-family residences, commercial and light commercial properties, a satellite education campus, recreation areas and a significant amount of open space lands within the interior of the project. (see table 2-1 of the DRSP)

The open space areas are approximately 49.8 total acres. Most of the area is part of a contiguous oak woodland environment with some chaparral and grassland interspersed. Other areas include islands of open space. The area has four large storm water basins.

The project also includes a 385-acre natural habitat and oak preserve located off-site that will be permanently maintained through a conservation easement with management and oversite by a local, non-profit conservation group. The site is referred to as Dana Ridge and is located along the Temettate Ridge about 2 miles to the east in the hills above Nipomo.



Open space area at Dana Reserve

General Information

Definitions

Community Wildfire Protection Plan (CWPP)- This Community Wildfire Protection Plan is a guide to provide a community that is prepared and resilient to the impacts of wildland urban interface fires.

Dead-end road- A road that has only one point of vehicular ingress/egress, including cul-de-sacs and looped roads.

Defensible space- The area within the perimeter of a parcel, development, neighborhood or community where basic wildland fire protection practices and measures are implemented, providing the key point of defense from an approaching wildfire or defense against encroaching wildfires or escaping structure fires.

Fire Alarm System- A system or portion of a combination system consisting of components and circuits arranged to monitor and annunciate the status of fire alarm or supervisory signal-initiating devices and to initiate the appropriate response to those signals.

Fire Apparatus Access Road- A road that provides fire apparatus access from a fire station to a facility, building or portion thereof. This is a general term inclusive of all other terms such as fire lane, public street, private street, parking lot lane and access roadway.

Fire Protection Plan- A document prepared for a specific project or development proposed for a Wildland-Urban Interface Fire Area. It describes ways to minimize and mitigate potential for loss from wildfire exposure.

Fire Hazard Severity Zone- Geographical areas designated pursuant to California Public Resources Codes, Sections 4201 through 4204, and classified as Very High, High, or Moderate in State Responsibility Areas or as Local Agency Very High Fire Hazard Severity Zones designated pursuant to California Government Code, Sections 51175 through 51189.

Fuel modification or treatment area- An area where the configuration of flammable vegetation has been reduced or modified, providing reduced fire intensity and duration.

Greenbelts- A facility or land-use, designed for a use other than fire protection, which will slow or resist the spread of a wildfire. It includes parking lots, irrigated or landscaped areas, golf courses, parks, playgrounds, maintained vineyards, orchards or annual crops that do not cure in the field.

Hydrant- A valved connection on a water supply or storage system, having either a two and a half (2 ½) inch or a four and a half (4 ½) inch outlet, with male American National Fire Hose Screw Threads (NH) used to supply fire apparatus and hoses with water.

Ignition Resistant Materials- A type of building material that resists ignition or sustained flaming combustion sufficiently to reduce losses from wildland-urban interface conflagrations under worst-case weather and fuel conditions with wildfire exposure of burning embers and small flames.

Occupancy- The purpose for which a building, or part thereof, is used or intended to be used.

State Responsibility Area- Lands that are classified by the Board of Forestry and Fire Protection pursuant to Public Resources Code Section 4125, where the financial responsibility of preventing and suppressing forest fires is primarily the responsibility of the state (CAL FIRE).

Turnaround- A road or driveway, unobstructed by parking, which allows for a safe opposite change of direction for emergency equipment. Design of such area may be a hammerhead/T or terminus bulb.

Turnouts- A widening in a road or driveway to allow vehicles to pass.

Vertical Clearance- The minimum specified height of a bridge or overhead projection above the road or driveway.

Wildfire- Any uncontrolled fire spreading through vegetative fuels that threatens to destroy life, property or resources as defined in Public Resources Code, Sections 4103 and 4104.

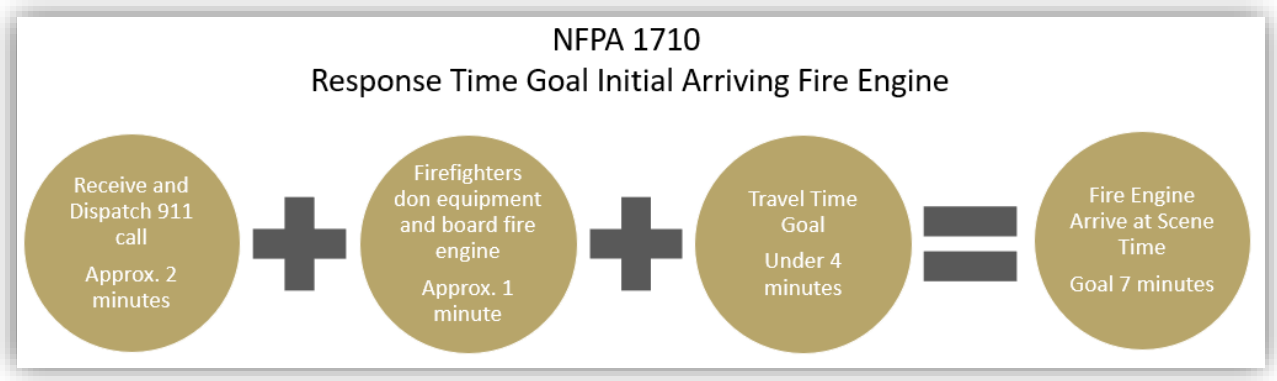
Wildfire Exposure- One or a combination of radiant heat, convective heat, direct flame contact and burning embers being projected by vegetation fire to a structure and its immediate environment.

Wildland-Urban Interface (WUI) Fire Area- A geographical area identified by the state as a "Fire Hazard Severity Zone" in accordance with the Public Resources Code, Sections 4201 through 4204, and Government Code, Sections 51175 through 51189, or other areas designated by the enforcing agency to be at a significant risk from wildfires.

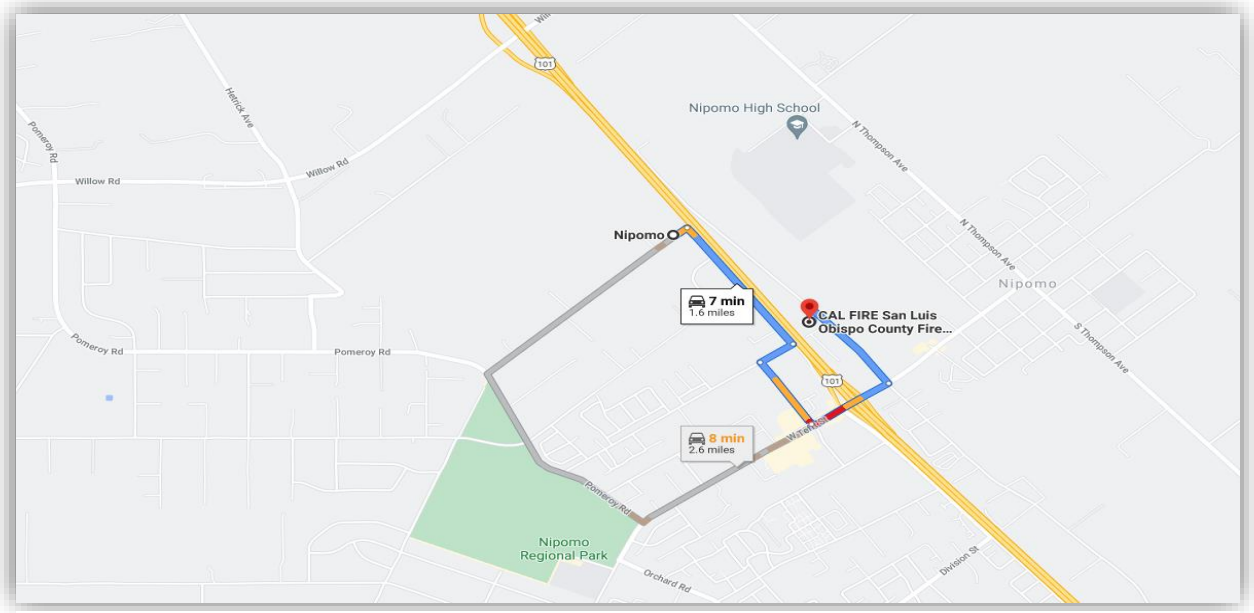
First Response Agencies Capabilities

Fire Department Response Time

The National Fire Protection Association (NFPA) 1710 recommends that the first fire engine arrive within 7 minutes or less of a 911 call.[1] The response time goals for San Luis Obispo County Fire for community service levels identified in Title 22 Land Use Plan is 7 minutes for urban areas and 8 minutes for Suburban areas 90% of the time. This includes the dispatch processing and time it takes the firefighters to board the fire engine, 3 minutes. Added on to 3 minutes is the travel time to the scene, which must be under 4 minutes to achieve the total goal of 7minutes.



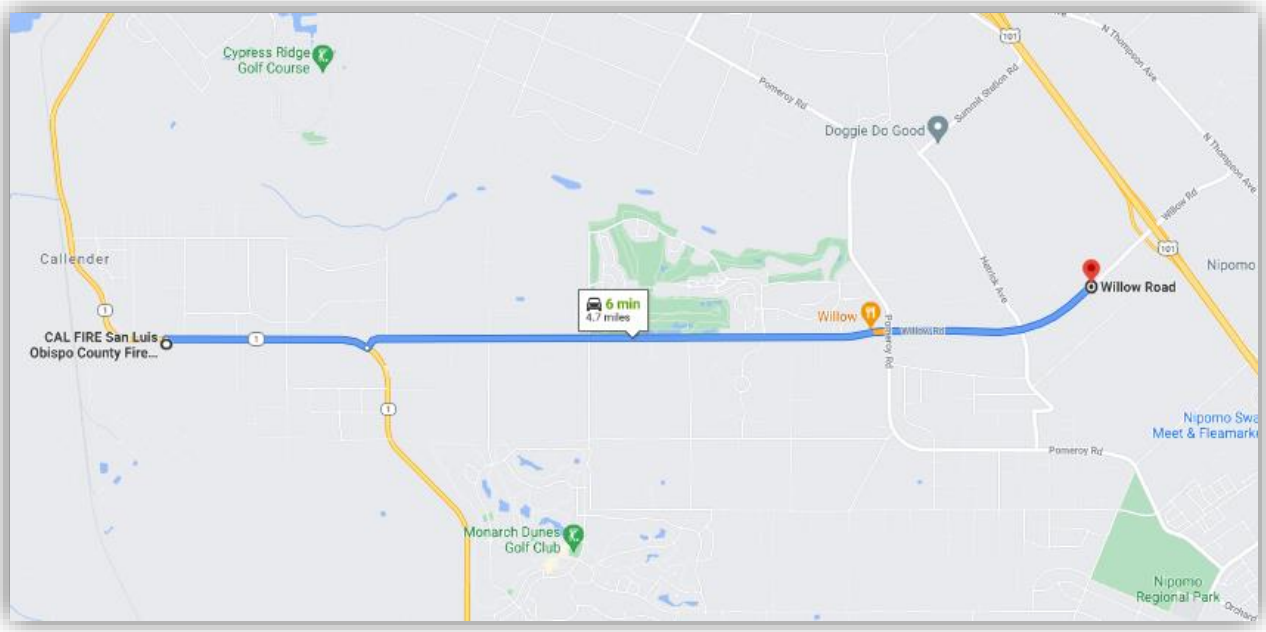
The travel time from the Nipomo Fire Station 20 to the current end of Frontage Rd (the closest entry point to the Dana Reserve southern entrance from the fire station) according to Google Maps is 7



Nipomo Station 20 to Dana Reserve travel time 7 minutes

[1] https://www.iaff.org/wp-content/uploads/Departments/Fire_EMS_Department/30541_Summary_Sheet_NFPA_1710_standard.pdf

minutes. This exceeds the recommended response time of NFPA by 3 minutes. The travel time from the Mesa Fire Station 22 to Willow Rd (the closest entry point to the north Dana Reserve entrance from the fire station) according to Google Maps is 6 minutes, exceeding the NFPA recommended response by 2 minutes. Further time will be required to get to areas within the Dana Reserve.



Mesa Station 22 to Dana Reserve entrance - travel time 6 minutes

Fire Department ISO Rating

Insurance Services Office (ISO) is an independent, for-profit organization. The ISO scores fire departments on fire prevention and fire suppression capabilities of individual communities or fire protection areas. The scores are on a point scale of 1 to 10 score with the lower number indicating the highest level of community fire protection. Some insurance companies utilize this scoring system to determine insurance rates. ISO rating system score includes the assessment of the four key areas:

- Emergency communications
  - A fire department's ability to receive and dispatch fire alarms.
- Fire department
  - A fire department's capability of response, including personnel, training and equipment.
- Water supply
  - A community's fire suppression water supply and hydrant system.
- Community risk reduction
  - A community's fire prevention, fire safety education and fire investigation programs.

The current ISO rating for the Dana Reserve area is a 4X. The X indicates that the hydrant system is not available within 1000 feet of properties. When the Dana Reserve fire hydrant system is completed, the score will then become an ISO rating of 4.

Emergency Medical Services

The California State Emergency Medical Services Authority (CAEMSA) response time goals are to have the first Basic Life Support, CPR and defibrillation capable responder arrive to the scene within 6 minutes and Advanced Life Support (paramedics) arrive in 8 minutes 90% of the time. The County Local Emergency Medical Services Agency (LEMSA) requirement for areas identified as "urban," which includes Nipomo, states that an ambulance must arrive within 10 minutes 90% of the time. San Luis Ambulance Service, Inc. is the designated ambulance provider for the South Zone including Nipomo. The two County Nipomo Fire Stations (20 & 22) both have paramedic fire engines.

It is assumed that San Luis Ambulance is currently meeting the local County EMSA requirements of an ambulance at the scene within 10 minutes 90% of the time and will continue to meet that requirement when the Dana Reserve is completed. The fire and ambulance services are not currently meeting the State CAEMSA response goals.

Law Enforcement

Primary law enforcement responsibility for the properties in the Dana Reserve rests with the San Luis Obispo County Sheriff's Office. The South Station, located on Front Street in Oceano, patrols all areas south of Avila Beach including Nipomo. The Sheriff's office has plans to build a new sub-station in Nipomo on Tefft Street. Additional funding is necessary to build the new sub-station. The Dana Reserve project will generate additional development impact Public Facility Fees that may support this plan.

New Fire Station

By ordinance, new development projects in San Luis Obispo County pay into a Public Facility Fee Program (PFF)[2]. The PFF is a special fund established by the Board of Supervisors to mitigate the impact of development in unincorporated areas, including Nipomo. With some exceptions, all new construction is required to pay a fee per unit for residential development and a fee per square footage for commercial development into the PFF to offset the impact on fire, law and other public services. The funds are generally used for construction or expansions of

Effective 1/1/2021 – Public Facilities Fees will be as follows:

PUBLIC FACILITIES FEES FOR 2021					
ADJUSTED	RESIDENTIAL (per unit)		NON-RESIDENTIAL (per 1000 Sq ')		
Fee Category	Single Family	Multi-Family	Commercial	Office	Industrial
Parks	$2,517	$1,769	-	-	-
Sheriff	$705	$490	$248	$551	$177
General Gov't	$1,055	$735	$372	$825	$265
Fire	$2,059	$1,432	$726	$1,610	$518
Library	$708	$507	$72	$160	$52
Admin Fee 2.0%	$141	$99	$28	$63	$20
Total Fees	**$7,185**	**$5,032**	**$1,446**	**$3,209**	**$1,032**

[2] https://library.municode.com/ca/san_luis_obispo_county/codes/county_code?nodeId=TIT18PUFAFE

facilities and would apply to building a new fire station.

The Strategic Plan for San Luis Obispo County Fire Department identifies the need for an additional fire station on the west side of Highway 101 in Nipomo. This is due to extended response times and the current and expected call volume. The County owns an undeveloped property for a future fire station at the Black Lake Golf Course, however this property may no longer be the best strategic location. The Strategic Plan estimates the cost of a new fire station in Nipomo at $10 million. [3]

The PFF ordinance does allow for developer-built facilities on County property. This practice has occurred previously in San Luis Obispo County. One example of the use of developer-built facilities is the Avila Valley Fire Station on San Luis Bay Drive. The Dana Reserve and the County should consider discussing how best to establish a fire station or a public safety facility at an agreed upon location in lieu of some or all PFF fees.

Fire Safe Codes and Ordinances

Fire laws are in place to protect life and property. Some codes exist to extinguish a hostile fire and others are to alert and provide time for occupants to escape. Full application of the California Building Code, California Fire Code will apply to this project. NFPA standards called out in these codes will be required. This includes residential, commercial and light industry development that is part of the Dana Reserve.

The Dana Reserve is located in a State Responsibility Area in a High Fire Severity Zone necessitating compliance with:

- California Building Code Chapter 7A Materials and Construction Methods for Exterior Wildfire Exposure
- California Residential Code Chapter R337 Fire-Resistant Construction
- Chapter 49 Requirements for Wildland-Urban Interface Fire (WUI) Areas.
- Public Resources Code 4290
- Public Resources Code 4291

The purpose of these codes is to establish minimum standards for the protection of life and property by increasing the ability of a building located in any Fire Hazard Severity Zone within State Responsibility Areas or any Wildland-Urban Interface Fire Area to resist the intrusion of flame or burning embers projected by a vegetation fire and contributes to a systematic reduction in conflagration losses.

The basic requirement is that the exterior of the structure be ignition-resistant and be able to resist the entry of flying embers and fire radiation during a wildfire. Various building components addressed in WUI are[4]:

- Defensible Space
- Class A Roofing
- Closed Eaves

[3] San Luis Obispo County Fire Strategic Plan - Financial Summary page 52
[4] http://www.readyforwildfire.org/wp-content/uploads/Wildfire_Home_Retrfit_Guide-1.26.21.pdf

- Protected attic and crawl space vents
- Non-combustible siding
- Glass skylights
- Tempered multi-pane windows on fire exposed sides
- Non-combustible decking
- Non-combustible fencing near or attached to homes

Fire Protection Requirements

Residential

Chapter 7A of the California Building Code (CBC) and Chapter R337 of the California Residential Code (CRC) contain standards associated with the construction of buildings in wildfire prone areas as identified as either a State Responsibility Area Fire Hazard Severity Zone (Moderate, High, or Very High) or a Local Area Very High Fire Hazard Severity Zone. The Dana Reserve project is located in a State Responsibility Area High Fire Severity Zone, thus requiring all residences comply with these codes.

Roofs and roof edges. CBC 705A / CRC R337.5

A fire-retardant Class 'B' minimum roofing assembly is required for the Dana Reserve.

Where the roof profile allows a space between the roof covering and roof decking, the spaces shall be constructed to resist the intrusion of flames and embers, be firestopped with approved materials or have one layer of minimum 72 pound (32.4 kg) mineral-surfaced nonperforated cap sheet complying with ASTM D3909 installed over the combustible decking.

Exterior Walls/siding. CBC 707A.3 /CRC R337.7.3

Noncombustible, listed ignition-resistant materials, heavy timber, 5/8" Type X gypsum sheathing behind exterior covering, exterior portion of 1-hr assembly or log wall construction is allowed.

Eaves and porch ceilings CBC 707A.4, A.6 / CRC 337.7.4. R337.7.6

The exposed roof deck under unenclosed eaves and underside of porch ceilings shall be noncombustible, listed ignition-resistant materials, or 5/8" Type X gypsum sheathing behind exterior covering.

Solid wood rafter tails on the exposed underside of roof eaves having a minimum 2" nominal dimension may be unprotected.

Vents. CBC 706A / CRC R337.6

Attic vents and underfloor vent openings must resist the intrusion of flame and embers or shall be a minimum of 1/16" and maximum 1/8" corrosion-resistant, noncombustible wire mesh or equivalent. Combustible vents on top of roofs may be covered with this material to comply. Ventilation openings on the underside of eaves are not permitted, unless a State Fire Marshal (SFM) approved vent is installed, or eaves are fire sprinklered, or vent is 12 feet above a walking surface or grade below.

Windows and exterior doors. CBC 708A / CRC R337.8

Windows must be insulated glass with a minimum of 1 tempered pane or 20 min rated or glass block. Exterior doors must be noncombustible or ignition resistant material or 1 3/8" solid core, or have a 20 min fire-resistance rating.

Exterior decking and stairs. CBC 709A / CRC R337.9

Walking surfaces of decks, porches. balconies and stairs within 10 feet of the building must be constructed of noncombustible, fire-retardant treated or heavy-timber construction. Alternate materials can be used if they are ignition-resistant and pass performance requirements specified by the SFM.

Underfloor and appendages. CBC 707A.8 / CRC R337.7.8

Exposed underfloor, underside of cantilevered and overhanging decks, balconies and similar appendages shall be non-combustible, ignition resistant, 5/8" Type X gypsum sheathing behind exterior covering, exterior portion of 1-hr assembly, meet performance criteria SFM Standard 12-7A-3 or be enclosed to grade.

Residential Sprinklers. CFC 903.3.1.3 / CRC R313.2

NFPA 13D Automatic sprinkler systems installed in one- and two-family dwellings, Group R-3, and townhouses shall be permitted to be installed throughout in accordance with NFPA 13D as amended in Chapter 35.

Commercial

All new commercial buildings over 1000 sq ft. are required to have automatic fire sprinklers installed in compliance with the California Fire Code 903 as amended by the County in County Ordinance Title 16. The sprinklers will be designed in compliance with NFPA 13. The builder applicant will need to identify what Hazard Class each commercial project is for review by the fire department (exp. Ordinary Hazard Class II). The fire department connection (FDC) supporting the sprinkler systems must be located in a location approved by the Fire Department as required by CFC 912.1. A Fire Alarm System is required as outlined in CFC 907.2 and NFPA 72. Alarm systems shall be monitored by an approved supervising station listed by Underwriters Laboratory for receiving fire alarms in accordance with the County amended CFC 907.6.6 and NFPA 72. Fire Protection Systems

As required by the County Fire Marshal, a fire protection engineer will need to review, approve, and stamp commercial fire protection system designs.

Portable fire extinguishers shall be installed in all the occupancies in compliance with the CFC 1002 and Standards 10-1. The contractor shall be licensed by the SFM. Fire hose boxes will be required in certain areas of the site for fire protection.

Building material and construction must comply with Chapter 7A of the California Building Code as required for new buildings located in Fire Hazard Severity Zones. [5]

[5] https://up.codes/viewer/california/ca-building-code-2016/chapter/7A/sfm-materials-and-construction-methods-for-exterior-wildfire-exposure#7A

KNOX® Box

All commercial properties and gates are required to have a KNOX® Box installed at or near the front entrance in a location approved by County Fire. Access keys will be installed in the KNOX® Box by County Fire.

Education Facility

If a state-owned and state leased education buildings is included in the Dana Reserve project, it must be in compliance with fire and life safety requirements of the Division of State Architect (DSA) design standard requirements and review.

The County Fire Department will be responsible for approval of:

- Fire department access roads, fire lane markings, pavers and gate entrances
- Fire hydrant locations and distribution
- Water supply requirements for fire flow
- Automatic fire sprinkler systems, locations of post indicator valves and fire department connections

Addressing

All homes and businesses must have clear address identification in compliance with Fire Code 505.1 and County Fire Standard #2 Addressing. Addressing must be clearly legible and easily visible from the street or road fronting the property. Additional locations of identification may be required by the Fire Code Official to facilitate emergency response. Address numbers will be Arabic numerals or alphabet letters that contrast with their background and be a minimum width of 0.5 inches. The height will be 6 inches for single family residences and 8 inches for multi-family residences and commercial properties.

Directory signage and building numbers will be installed at multi-family building complexes when the location of individual units is difficult to locate. Directional signs may also be used. The specification for the signage will comply with the County Fire Standard #2.

Hydrant and Water Storage

The Dana Reserve domestic and fire water storage and delivery will be provided by the Nipomo Community Service District (NCSD).

The water system is proposed to be comprised of a 12” main line extension from the stub in North Frontage Road, at the southeast corner of the property, to Willow Road and will also include an internally looped 8” public water main lines which will provide fire suppression to the development areas. These will be routed within the public roads. The main trunk lines will be owned and operated by NCSD. The private main line system for the commercial areas will be protected at each connection point to the public system with a double detector check assembly.

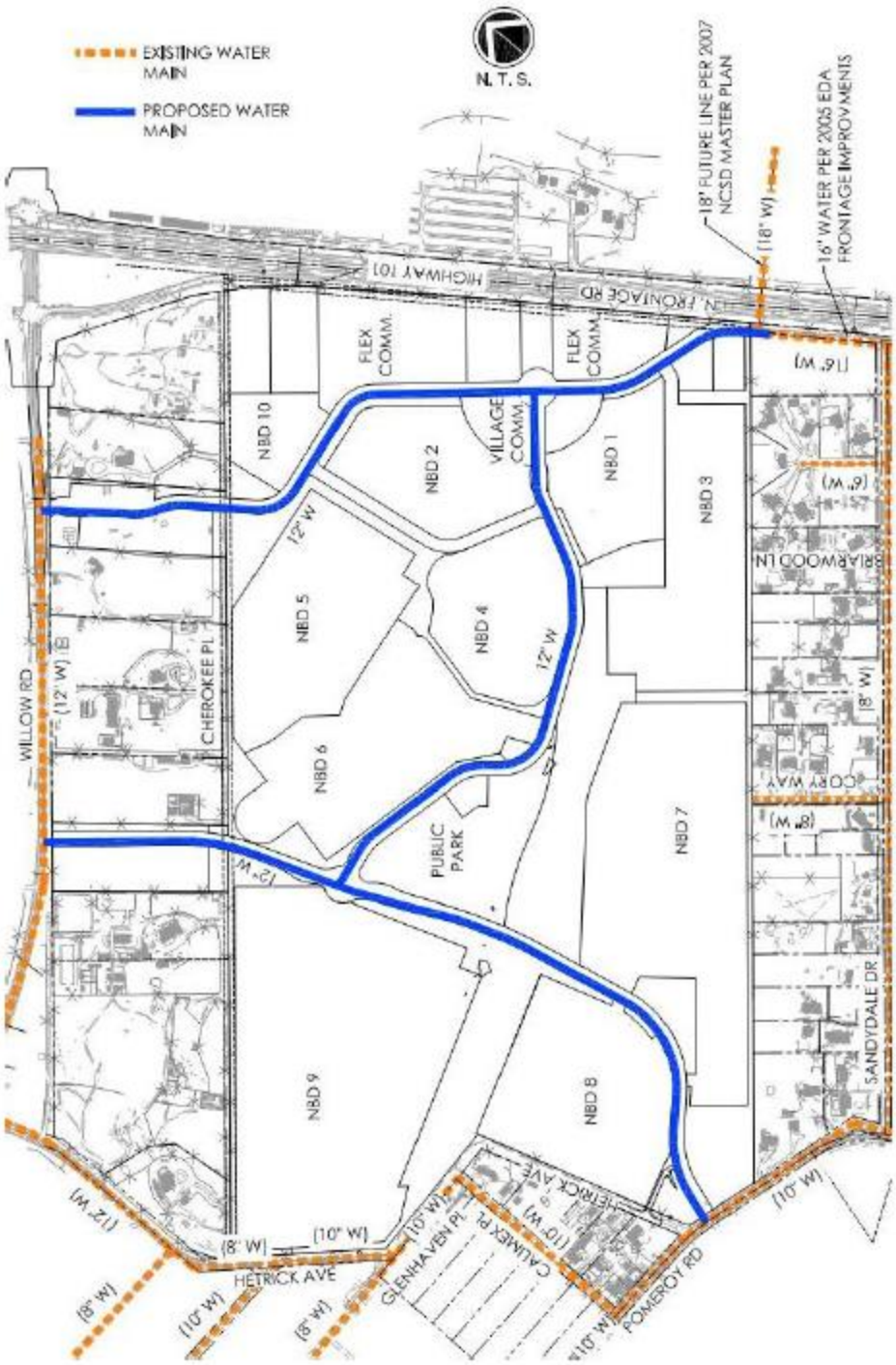
The DRSP states that fire hydrants will be located adjacent to roadways and spacing will be no greater than 500 feet, except on dead end streets it shall be no more than 400 feet. The maximum distance from any point on the street frontage to a hydrant shall be 250 feet. For commercial or light industrial areas, the maximum spacing will be no greater than 250 feet or less, as required by the Fire Official. Hydrants or tie-ins for future hydrants may be required by the fire official and shall typically limit the

distance from any point on the exterior of any building to 150 feet. This design meets the requirements of the California Fire Code Appendix C.

Fire-flow requirements must comply with Appendix B of the California Fire Code. The system must be designed to meet or exceed the following:

- **Residential one- and two-family areas** will have a minimum fire-flow requirement of 500 gallons per minute(gpm) for ½-hour at 20 psi residual pressure. (CFC Table B105.1(1))
- **Residential areas with buildings other than residential one- and two-family dwellings such as townhouses and apartments** will have a minimum fire-flow of 1000 gpm for 1-hour duration at 20 psi residual pressure. (CFC Table 105.2)
- **Commercial light industrial areas** will have a minimum fire-flow to meet or exceed the single largest buildings square footage with fire sprinklers. This will meet the minimum requirements in Table B105.1(2). It is anticipated that the largest commercial building will be 32,000 sq.ft., the Neighborhood Market with a Type II construction, thus requiring 2500 gpm for a 2-hour duration at a minimum of 20 psi residual pressure.

Exhibit 5-1: Proposed Water Backbone Infrastructure



Fire Resistive Landscaping

The landscaping in the public areas of the Dana Reserve must be designed to include fire-resistant plants that are strategically placed to resist the spread of fire to nearby homes. Consideration should always be made to ensure these plants are drought tolerant. Hardscaping should use limited combustible materials in or near structures.

The following landscape principles should be utilized in the landscape design:

- Use of stone or other non-combustible walls, patios, decks and roadways that will act as barriers, defensible space and flame deflectors
- Selection of high-moisture plants that grow close to the ground and have a low sap or resin content
- Selection of fire-resistant plant species that resist ignition
- Use of noncombustible rock, gravel, concrete and pavers in areas less than five feet away from structures
- Plants should be non-invasive

A list of fire resistive and non-invasive plants should be identified as part of the overall landscape design for public areas. Homeowners should be encouraged to utilize this list in their landscaping. This list could be similar to those identified on the Sustainable Defensible Space webpage.[6]

[6] https://defensiblespace.org/plants/

Open Space Areas

The overall geography of the approximate 49.8 acres of open space in the Dana Reserve consists of four large storm water basins and rolling hills covered in the oak woodland and chaparral. Flat grassland areas with sandy soils are dispersed in open space areas. There are no watercourses or riparian areas. The open space harbors eight sensitive plants and nine special status animals. The open space areas can be defined by their characteristics into the following categories:

- Contiguous Space
- Pocket Space

There will be several foot, bicycle and equestrian trails that either go through the open space areas or are along the perimeter of the open space.

There are approximately 100 parcels that are arranged along the perimeter of the open space areas. Some of these parcels have their backyards up against the open space and others are separated from the open space by a road or trail.

When the project is complete each neighborhood within the community will each have a Homeowners Association with a master Homeowners Association in place that will be responsible for maintenance of the open space areas.

Environment

The environment of the entire developed and open space area in the Dana Reserve are discussed in the Biological Report for Dana Reserve, Nipomo, San Luis Obispo County (Althouse and Meade, 2020) and in the Dana Reserve Specific Plan (DRSP) submitted to the County of San Luis Obispo. Part of the focus of the Fire Protection Plan is to discuss the wildfire hazard identified by the DRSP on the open space (see next section; Wildfire Environment) and to discuss how wildfire minimization measures in open spaces here may affect habitats and special status species described in the DRSP and by Althouse and Meade (2020) and potential mitigation to those impacts (see the Fuel and Vegetation Management section below).

Habitats as identified in the DRSP open space by Althouse and Meade (2020) consist primarily of coast live oak with approximately a 50% canopy cover, interspersed with chamise-black sage chaparral alliance and a small amount of California perennial grassland habitat near the edges. It is notable that there are no watercourses or riparian habitats, and no serpentine soils here, all of which support many special status species. Nonetheless, eight special status plant species and nine special status wildlife species were found on site and the potential exists for more to occur here.

Typical coast live oak and grasslands in the Dana Reserve Open Space

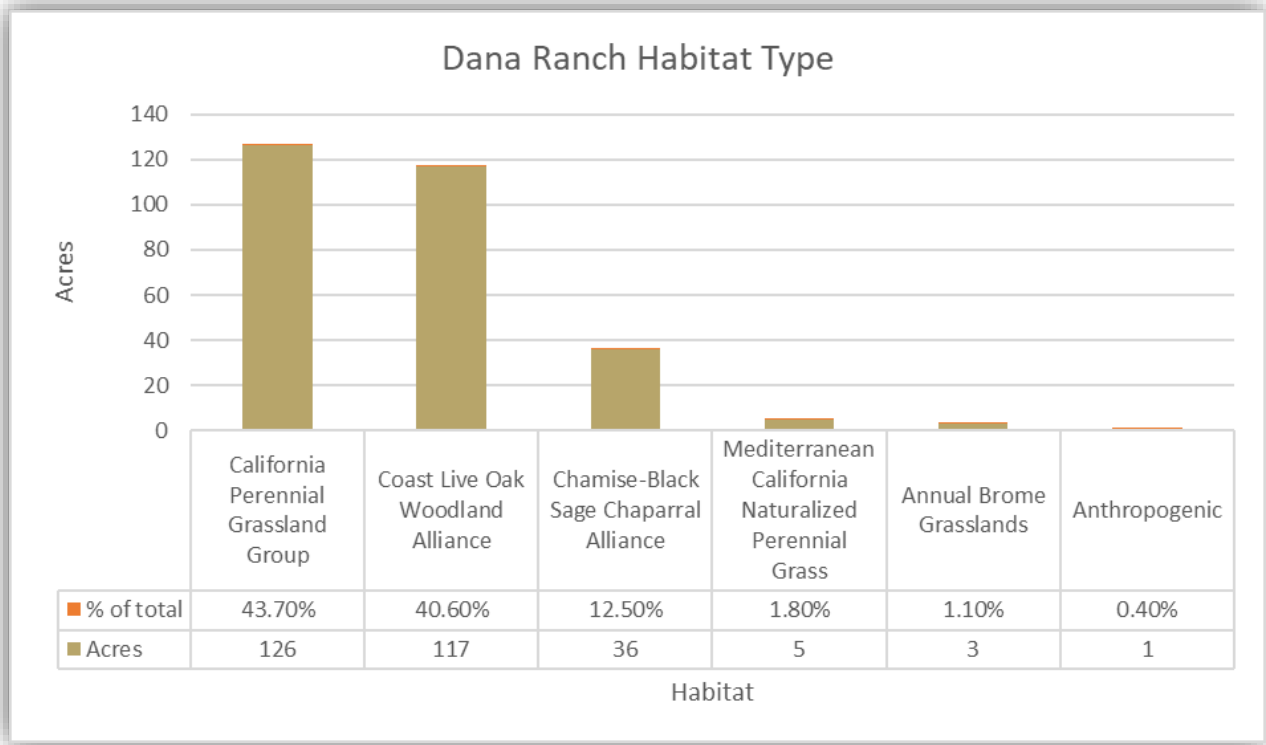
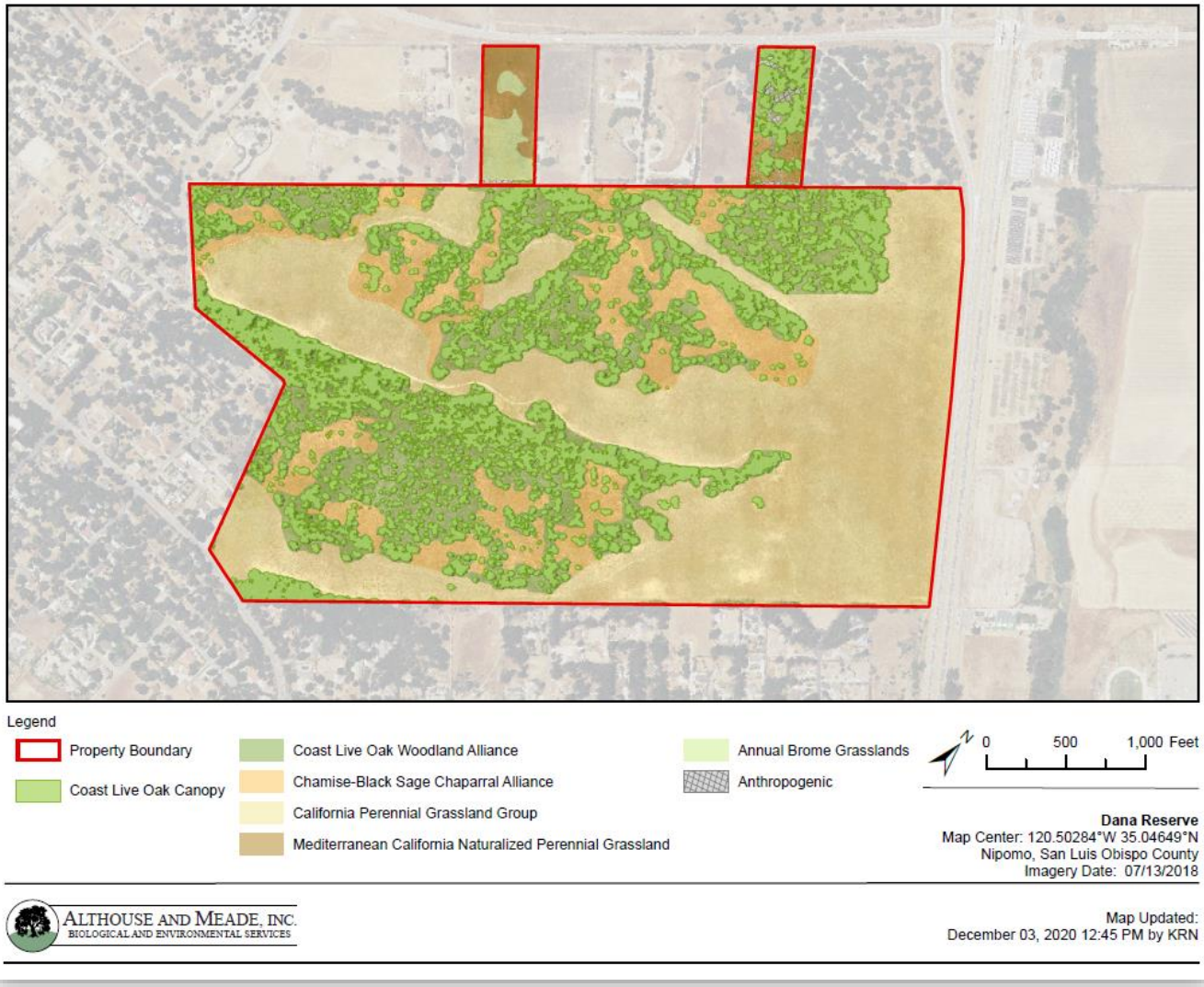


Chart showing total acreage and percent of each habitat type in the Dana Reserve

Habitat	Acres	% of total
California Perennial Grassland Group	126	43.7%
Coast Live Oak Woodland Alliance	117	40.6%
Chamise-Black Sage Chaparral Alliance	36	12.5%
Mediterranean California Naturalized Perennial Grass	5	1.8%
Annual Brome Grasslands	3	1.1%
Anthropogenic	1	0.4%
Total:	288	100.0%

Table showing total acreage and percent of each habitat type in the Dana Reserve

Figure 4. Habitats



The open space includes 40.6 percent coast live oak woodland alliance which integrates with disturbed chamise and black sage chaparral.[7] These integrated areas are considered a sensitive community and all of the special status plant species found in the project area occur in the live oak woodland alliance or along its edges, particularly within the chaparral integration zone. Wildfire can burn quickly through light fuels here such as annual grasses in the oak understory and although flame lengths may not be as high as in chaparral, the speed of fire spread and the rapid regrowth of grasses each year makes this habitat dangerous when in juxtaposition to urban areas. Where there is chaparral mixed in with oaks flame lengths can reach into the crowns of the oaks. Fire typically does not kill live oaks because of their insulating bark and ability to sprout from the trunk, so this habitat is relatively resilient to recurring low intensity fire. In order to preserve this habitat and keep fuel levels manageable, it will be necessary to maintain the current level of chaparral growth, trim low hanging oak branches, and to reduce the grass length around the periphery of the open space near the homes and, to a lesser degree, within the oak grassland habitat in the interior of the open space. This can be accomplished without losing biodiversity or significantly harming special status plants and animals if done with conservation of species in mind.

The open space includes 12.5% of the open space is covered by the chamise-black sage chaparral alliance and is in most cases closely intermixed with the coast live oak woodland alliance. This intermixed habitat is considered a sensitive habitat, although most of this chaparral component has been regularly grazed or cut to reduce fuel loading and does not support the diversity normally seen in a mature version of this habitat. This vegetation type is very flammable and can burn under very high intensity and generate significant flying embers if the fuel loading is high. If a fire were to burn through the open space as it exists now, these patches of chaparral would increase the fire intensity when it burned but because these patches are small, the overall fire intensity would be lower in the predominantly grass understory. This vegetation alliance is adapted to fire and recovers in 3-5 years. Without fuels reduction, this habitat type is likely to expand into existing open areas in the oak woodland and increase fuel loading which will greatly increase the fire hazard. Reducing fuels while protecting sensitive resources will require regular but light brush trimming by crews trained to recognize and reduce impact to sensitive species while still obtaining fuel reduction goals.

The open space includes 46.6% of the open space is covered by three kinds of grassland groups or alliance and occur around the margins of oak and chaparral habitats and large open areas on the eastern side of the property. Very few native grass species are seen here despite the classification, and most grasses are non-native or invasive. Despite the preponderance of non-native vegetation several special status plants and animals are found in this habitat. Fuels here are light and flashy and burn readily, but recovery quickly after winter rains. General fuel control options in this type of habitat include annual mowing, grazing, and prescribed fire.

There are several options for fuel management in the habitats found in the open space area. If done with proper timing and technique, and monitored, sustainable fuel management can be accomplished while maintaining native habitats. Known fuel reduction techniques are described below in the fuels and vegetation management section. Planning for fuels management can follow the programmatic

[7] Woodlands Conservation Act (Fish & Game Code, § 1360 et seq.) Section 1361, subdivision (h), defines “oak woodland” as “an oak stand with a greater than 10 percent canopy cover or that may have historically supported greater than 10 percent canopy cover.”

coverage of the California Board of Forestry and Fire Protection's California Vegetation Treatment Program, Final Environmental Impact Report, State Clearinghouse #2019012052, Volume II: Program Environmental Impact Report (PEIR), as Revised (CBFFP 2019). The PEIR provides guidelines for impact assessment under California Environmental Quality Act, including biological resources.

Noxious Weeds and Invasive

Noxious and invasive weeds have the potential to exacerbate wildfire conditions if not controlled, decrease the native biodiversity of the area, and may become an economic burden to local agriculture. Potential fuels management activities can help reduce the spread of these weeds if done intentionally or worsen the problem by introducing weeds through crews and equipment or helping spread weeds already onsite. Althouse and Meade (2020) report many non-native species in their list of observed plants in the project area but many of these have been ubiquitous throughout the Central Coast for decades and are unlikely to be eradicated there, but further spread can be prevented by routine inspection and by following best management practices to prevent the spread of weeds. Some of the more aggressive invasive plants to watch for in this habitat include the expansion of the nearby eucalyptus trees, the establishment of yellow star thistle, purple star thistle, or the expansion of existing Italian or milk thistle, especially under the oak trees where cattle tend to congregate for shade. The existing veldt grass is well established in the Central Coast area so control of it on the Dana Reserve will require ongoing annual treatment and possibly re-introduction of native perennial grass to help reduce veldt grass incursion.

Best Management Practices for minimizing the introduction of noxious weeds include preventing landscaping with species such as pampas grass or iceplant that could move into the open space, monitoring equestrian and foot paths for weed introduction, and cleaning maintenance, fuel control, and fire suppression equipment before working in the open space. Vehicles and heavy equipment should be thoroughly washed before entering this area, especially the tires and undercarriage. Minimizing soil disturbance during any maintenance activities will also help prevent the establishment of undesirable plants.

Livestock used to control fuels can be a source of invasive plants propagules through their digestive track unless fed a weed free diet before entering the open space to purge noxious weed seeds from their system. Prior to entering the open space, livestock used for vegetation management should also be corralled in areas free of known noxious weed seeds of that may adhere to their fur.

Livestock used for vegetation management can also be managed to reduce noxious weeds in the open space by using electric fencing to concentrate the livestock over infested areas and thereby encouraging consumption of undesirable plants.

More information about noxious weeds and their control can be found at the California Invasive Plant Council (CAL-IPC): https://www.cal-ipc.org/

Oak Woodland Protection

Coast live oak (*Quercus agrifolia*) is a supremely adapted plant to fire as it features a thick and mostly live bark, evergreen leaves, and vigorous resprouting from both basal and epicormic buds. Even roots are protected by a corky layer. As such, mature oaks can survive even crown fires, though they may

delay resprouting for a year or more. Lightning in the project area is not a common occurrence, but aboriginal burning to manage acorns and other food plants occurred commonly with the fire return interval dependent on the palatability of the local acorns and other species requiring intermittent fire to reduce insect predation upon and to allow for an easier harvest. Van de Water and Safford (2011) summarized pre-contact fire histories and suggest that California oak woodlands had a mean minimum of 5 years and mean maximum of 45 years with a median of 12 years between fires.[8]

Seedling and saplings tend to survive low-to-moderate fire intensity, even if the crown is damaged or lost. Sprouting from the root crown is a common feature in top-killed immature coast live oak. Mature trees of an average diameter at breast height of at least 18 inches withstand even high fire intensity very well and will often resprout from both the root crown and trunk if the crown is damaged. Surface fires of low to moderate severity will scorch and kill the lower canopy of coast live oak, these leaves tend to persist of the stem for some time, adding protection to the scorched soil surface when they do release.

This property has previously been managed with cattle grazing, to the extent that the oak understory is patchy, with varying vertical continuity and low oak regeneration. The overstory is approximately 50% continuous horizontally, but since coast live oak leaves do not ignite readily, canopy thinning is not recommended. Understory vegetation includes Frangula californica, Arctostaphylos rubris, Toxicodendron divirsilobum, some large woody debris, and a continuous bed of grasses. The oak woodland is punctuated with pockets dominated by chamise, poison oak, black sage and other chaparral, all fire-adapted species. Historic harvesting of oaks in the open area is also evident from cut stumps, many which have resprouted. Live oak has been used historically for uses including charcoal production, firewood, and structural wood.

Fire mitigation in the oak woodland should consist of an initial removal and de-densification of understory ladder fuels. Native species that are fire-adapted will be retained. Treatments could occur before construction to enable access. Such treatments could include: mowing, masticating where applicable, and pruning smaller lower limbs from individual oak trees. A prescribed light, broadcast burn would be ideal, while pile burning debris is a secondary option. Low severity understory fires have multitudes of benefits to oak woodlands, namely in insect and disease mitigation, as well as soil fertilization.

Annual management of the oak woodland understory is crucial; the goal of which is to interrupt a continuous fuel bed of lighter fuels such as dried grasses that have the potential to carry even a low intensity fire into the canopy. Mowing and weed whacking are necessary immediately adjacent to structures and will complement grazing animals in more open spaces away from structures.

A majority of the centrally located oak woodland is to be maintained as part of the Dana Reserve Specific Plan. Where development is to occur adjacent to coast live oaks, County oak tree protection measures include on-site tree protection measures where oaks can preserve, and off-site mitigation to offset necessary oak tree removal.

Fire safe management of the oak woodland areas in open spaces on the Dana Reserve will not require removal of healthy trees. Areas outside of the 100-foot defensible space will require good forest

[8] * (Van de Water, K.M.; Safford, H.D. 2011. A Summary of fire frequency estimates for California vegetation before Euro-American settlement. Fire Ecology 7(3): 26–58.)

practices, such as grazing, handcrew trimming and limited prescribe burning. Within the 100-foot defensible space zone, the concept of a shaded fuel break will be utilized by:

- Removing non-native species
- Separating native chaparral species so there is not a contiguous fuel bed
- Using mechanical, animal or hand crew efforts underneath the trees to reduce heavier fuels
- Limbing the lower branches of the trees up to 6 feet to prevent a ladder fuels that could spread fire from the ground into the trees canopy

Cut vegetation should generally be chipped on site or may be piled for winter burning.

Oak Trees – Conservation & Preservation

A majority of the centrally, located oak woodland on the Dana Reserve property is to be maintained as part of the 64.1-acre open space areas or 22.3% of the total site acreage. Where development is to occur adjacent to coast live oaks, County oak tree protection measures will be implemented.

Off-site 385-acre natural habitat and oak preserve

A combination of both on-site mitigation and off-site mitigation will be used to offset the live oak trees. Dana Reserve has purchased the Dana Ridge property that was part of the original Dana Rancho Nipomo for the off-site mitigation featuring a similar in character and quality of the coast live oaks within the Dana Reserve. This 385-acre Dana Ridge natural habitat and oak preserve is planned to be permanently maintained through a conservation easement with management and oversite by a local, non-profit conservation group.

Biological Mitigation Site - DRSP Exhibit 3-2

As part of the agreement with the non-profit conservation group a requirement should be required that forest management practices are maintained that include reducing fuel loading that could create an elevated fire threat. This may include prescribe fire, mechanical treatments, hand crew and the use of animal grazing.

Wildfire Environment

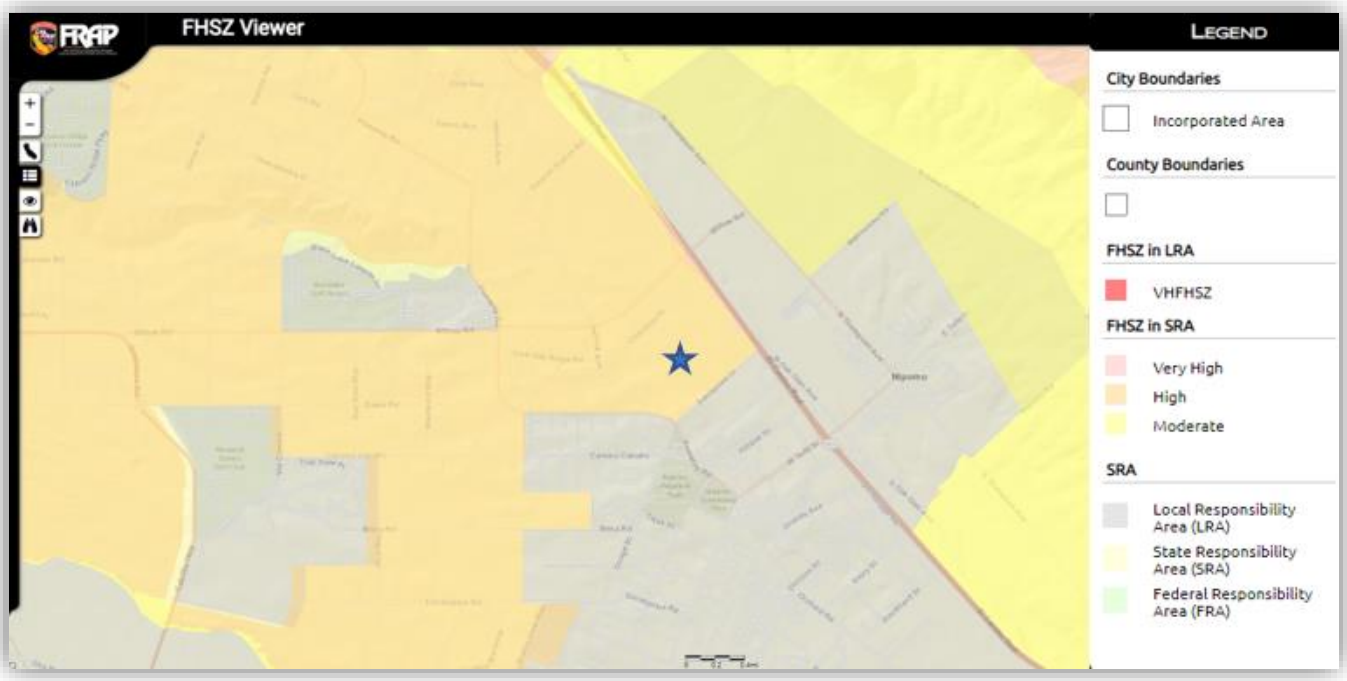
Fire Hazard Severity Zone

The Dana Reserve development is located in State Responsibility Area as a High Fire Hazard Severity Zone. The Fire Hazard Severity Zone map[9] is developed using a science-based and field-tested model that assigns a hazard score based on the factors that influence fire likelihood and fire behavior. They were last updated in 2007. Many factors are considered such as fire history, existing and potential fuel (natural vegetation), predicted flame length, blowing embers, terrain, and typical fire weather for the area. There are three levels of hazard in the State Responsibility Areas: moderate, high and very high. Urban and wildland areas are treated differently in the model, but the model does recognize the influence of burning embers traveling into urban areas, which is a major cause of fire spread. They do not take into account modifications such as fuel reduction efforts.

CAL FIRE has begun the long process of updating the map. While a change to the Dana Reserve area as a State Responsibility Area High Fire Hazard Severity Zone prior to development is unlikely, after the project is fully developed, the area, exclusive of the open space areas, may well be converted to a Local Responsibility Areas, like the Black Lake development nearby, and not considered a fire hazard severity zone. The open space, even after the surrounding areas are developed, will likely be designated either a State Responsibility Fire Hazard Severity Zone, or become a Local Responsibility Area Fire Hazard Severity Zone.

While FHSZs do not predict when or where a wildfire will occur, they do identify areas where wildfire hazards could be more severe and therefore are of greater concern. FHSZs are meant to help limit wildfire damage to structures through planning, prevention, and mitigation activities/requirements that reduce risk. The FHSZs serve several purposes: they are used to designate areas where California's wildland urban interface building codes (Chapter 7A) apply to new buildings; they can be a factor in real estate disclosure; and the County considers fire hazard severity in the safety elements of the general plan.

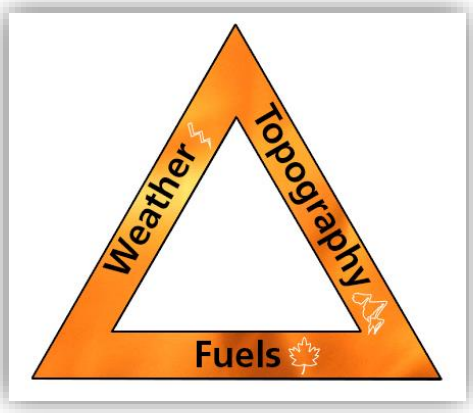
[9] https://www.arcgis.com/home/item.html?id=789d5286736248f69c4515c04f58f414



Fuel Weather & Topography

There are three factors that influence fire behavior: fuel, weather, and topography.

Fuel



A fuel's composition, including moisture level, chemical makeup, and density, determines its degree of flammability. Moisture level is the variable factor and changes daily, even hourly. Live trees usually contain a great deal of moisture and dead logs contain very little. The moisture content and distribution of these fuels define how quickly a fire can spread and how intense or hot a fire may become. High moisture content will slow the burning process, because heat from the fire must first eliminate moisture.

In addition to moisture, a fuel's chemical makeup determines how readily it will burn. Some plants, shrubs, and trees contain oils or resins that promote combustion, causing them to burn more easily, quickly, or intensely than those without such oils. Finally, density of a fuel influences its flammability. If fuel particles are close together, they will ignite each other, causing the fuel to burn readily. But if fuel particles are so close that air cannot circulate easily, the fuel will not burn freely.

Soil types also must be considered because fire affects the environment above and below the surface. Soil moisture content, the amount of organic matter present, and the duration of the fire determine to what extent fire will affect soil.

Mixture of vegetation types in open space area

Weather

Weather conditions such as wind, temperature, and humidity also contribute to fire behavior. Wind is one of the most important factors because it can bring a fresh supply of oxygen to the fire and push the fire toward a new fuel source.

Temperature of fuels is determined by the ambient temperature because fuels attain their heat by absorbing surrounding solar radiation. The temperature of a fuel influences its susceptibility to ignition. In general, fuels will ignite more readily at high temperatures than at low temperatures.

Humidity, the amount of water vapor in the air, affects the moisture level of a fuel. At low humidity levels, fuels become dry and, therefore, catch fire more easily and burn more quickly than when humidity levels are high.

The weather in Nipomo is a typical of a coastal valley climate that is influenced by its proximity to the Pacific Ocean. Nipomo has an average annual precipitation of approximately 17 inches. While record temperatures are over 100 degrees, seasonal highs are around 80 degrees and lows around 43 degrees. Historic average humidity is in the low 60s. Outside of winter storms, wind conditions in Nipomo peak in both springtime and early autumn, often fresh and most often from the northwest to west-northwest. Due to the property's topography, winds from this direction can push a fire uphill into the slopes of the oak woodland complex.

Maximum wind speeds do not generally exceed 23 mph with the average wind speeds about 10.4 mph.[10]

Anthropogenic climate disruption is resulting in more variable and potentially extreme weather conditions. An increase in wind and temperature plus a decrease in precipitation effectively dries vegetation at a faster rate, making even our fire-adapted plant species more able to ignite.

Topography

Topography describes land shape. It can include descriptions of elevation with the height above sea level; slope, the steepness of the land; aspect, the direction a slope faces (e.g., the south side of a canyon will have a north-facing slope); features, such as canyons, valleys, rivers, etc.

Slope can determine how quickly a fire will move up or down hills. For example, if a fire ignites at the bottom of a steep slope, it will spread much more quickly upwards because it can pre-heat the upcoming fuels with rising hot air, and upward drafts are more likely to create spot fires.

The topography of the open space areas of the Dana Reserve are minimally sloping and will only have a minimal effect on fire behavior.

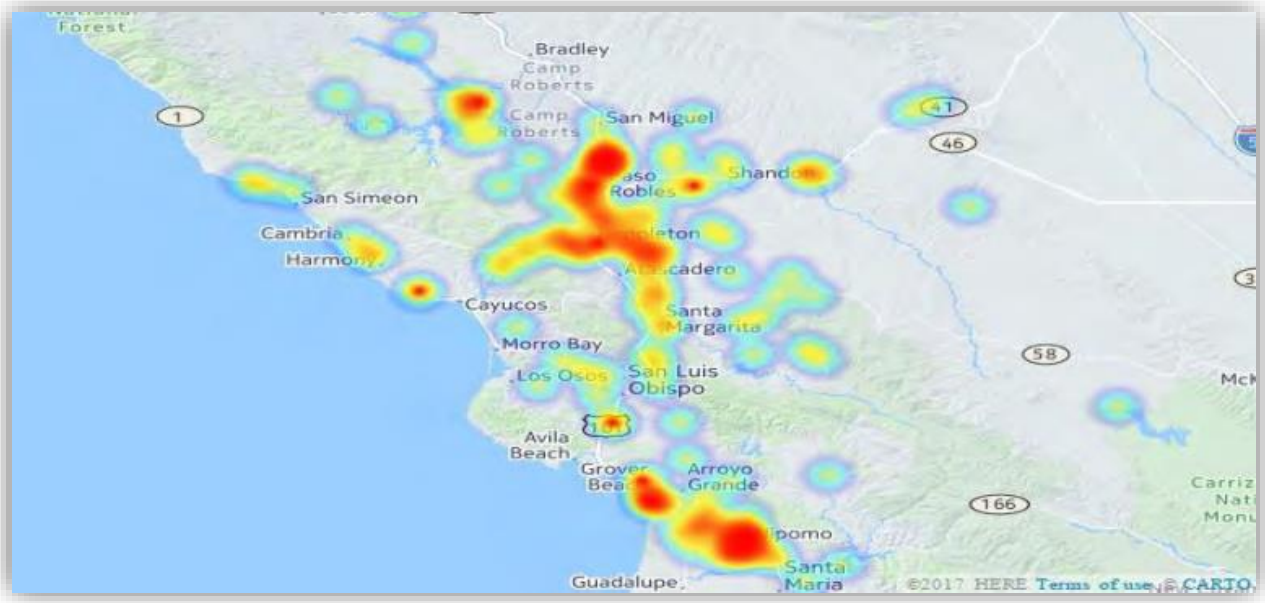
Nearly the entirety of the Dana Reserve property and surrounding area is approximately 374 feet above sea level. The property features a predominantly southwest-northeast ridge that supports the oak woodland complex on all aspects. The steeper, north- and west-facing slope of the ridge is short, about 350 feet in length at the longest, and involves slopes to a maximum of about 30%.[11] The milder, south- and east-facing side of this hill features a mix of oak woodland and chamise-black sage chaparral and has an average slope of about 6% and maximum of about 20%.

Ignitions

CAL FIRE Ignition data for San Luis Obispo County was analyzed for a 5-year period (2013-2017) to evaluate ignition trends and problems within the County.[12]

Ignition Cause	Number	Percentage
Arson	31	4%
Campfire	35	4%
Debris Burning	46	6%
Powerline/Vehicle/Equipment Use	319	41%
Lightning	10	1%
Playing w/ Fire	7	1%
Unknown/Undetermined	326	42%
Smoking	9	1%

[10] https://www.worldweatheronline.com/nipomo-weather-averages/california/us.aspx
[11] USDA Soil Survey reported in Althouse and Meade Biological Report Figure 3
[12] 2019 Community Wildfire Protection Plan



Ignition Data 2013-2017 source 2019 CWPP

The majority of known ignitions in the County, 41%, were from powerline/vehicle/equipment classification. Most often fire ignitions are starting along transportation corridors. Fires along Highway 101 are the most common. Considering this, the project will develop mitigation strategies that will prevent a fire that starts along the Highway 101 from burning into the development. These strategies can be a barrier such as a non-combustible wall, a greenbelt, or annual maintenance of vegetation so it will not support fire spread.

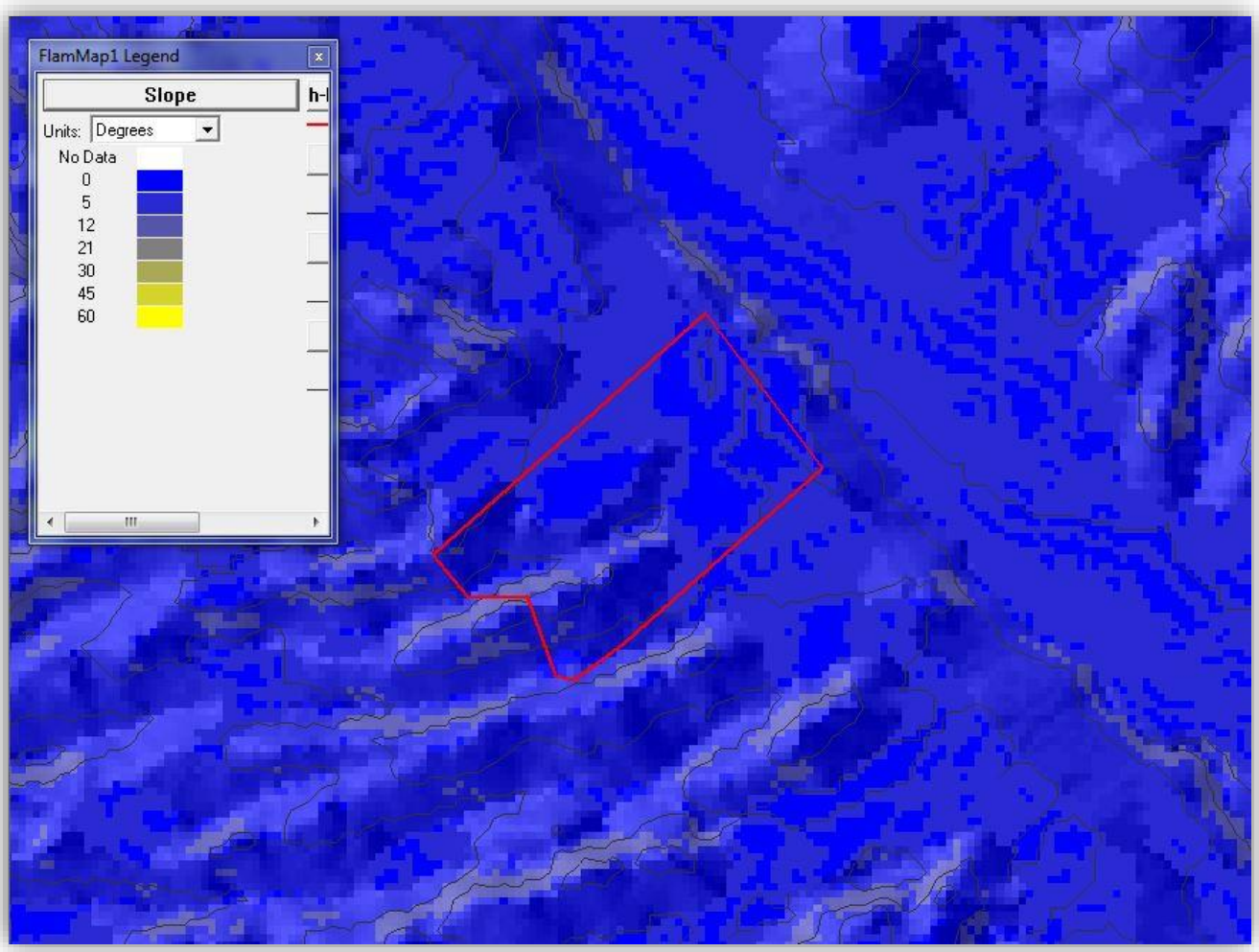
Other prevention methods will also be used to reduce or eliminate ignition sources. These include undergrounding of all new electrical lines. Fire prevention signs located on trails will include fire safety messages such as no smoking, no cooking devices, no camping, prevent wildfires and be fire safe.

Wildfire Threat Analysis

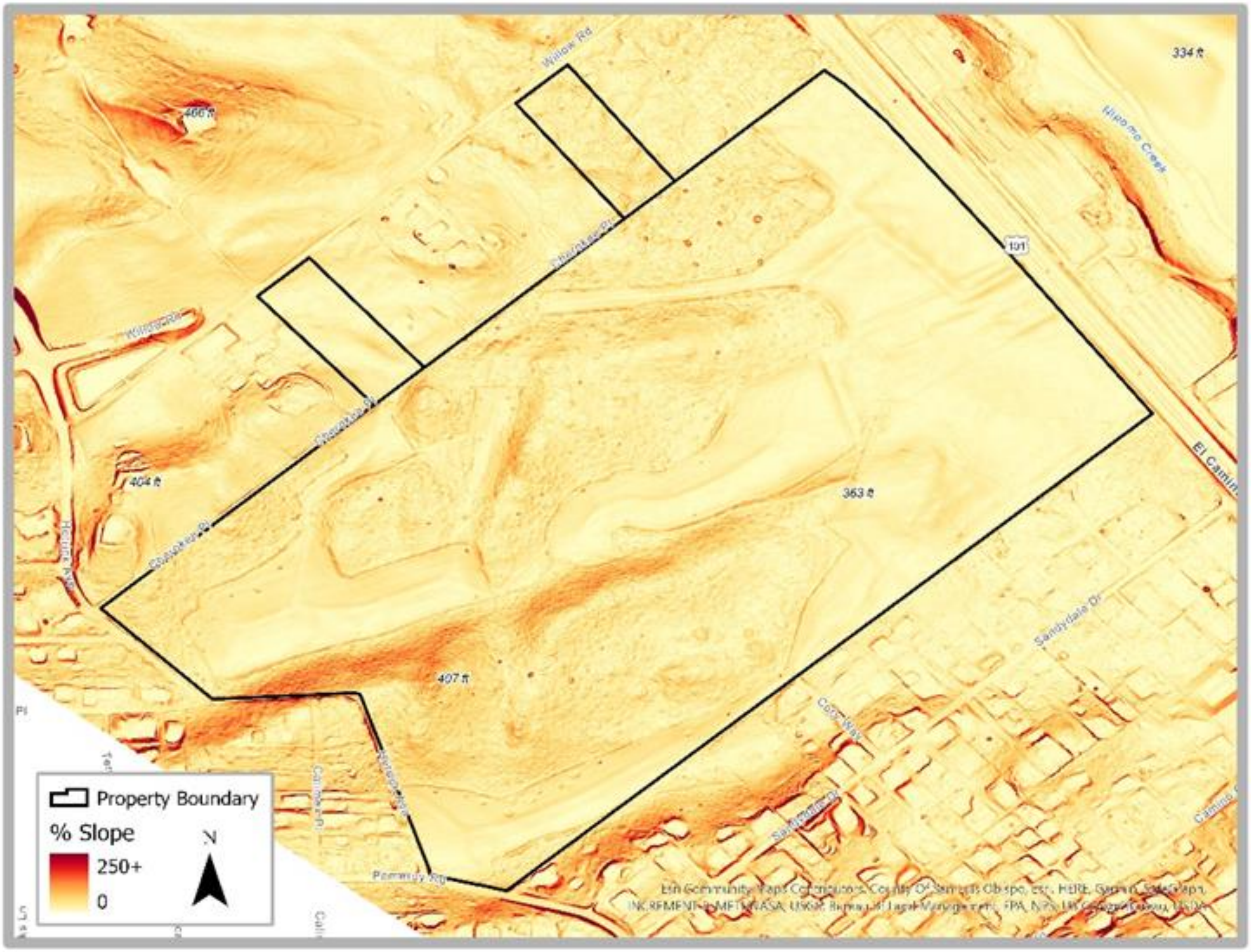
The wildfire threat analysis is based on the current conditions of the Dana Reserve property. With full development of the project, the fire spread models will change and fire spread will be reduced. This threat analysis validates the fire protection requirements for this project and with proper maintenance and fuel treatments, will be effective in mitigating a flaming front from spreading into the development and reduce the ability for embers to ignite beyond the flaming front.

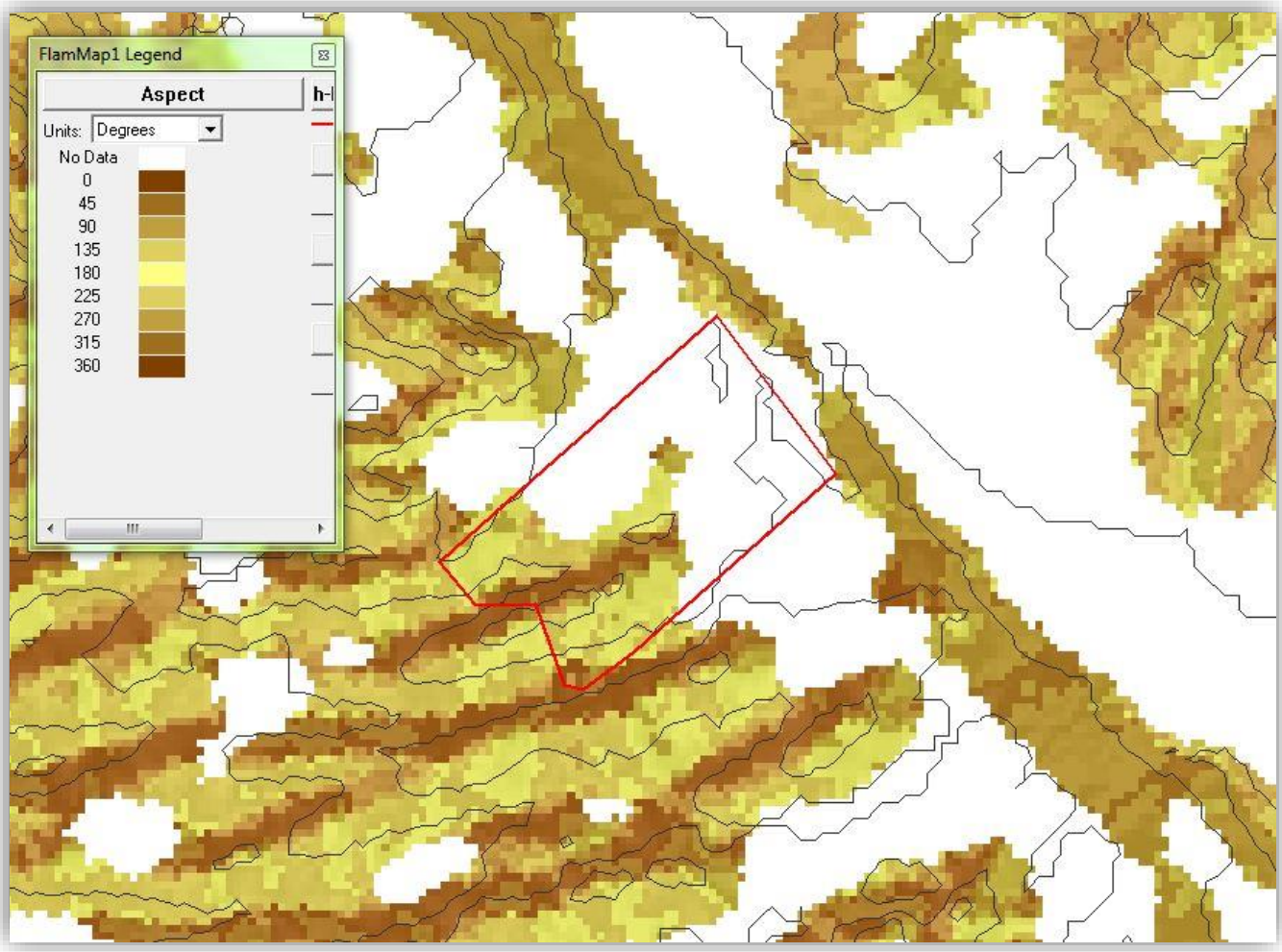
Topography

The project area consists of gently rolling terrain with slope percentages ranging from flat to 25 to 30% slope steepness. Fires can be slope driven, the steeper the slope the faster the fire may spread.

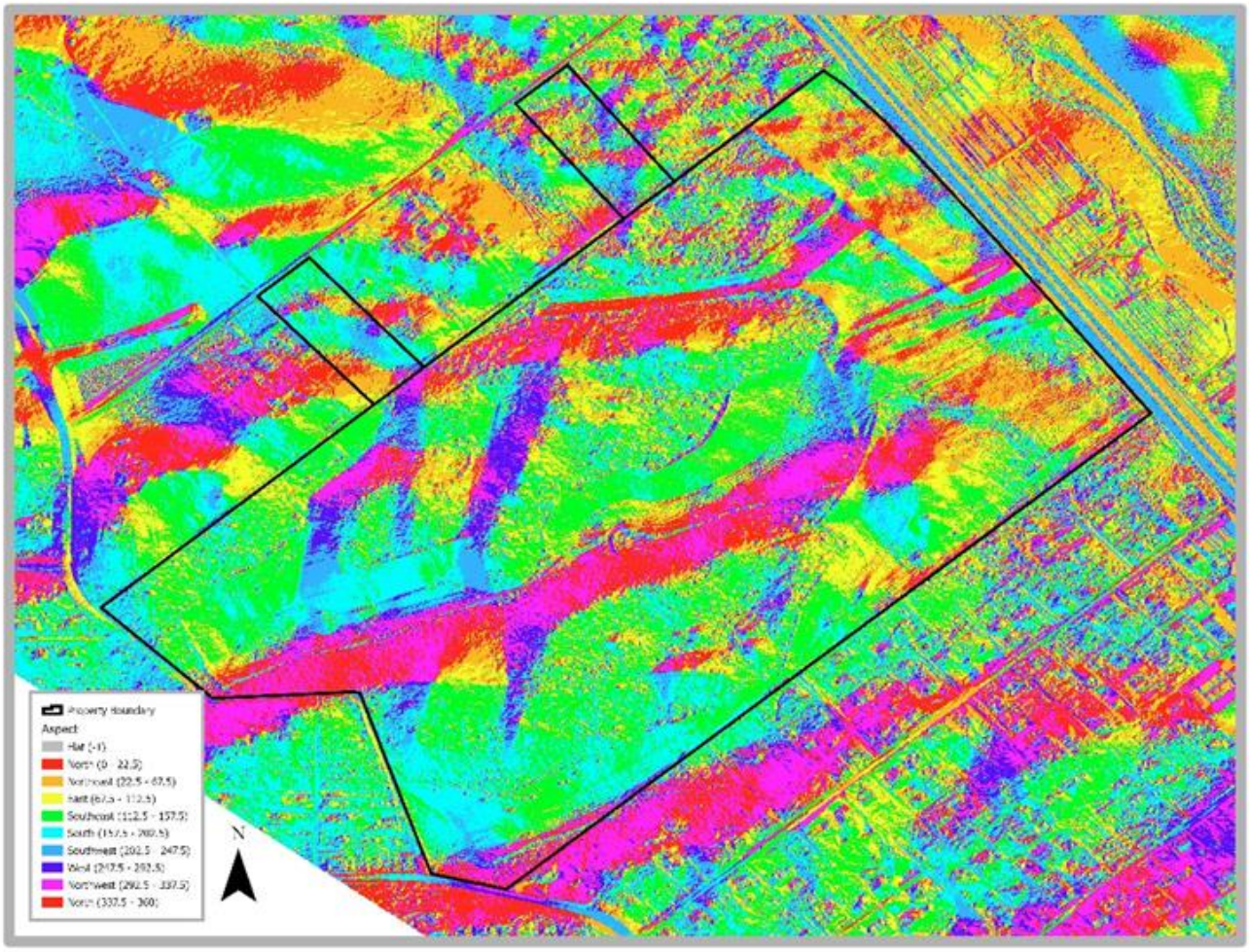


FlamMap slope map in degrees


Property Boundary
% Slope
250+
0
N
Willow Rd
Nipomo Creek
El Camino
Sandydale Dr
334 ft
466 ft
404 ft
363 ft
407 ft



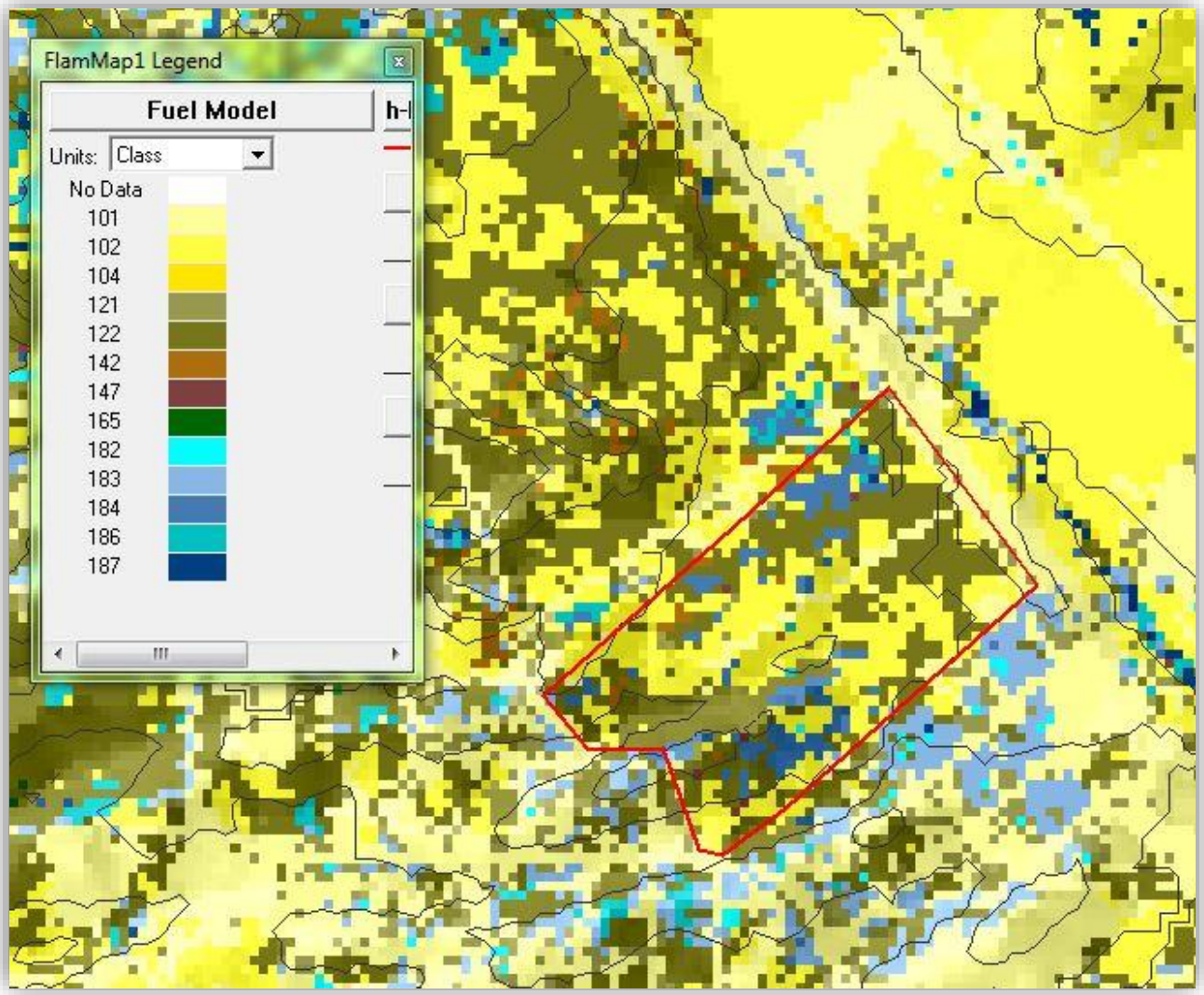
FlamMap Aspect. The aspect, or the way the slopes face, range from mostly northeast to southwest facing slopes in the project area.


Property boundary
Aspect
Flat (-1)
North (0 - 22.5)
Northeast (22.5 - 67.5)
East (67.5 - 112.5)
Southeast (112.5 - 157.5)
South (157.5 - 202.5)
Southwest (202.5 - 247.5)
West (247.5 - 292.5)
Northwest (292.5 - 337.5)
North (337.5 - 360)
N

Aspect map

Fuels

Fuels in the project area were determined from site visits, aerial photo analysis and using the U.S. Geological Survey LANDFIRE database. Results are shown below:



FlamMap Fuel (vegetation)

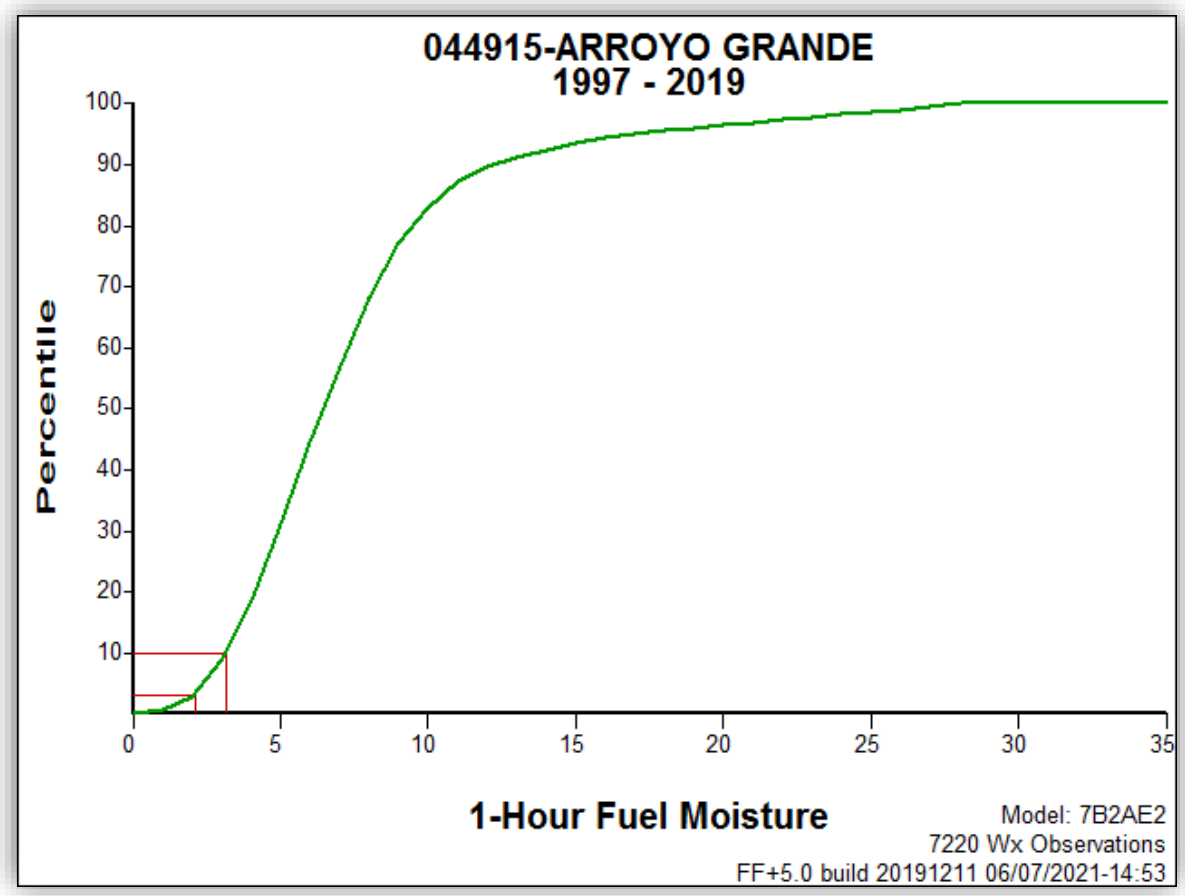
Fuel models (the classification of vegetation) are stylized representations of fuel composition and structure that are used for fire behavior analysis. (Scott and Burgan 2005). The majority of the fuels in the project are represented by the following fuel models:

- 101-104 Grass of varying characteristics (yellow colors)
- 121-122 Grass shrub mix of varying characteristics (olive colors)
- 142-147 Brush fuels (very little) (brown colors)
- 165 Heavy timber/shrub combination (very little) (dark green)
- 182-187 Tree litter and understory branches and logs (blue colors)

Weather

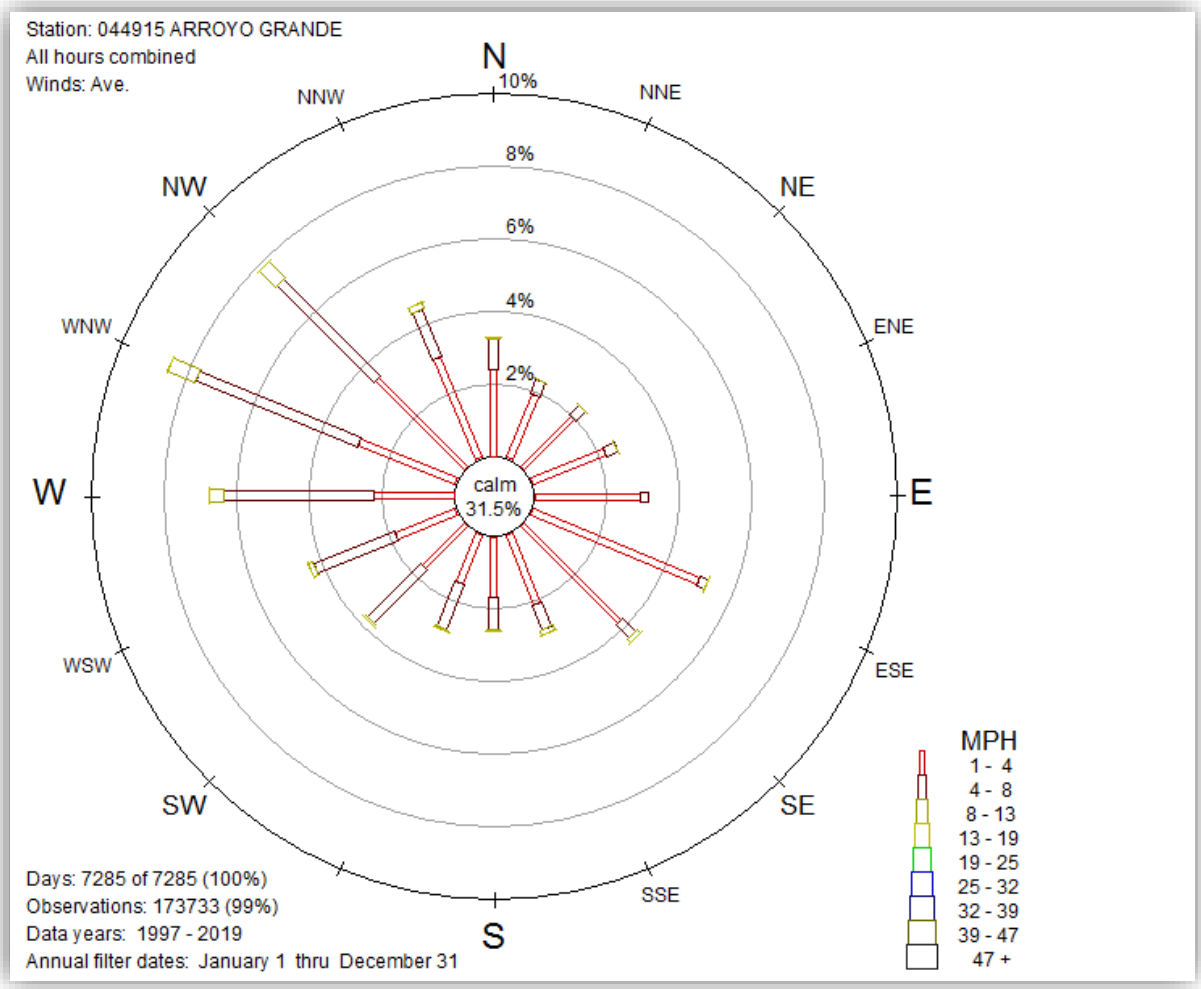
The weather data from the Arroyo Grande Remote Automatic Weather Station, 8 miles to the northwest of the project was analyzed using the software FireFamily Plus version 5 to statistically determine "average" and "worst case" fire weather. The data from the RAWS covers the period 1997-2019. Two elements of fire weather most important to estimating threat are the fine dead fuel moisture content, and the wind speed. Fine dead fuel moisture responds to the changes in humidity in the air.

The fine dead fuel moisture content for the area was distributed as shown in the graph below:



The 50th percentile of the distribution of the fine dead fuel moisture was 6%. This represents frequent conditions. A 6% fuel moisture in 1-hour fuels is fully capable of carrying fire. The extreme conditions are represented by the 10th percentile value of 3%. Under these fuel moisture conditions fire behavior and the ability to ignite significantly increases.

Wind direction and speed for the area are represented by the analysis in the wind rose graphic below:



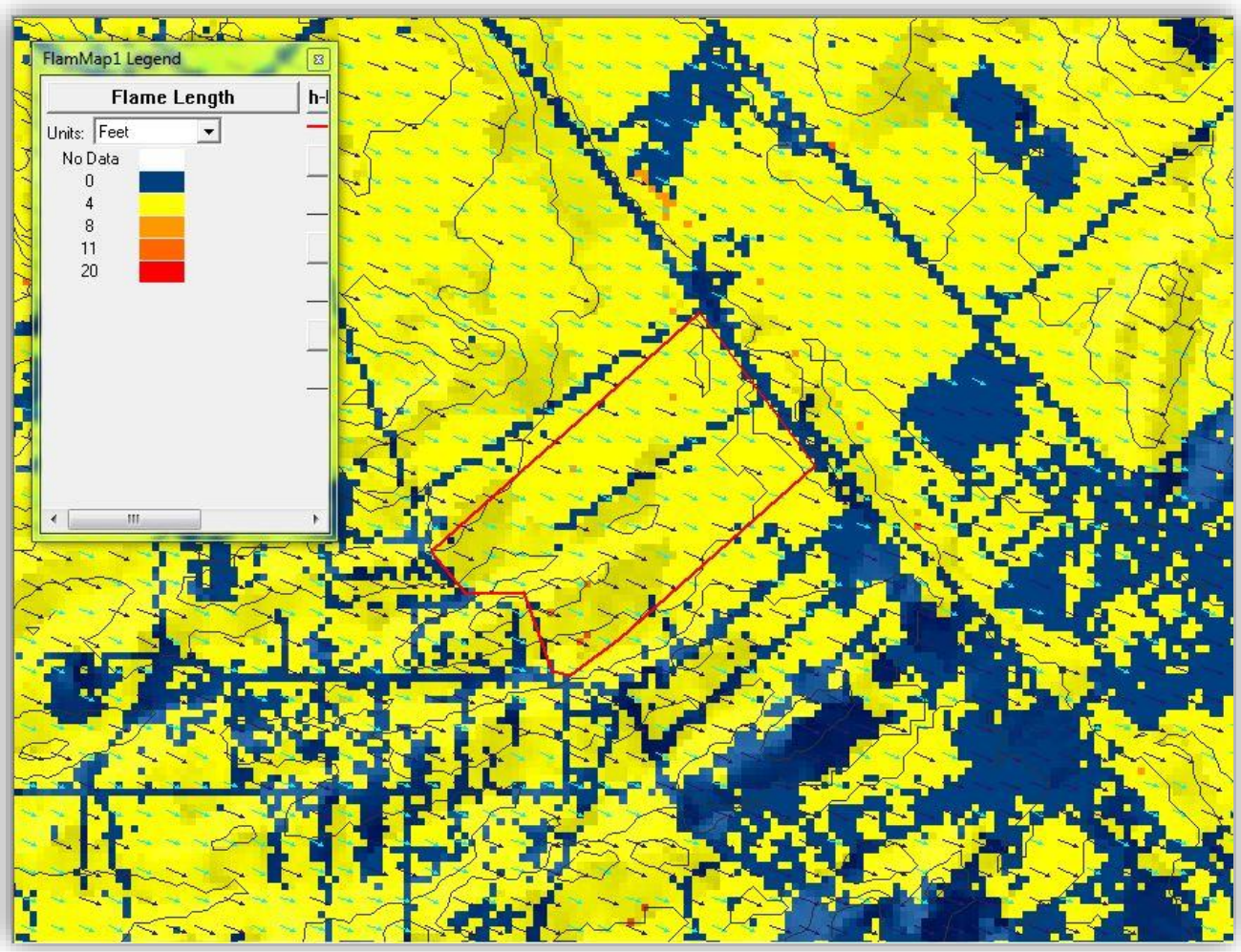
This shows that the predominant wind direction for the area is in the range of west to northwest and wind speed ranges most of the time from 0-19 mph. Statistically the wind speed at the 50th percentile is 4 mph and 7 mph at the 90th percentile. The maximum gust recorded was SE 39 mph on October 19, 2004. Higher wind rates can dominate the other factors, driving fires down slope and moving fire through fuels with higher moisture content. The wind speed rates in this location are moderate compared to conditions that exist such as Sundowner winds in Santa Barbara, Santa Lucia winds near Cuesta Grade and the famous Santa Ana winds.

Fire Behavior

Using the data above, two fire behavior simulations using FLAMMAP version 6.0 using the following factors was conducted to show the potential flame length under these scenarios:

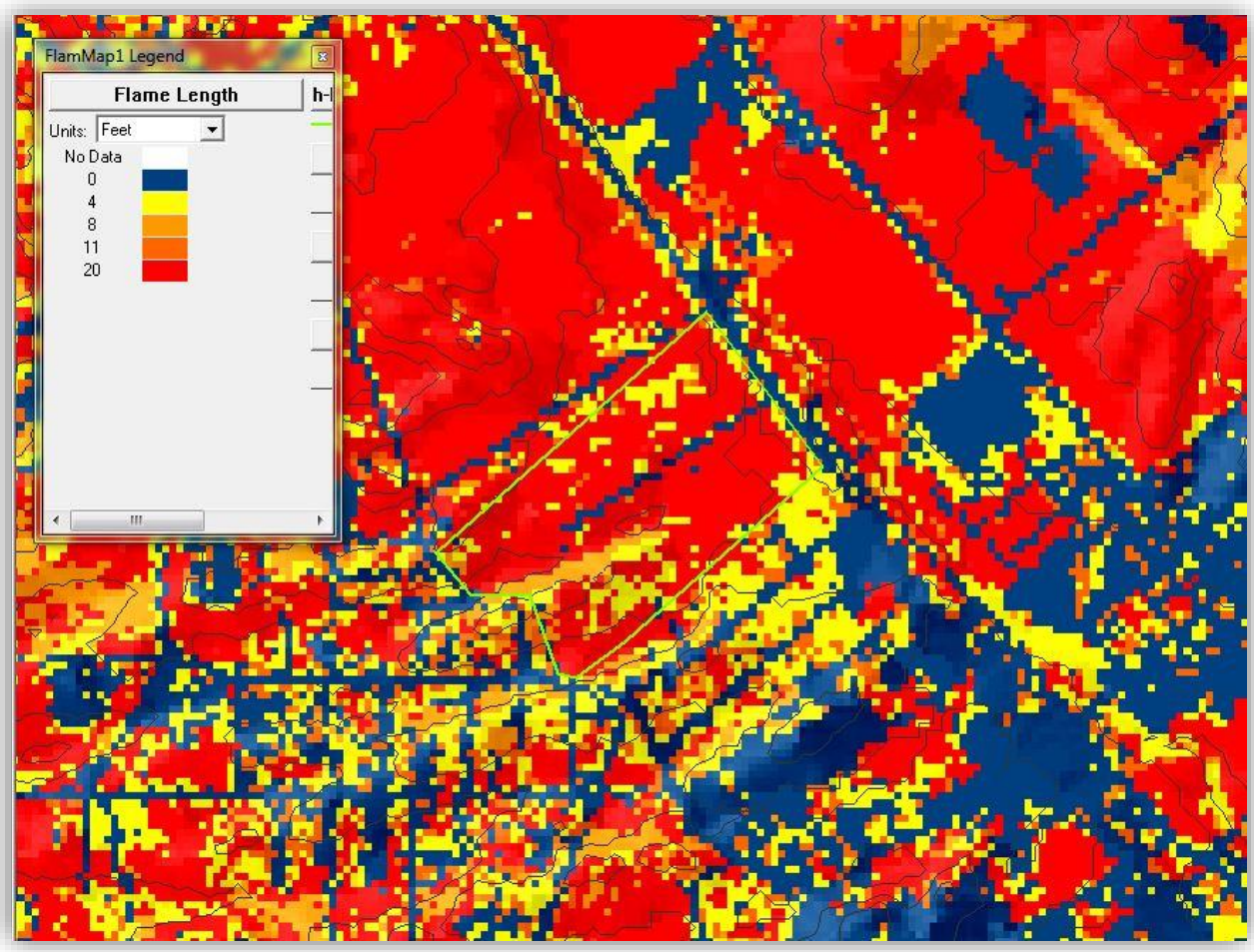
Conditions	Wind Speed	Fine Dead Fuel Moisture	Flame Length Results
Average	4 mph NW	6%	4 feet - Fire can generally be attacked at the head or flanks by persons using hand tools. Handline should hold the line.
Extreme (Above 90th percentile)	39 mph SE	3%	8 to 11 feet - Fires may present serious control problems-torching out, crowning, and spotting. Control efforts at the fire head will probably be ineffective.

Average Scenario



FlamMap - Average scenario flame lengths 0 to 4 feet

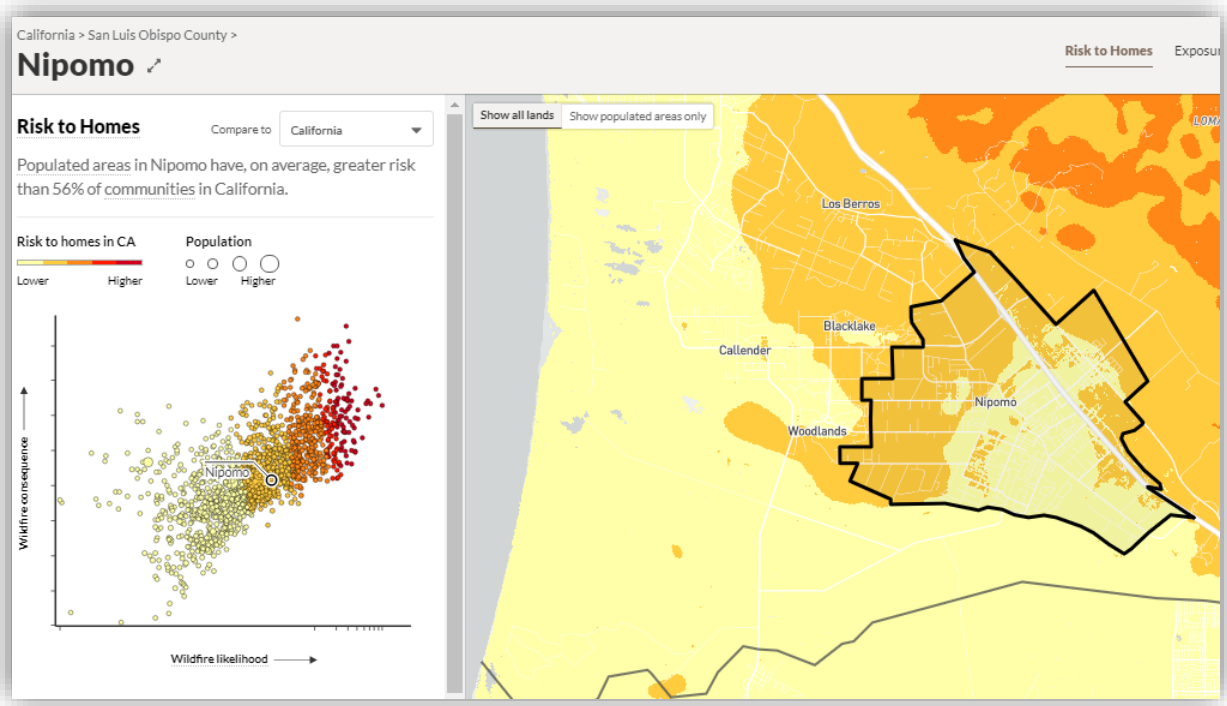
Extreme Scenario

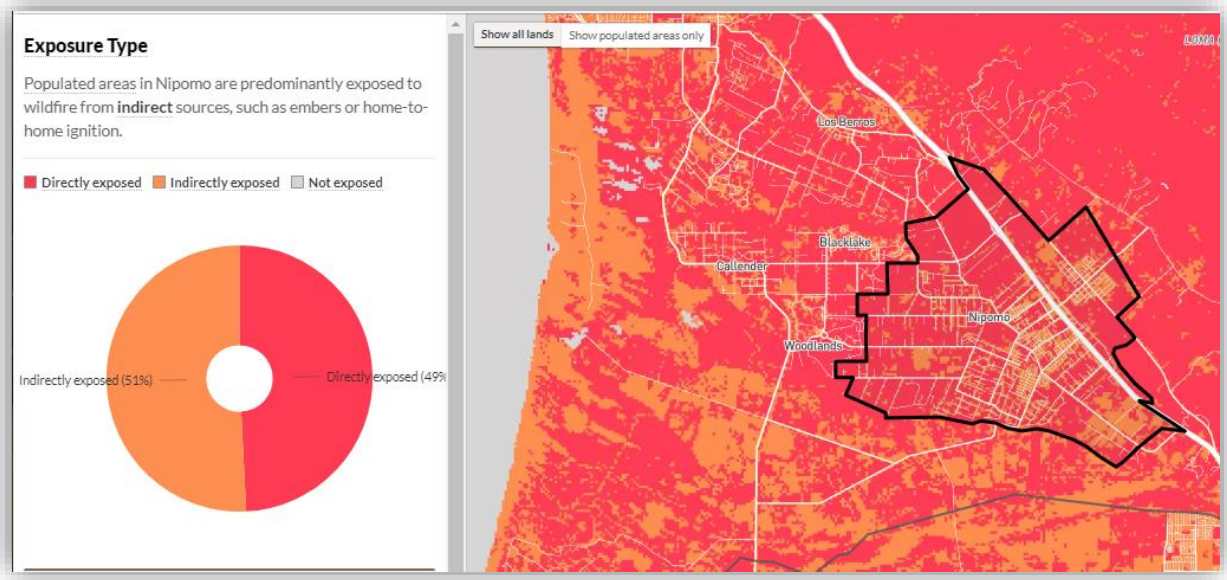


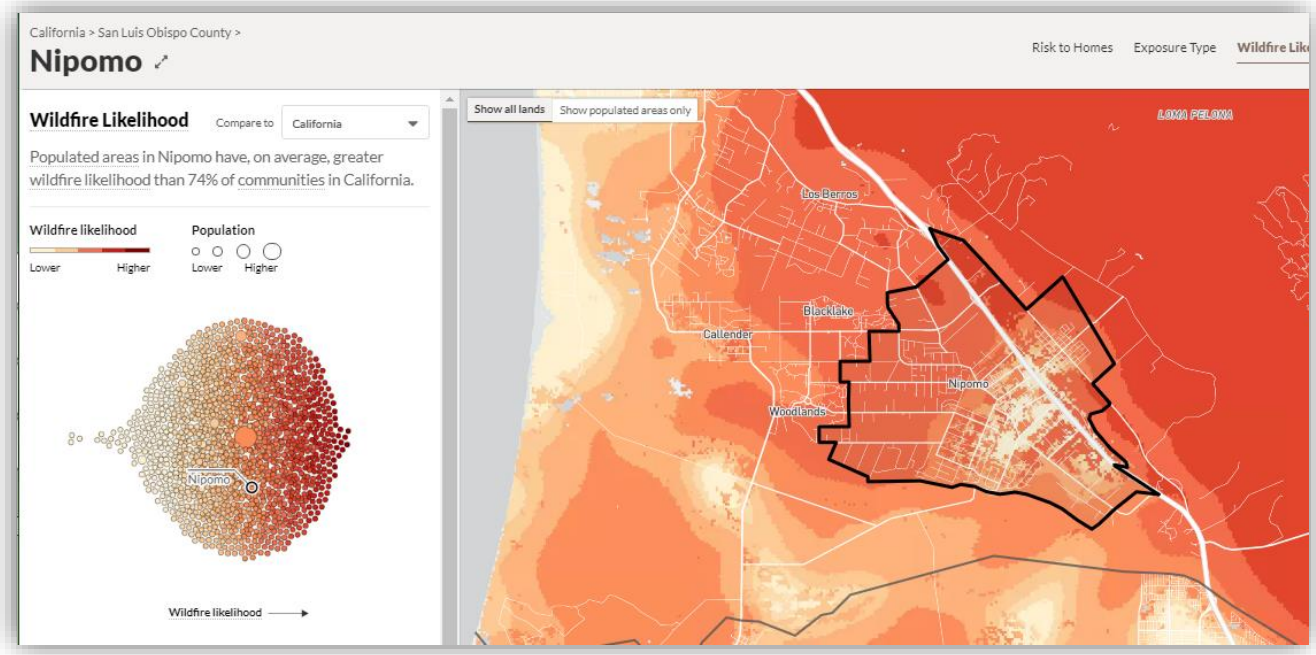
FlamMap - Extreme scenario flame lengths 11 to 20 feet

Generally, the potential fire burning conditions (90% of the days), is low to moderate with flame lengths from 0-4'. This type of burning conditions can be extinguished using direct fire suppression tactics. Even under extreme conditions (10% of the days) with flame lengths 11 to 20 feet, direct flame impingement on developed areas can be minimized through defensible space and fire safe mitigations. Spotting is possible and therefore hardening structures to prevent ignition from embers is critical.

The above analysis is corroborated by the analysis in the Wildfire Risk to Communities project available at http://www.wildfirerisk.org/ excerpts are shown below:


California > San Luis Obispo County >
Nipomo
Risk to Homes
Exposu
Risk to Homes
Compare to
California
Populated areas in Nipomo have, on average, greater risk than 56% of communities in California.
Risk to homes in CA
Lower
Higher
Population
Lower
Higher
Nipomo
Wildfire consequence
Wildfire likelihood
Show all lands
Show populated areas only
Los Berros
Blacklake
Callender
Nipomo
Woodlands


Exposure Type
Populated areas in Nipomo are predominantly exposed to wildfire from indirect sources, such as embers or home-to-home ignition.
Directly exposed
Indirectly exposed
Not exposed
Indirectly exposed (51%)
Directly exposed (49%
Show all lands
Show populated areas only
Los Berros
Blacklake
Callender
Nipomo
Woodlands



References used for threat analysis:

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

Finney, M. A. 2006. An overview of FlamMap fire modeling capabilities. In: Fuels management—how to measure success: conference proceedings. 2006 March 28-30; Portland, Oregon. Proceedings RMRS-P-41. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station: 213-220. (647 KB; 13 pages)

Bradshaw, Larry; McCormick, Erin 2000. FireFamily Plus user's guide, Version 2.0. Gen. Tech. Rep. RMRS-GTR-67WWW. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.

LANDFIRE, 2021, Existing Vegetation Type Layer, LANDFIRE 1.1.0, U.S. Department of the Interior, Geological Survey. Accessed 07 June 2021 at http://landfire.cr.usgs.gov/viewer/

Fuel & Vegetation Management

California's native vegetation are adaptive species who thrive in a climate where each summer there are many months of drought. Eons of evolution have chosen for the ecologically diverse and resilient Central Coast plants and animals. The Dana Ranch's historic oak woodland and associated chamise-black sage chaparral are home to native wildlife and humans. Oak trees are long-lived with complex rooting systems that not only retain soil moisture and structure, but continually contribute to soil carbon storage. Neighborhoods adjacent and mixed within oaks benefit greatly from the oak's ability to absorb storm runoff, provide home cooling savings, bank atmospheric carbon, and provide a sense of respite and habitat for both humans and wildlife.

California's oak woodlands and all chaparral species are adapted to fire to such an extent that many species are fire dependent. This dependence to fire serves the plant community well: disturbance functions to refresh the ecosystem, encourage plant vigor and seed germination, and support animal species that are adapted to a location's fire regime.

California, among other western states, was largely successful in suppressing destructive wildfire for well over 100 years, all while the human population has grown exponentially. The challenge today is to manage these habitats within the reality of anthropogenic climate change.

Mitigation Methods to Reduce Wildfire Threat

Naturally growing and combustible ornamental vegetation is considered fuel for wildland fires. Some vegetation species will burn faster, while others will burn with more heat and spotting. Selecting the right combination of fuel treatment methods is important and is based on topography, type of vegetation, sensitive species protection and cost. Combining periodic prescribed fire, with occasional grazing and annual mechanical maintenance for defensible space will achieve the ideal combination.

Grazing has been used successfully to reduce fine fuels in areas where other techniques are too obtrusive. Cattle and sheep (grazers) concentrate on grasses while goats (browsers) can be used to reduce woody shrubs. All livestock need to be controlled in small managed pastures to reduce the vegetation where needed rather than where livestock prefer, so water, temporary fencing (electric), protection (trained dogs), and close oversight are needed for success. Fencing may be to be repositioned several times a year. Grazing has the benefit of usually being acceptable near housing developments, is quiet and does not disturb wildlife as much as mechanical means and may provide a benefit of producing marketable commodity. Grazing can help control annual grasses and cattle or sheep have traditionally been used. Cattle tend to focus on and overgraze moist or shady areas, but this could be controlled by intensive management. Goats are also used locally and can reduce the fuel loading from shrubs when fuel beds

are low density, such as the current conditions at the Dana Reserve, but are less successful in thinning large patches of heavy and decadent brush. Water sources needed for livestock can also supply water for wildlife species and increase their abundance if this water is reliable and consistent. For instance, bats, birds, and many large and small mammals will drink from livestock troughs if a wildlife-friendly design is used that allows access and escape. Water and salt needed for livestock health can cause overuse near these resources, so they should be placed away from sensitive plant habitats.

Hand crews can be used to selectively thin brush and limbs with chainsaws and then lop and scatter the fuel, pile it for wildlife habitat or burning, or run it through a chipper. Sensitive species can be identified in advance and avoided or selectively pruned while still quickly and significantly reducing fuel loading. Hand crews can cut low hanging branches of trees that can catch on fire from grasses burning underneath them to height of about 6 feet. Brush density can be easily reduced. For instance, from homes out to 30 feet away from buildings all brush can be cut, and from 30 feet out to 100 feet away 50% of the brush can be cut. Hand crews offer the finite control needed to follow a detailed pattern that may need to avoid sensitive areas.

Mechanical reduction of fuel consists of using machinery, such as a masticator head on the arm of a tracked vehicle or an excavator or skid steer to shred or chop woody brush and small branches or trees and for scattering the chips throughout the worksite. This technique quickly puts the fuel down onto the soil, reducing the flammability and protecting the soil from rain caused erosion. Although fast and effective, the ability to selectively cut particular species of brush is limited, flagging sensitive areas by a qualified individual for exclusion is necessary and so it is more complex to carry out detailed work around sensitive plants and habitats. The larger masticators may cause compaction of the soil and soil disturbance down where the tracks are turning, exposing soil to invasive plants that could be carried in on the equipment or crews. Masticators are also loud and throw chips hundreds of feet, and so could disturb residents and breeding animals. If large amounts of material need to be removed quickly and efficiently masticators are very effective, such as during the construction phase, fire suppression or heavy fuel reduction. The condition of the

chaparral and oaks in the Dana Reserve open space presently would not require a masticator to control, but after 3-5 years of growth this could change.

A **chipper** is a tracked vehicle or a wheeled vehicle pulled by a truck that feeds branches and brush and ejects the chips out of a chute onto the ground. These are used in conjunction with hand crews who cut vegetation with chain saws and manually and feed the vegetation into the chipper, then spread out the chips so they are not so thick as to smother grasses and herbaceous vegetation. The advantage of a chipper is that the fuel is not left in piles which can create wildlife habitat but also create pockets of heavy fuel. Chippers are useful in areas where much brush needs to be reduced. This equipment has the same impacts on soil as a masticator but to a lesser degree because it is usually much lighter and smaller than a masticator. At the present time, a chipper would not be necessary to control the lighter fuels that predominate the open space, and chaparral brush species that needed trimming or cutting could be done by hand and not create large piles that needed chipping.

Other **mechanical means** of fuel control include brush crushing by pulling a heavy cylinder behind a dozer or by dragging a chain between dozers, but these techniques are best suited to clearing large areas of chaparral brush. A simple mower can be used annually in areas that are relatively level and accessible. There best use is for annual maintenance in the 0 to 30 foot area of the defensible space. Desired oak seedlings should be identified and marked prior to mowing to prevent damage.

There are no fire or smoke concerns. Although the use of heavy equipment may spark a fire, this threat can be controlled by concurrent fire suppression presence. A minimum requirement for operating equipment to reduce ignitions from sparks is for the operator to:

- Mow before 10 AM
- Equipment must have a spark arrestor
- Do not drive hot exhaust into standing grass
- Have a shovel and fire extinguisher onsite
- If doing hot work like welding, have a minimum of 10 feet clearance
- Have a phone to call 911

Prescribed burning may be used to burn standing brush or piles during times when fire hazards are lower or conduct a broadcast burn to reduce fine fuels and brush over a larger landscape. These techniques most closely mimic the mechanisms of natural fire and recovery but also create the risk of escaped fire or higher intensity of fire than anticipated so require careful planning to minimize these dangers and will require fire suppression equipment in place to protect nearby residences. In a development such as the Dana Reserve, broadcast burning will be exceptionally challenging to accomplish. Winter burning of piles after green-up is relatively safe with minimal threat of spread. Smoke is an issue and would need to be managed.

All or part of these techniques can be employed to create the fuel density and structure needed to minimize wildfire risk but still provide for natural habitats and protect sensitive species. The details of such a plan will need to be finalized under the California Vegetation Treatment Program PEIR.

Treatment Type	Benefits	Risks	Frequency	Cost per Acres	Notes
Hand Crew	Light on the land. Selective cutting. Can leave roots- low soil disturbance/invasive introduction	Poison oak Slower than mechanical for heavy fuels. A chipper may be required concurrently.	7 to 10 years for heavier fuels.	$5,000 - $6,000 per acres	If done for grasslands needs to be annually.

Treatment Type	Benefits	Risks	Frequency	Cost per Acres	Notes
Mechanical – Mower, Mastication, Crushing and Chippers	Can cover a large area quickly at lower costs. Does not remove roots. Can select lighter machines if soil compaction is an issue.	Heavy equipment can cause soil compaction, disturbance and introduce weeds. Masticator heads loud and fling debris.	Grass mowing annually in area near homes to create defensible space. 5 to 10 years for heavier fuels.	$500-1,000 per acre	Chip piles need to be less than 6 inches deep to allow plant emergence. Need to work within CalVTP EIR to minimize impacts to sensitive species (see Appendix A).
Prescribe burning	• Broadcast burning simulates a natural burn. Little impact on sensitive species • Pile burning can be done after hand cutting and piling and can be burned in the winter.	Higher risk of escape Smoke can impact neighborhoods. Limited number of days to broadcast burn which may cause delays into the next year.	10 to 20 years	$500-1,000 per acre	Need coordination with local fire agencies to undertake safely. Spring burning may be harmful to breeding animals and germinating plants. Liability insurance for prescribed burning is limited
Long Term Fire Retardant (e.g. Phos-Chek Fortify ©)	• Prevents ignition of vegetation • Protects fuels for the duration of fire season (up to approx. 2inches of rain) • Easily applied to road corridors.	May increase weeds through fertilization. May have harmful effects to surface water (not an issue in open space)	Annual application on fuels adjacent to high-risk roads	$1,000-2,000 per acre	https://www.perimeter-solutions.com/wp-content/uploads/2021/05/PERI_PC-LTR_Datasheet_VF.pdf NEPA-approved

Treatment Type	Benefits	Risks	Frequency	Cost per Acres	Notes
Goats	Will consume most species. They are browsers so they will eat the lower leaves of oak trees. They leave the roots. Some market for goat meat. Not affected by poison oak.	Goats need to be monitored by electric fence and dogs to prevent escape and guard against predators. Limited success with heavy brush; they do not consume larger woody stems	3 to 5 years.	$600-750 per acre	Contractor s who specializes in “fire goats” are located on the Central Coast. They will generally charge by the acre. Water /salt will need to be provided in each rotational pasture.
Cows	Will consume the grasses and trample brush but will not consume woody material. Can be contained by good fencing. Not affected by poison oak. Good market for beef	Need to keep gates closed which may affect ability for recreational use. Tend to overuse wet and/or shady areas.	Annually in spring to reduce grasses prior to peak fire season.	If good fencing, may have no costs if nearby rancher can move cows onto property.	Water/salt will need to be provided in each rotational pasture.
Sheep	Will consume the grasses and trample brush but will not consume woody material. Can be contained by good fencing. Not affected by poison oak. Good market for lamb	Sheep need to be monitored by electric fence and dogs to prevent escape and guard against predators. Limited success with heavy brush; they do not consume larger woody stems	Annually in spring to reduce grasses prior to peak fire season.	$600-750 per acre	Water/salt will need to be provided in each rotational pasture.

Appendix A & B have tables that show the effects of different types of fuel treatments on specific sensitive species. Appendix A - Effects of Fuel Treatments on Sensitive Plant Species and Appendix B - Effects of Fuel Treatments on Sensitive Animal Species at the Dana Reserve.

Community Education and Participation

While there are many avenues for community education and buy-in, one model that has been increasingly successful is active participation in the Firewise Community. HOAs are particularly effective in implementing and maintaining Firewise Community status. Communities in San Luis Obispo that are designated Firewise include; Cabrillo Estates, Cambria, Heritage Ranch HOA, Lake Nacimiento, Las Ventanas Ranch, Oakshores, Ranchita Estates.

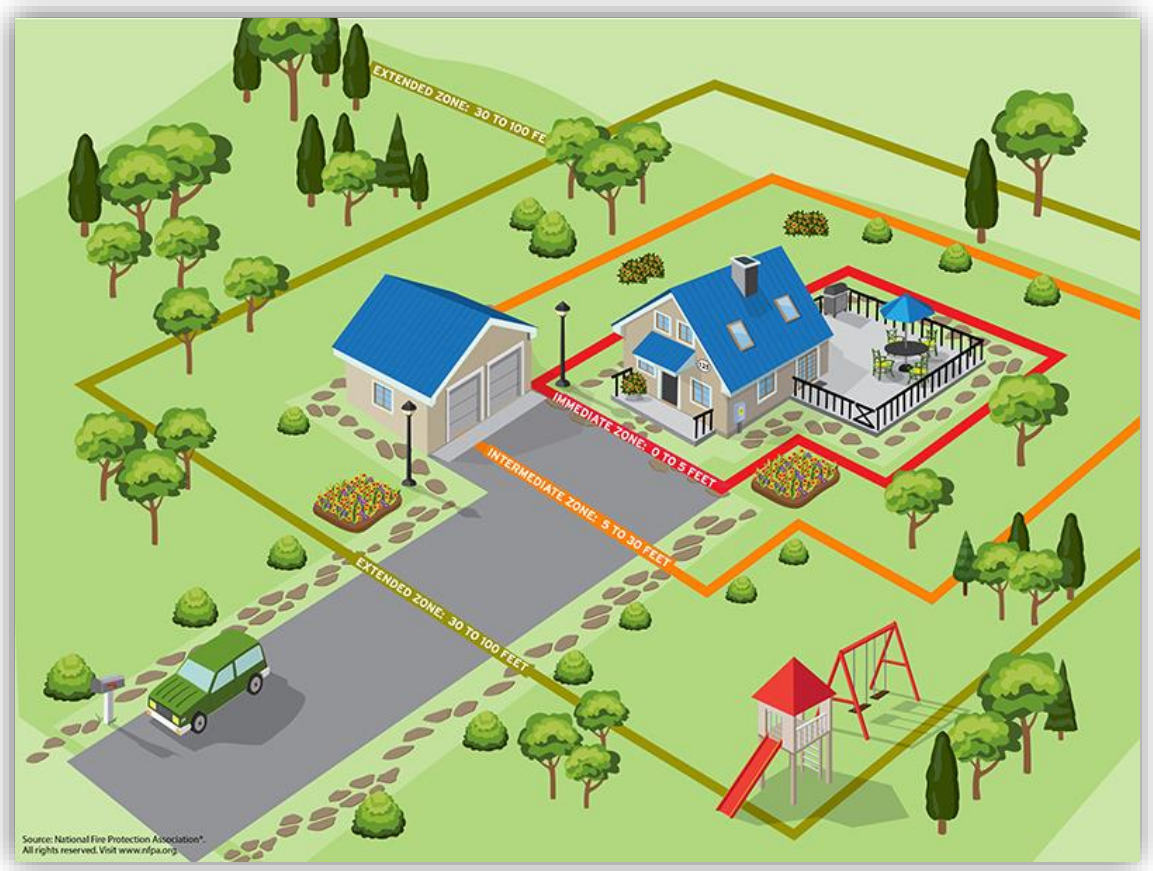
HOA's provide an excellent path for outreach and coordination for improving understanding of fire safety and community preparedness.

Management of the open space could be enhanced by inviting a community college or university to use the open space as a training area to help students learn about ecological monitoring, land management near urban areas, and fire and fuels management.

100 Foot Defensible Space

Public Resources Code 4291 requires 100 feet of defensible space around all structures. This **does not** require that all 100 feet be cleared of all vegetation, but that as you move closer to the structures there is an increasing reduction of combustible vegetation and materials. The area directly around the structure (0 to 5 feet) should be ember-resistant.

Because the open space areas are in proximity to developed areas with the individual homeowners only capable of providing defensible space in the immediate zone to their property line, the design requirements of the Dana Reserve and the maintenance conducted annually by the HOA will achieve the additional defensible space out to 100 feet. This will include the use of non-combustible fencing, roads and trails strategically located to act as buffers. Mechanical, animal, hand and methods of vegetation will all be employed in the open spaces areas as identified in other sections of this Plan. Prescribe fire may periodically be utilized. This could include broadcast burning and pile burning.



Immediate Zone - 0 to 5 feet

This zone includes the area under and around all homes and requires the most stringent wildfire fuel reduction. The ember-resistant zone is designed to keep fire or embers from igniting materials that can spread the fire to homes. The following provides guidance for this zone:

- Use hardscape like gravel, pavers, concrete and other noncombustible mulch materials (No combustible bark or mulch)
- Remove all dead and dying weeds, grass, plants, shrubs, trees, branches and vegetative debris (leaves, needles, cones, bark, etc.); Check your roofs, gutters, decks, porches, stairways, etc.
- Remove all branches within 10 feet of any chimney or stovepipe outlet
- Limit plants in this area to low growing, nonwoody, properly watered and maintained plants
- Limit combustible items (outdoor furniture, planters, etc.) on top of decks
- Relocate firewood and lumber
- Use noncombustible fencing, gates, and arbors attach to the home
- Keep garbage and recycling containers outside this zone or inside garage
- Consider relocating boats, RVs, vehicles and other combustible items outside this zone

Embers can spread fire to combustible material inside and outside homes

Intermediate Zone - 5 to 30 Feet

5-30’ from the furthest exterior point of the home. Landscaping/hardscaping- employing careful landscaping or creating breaks that can help influence and decrease fire behavior.

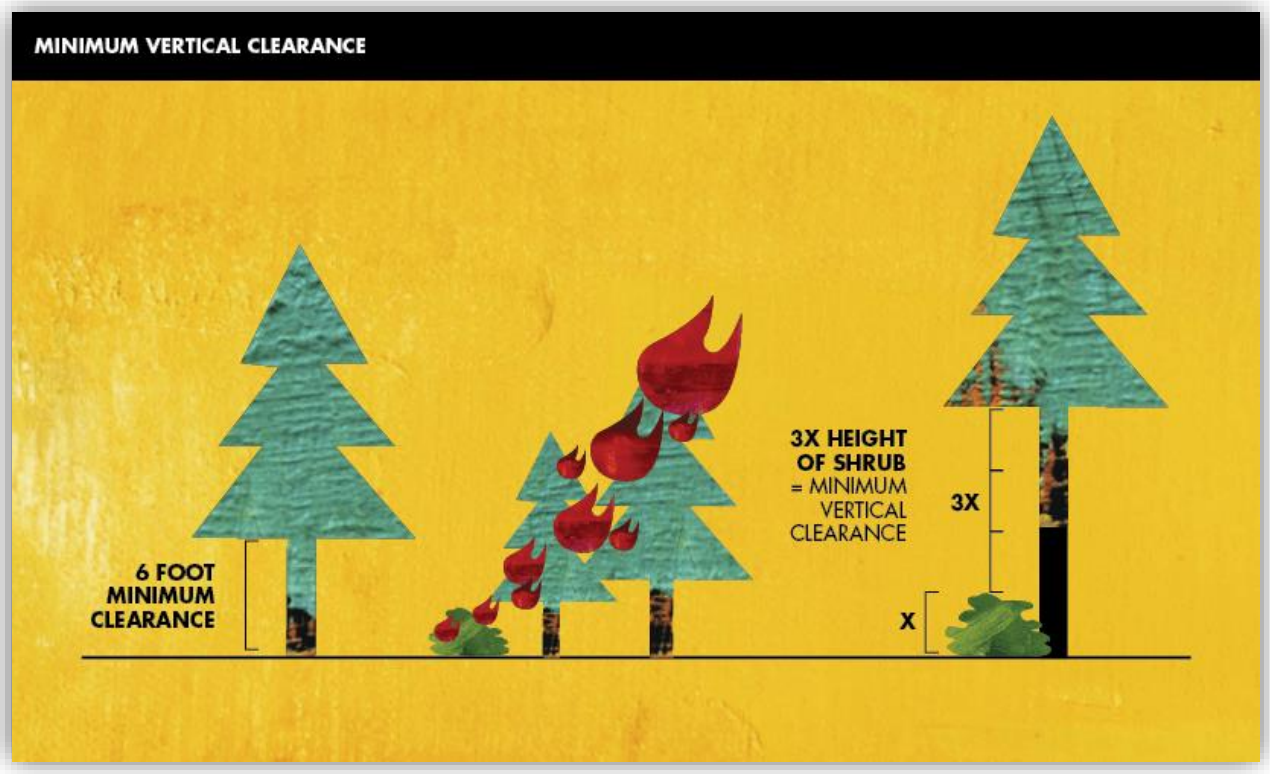
- Remove all dead plants, grass and weeds (vegetation)
- Trim trees regularly to keep branches a minimum of 10 feet from other trees
- Relocate wood piles
- Remove vegetation and items that could catch fire from around and under decks, balconies and stairs
- Create a separation between trees, shrubs and items that could catch fire, such as patio furniture, wood piles, swing sets, etc.

Extended Zone - 30 to 100 Feet

30-100 feet, out to 100 feet. Landscaping – the goal here is not to eliminate fire but to interrupt fire’s path and keep flames smaller and on the ground.

- Dispose of heavy accumulations of ground litter/debris
- Remove dead plant and tree material
- Remove vegetation adjacent to storage sheds or other outbuildings within this area
- Brush should be separated from each other 2 times the height of the brush

- Trees should be kept free of dead material
- The lower branches of the tree up to 6 feet should be pruned to prevent a ground fire from igniting the tree (Brush underneath trees should be maintained to prevent spread of a fire from the brush to the tree.)



Fire Safety During Construction

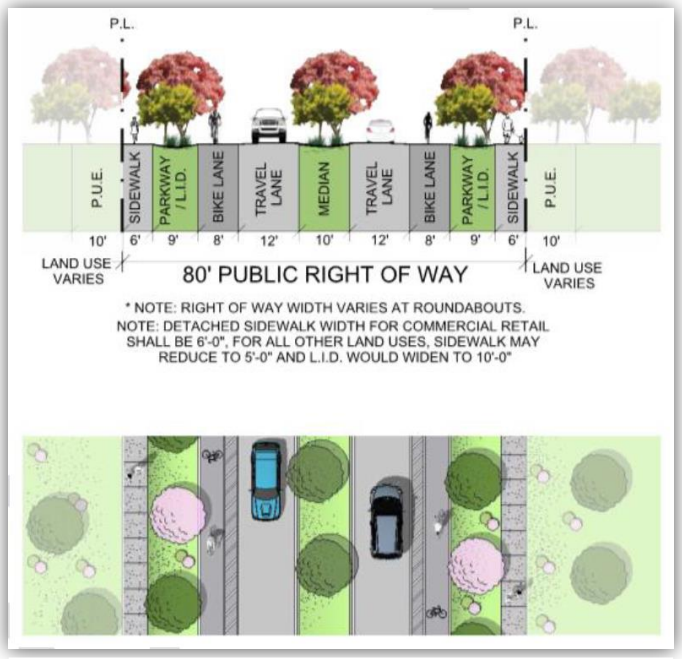
To ensure compliance with the Fire Code section 3312, a temporary or permanent water supply system for fire protection will be available prior to combustible materials arriving at the site. A limited number of all-weather access roads will be available during construction to allow fire and ambulance access to construction areas.

During construction all applicable Public Resources Codes must be complied with to prevent a wildfire. These will include spark arresters, clearance around welding operations, smoking restrictions and extinguishers on site. The Industrial Operations Fire Prevention Field Guide will assist the applicant.

Ingress & Egress

Access Roads

There are four unimpeded access points into the Dana Reserve. There are an additional two emergency access points that also serve as pedestrian and bike routes. All of these points provide both ingress by emergency responders and egress by residents and guests who may have to evacuate. All collector road lane widths are two 12-foot travel lanes. The streets that serve the single-family residences and private motorcourt roads have two 10-foot lanes. All neighborhoods are designed to have two ingress and egress points. All dead-end roads will have required turnarounds. Vertical clearance will be a minimum of 13 feet 6 inches. All roads will meet County Road standards and Public Resources Code 4290.



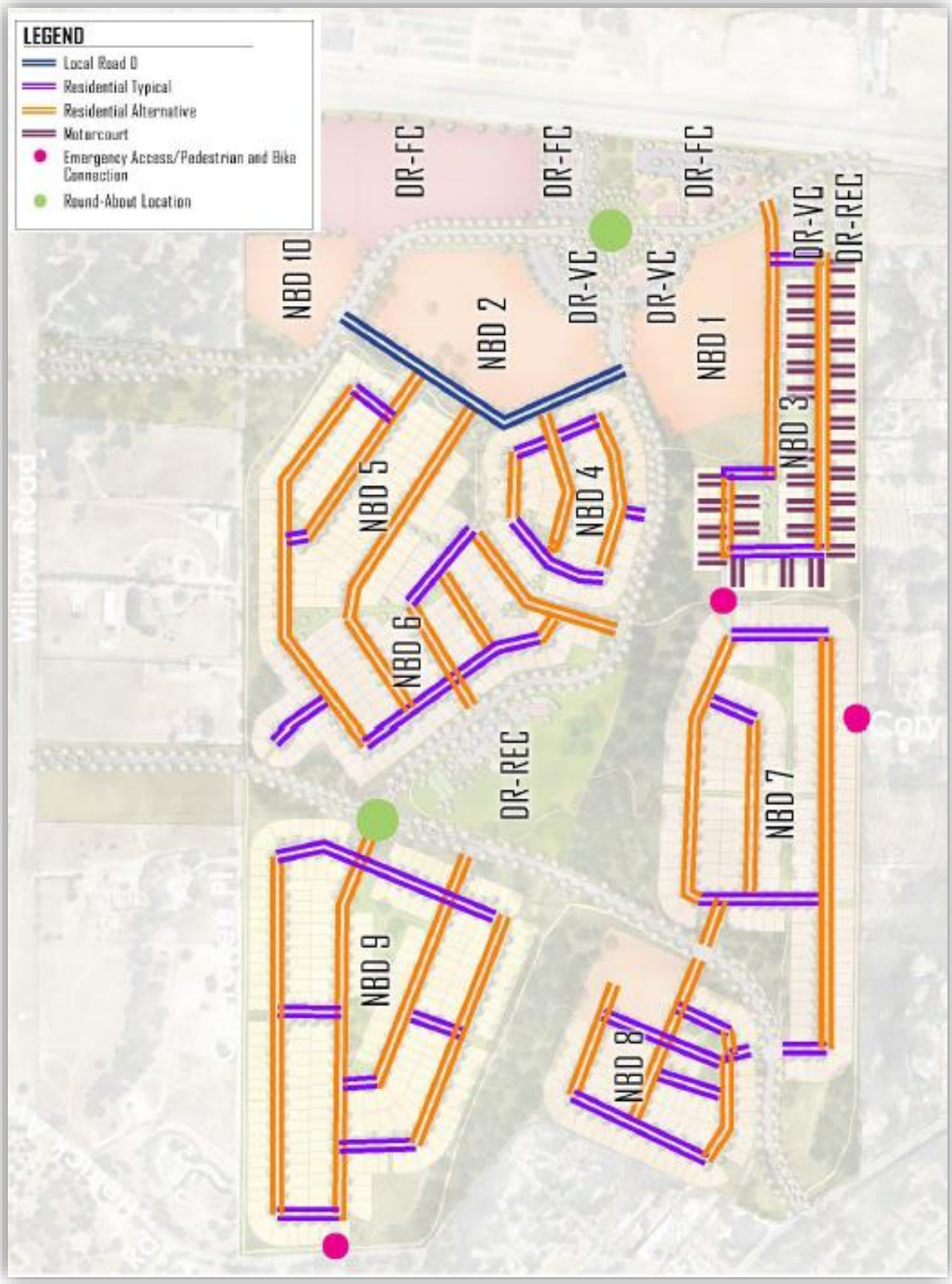
Collector Roads

The larger intersections on the main collector roads have a total of 54 feet available width and are designed to allow emergency vehicles to crossover or straddle medians or utilize bike lanes if necessary when operating with lights and siren.

Emergency Access Roads

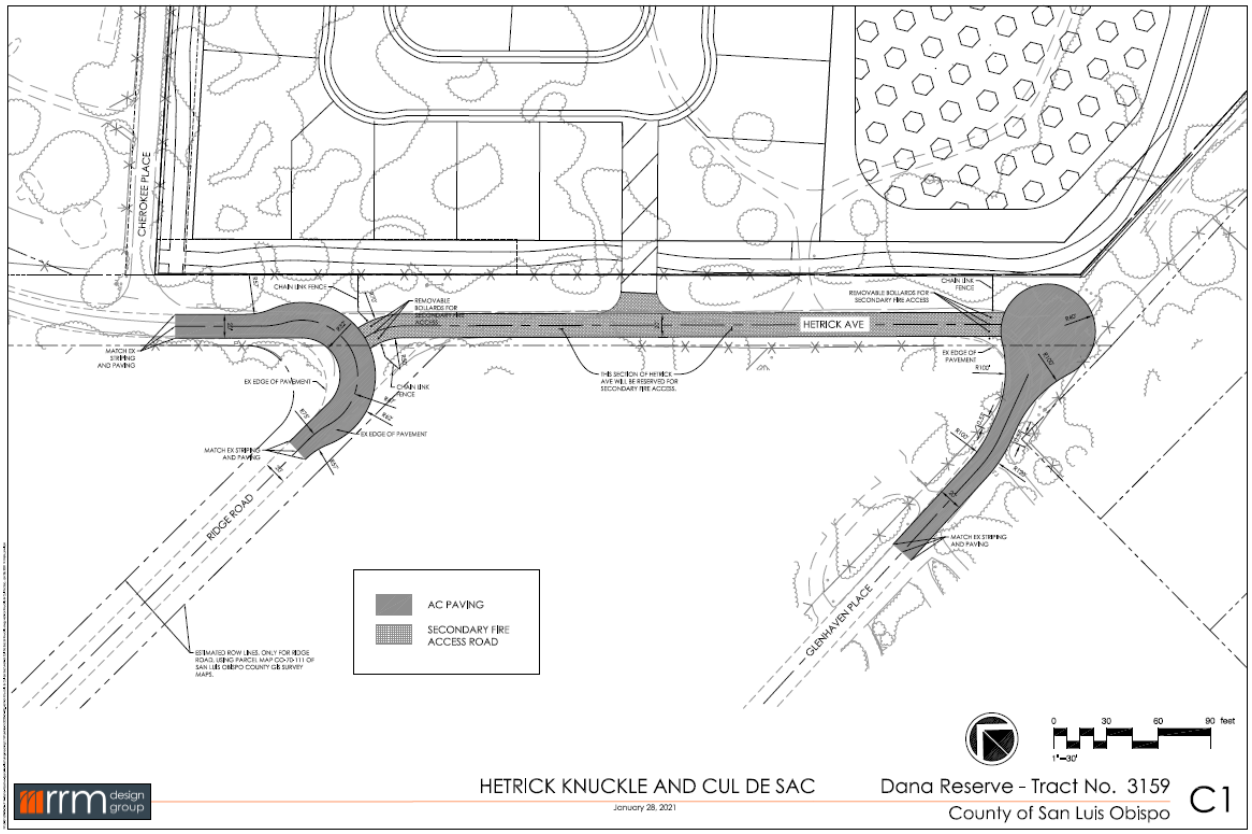
Two emergency access points are proposed. Emergency access points are proposed within Neighborhood 9, adjacent to Hetrick Road, and within Neighborhood 7, as a continuation of Cory Way. Gates or bollards will be installed that must meet the requirements of the County Fire Department. The access points provide additional routes into and out of the Dana Reserve during an emergency.

The emergency access points are designed to be constructed with adequate width to accommodate fire/safety vehicles and be gated per County Fire standards. The emergency access points will be designed to include pedestrian, bicycle, and equestrian access. This use of the emergency access road for these uses will ensure the community has awareness of the existence of these egress route. Bollards or some other type of impediment will prevent regular use of these two emergency access roads by vehicles. To open them will require the physical removal or opening. Signage should be included to ensure that the public is aware that during an emergency, these roads may be utilized for egress.


LEGEND
Local Road D
Residential Typical
Residential Alternative
Motorcourt
Emergency Access/Pedestrian and Bike Connection
Round-About Location
DR-FC
DR-FC
DR-FC
DR-VC
DR-VC
DR-VC
DR-REC
NBD 10
NBD 2
NBD 1
NBD 3
NBD 5
NBD 4
NBD 6
DR-REC
NBD 7
NBD 9
NBD 8
Willow Road

Hetrick Avenue

It is proposed that Hetrick Avenue be converted into an emergency access road to allow for emergency access and egress into Neighborhood 9. This emergency access point is intended to be used during non-emergencies as a pedestrian, bicycles, and equestrian path. Removable bollards are proposed to prevent vehicle traffic. The access road is designed to meet the minimum County Fire standards including the turnaround on Glenhaven Place to accommodate a fire engine and meet County Fire standards. No parking signs and red curbing will be needed within the turnaround if the radius is less than 48 feet and in front of the bollards. The turning radius into the access road into neighborhood 9 will need to be able to accommodate a fire engine.



HOA, CC&Rs Open Space Protection

While each neighborhood will have its own Declaration of Covenants, Conditions and Restrictions (CC&Rs) for its HOA. The entire development will be under a master HOA with its own CC&R. The master HOA will be responsible for the maintenance and protection of the open space areas including the 49.8 acres of native oak woodland, the retention basins and the common trails. This will require that the CC&Rs include language to ensure that these spaces are maintained in perpetuity. HOA open space management concerns include prevention and protection from fire, maintaining and enhancing native vegetation and biodiversity, providing security and liability coverage, trail access and maintenance, and securing maintenance funding and staff.

The CC&Rs should have language that is similar to:

1. Smoking, use of cooking equipment or any other ignition source is prohibited in the open space areas.
2. Safety precautions are required when using equipment capable of creating a spark, this includes spark arrestors.
3. All fireworks or other device that could cause an ignition of a fire are prohibited throughout the Dana Reserve.
4. Overnight camping is prohibited.
5. Motorized vehicles are not permitted in the open space areas. (except emergency vehicles, vehicles permitted by the HOA to conduct official business and single-rider motorized vehicles adapted for recreational use by people with disabilities).
6. Collecting, removing, destroying, or defacing any natural or humanmade objects within the open space is not permitted.
7. Discharging or carrying firearms, crossbows, fireworks, or projectile weapons of any kind is not permitted (except law enforcement officials) in the Dana Reserve.
8. Feeding, disturbing, trapping, hunting, or killing wildlife is not permitted (except under the direction of Department of Fish & Wildlife or like agency).
9. All dogs or other domestic animals shall be restrained by a leash, cord, rope or chain and under physical control of a person when in the open space areas. (except grazing and browsing animals such as, sheep and goats)
10. Trail use shall be limited to officially designated trails and roads only.
11. Open space areas are closed from sunset to sunrise unless permitted by the HOA.
12. Activities that unduly interfere with the health, safety, and welfare of the users or the neighbors in the open space area, or that create a nuisance or hazard to the use and safety or persons using or neighboring such areas are prohibited. Disorderly conduct (including amplified sound) shall be prohibited.
13. Swimming, diving, wading in any retention basin or other body of water is prohibited.
14. The HOA will maintain fire prevention signage in fire prone areas near or on trails.
15. The HOA will conduct vegetation management in the open spaces, retention basins, trails and near Highway 101 that prevent or reduce the ability for a wildfire to spread to other properties in proximity. Methods used will provide for the protection of the open space environment.
16. Fencing or barriers adjoining the open space areas, whether privately owned or by the HOA, will be constructed of a fire resistive material so that it will not convey or contribute to the spread of fire from or to the open space areas (exception may include an open type fence such as a split rail fence). Combustible fence material will not be used within 5 feet of structures.
17. Vegetation management will be consistent with Dana Reserve's County-approved oak woodland habitat management plan.
18. The HOA is authorized to enter into contracts and agreements for vegetation management in and near the open space areas that includes hand, mechanical, animal, prescribe fire, herbicide and other methods consistent with accepted vegetation management practices.
19. The HOA is authorized to increase assessment and fines necessary to protect and maintain the open space areas. This may include funds for the hiring of staff and contracts.
20. The HOA is authorized to enter into agreements with agencies, land conservancies and other organizations who also have a mutual concern for the protection of the open space areas.

Emergency Planning

There are a variety of threats that could cause a community to evacuate or shelter in place. These could include wildfire, hazardous material spill, gas leak, power outage, hazardous air quality, storms or an active shooter. The County has several methods that are used to alert the public to take action. This includes:

- Emergency Alerts System (EAS) – broadcast over radio and television
- Wireless Emergency Alert (WEA)- send a text alert to cell phones
- Reverse 911- a recorded message to landlines and cell phones that are signed up
- Social media – Twitter, Facebook, Nextdoor
- Route alerting – Sheriff and fire department driving through neighborhoods announcing action to take over loudspeaker
- Door to door notification – Sheriff going to each property to alert people

The HOAs of Dana Reserve annually in cooperation with the County should provide residents information on emergency preparedness including:

- Family emergency planning
- Emergency alerting
- Emergency supply kit
- Care for animals in an emergency

Evacuation & Temporary Refuge Areas

Emergency responders make a determination on how best to protect the residents and guests of a community. Their first strategic choice is to go offensively after the threat to prevent it from spreading and causing more harm. Sometimes that effort is not possible, and they take a defensive strategy and utilize the following actions:

- **Evacuation Order**
  Movement of community members out of a defined area due to an immediate threat to life and property from an emergency incident. An Evacuation Order should be used when there is potential or actual threat to civilian life within 1 to 2 hours or when the Incident Commander deems it necessary to protect civilians.
- **Evacuation Warning**
  Alerting of community members in a defined area of a potential threat to life and property from an emergency incident. An Evacuation Warning may be issued when the potential or actual threat to civilian life is more than 2 hours away.
- **Shelter in Place**
  Directing community members to stay secured inside their current location. Used if evacuation will cause higher potential of loss of life.
- **Temporary Refuge Area**
  A temporary location to hold evacuees until safe evacuation is possible.
- **Safe Points**
  Temporary area outside of affected area to stage evacuees until emergency is over or a shelter can be opened.

An evacuation takes time. It requires that first responders analyze the situation and determine the need for an evacuation. An evacuation alert is then issued electronically and by neighborhood route alerting. This all takes time. Public outreach before any emergency occurs is part of the County effort to encourage the public to leave early or shelter in place whenever there is a threat. The Dana Reserve HOA should commit to annual public outreach in coordination with the County.

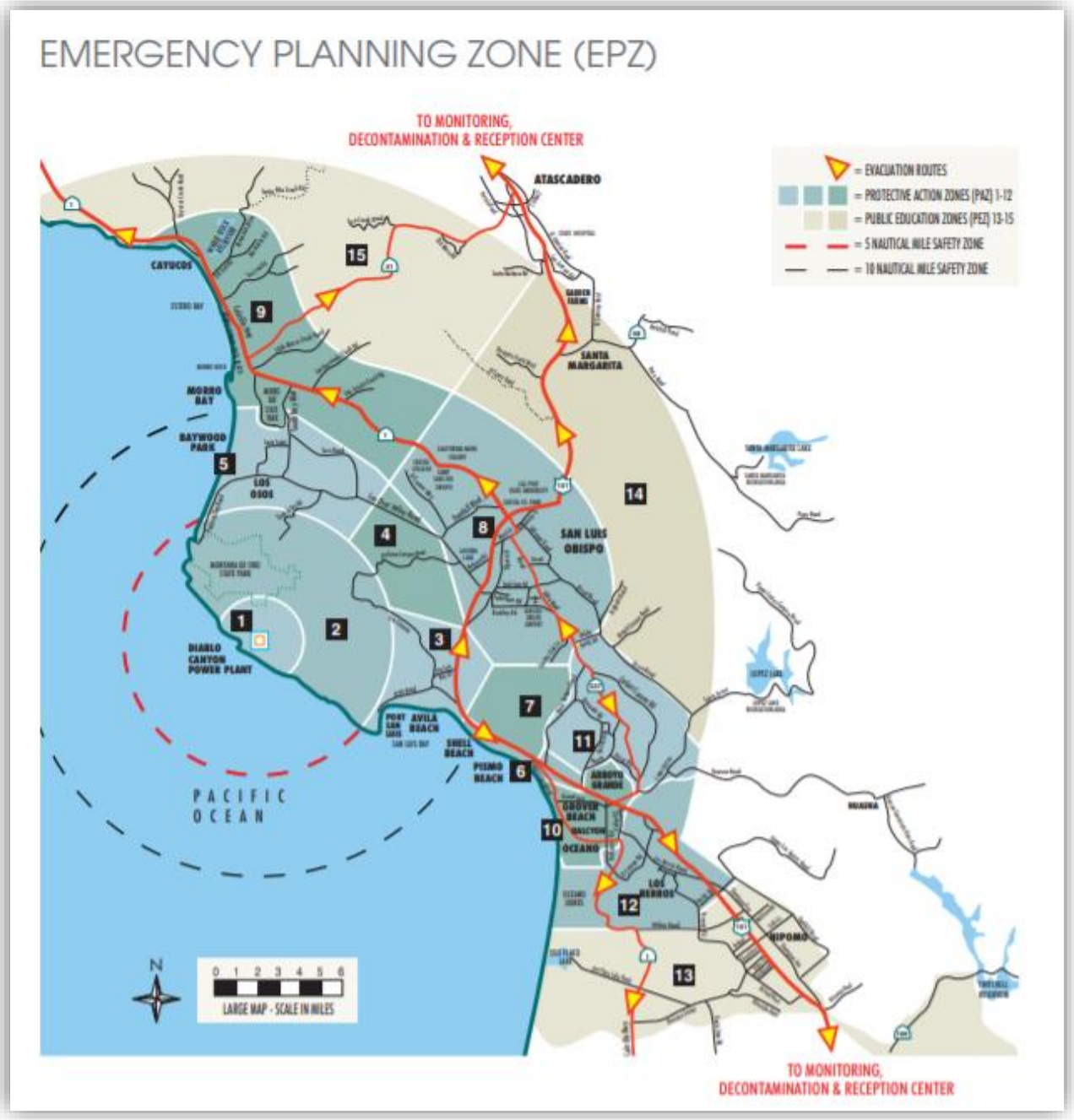
Working with the County Fire Department, emergency temporary refuge areas should be identified throughout the community and the public educated about their locations. These could include:

- Parking lot in commercial and multi-family residence areas
- Neighborhood parks
- Public Park
- Neighborhood pocket parks

Examples of possible Temporary Refuge Areas

Diablo Canyon Power Plant

The Dana Reserve is located outside the Diablo Canyon Power Plant (DCPP) 12 Public Action Zones (PAZ). It is located in the Public Education Zone 13 (PEZ). Therefore, the Nuclear Regulatory Commission has determined that residents in these areas, including the Dana Reserve, are not likely to be affected by an emergency at DCPP. However, since residents in the PEZ (zones 13 through 15) are near the PAZ, general information about Diablo Canyon Power Plant (DCPP) is also provided to them.



Conclusion

In general, the Dana Reserve project is designed with fire risk mitigation in mind. Fire resistant design and construction standards, open space management, community outreach and education, master HOA management practices, access and egress routes, fire defensible space, fire protection hydrants and sprinkler systems, and ignition prevention will all be necessary to provide a high level of protection for the community.

The County and the Dana Reserve are encouraged to enter into discussions on the best use of public facility fees. It may be advantageous for both parties to develop a fire station, a sheriff sub-station or both in-lieu of full fees.

Continuous and proper vegetation management of the open spaces will be essential to make sure the community is fire safe long into the future. To ensure this, the HOAs should include language in their CC&Rs that will ensure regular maintenance and projects that are both fire defensive and environmentally sound.

Design, construction and maintenance of the Dana Reserve project are required to comply with fire, building and public resource codes specifically for areas that have a wildland fire threat. These combined with best management practices will provide a high level of fire safety to the community.

Appendix A - Effects of Fuel Treatments on Sensitive Plant Species -Dana Reserve

(Species list from Althouse and Meade 2020)

Scientific Name	Common Name	Fed/ State	Global/ State	CA Rare Plant	Blooming	Habitat Preference	Potential to Occur	Grazing	Browsing	Mastication	Hand Crew	Chipping	Mowing	Pile Burning	Broadcast Burning
Detected On Site															
Arctostaphylos rudis	Sand Mesa Manzanitia	-/-		1B.2	Nov-Feb	Chaparral. Sandy soils. <380 m.	**Present**. Suitable sandy chaparral habitat is present in the Study Area and species was observed during surveys.	Little to no effect	Minor browsing expected	Partial/temporary with trimming. Excessively low trimming could eliminate, otherwise will resprout.	Partial/temporary trimming most likely.	None	No effect	Could scarify patches of soil	Manzanitas will resprout if burning is not excessively hot
Ceanothus cuneatus var. *fascicularis*	Lompoc Ceanothus	-/-	G5T4/ S4	4.2	Feb-Apr	Coastal chaparral. Sandy substrates. <275 m.	**Present**. Suitable habitat is present in the Study Area and species was observed during surveys.	Little to no effect	Minor browsing expected	Partial/temporary with trimming. Excessively low trimming could eliminate	Partial/temporary trimming most likely.	None	No effect	Could scarify patches of soil	Ceanothus will re-seed if burning is not excessively hot

Effects of Fuel Treatments on Sensitive Plant Species -Dana Reserve
(Species list and notes taken from Althouse and Meade 2020)

Scientific Name	Common Name	Fed/ State	Global/ State	CA Rare Plant	Blooming	Habitat Preference	Potential to Occur	Grazing	Browsing	Mastication	Hand Crew	Chipping	Mowing	Pile Burning	Broadcast Burning
Ceanothus impressus var. *nipomensis*	Nipomo Mesa Ceanothus	-/-	G3T2/S2	1B.2	Feb-Apr	Chaparral. Canyons, flats. Sandy substrates. <200 m.	**Present**. Suitable habitat is present in the Study Area and species was observed during surveys.	Little to no effect	Minor browsing expected	Partial/temporary with trimming. Excessively low trimming could eliminate	Partial/temporary trimming most likely.	None	No effect	Could scarify patches of soil	Ceanothus will re-seed if burning is not excessively hot
Clarkia speciosa ssp. *Immaculata*	Pismo Clarkia	FE/SR	G4T1/S1	1B.1	May-Jul	Woodland edges, chaparral, disturbed grassland. Openings in sandy soil. <100m	**Present**. Suitable habitat is present in the Study Area and species was observed during surveys.	Annual herb blooms May-July. Grazing in this period detrimental, otherwise insignificant unless overgrazed.	Less impact than grazers during blooming period May-Jul but some impact. Insignificant if outside of blooming	Mastication would not affect species except where tracks disturb soil.	Little to no effect but possible from trampling in blooming.	Could impact regen if chipping is too deep along edge habitats	Will remove plant if done Feburary-July. Otherwise, insignificant effect.	Excessive heat in soil under piles could kill seeds.	Little effect if done outside of blooming season, or it could promote Clarkia by removing grass competition. Burning during bloom would kill adult plants.

Effects of Fuel Treatments on Sensitive Plant Species -Dana Reserve
(Species list and notes taken from Althouse and Meade 2020)

Scientific Name	Common Name	Fed/ State	Global/ State	CA Rare Plant	Blooming	Habitat Preference	Potential to Occur	Grazing	Browsing	Mastication	Hand Crew	Chipping	Mowing	Pile Burning	Broadcast Burning
Horkelia cuneata var.*puberula*	Mesa Horkelia	-/-	G4T1/S1	1B.1	Feb-Jul	Coastal chaparral, woodland. Dry, sandy or gravelly sites. 70-870 m.	**Present**. Suitable habitat is present in the Study Area and species was observed during surveys.	Perennial herb. Palatability unknown. Occurs in denser habitat than preferred by cattle to graze. Could be trampling in bedding areas under oaks.	Palatability unknown. Can be minimized by limiting grazing period.	Mastication would not affect species except where tracks disturb soil.	Little to no effect but possible from trampling in blooming. Chipper could crush plants.	Could impact regen if chipping is too deep along edge habitats	Will remove plant if done May-June. Otherwise, insignificant effect. Set mower to 4 inches, this perennial hugs the ground.	Excessive heat in soil under piles could kill seeds.	Light burning would reduce plant cover but allow some resprouting. Less impact if burned outside of blooming period.
Mucronea californica	California Spineflower	-/-	G3/S3	4.2	Mar-Aug	Chaparral, woodland, coastal scrub, grassland. Sandy soil. <1000 m.	**Present**. Suitable habitat is present in the Study Area and species was observed during surveys.	Annual herb Mar-Jul. Not likely grazed but chance of trampling. Could avoid impacts by avoiding blooming period.	Not likely to be affected by browsers.	Not likely to occur in areas needing mastication as it prefers open areas	Not likely to impact. Some trampling/cutting if hand crews are cutting grass with whips. Impacts avoided by working outside of blooming.	Not likely unless chipper accessed work area over plants during blooming.	Possible impact of mowing if done in blooming period.	Only impacted if piles constructed in open areas over Mucronea. Avoid by flagging.	Not likely affected if burned outside of blooming.

Effects of Fuel Treatments on Sensitive Plant Species -Dana Reserve
(Species list and notes taken from Althouse and Meade 2020)

Scientific Name	Common Name	Fed/ State	Global/ State	CA Rare Plant	Blooming	Habitat Preference	Potential to Occur	Grazing	Browsing	Mastication	Hand Crew	Chipping	Mowing	Pile Burning	Broadcast Burning
Piperia michaelii	Michael's Rein-Orchid	-/-	G3/S3	4.2	April-Aug	Coastal scrub, woodland, chaparral. Generally on dry sites. <700 m.	**Present**. Suitable habitat is present in the Study Area and species was observed during surveys.	Perennial found along woodland edges. Susceptible to overgrazing. Consider fencing out livestock from known pops.	Less impact than grazers since browsers focus on woody material but still sensitive to trampling.	Machinery tracks or wheels could crush plants while accessing areas to masticate.	Minimal impact from hand crew but tracks from chipper could crush if working with crews.	Possible crushing by chipper, could affect growth if chips too deep.	Mowing during flower/seed production could kill plant or reduce seeding	Only impacted if piles constructed in open areas over orchid. Avoid by flagging.	Deleterious if done during blooming period, unknown effect outside of blooming, but not likely significant if plant is dried for the season.
Prunus fasciculata var. *punmctata*	Sand Almond	-/-	G5T4/S4	4.3	Mar-April	Coastal scrub, chaparral, woodland. Sandy flats. <200 m.	**Present**. Suitable habitat is present in the Study Area and species was observed during surveys.	Little to no effect	Palatability unknown. Can be minimized by limiting grazing period. Monitor if browsed.	Could be reduced in size or killed if masticated. Flag and avoid few plants in place.	Could be reduced in size or killed if chainsawed. Flag and avoid few plants in place.	No effect	No effect	No effect unless pile on or close to individuals	Unknown effect from burning

Effects of Fuel Treatments on Sensitive Plant Species -Dana Reserve
(Species list and notes taken from Althouse and Meade 2020)

Scientific Name	Common Name	Fed/ State	Global/ State	CA Rare Plant	Blooming	Habitat Preference	Potential to Occur	Grazing	Browsing	Mastication	Hand Crew	Chipping	Mowing	Pile Burning	Broadcast Burning
Agrostis hooveri	Hoover's Bent Grass	-/-	G2/S2	1B.2	Apr-Jul	Open chaparral, oak woodland. Dry sandy soils. <600 m.	High. Suitable habitat is present in the Study Area. CNDDB #8 (1988) located 3.8 miles west of Study Area.	Perennial. Heavy grazing could reduce vigor or allow annuals to outcompete. Monitor grazing effects if found.	Little to no effect	Track may affect plants but will not likely be done in this species' habitat	No effect	No effect unless species chipping covers known plants.	Could affect if done before seed set, but otherwise little effect.	No effect unless pile on or close to individuals	Low intensity burning not likely to affect unless done too often.
Calandrinia breweri	Brewer's Calandrinia	-/-	G4/S4	4.2	Mar-Jun	Chaparral, coastal scrub. Disturbed sites, burns. Sandy to loamy soil. <1200 m.	Moderate. Suitable habitat is present in the Study Area. CCH record (1948) located 9.5 miles to the northwest.	Annual, disturbance follower. Could be impacted by grazing during blooming period. Monitor if found.	Little or no effect but should be monitored if found.	Only impact from soil disturbance from machinery.	No effect	No effect unless species chipping covers known plants.	May affect through cutting. Flag and avoid if found.	No effect unless pile on or close to individuals	If burned outside of blooming period it may respond positively.

Effects of Fuel Treatments on Sensitive Plant Species -Dana Reserve
(Species list and notes taken from Althouse and Meade 2020)

Scientific Name	Common Name	Fed/ State	Global/ State	CA Rare Plant	Blooming	Habitat Preference	Potential to Occur	Grazing	Browsing	Mastication	Hand Crew	Chipping	Mowing	Pile Burning	Broadcast Burning
Chorizanthe rectispina	Straight-Awned Spineflower	-/-	G2/S2	1B.3	Apr-Jul	Chaparral, cismontane woodland, coastal scrub. In disintegrating shale, often on granite. 200-600 m.	Low. Marginal suitable habitat is present in the Study Area. CNDDB #20 (2003) located 7.3 miles to the northwest.	Annual. Buckwheat family-not likely grazed but may be trampled.	Little or no effect but should be monitored if found.	Only impact from soil disturbance from machinery.	No effect	No effect unless species chipping covers known plants.	Low enough growing to not likely be impacted	No effect unless pile on or close to individuals	If burned outside of blooming period it may respond positively.
Deinandra paniculata	Paniculate Tarplant	-/-	G4/S4	4.2	Mar-Dec	Grassland, open chaparral and woodland. Disturbed areas, often in sandy soils in mesic sites. <1320 m.	Low. Marginal suitable habitat is present in the Study Area and CCH record (RSA699628 ; 1935) is located ~5 miles to the west.	Annual, not likely grazed.	Little or no effect but should be monitored if found.	Only impact from soil disturbance from machinery.	No effect	Only impact from soil disturbance from machinery.	Could be cut if found. Flag and avoid	No effect unless pile on or close to individuals	If burned outside of blooming period it may respond positively.

Effects of Fuel Treatments on Sensitive Plant Species -Dana Reserve
(Species list and notes taken from Althouse and Meade 2020)

Scientific Name	Common Name	Fed/ State	Global/ State	CA Rare Plant	Blooming	Habitat Preference	Potential to Occur	Grazing	Browsing	Mastication	Hand Crew	Chipping	Mowing	Pile Burning	Broadcast Burning
Delphinium parryi ssp. *blochmaniae*	Dune Larkspur	-/-	G4T2/S2	1B.2	April-Jun	Coastal chaparral and dunes. Sandy soils. <200 m.	High. Suitable habitat is present in the Study Area. CNDDB #23 (1936) located 1.5 miles to the east. Multiple CNDDB occurrences within near vicinity.	Perennial, not likely grazed.	Little or no effect but should be monitored if found.	Little or no effect but should be monitored if found.	No effect	Only impact from soil disturbance from machinery.	Could be cut if found. Flag and avoid	No effect unless pile on or close to individuals	Can survive fire during non-blooming period but uncertain. Flag and avoid if found.
Erysimum suffrutescens	Suffrutescent Wallflower	-/-	G3/S3	4.2	Jan-/Aug	Stabilized coastal sand dunes, coastal scrub. Coastal dunes and bluffs. <150 m.	Low. Study Area is inland of species known range and marginal suitable habitat present in the Study Area. CCH Record (UCSB041306; 1988) located >5 miles to west.	Perennial, not likely grazed.	Little or no effect but should be monitored if found.	Little or no effect but should be monitored if found.	No effect	Only impact from soil disturbance from machinery.	Could be cut if found. Flag and avoid	No effect unless pile on or close to individuals	Can survive fire during non-blooming period but uncertain. Flag and avoid if found.

Effects of Fuel Treatments on Sensitive Plant Species -Dana Reserve
(Species list and notes taken from Althouse and Meade 2020)

Scientific Name	Common Name	Fed/ State	Global/ State	CA Rare Plant	Blooming	Habitat Preference	Potential to Occur	Grazing	Browsing	Mastication	Hand Crew	Chipping	Mowing	Pile Burning	Broadcast Burning
Horkelia cuneata var. *sericea*	Kellog's Horkelia	-/-	G4T1?/S1?	1B.1	Apr-Sep	Coastal scrub and dunes, coniferous forest, chaparral. Old dunes, coastal sandhills, openings in sand. <200 m.	High. Suitable habitat is present in the Study Area. CNDDB #4 (1969) located 1.8 miles to the west.	Perennial herb. Palatability unknown. Occurs in denser habitat than preferred by cattle to graze. Could be trampling in bedding areas under oaks.	Palatability unknown. Can be minimized by limiting grazing period.	Mastication would not affect species except where tracks disturb soil.	Little to no effect but possible from trampling in blooming. Chipper could crush plants.	Could impact regen if chipping is too deep along edge habitats	Will remove plant if done May-June. Otherwise, insignificant effect.	Excessive heat in soil under piles could kill seeds.	Light burning would reduce plant cover but allow some resprouting. Less impact if burned outside of blooming period.
Monardella sinuata ssp. *sinuata*	Southern Curly-Leaved Monardella	-/-	G3T2/S2	1B.2	Apr-Sep	Chaparral, woodland, coastal sage scrub and dunes. Sandy soils, coastal strand, dune. <300 m	High. Suitable sandy chaparral and woodland habitats are present in the Study Area. CNDDB #28 (1948) located 2.7 miles to west.	Annual herb in the mint family; probably not grazed. Could be trampled if found. No effect if done after blooming over in July.	Unknown palatability to browsers. No effect if done after blooming in July	Mastication would not affect species except where tracks disturb soil.	Little to no effect but possible from trampling in blooming. Chipper could crush plants.	Could impact regen if chipping is too deep along edge habitats	Will remove plant if done May-June. Otherwise, insignificant effect.	Excessive heat in soil under piles could kill seeds.	Light burning would reduce plant cover but promote seed germination. Less impact if burned outside of blooming period.

Effects of Fuel Treatments on Sensitive Plant Species -Dana Reserve
(Species list and notes taken from Althouse and Meade 2020)

Scientific Name	Common Name	Fed/ State	Global/ State	CA Rare Plant	Blooming	Habitat Preference	Potential to Occur	Grazing	Browsing	Mastication	Hand Crew	Chipping	Mowing	Pile Burning	Broadcast Burning
Monardella undulata ssp. *undulata*	San Luis Obispo Monardella	-/-	G2/S2	1B.2	May-Sep	Coastal scrub, stabilized dunes. Stabilized sandy soils. <200 m.	High. Suitable habitat (stabilized sandy soil) is present in the Study Area. A portion of CNDDB #37 (1979) occurs within the Study Area to the south. Additional CCH records in the near vicinity.	Annual herb in the mint family; probably not grazed. Could be trampled if found. No effect if done after blooming over in July.	Unknown palatability to browsers. No effect if done after blooming in July	Mastication would not affect species except where tracks disturb soil.	Little to no effect but possible from trampling in blooming. Chipper could crush plants.	Could impact regen if chipping is too deep along edge habitats	Will remove plant if done May-June. Otherwise, insignificant effect.	Excessive heat in soil under piles could kill seeds.	Light burning would reduce plant cover but promote seed germination. Less impact if burned outside of blooming period.
Scrophularia atrata	Black-flowered Figwort	-/-	G2?/S2?	1B.2	Mar-Jul	Coniferous forest, chaparral, coastal scrub, riparian scrub. Sand, calcium-diatom-rich soils, around swales. <400 m.	High. Suitable sandy coastal habitats are present in the Study Area. CNDDB #63 (2005) located 2.75 miles to northwest.	Perennial, not likely grazed. Possible trampling if too much stock.	Not likely grazed but should be monitored if found.	Could be cut or crushed by machinery. Flag and avoid if found.	Likely no effect.	Could impact regen if chipping is too deep along edge habitats	Could cut plant - flag and avoid if found.	Excessive heat in soil under piles could kill seeds. Avoid burning in habitat.	Response to burning unknown but seeds would likely sprout after.

Appendix B - Effects of Fuel Treatments on Sensitive Animal Species -Dana Reserve

(Species list from Althouse and Meade 2020)

Scientific Name	Common Name	Fed/ State	Global/ State	CDFW	Habitat Preference	Potential to Occur	Grazing	Browsing	Mastication	Hand Crew	Mowing	Pile Burning	Broadcast Burning
Accipiter cooperii	Cooper's Hawk	-/-	G5/S4	WL (nesting)	Oak woodland, riparian, open fields, Nests in dense trees, especially coast live oak.	Present. This species was observed during 2020 surveys foraging in the Coast live oak woodland habitat.	Little effect. May reduce bird prey base that uses annual grass.	Little effect. May reduce bird prey base that uses shrubs.	Avoid during the nesting season - Feb-August, or conduct nest survey	No effect	May reduce prey base of bird prey nesting in grasses.	Do not burn during nesting period or conduct nest surveys near piles beforehand.	Avoid during breeding season or conduct nest surveys
Antrozous pallidus	Pallid Bat	-/-	G5/S3	SSC	Rock crevices, caves, tree hollows, mines, old buildings, and bridges.	Present. Limited roosting habitat (no structures and few tree cavities) in the Study Area. Vocalizations detected during 2020 acoustic surveys	Little or no effect but may provide water through more troughs.	Little effect. May reduce bird prey base that uses shrubs. May provide water through more troughs.	Little to no effect	No effect	Little or no effect	Little or no effect	Could temporarily displace bat species by reducing prey base in burned area until next green-up.
Baeolophus inornatus	Oak titmouse	-/-	G4/S4	USFWS BCC: WL (nesting)	Nests in cavities in oak woodland habitat. Non-migratory.	Present. Numerous oak titmice were observed during 2017, 2018, 2019, and 2020 surveys.	No effect	No effect	No effect	No effect	No effect	No effect unless directly under nesting area. Conduct nest surveys prior if breeding season.	Little effect unless done during breeding season. Conduct nest survey prior if breeding season.

Effects of Fuel Treatments on Sensitive Animal Species -Dana Reserve
(Species list and notes taken from Althouse and Meade 2020)

Scientific Name	Common Name	Fed/ State	Global/ State	CDFW	Habitat Preference	Potential to Occur	Grazing	Browsing	Mastication	Hand Crew	Mowing	Pile Burning	Broadcast Burning
Lasiurus nocrivagans	Silver-haired Bat	-/-	G3G4/S3S4	SSC	Coastal and montane forests, often feeds over water. Roosts in hollow trees, loose bark, woodpecker cavities, rarely in rocks.	Present. Suitable roosting and foraging habitat are available in the Study Area. Vocalizations detected during 2020 acoustic surveys	Little or no effect but may provide water through more troughs.	Little effect. May reduce bird prey base that uses shrubs. May provide water through more troughs.	Little to no effect	No affect	Little or no effect	Little or no effect	Could temporarily displace bat species by reducing prey base in burned area until next green-up.
Lasiurus cinerius	Hoary Bat	-/-	G5/S5	SA	Forages in open habitats or habitat mosaics with trees. Roosts in dense foliage of medium to large trees. Feeds on moths. Requires water.	Present. Suitable habitat is available in the Study Area. Vocalizations detected during 2020 acoustic surveys	Little or no effect but may provide water through more troughs.	Little effect. May reduce bird prey base that uses shrubs. May provide water through more troughs.	Little to no effect	No effect	Little or no effect	Little or no effect	Could temporarily displace bat species by reducing prey base in burned area until next green-up.
Myotis yumanensis	Yuma myotis	-/-	G5/S5	SSC	Caves, mines, buildings, tree cavities, rock crevices, or under bridges. Feeds near open water	**Present**. SPresent. Suitable habitat is available in the Study Area. Vocalizations detected during 2020	Little or no effect but may provide water through more troughs.	Little effect. May reduce bird prey base that uses shrubs. May provide water through more troughs.	Little to no effect	No effect	Little or no effect	Little or no effect	Could temporarily displace bat species by reducing prey base in burned area until next green-up.

Effects of Fuel Treatments on Sensitive Animal Species -Dana Reserve
(Species list and notes taken from Althouse and Meade 2020)

Scientific Name	Common Name	Fed/ State	Global/ State	CDFW	Habitat Preference	Potential to Occur	Grazing	Browsing	Mastication	Hand Crew	Mowing	Pile Burning	Broadcast Burning
						acoustic surveys.							
Phrynosoma blainvillii	Blainville's (Coast) Horned Lizard	-/-	G3G4/S3S4	SSC	Frequents a wide variety of habitats, most common in lowlands along sandy washes with scattered low bushes.	Present. Two observations; suitable habitat is available in the Study Area.	Possible but not significant effect of trampling. Some grazing may open habitat for lizard movement and prey.	Could be loss of cover in brush habitat if overgrazed, otherwise little effect.	May affect horned lizard through loss of cover and crushing. Survey and remove individuals prior.	No effect	May affect if done too short, but otherwise low chance of trampling.	Little effect. May displace individuals in piles	Could temporarily displace but horned lizards could hide in a burrow away from direct effects.
Picoides nuttallii	Nutall's Woodpecker	-/-	G4G5/USFWS BCC		Oak, riparian woodlands	Present. Nuttall's woodpecker is a year-round resident of oak woodland habitat onsite and was observed during 2017, 2018, 2019, and 2020 surveys.	No effect	No effect.	No effect	No effect	No effect	No effect.	Could affect nesting if done in breeding season or if snags used as granaries burned. Survey and avoid.
Taxidea taxus	American Badger	-/-	G5/S3	SSC	Needs friable soils in open ground with abundant food source such as	Present. Several dens observed: suitable grassland habitat and	Little effect. Some grazing may promote small mammal activity and	No effect.	May affect badger through loss of cover and crushing of dens. Flag	No effect	May affect - avoid den sites.	No effect.	Temporary - may displace some prey species dependent on

Effects of Fuel Treatments on Sensitive Animal Species -Dana Reserve
(Species list and notes taken from Althouse and Meade 2020)

Scientific Name	Common Name	Fed/ State	Global/ State	CDFW	Habitat Preference	Potential to Occur	Grazing	Browsing	Mastication	Hand Crew	Mowing	Pile Burning	Broadcast Burning
					California ground squirrels.	ground squirrels in the Study Area.	keep area open for badgers		den sites prior				annual grass seed.
Accipiter striatus	Sharp-Shinned Hawk	-/-	G5/S4	WL	Riparian, coniferous, and deciduous woodlands near water.	**Moderate**. Suitable prey (passerines) is available in the Study Area.	Little effect. May reduce bird prey base that uses annual grass.	Little effect. May reduce bird prey base that uses shrubs.	Avoid during the nesting season - Feb-August, or conduct nest survey	No effect	May reduce prey base of bird prey nesting in grasses.	Do not burn during nesting period or conduct nest surveys near piles beforehand.	Avoid during breeding season or conduct nest surveys
Anniella pulchra	Northern California Legless Lizard	-/-	G3/S3	SSC	Sandy or loose loamy soils under coastal scrub or oak trees. Soil moisture essential.	**High.** Suitable habitat is available in the Study Area.	May affect through trampling.	May affect through trampling	Mechanical disturbance could crush individuals.	Monitor effect from some walking on foot.	Cutting usually high enough to avoid direct impact. Some disturbance from walking.	May affect some individuals around piles.	Direct effects mostly avoided by finding burrows, but temporary ground cover/duff habitat loss.
Athene cunicularia	Burrowing Owl	-/-	G4/S3	SSC	Burrows in squirrel burrow complexes in open habitats with low vegetation.	**Low.** Suitable habitat (grazed grassland and squirrel burrows) available in the Study Area.	May promote more open vegetation	Has some impact on lowering grass veg but not much.	No effect	No effect	May promote open habitat but should be avoided during nesting. Survey prior to work.	No effect	No effect if grasslands avoided.

Effects of Fuel Treatments on Sensitive Animal Species -Dana Reserve
(Species list and notes taken from Althouse and Meade 2020)

Scientific Name	Common Name	Fed/ State	Global/ State	CDFW	Habitat Preference	Potential to Occur	Grazing	Browsing	Mastication	Hand Crew	Mowing	Pile Burning	Broadcast Burning
Bombus calignosus	Obscure Bumble Bee	-/-	G4?/S1S2	SA	Open coastal grasslands and meadows. Food plant genera include Baccharis, Cirsium, Lupinus, Lotus, Grindelia and Phacelia.	**Low.** Habitat and nectar sources potentially suitable. Sensitive invertebrate surveys provided negative results for this species.	Minor effect on food species.	Browsers may reduce some of the food plant species but impact can be mitigated by controlling browsing pressure	May reduce some of the food plant species.	May reduce some food plant species but could be mitigated easier through individual plant avoidance than mastication.	May reduce some food plant species.	No effect	Could temporarily affect food species during one growing season. May displace bumble bees but Less impact if done in the fall after burrowing.
Bombus occidentalis	Western Bumble Bee	-/CCE	G2G3/S1	SA	Wide variety of natural, agricultural, urban, and rural habitats. Flower-rich meadows of forests and subalpine zones.	**Low.** Suitable habitat is available in the Study Area. Closest known historical occurrence is located 14 miles northwest (CNDDB #279). Focused sensitive invertebrate surveys provided negative results for this species.	Minor effect on food species.	Browsers may reduce some of the food plant species but impact can be mitigated by controlling browsing pressure	May reduce some of the food plant species.	May reduce some food plant species but could be mitigated easier through individual plant avoidance than mastication.	May reduce some food plant species.	No effect	Could temporarily affect food species during one growing season. May displace bumble bees but Less impact if done in the fall after burrowing.

Effects of Fuel Treatments on Sensitive Animal Species -Dana Reserve
(Species list and notes taken from Althouse and Meade 2020)

Scientific Name	Common Name	Fed/ State	Global/ State	CDFW	Habitat Preference	Potential to Occur	Grazing	Browsing	Mastication	Hand Crew	Mowing	Pile Burning	Broadcast Burning
Danaus plexippus pop. 1	Western Bumble Bee	-/-	G4T2T3/S2S3	SA	Roosts located in wind-protected tree groves (eucalyptus, Monterey pine, cypress), with nectar and water sources nearby.	**Low.** Suitable habitat is not available in the Study Area, eucalyptus adjacent to property may be suitable.	No effect	No effect	No effect	Possible if monarchs wintered in open space. Avoid work in overwintering areas if found.	Possible if native milkweed found in mowed areas. Avoid cutting milkweed.	Avoid burning over existing milkweed. Otherwise, no effect	Temporary impact through loss milkweed and pupae, but long-term effects may include increased milkweed.
Elanus leucurus	White-tailed Kite	-/-	G5/S3S4	FP	Nests in dense tree canopy near open foraging areas	**Low.** Suitable nesting and foraging habitat are available in the Study Area.	Little effect. May reduce bird prey base that uses annual grass.	Little effect. May reduce bird prey base that uses shrubs.	Avoid during the nesting season - Feb-August, or conduct nest survey	No effect	May reduce prey base of bird prey nesting in grasses.	Do not burn during nesting period or conduct nest surveys near piles beforehand.	Avoid during breeding season or conduct nest survyes
Lasiurus blossevillii	Western Red Bat	-/-	G5/S3	SSC	Roosts primarily in trees, from sea level up through mixed conifer forests.	**High**. Suitable habitat is available in the Study Area. Not detected during 2020 acoustic surveys.	Little or no effect, but may provide water through more troughs.	Little effect. May reduce bird prey base that uses shrubs. May provide water through more troughs.	Little to no effect	No effect	Little or no effect	Little or no effect	Could temporarily displace bat species by reducing prey base in burned area until next green-up.

Effects of Fuel Treatments on Sensitive Animal Species -Dana Reserve
(Species list and notes taken from Althouse and Meade 2020)

Scientific Name	Common Name	Fed/ State	Global/ State	CDFW	Habitat Preference	Potential to Occur	Grazing	Browsing	Mastication	Hand Crew	Mowing	Pile Burning	Broadcast Burning
Spinus lawrencei	Lawrence's Goldfinch (nesting)	-/-	G3G4/S3S4	SA, BBC	Arid and open woodlands within near vicinity of chaparral or other brushy areas; tall annual weed fields; and a water source such as a stream, small lake, or farm pond. Live oaks (Quercus spp.) and blue oaks (Q. douglasii) are predominant trees where this species nests	High. Suitable habitat (stabilized sandy soil) is present in the Study Area. A portion of CNDDB #37 (1979) occurs within the Study Area to the south. Additional CCH records in the near vicinity.	Could potentially reduce some seed sources.	No effect	May affect feeding areas by reducing cover/feeding areas	May affect feeding areas by reducing cover/feeding areas	Could potentially reduce some seed sources.	No effect	Could affect nesting. Temporary reduction in food sources.