APPENDICES

APPENDIX 1.0-1 NOTICE OF PREPARATION

Notice of Preparation

Midpeninsula Regional Open Space District

Wildland Fire Resiliency Program

San Mateo, Santa Clara, and Santa Cruz Counties, California

Date:	April 27, 2020
To:	Agencies and Interested Parties
From:	Midpeninsula Regional Open Space District
Subject:	Notice of Preparation of a Draft Program Environmental Impact Report for the Proposed Wildland Fire Resiliency Program
Review Period:	April 27, 2020 to May 28, 2020

Introduction

The Midpeninsula Regional Open Space District (Midpen) is initiating the process of preparing a Program Environmental Impact Report (EIR) for the Wildland Fire Resiliency Program (Program) to satisfy the requirements of the California Environmental Quality Act (CEQA) (Public Resources Code Section 21000 et seq.). Midpen will serve as the lead agency for CEQA compliance.

In accordance with the State CEQA Guidelines (Title 14 California Code of Regulations [CCR] Section 15082), Midpen has prepared this Notice of Preparation (NOP) to inform agencies and interested parties that a Program EIR will be prepared for the above-referenced project. The purpose of a NOP is to provide sufficient information about a project and its potential environmental impacts to allow agencies and interested parties the opportunity to provide a meaningful response related to the scope and content of the EIR, including mitigation measures that should be considered and alternatives that should be addressed (14 CCR Section 15082[b]). Midpen is currently gathering public input regarding the scope of the Program EIR.

Midpen will hold a public scoping meeting on May 13, 2020. Invitations to the scoping meeting will be sent to all recipients of this NOP. Midpen appreciates scoping input from public agencies and individuals in response to this NOP and to the scoping meeting. The Program information, as well as Midpen contact information, are provided below.

Program Information

Title

Wildland Fire Resiliency Program

Lead Agency and Address

Midpeninsula Regional Open Space District
330 Distel Circle
Los Altos, CA 94022
(650)-691-1200

Contact

Coty Sifuentes-Winter, Senior Resource Management Specialist
csifuentes@openspace.org

Location

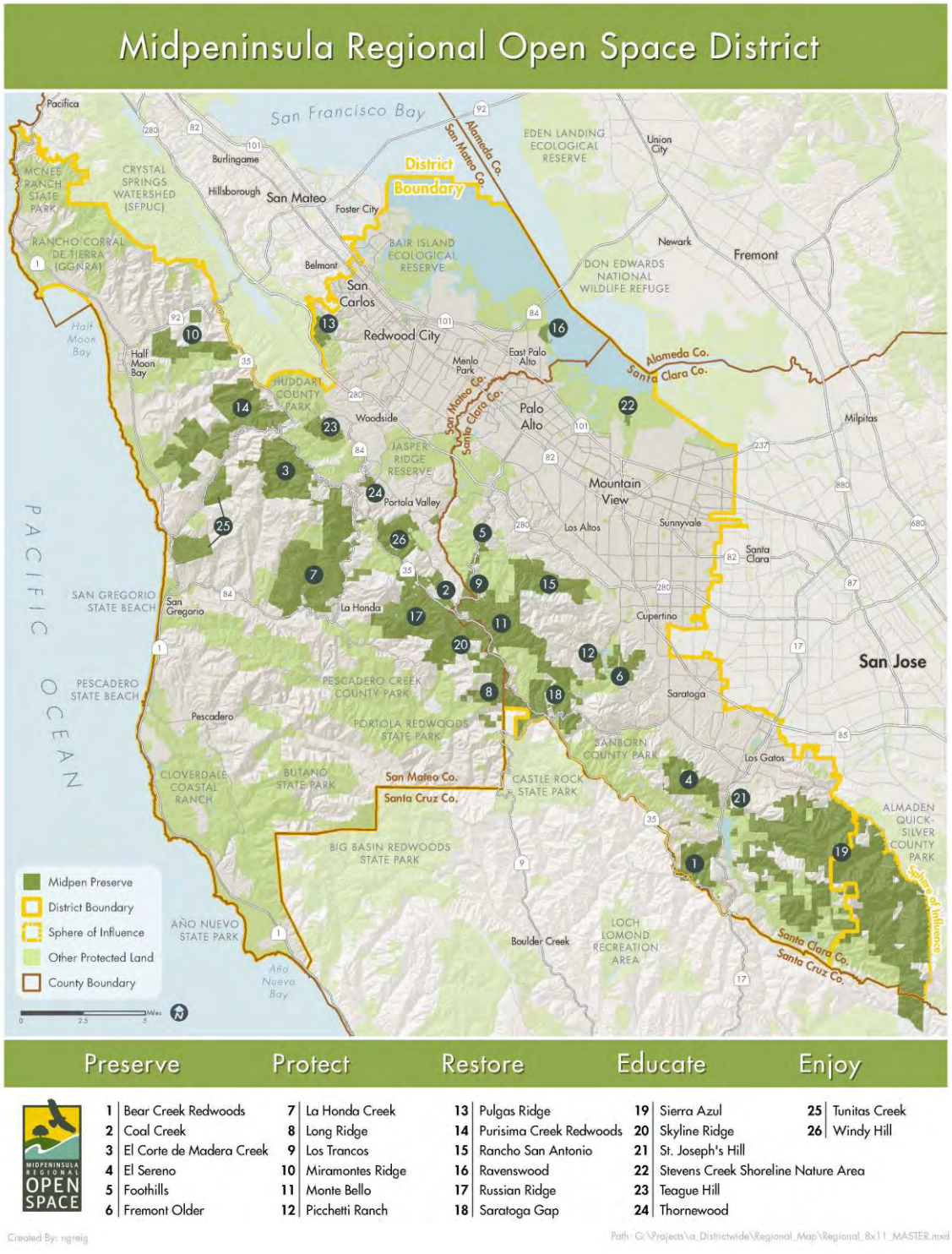
The actions under the Program would be applied on all Midpen's open space preserves (OSP) and other areas under Midpen management (collectively referred to as "Midpen lands"). Midpen is located along the western edge of the North American continent on a geologically active peninsula between the Pacific Ocean and San Francisco Bay, which limits migration of plants and animals. This unique location is contained within the Santa Cruz Mountain region. The region's Mediterranean climate is comprised of mild wet winters and long, hot, and dry summers cooled by cyclical coastal fog. Midpen's boundary extends along the San Francisco Bay from San Carlos to Los Gatos and along the Pacific coast from south of Pacifica to the Santa Cruz County line. Midpen lands permanently protect wildlife habitat, natural resources, watersheds, and a variety of ecosystems, as shown in Figure 1.

Program Setting

Midpen Lands and Recreational Resources

Midpen's purpose is to create a regional greenbelt of public open space lands to permanently protect natural resources and to provide for public use and enjoyment. In addition, through the Coastal Protection Area Service Plan, Midpen is committed to protecting coastal watershed and agricultural lands and preserving the rural character of the region. Midpen has preserved nearly 65,000 acres of open space lands, of which Midpen manages nearly 59,000 acres across 26 OSPs and through management agreements (e.g., Rancho San Antonio County Park). The remaining acreage that was preserved through Midpen action is managed by other entities. Each OSP ranges from 55 to over 18,000 acres. Of the total 26 OSPs, 24 are open to the public, 365 days a year from sunrise to one-half hour after sunset. The preserves are primarily visited for recreational and educational uses. Some preserves are leased for conservation grazing. There are a variety of rural residential and agricultural structures dispersed within preserves. Within the OSPs, there are over 240 miles of trails for hiking, mountain biking, nature study, and dog walking, as well as historical and cultural artifacts, horse stables and barns, a backpack campsite, scenic viewpoints, and picnic tables and benches. District visitor use regulations prohibit activities that can spark fires including possession of firearms, smoking, open campfires, and off-road vehicle use.

FIGURE 1 MIDPENINSULA REGIONAL OPEN SPACE DISTRICT OSPS AND OTHER MANAGED LANDS



Natural Resources

Located within the California Floristic Province (one of 25 internationally recognized biological hotspots), Midpen lands are rich with natural resources. Habitats found within OSPs include forested lands, grasslands, shrublands, and woodlands. Midpen lands include redwood, oak, and fir forests, chaparral-covered hillsides, riparian corridors, grasslands, and wetlands along the San Francisco Bay. Biological resources of special significance or importance, including species and habitats currently known to occur and those currently listed as sensitive or special-status by resource agencies, are found throughout Midpen lands.

Nearby Communities

Midpen's jurisdictional boundary encompasses 17 cities (Atherton, Cupertino, East Palo Alto, Half Moon Bay, Los Altos, Los Altos Hills, Los Gatos, Menlo Park, Monte Sereno, Mountain View, Palo Alto, Portola Valley, Redwood City, San Carlos, Saratoga, Sunnyvale, and Woodside) and unincorporated areas in San Mateo, Santa Clara, and northern Santa Cruz counties with a combined population of over 700,000 residents. Although use within the OSPs is primarily ecologically sensitive outdoor recreation, many of the OSPs abut low-density residential development in addition to open space owned and maintained by various agencies.

According to CALFIRE, almost 95 percent of fires in California are started by people. Many nearby communities lie within the wildland-urban interface (WUI); the area where structures meet or intermingle with undeveloped wildland vegetation. The WUI is thus an area of high human-environment interactions, and a potential source of fire ignition where fires can spread into wildland areas and impact homes located in the WUI. The majority of the WUI along the OSPs has a California Department of Forestry and Fire Protection (CAL FIRE) Fire Hazard Severity Zone rating of "High" or "Very High". The Program includes priority areas identified by Community Wildfire Protection Plans for fuel reduction at multiple OSPs.

Fire management enhancements on Midpen lands reduce the potential for catastrophic wildfires, as well as:

- Protect sensitive natural resources and habitat from long-lasting damage and loss;
- Benefit the local communities in the WUI by providing fuelbreaks and aiding fire suppression activities for emergency response to wildland fires; and
- Protect residents living further away and downwind who may be significantly affected by smoke and impacts to air quality within the larger Bay Area region.

Current Midpen Fuels Management Practices

Midpen undertakes several actions and activities on their lands to prepare for fire season. The actions related to fuel maintenance and reduction and fire management include:

- Maintaining existing fuelbreaks in OSPs;
- Defensible space clearing around 117 Midpen-owned structures;
- Maintaining hundreds of miles of fire roads; and
- Managing over 8,500 acres of grasslands through conservation grazing, which reduces fuel loads.

Description of Proposed Program

Purpose and Goals

Changing climatic conditions, past land uses, and years of fire suppression have increased fuel loads and fire-prone conditions that could contribute to larger and more intense wildland fires. Midpen seeks to protect the natural resources on its land and to make policy decisions that support local and state fire agencies to aid in the suppression of wildfire. The Program encompasses vegetation management, as well as planning, response, and monitoring. Vegetation management helps to restore ecosystems closer to pre-fire suppression conditions through the removal of dead and accumulated vegetation, and treatment of forest disease and invasive species. Prior to the mid- to late-20th century, landscapes in the San Francisco Bay Area were subject to periodic natural fire and Native American practices of prescribed burning that kept fuel loads down. Before European contact, the spread of invasive species that alter ecosystems and increase fire risks was a lower concern. Today, in the absence of decades of natural and prescribed fires, live and dead fuels have accumulated creating higher surface fuel loads, vegetation density, and varied species composition from what was seen prior to European contact. The Program would guide Midpen activities and be periodically updated, as needed, to adapt to changing conditions and improved knowledge. The primary objectives of the Program include the following:

1. Manage vegetation to establish healthy, resilient, fire-adapted ecosystems, furthering Midpen's mission to protect and restore the diversity and integrity of the ecological processes on Midpen lands and facilitating healthy post-fire recovery.
2. Integrate Native American cultural practices of vegetation management, particularly as they relate to prescribed fire, that promote ecological resiliency and enhance biodiversity.
3. Manage vegetation and infrastructure on Midpen lands to reduce wildland fire risks, improve wildland fire fighting capabilities and coordination, and improve overall safety to reduce the harmful effects of wildland fire on natural resources, people, and property.
4. Provide an adaptive framework for periodic review and adjustments of the Program based on a changing climate, improved knowledge, and improved technology over time. This framework will also recognize that annual implementation of the Program will need to be balanced with other competing Midpen priorities, capacity, and funding to determine the location, scale, timing, and scope of future vegetation management activities as part of annual workplans and approved fiscal year budgets.

Program Considerations

It is important to note that the Program EIR would be a programmatic document that is intended to help guide Midpen's vegetation and fuel management activities. As such, the Program provides a framework to guide decisions on the types, locations, and timing of vegetation and fuel management activities. The scope, scale, and level of focus that Midpen would be able to place on vegetation and fuel management activities would vary each year and would be dependent on other competing Midpen project and Program priorities, staffing capacity, and funding availability. Also, given the ongoing growth of Midpen land holdings, changing climate conditions that may affect fire risk levels across the landscape, and other factors, Midpen may shift their vegetation and fuel management priorities as needed in response to new or changed priority sites. Annual vegetation and fuel management projects and Program budgets would be reviewed in the context of

the larger agency-wide work plan with discretionary approval held by the Midpen Board of Directors as part of the annual budget and action plan development process.

Program Components

Program Overview

The Program would guide a comprehensive approach to vegetation management, including pre- and post-response activities to wildland fire on Midpen lands that integrates the following four plans:

1. Vegetation Management Plan (VMP)
2. Prescribed Fire Plan (PFP)
3. Wildland Fire Pre-Plan/Resource Advisor Maps
4. Monitoring Plan

The VMP and the PFP are the primary plans within the Program that could result in physical effects on the environment. In addition, the Wildland Fire Pre-Plan includes potential new infrastructure to support wildland fire response that also could result in physical effects on the environment. The Program EIR will focus on the elements of the Program that may result in physical effects on the environment.

Vegetation Management Plan

Overview

The VMP covers the creation of new vegetation treatment areas and maintenance of existing fuel treatment areas using various treatment methods (excluding the use of prescribed fire) to address ecosystem resiliency and/or to enhance fire management. Creation and maintenance of ecologically-sensitive vegetation management areas (VMAs) would reduce fuels by strategically and selectively thinning and removing vegetation to reduce the risk of extreme wildland fire behavior, slow the spread of a wildland fire, aid in the suppression and control of a wildland fire, and/or reduce the impacts of wildland fire should it occur. Treatment would also maintain healthy ecosystems, prioritizing treatment of invasive species over native species.

Although fuel reduction does not necessarily stop fires from spreading, reducing fuel loads lessens both fire intensity and severity, increasing resiliency to both the ecological and human communities. In addition, by slowing the spread of fire, additional time is afforded for fire personnel to respond and for private residents in the WUI to evacuate. The following VMAs would reduce wildland fire damage to natural resources, enhance fire suppression activities, and reduce fire spread:

- Fuel Reduction Areas (FRAs)
- Shaded and Non-Shaded Fuelbreaks
- Ingress/Egress Route Fuelbreaks
- Disclines
- Defensible Space
- Emergency Staging Areas, Emergency Landing Zones, and Other Fire Management Logistics Areas
- Eucalyptus and Acacia (Non-Native, Highly Combustible Plant) Removal

Types of VMAs

FRAs would be implemented for ecosystem resiliency. FRAs also enhance public safety when created in close proximity to the WUI and/or adjacent to existing fuelbreaks. FRAs are less permanent than fuelbreaks and are typically implemented in more natural areas (such as away from roads) where fuel load reduction achieves a combination of habitat enhancement goals and wildland fire risk reduction. Due to past land uses, fire management practices, and disease (such as Sudden Oak Death), reducing fuel loads in certain habitats can make the ecosystem more resilient to wildland fire. This reduction of fuels can reduce fire intensity, severity, and spread in case of a wildland fire. Vegetation management for ecosystem resiliency is performed at a considerably lower intensity than that for fire management.

Other types of VMAs include fuelbreaks. Fuelbreaks are linear strips of land where trees, vegetation, and dead material have been reduced or removed. A shaded fuelbreak is an area where the tree canopy would be thinned to reduce the potential for a fire to move quickly through and/or to reduce fire spread into or through the canopy. A non-shaded fuelbreak is a swath of land where fuels are reduced in areas without an existing tree canopy, typically at a change in vegetation type, such as from forest or shrubland into grassland, or within grasslands. Fuelbreaks can slow, and even stop the spread of a wildland fire because fewer fuels are present to combust. These areas also provide firefighters with zones to take a stand against or control the spread of a wildland fire, or retreat from fire if the need arises. For the purposes of the VMP, fuelbreaks encompass a range of fuel reduction intensities, depending on the resources being protected and the ecological setting. Fuelbreaks can vary in width from approximately 15 feet around minor ingress and egress routes and up to 200 feet around major routes of travel (e.g., highways) or associated with regional vegetation management treatments.

To enhance the safety of emergency staging areas and the safety of fire emergency personnel during an active wildland fire, the VMP would involve creation and maintenance of up to 200-foot shaded and non-shaded fuelbreaks around fire management areas (e.g., staging areas, landing zones), where feasible. Estimated maximum fuelbreak widths are shown in the following table.

TABLE 1 MAXIMUM FUELBREAK WIDTHS BY HABITAT TYPE

Habitat Type	Fuelbreak Width (feet)
Grass	100
Shrub	100
Oak woodland	200
Redwood or Douglas fir forest	200

An ingress/egress route fuelbreak is a 10- to 30-foot zone located on both sides of those roads identified as critical for emergency vehicle passage, typically designed to accommodate a Wildland Type 3 Fire Engine (a mid-sized fire engine built both for wildland mobility and large water capacity). Disclines are a type of mechanical vegetation treatment that would involve turning over the soil and leaving mostly a dirt surface that is intended to slow or stop progression of a fire. Defensible space is the area immediately surrounding a building(s) where vegetation management measures to reduce fuels are implemented, providing the key point of defense from an approaching wildland fire, or defense against escaping structure fires. Emergency

staging areas are key areas where fire suppression resources may safely park, gather crews, or land a helicopter during a wildland fire. These staging areas may also serve as a temporary refuge area during a wildland fire and must be of sufficient size to provide adequate safety for anticipated flame lengths, wind, and other factors. Emergency staging areas include existing parking areas and landing zones. Emergency landing zones allow helicopters to land in the event of an emergency. Eucalyptus and acacia trees would be removed from locations where these non-native and highly combustible trees pose a significant fire hazard.

Locations and Prioritization of VMAs

Several criteria would be used to determine the prioritization and location of new VMAs for both ecosystem resiliency and fire management. The criteria for ecosystem resiliency focus on natural resources, while the criteria for enhanced fire management focuses on infrastructure critical for emergency response, evacuation routes and protecting District managed structures. Prioritization will take into consideration projected staffing and financial resources to confirm long-term maintenance and management of fuel treatment areas. Each year, Midpen staff, with input from surrounding fire agencies, will identify the extent, scope, and location of the proposed VMAs to include in Annual Work Plans. The annual plan will be dependent upon numerous factors, including annual staffing capacity, funding availability, partnerships, and other resource availability, and be balanced with other Midpen priorities that also further Midpen's mission, annual *Strategic Goals & Objectives*, and the *Vision Plan*. District staff, with input from surrounding fire agencies, will annually prioritize areas for treatment and bring the anticipated budgets to the Board for review and approval as part of the annual capital improvement and action plan development process.

Cyclical Maintenance of VMAs

Frequency of maintenance can vary from annually, for vegetation management in grass-dominated vegetation types, to approximately once every 3 to 10 years depending on vegetation type, the fuel conditions, and regrowth. VMAs would be treated annually with Early Detection Rapid Response (EDRR) through Midpen's Integrated Pest Management Program (IPMP) to detect and remove invasive species that may arise. VMAs that border or traverse largely intact ecosystems still dominated by native species can be maintained with low-intensity brushing, performed as needed based on field inspections. In contrast, VMAs that are bordered or traversed by degraded ecosystems dominated by weeds need a different and more intensive maintenance prescription to reduce the spread of weeds in the VMA and into surrounding areas. VMAs with non-native species would be maintained with annual brushing, which removes invasive weeds; disposal of brush is accomplished via chipping, pile burning, or hauling. Invasive species treatment is addressed in Midpen's IPMP. The IPMP, however, does not address the acreages of mowing and the use of pesticides for VMA creation and maintenance; these are therefore included in the VMP.

Midpen annually mows over 100 miles of roadside to eliminate weeds, and unwanted vegetation and, where applicable, to allow access for Wildland Type 3 Fire Engines. These activities will continue on an annual basis, as defined in the IPMP and covered under that program and its certified EIR (2014; addendum 2019). The VMP would potentially expand on this existing treatment by creating and maintaining fuelbreaks along Wildland Type 3 ingress and egress routes and major routes, and widen the area of treatment, as appropriate.

Vegetation Management Methods for Creation and Maintenance of VMAs

As part of VMP implementation, Midpen would primarily rely on manual, mechanical, and grazing approaches to manage vegetation, consistent with existing vegetation management activities. These approaches currently account for approximately 90 percent of all vegetation management work, and similar percentages are expected to continue into the future even with the continual addition of newly protected open space acreage. Approximately 10 percent of all vegetation management work incorporates chemical methods under limited and controlled applications, supervised by State of California certified applicators. All vegetation management on Midpen lands prioritize invasive and non-native species removal over native species. Limited chemical control would involve use of the Midpen-approved pesticides listed in the IPMP and covered in the IPMP EIR and Addendum (Midpen, 2014; Midpen, 2019). For each type of vegetation management method, Midpen would continue to employ a series of best management practices (BMPs) to prevent, reduce, or mitigate potential impacts to ecological and/or human health and safety. All updates to the Board-approved pesticide list and associated BMPs would be incorporated into the Program.

Prescribed Fire Plan

The Program also includes a programmatic-level PFP. Prescribed burning is a specific activity in which fire is applied to most or all of a well-defined treatment area with discrete boundaries for the combined purpose of habitat improvement to restore and/or enhance ecosystem health and fuel load reduction. Prescribed fires would only be conducted with the agreement of the jurisdictional fire agency. Areas of Midpen land where prescribed fire would likely not be considered include those areas where burning is prohibited by law/regulation/ordinance, less than 0.25 miles of a smoke sensitive area (e.g., hospitals, schools, nursing homes), or where topography (e.g., slope, aspect) makes it unsuitable for a prescribed burn. The technique is particularly useful in grassland and oak woodland habitats, as it can both meet biological objectives by reintroducing natural ecological processes, including the regeneration of native fire-dependent vegetation, and reduce risk of wildland fire.

Prescribed fire burn plans would be utilized to identify site specific aspects of the burn. Burn units would be generally selected to take advantage of natural control lines, such as reservoirs and service roads, and changes in habitat types. Prescribed burning occurs in four distinct phases: pre-treatment, the burn event, mop-up and patrol, and rehabilitation. Pre-treatment may include removal and scattering of vegetation in addition to installation of control lines, where existing control lines do not exist. The burn event would typically be a full-day activity when fire would intentionally be applied at one or more ignition points and allowed to run between control lines across the designated unit. The fire is monitored until completely out. The prescribed burn sites would be patrolled by Midpen Early Detection Rapid Response (EDRR) crews for 1 to 5 years as needed following a burn event to protect the newly disturbed area from invasive species becoming established.

The PFP lays out the parameters, resources, and factors to guide the implementation of prescribed burns on Midpen lands, including: burn methods, fire durations, fire regimes, seasonality, exclusion zones, priority/recommended locations, vegetation types, monitoring of fuel loads, best management practices, pre- and post-fire activities, personnel, and equipment. The PFP also identifies the priority activities and mapping of burn units. Although prescribed burns would likely focus initially on grasslands, all habitat types that occur within Midpen OSPs would be evaluated and prioritized.

Wildland Fire Pre-Plan/Resource Advisor Maps

The Wildland Fire Pre-Fire Plan/Resource Advisor Maps are geographic-based documents to assist responding fire agencies during emergency response activities in the event of a wildland fire by providing information on fire suppression resources like water sources and staging areas. In addition, the maps provide information on sensitive natural and cultural resources to avoid, if possible, during fire suppression activities or to minimize harm to natural ecosystems. This component of the Program primarily describes planning actions and preparation of maps that do not have physical effects on the environment. The Wildland Fire Pre-Plans and Resource Advisor Maps include the following elements:

- Existing conditions and infrastructure that may aid fire suppression activities, including access roads, fuel breaks, structures, and water sources (hydrants, water tanks, ponds, creeks, and springs);
- Known sensitive natural and cultural resources for fire personnel to avoid, if possible, during fire suppression activities;
- Structures that are inhabited or are historically significant that should have resources committed to their defense during a wildland fire;
- Potential locations for fire suppression activities and equipment staging for Midpen lands in the event of a wildland fire;
- Suggested BMPS for wildland fire response and suppression activities;
- Areas where suppression activities should be limited (if feasible); and
- Circulation and access roads, including designated evacuation routes.

The Wildland Fire Pre-Fire Plan and Resource Advisor Maps have been and would continue to be prepared with input from the local community.

Monitoring Plan

The Monitoring Plan describes and references generally accepted protocols that monitor vegetation, water, and wildlife on Midpen lands to establish and compare pre- and post-project conditions, vegetation treatment response, and fuels inventories. Monitoring results are used to identify any adaptive management techniques that should be considered and incorporated in subsequent fuel management work. The monitoring protocols are based on best practices used by adjacent or regionally based land management agencies (e.g., National Park Service, State Parks) and supported by published research. More specifically, a monitoring plan may include the following:

- Monitoring pre-project vegetation, soil, erosion, and water quality to establish baseline conditions for post project analysis;
- Monitoring Burned Area Emergency Response/Burned Area Rehabilitation, and post fire response;
- Monitoring the response to other vegetation management activities;
- Assessing the achievement of project objectives;
- Assessing impacts to vegetation, soil, erosion, and water quality from fire or other vegetation management activities; and
- Inventorying and monitoring fuels to track fuel accumulation over time.

Monitoring Plans do not typically include elements that could result in physical effects on the environment, as they simply provide the protocols to monitor the environment.

Other Approvals Required

The Program requires approval from the Midpen Board of Directors. For the purposes of CEQA compliance and project implementation, Midpen serves as the lead agency in completing and certifying the CEQA document. Prescribed burns also require approval from the Bay Area Air Quality Management District (BAAQMD). Approval may be required by the United States Fish and Wildlife Service (USFWS), California Department of Fish and Wildlife (CDFW), the San Francisco Bay Regional Water Quality Control Board (SFBRWQCB), and, if some activities occur within jurisdictional waters, the United States Army Corps of Engineers (USACE). Other permits and approvals may be identified during preparation of the Program EIR.

Potential Environmental Impacts

The Program EIR will describe the direct and indirect environmental impacts associated with implementation of the Program. The Program EIR will also evaluate the cumulative impacts of the Program when considered in conjunction with other related past, present, and probable future projects. All topics identified in the Appendix G Checklist of the CEQA Guidelines will be addressed in the Program EIR. Midpen expects that the Program could result in potentially significant environmental impacts in the following topic areas, which will be analyzed in the Program EIR:

Aesthetics	**Air Quality**	**Biological Resources**
Cultural Resources	**Geology and Soils**	**Greenhouse Gas Emissions**
Hazards and Hazardous Materials	**Hydrology and Water Quality**	**Noise**
Recreation	**Transportation**	**Tribal Cultural Resources**
Wildfire	**Mandatory Findings of Significance**	

Feasible mitigation measures will be identified to reduce any identified potentially significant impacts.

Alternatives to be Evaluated in the Program EIR

In accordance with the CEQA Guidelines Section 15126.6, the Program EIR will describe a reasonable range of alternatives to the proposed project that are capable of meeting most of the project's objectives but would avoid or substantially lessen any of the significant effects of the project. The Program EIR will identify any alternatives that were considered but rejected by the lead agency as infeasible and briefly explain the justification for this decision. The Program EIR will also provide an analysis of the No Project Alternative.

Documents Available for Public Review

A hard copy of the NOP is available for public review at:

Midpeninsula Regional Open Space District
330 Distel Circle
Los Altos, CA 94022

The NOP is also available for public review online at: http://www.openspace.org/news/public_notices.asp

Opportunity for Public Comment

Interested individuals, groups, and agencies may provide Midpen with written comments on topics to be addressed in the Program EIR. Because of time limits mandated by state law, comments should be provided no later than 5:00 p.m. on May 28, 2020.

Agencies that will need to use the Program EIR when considering permits or other approvals for the proposed project should provide Midpen with the name of a staff contact person. Please send all comments to:

Midpeninsula Regional Open Space District
Attn: Coty Sifuentes-Winter, Senior Resource Management Specialist
330 Distel Circle
Los Altos, CA 94022
(650) 691-1200
Email: csifuentes@openspace.org

Comments provided by email should include "Wildland Fire Resiliency Program NOP Scoping Comment" in the subject line, and the name and physical address of the commenter in the body of the email.

All comments on environmental issues received during the public comment period will be considered and addressed in the Draft Program EIR, which is anticipated to be available for public review in summer 2020.

Public Scoping Meeting

A public scoping meeting will be held by Midpen to inform interested parties about the proposed project, and to provide agencies and the public with an opportunity to provide comments on the scope and content of the Program EIR. The meeting time and location are as follows:

May 13, 2020
5:00 p.m.
Board Room, Midpeninsula Regional Open Space District Administrative Office
330 Distel Circle, Los Altos, CA 94022
(650) 691-1200

In the event of the continuance of the Shelter-In-Place order due to COVID-19, the scoping meeting may be conducted via teleconference in accordance with the March 17, 2020 Governor issued Executive Order N-29-20. The meeting space is accessible to persons with disabilities. Individuals needing special assistive devices will be accommodated to Midpen's best ability. For more information, please contact the District Clerk at (650) 691-1200 or clerk@openspace.org at least 48 hours prior to the meeting.

APPENDIX 1.0-2 GLOSSARY OF TERMS

Term	Definition
All terrain vehicle (ATV)	Vehicles designed to be used off paved road, in all terrains. Examples include dirt bikes, 4-wheelers, side by sides, and quads.
Best management practices (BMPs)	Measures designed to broad implementation with the intent to protect many different resources, including water quality from soil erosion and runoff.
Burn Boss	Ensures that all Burn Plan specifications are met before, during, and after a prescribed fire.
Broadcast spraying	Applying an herbicide spray uniformly over an entire treated area. Broadcast spraying is not currently allowed within Midpen lands and is not proposed as part of the WFRP.
Burn Plan	Prescribed fire activities are implemented in accordance with a pre-written Burn Plan, which identifies land management goals and specific fire use strategies to safely achieve those goals, with prior approval by the applicable regulatory agencies. A Burn Plan addresses characteristics of the land being treated and specifies how the fire will be applied, by whom, and what fire control people and equipment must be on-scene before the burn can commence.
Control lines	Linear areas used to control a fire and maintained to provide wildland firefighters a location to perform wildfire suppression activities. Control lines include treatments such as disclines, and firelines. New control lines are typically 1-foot to 6-foot wide, depending on location, vegetation type, and type of equipment used to construct the line.
Cut stump	An herbicide treatment that combines physical removal of the above-ground portions of target invasive plants with chemical control of the roots. An herbicide solution is applied directly to the stump top immediately after cutting down the plant.
Critical infrastructure	Communications towers, evacuation centers, fire stations, Incident Command Posts (ICP), medivac sites, Shelter-in-Place (SIP) locations, water collection points, and water tanks. These are Federal Emergency Management Agency (FEMA) Target Hazards important for emergency response, and/or disaster recovery functions.
CWPP Priority Areas	Locations defined in Community Wildfire Protection Plans as priority areas for hazardous fuel reduction treatments.
Defensible space	The buffer created between a building and the grass, trees, shrubs, or any wildland area that surround it. This space is needed to slow or stop the spread of wildfire and it protects buildings from catching fire—either from direct flame contact or radiant heat. Defensible space is also important for the protection of the firefighters defending buildings. There are three defensible space zones with different treatment requirements; within 5 feet, within 30 feet, and within 30 to 100 feet from buildings.
Discline	A treatment of 10 feet or more created using an agricultural disc or bulldozer to create an area of bare mineral soil without flammable vegetation. See "control lines".
Ecosystem resilience	Ecological resilience is the ability of an ecosystem to maintain its normal patterns of nutrient cycling and biomass production after being subjected to damage caused by an ecological disturbance.
Emergency Staging Areas	Areas defendable from wildfire which are large enough to stage firefighting equipment, supplies, and personnel prior to deployment to a wildfire. Staging areas must be located where equipment, supplies, and personnel can reach the fireline within 1 hour.

Term	Definition
Emergency Landing Zones or Landing Zones	Areas where wildfire helicopters can land and take off safely with equipment, supplies, personnel, and water. Some landing zones are suitable for refueling and firefighting water filling.
Eucalyptus removal	Removal of trees in the genus "Eucalyptus". The most common species is Blue Gum Eucalyptus, *Eucalyptus globulus*. Control is accomplished by mechanical removal of standing trees followed by herbicide treatment.
Evacuation Routes (Primary and Secondary)	Evacuation routes were designated by the following plans: Woodside Evacuation Plan, King Hill Plan, Skyline Ridge Evacuation Plan, Redwood West Lexington Pre-Plan, Las Cumbres Evacuation Plan, Santa Clara County Plan, and East Lexington Basin Fire Pre-Plan. Some Primary and Secondary Evacuation Routes specific to Midpen Lands are designated in this plan which were not defined in another local plan.
Firelines	A break in fuel, made by cutting, scraping, or digging. See "control lines".
Fire Effects Monitor	Responsible for collecting incident status information and providing this information to the Burn Boss. The information may include fire perimeter location, on-site weather, fire behavior, fuel conditions, smoke, and fire effects information needed to assess firefighter safety and whether the fire is achieving established incident objectives and requirements.
Fire Management Logistics Areas	Locations where firefighting planning and efforts occur, including helispots, fire lookouts, safety zones, and staging areas.
Firing Boss	Leads ground ignition operations and is responsible for the safety and coordination of assigned resources on prescribed fire and wildfire incidents.
Fuelbreak	An area where fire fuels are modified to change the behavior of a fire in order to reduce the flame lengths and energy output. A fuelbreak acts as an achor point for indirect attack on wildfires, operational tool for firefighters to create backfires, and supports safer ingress/egress for emergency responders and the public. Fuelbreaks may be around Wildland Type 3 ingress/egress routes, evacuation routes, and other trails and roads.
Fuel Reduction Area (FRA)	An area where specific fuel management prescriptions are applied. FRAs are less permanent than fuelbreaks and are typically implemented in more natural areas where fuel load reduction achieves a combination of habitat enhancement goals and wildland fire risk reduction.
Helispot	See "Emergency Landing Zones".
Incident Command Post (ICP)	The location where primary command functions are executed by the Incedent Commander and his/her team.
Ingress/egress route (i.e., Wildland Type 3 ingress/egress)	Unimproved roads and trails capable of allowing transit by a Wildland Type 3 fire engine. These roads and trails are typically 8 to 12 feet wide.
Ladders fuels	Also referred to as “fuel ladders.” Shrubs, small trees, and grass that can allow a surface wildland fire to travel up into the tree canopy and turn into a crown fire.

Term	Definition
Mop Up	To make a fire safe or reduce residual smoke after the fire has been controlled by extinguishing or removing burning material along or near the control line, felling snags, or moving logs so they won't roll downhill.
Non-shaded fuelbreak	A non-shaded fuelbreak is used in a swath of land where fuels are reduced in areas without a tree canopy, typically at a change in vegetation type, such as from forest or shrubland into grassland, or within grasslands. Non-shaded fuelbreaks are most often maintained in grasslands or shrublands versus wooded areas, although they can be implemented at a transition, particularly near homes if deemed critical for fire safety or necessary to meet defensible space requirements. See "fuelbreak".
Pile burn	A fuel treatment where brush and trees are cut or pushed with a machine, and then piled and burned.
Prescribed fire/burn	Any fire ignited by management actions under certain, predetermined conditions to meet specific objectives related to hazardous fuels or habitat improvement. A written, approved prescribed fire plan must exist, and all regulatory requirements must be met prior to ignition.
Prescribed Fire Plan (PFP)	A document that provides the prescribed fire burn information needed to implement an individual prescribed fire project.
Prescribed herbivory	A method used as pre-treatment to reduce fuel loads prior to implementation of other fuel treatment methods where livestock are allowed to consume vegetation.
Primary evacuation route	If not defined in a local plan, Primary Evacuation Routes are defined as major roadways which will channel most if not all traffic out of a large area.
Refugia	An area within an FRA where certain activities are prohibited, such as use of artificial light. A Midpen-approved biologist may designate sites within an FRA as “refugia” areas prior to the creation of the FRA.
Resource Advisor	Provides professional knowledge and expertise for the protection of natural, cultural, and other resources within an incident environment.
Safety zone	An area cleared of flammable materials used for escape in the event a fireline is outflanked or in case a spot fire causes fuels outside the control line to render the line unsafe. In firing operations, crews progress so as to maintain a safety zone close at hand allowing the fuels inside the control line to be consumed before going ahead. Safety zones may also be constructed as integral parts of fuelbreaks; they are greatly enlarged areas which can be used with relative safety by firefighters and their equipment in the event of a blowup in the vicinity. See "control lines".
Secondary evacuation route	If not defined in a local plan, Secondary Evacuation Routes are defined as either local or neighborhood feeder roads or routes alternate to Primary Evacuation Routes. Generally, individual driveways are excluded; however, there are exceptions.
Shaded fuelbreak	A type of fuelbreak used in forested areas. Enough tall tree canopy is retained to maintain shade, reduce the potential for rapid re-growth of shrubs and sprouting hardwoods, and minimize erosion. Ladder fuels and woody understory vegetation are thinned out. The purpose of a shaded fuelbreak is to reduce ladder fuels and increase base canopy height of trees for the purpose of preventing fires from spreading from the forest floor into the forest canopy. See "fuelbreak".

Term	Definition
Smoke management plan	A plan submitted to the BAAQMD that specifies the “smoke prescription,” which is a set of air quality, meteorological, and fuel conditions needed before burn ignition may be allowed.
Spot spray	Applying an herbicide spray to individual weeds directly, or in "spots," rather than applying a product to the entire area (see “broadcast spray”).
Staging area	A location set up at an incident where resources can be placed while awaiting a tactical assignment on a three-minute available basis. Staging areas are managed by the operations section.
Structure Type 1 (tender) Route	Roads and trails capable of allowing transit by a Type 1 (or Class A) fire engine. A Type 1 fire engine is most common in a metropolitan communities. Large cities rely on Type 1 fire apparatus based on flexibility, staffing, and the ability to operate at homes, apartments, businesses, and high rise buildings. Technically, a Type 1 fire engine is designed for structural firefighting. It will typically include a pump that operates at 1,000 gallons per minute (GPM) and includes a 400 gallon tank, 1,200 feet of 2 1/2-inch hose, 400 feet of 1 1/2-inch hose, 200 feet of 1-inch hose, 20+ feet of ladder, a 500 GPM Master Stream, and minimum staffing of typically four firefighters.
Target hazards	Facilities in either the public or private sector that provide essential products and services to the general public, are otherwise necessary to preserve the welfare and quality of life in the community, or fulfill important public safety functions. Target hazards include assisted living facilities, campsites, hospitals, community centers, schools, and mobile home parks.
Traditional ecological knowledge	The evolving knowledge acquired by indigenous and local peoples over hundreds or thousands of years through direct contact with the environment. This knowledge is specific to a location and includes the relationships between plants, animals, natural phenomena, landscapes and timing of events that are used for lifeways, including but not limited to hunting, fishing, trapping, agriculture, and forestry.
Vegetation management (fuel management)	The practice of removing or modifying live and dead vegetation to reduce the potential spread of wildland fire ignitions, overall rates of wildland fire spread, flame lengths, and catastrophic fire severity. Vegetation management activities typically occur within vegetation management areas (see below).
Vegetation management area (VMA)	A broad area where vegetation management is implemented. Types of VMAs include defensible space, disclines, FRAs, and fuelbreaks.
Vegetation Management Plan (VMP)	A document intended to mitigate the risk of wildfire by reducing flammable vegetation in wildlands and around structures in the WUI. For the Wildland Fire Resiliency Program, the VMP defines the suite of vegetation management activities that Midpen may implement to reduce the potential for ecologically-catastrophic wildland fires while also preserving biodiversity and minimizing effects on the environment. This VMP focuses on what is referred to as “non-fire” vegetation management. Only manual, mechanical, conservation grazing, and limited chemical methods of vegetation management are considered
Wildland Fire Pre-Plan/Resource Advisor Maps	Map-based documents that can aid CAL FIRE and other firefighting agencies in their firefighting efforts in the event of a wildland fire.

Term	Definition
Wildland Type 3 Fire Engine	A Type 3 fire engine is the most popular fire engine in California due to the easy road access of most fires. A Type 3 fire engine traditionally has four-wheel drive to make driving over rough terrain easier, but can also be produced with standard rear wheel drive. The cab can either be two- or four-door holding up to five people. Type 3 fire engines are required to have a minimum of 500 gallons of water and be able to pump 150 gallons per minute at a pressure of 250 pounds per square inch (1,700 kPa). They have a typical gross vehicle weight rating (GVWR) of 26,000 pounds.
Wildland-urban interface (WUI)	The area where houses and other structures are built close to, or intermingled with, undeveloped wildlands. The WUI poses significant concern in the event of fire, as it combines the characteristics of wildlands (where larger fires generally occur) and developed areas (where lives, homes, and property are vulnerable).

APPENDIX 3.0-1 VEGETATION MANAGEMENT MAPS

Appendix 3.0-1a Existing and Potential Treatments (Overlaid on Topographic Maps)

Appendix 3.0-1b Tier 1 and Tier 2 Prioritized Treatments (Overlaid on Topographic Maps)

Appendix 3.0-1a Existing and Potential Treatments (Overlaid on Topographic Maps)

Table of Contents

Attachment 2

These maps are for reference only. Although every effort has been made to ensure the accuracy of information, errors and conditions originating from physical sources used to develop the data may be reflected on this map. Midpeninsula Regional Open Space District shall not be liable for any errors, omissions, or damages that result from inappropriate use of this document.

Existing and Potential Treatments
Miramontes Ridge

Existing Treatments

- Defensible Space 30-foot
- Defensible Space 100-foot
- Non-Shaded Fuelbreak

Potential Fuels Treatments

- Fuelbreak 200-foot
- Eucalyptus and Acacia Removal
- Potential FRAs for Ecosystem Resiliency
- Wildland Type 3 Ingress/Egress

Critical Infrastructure

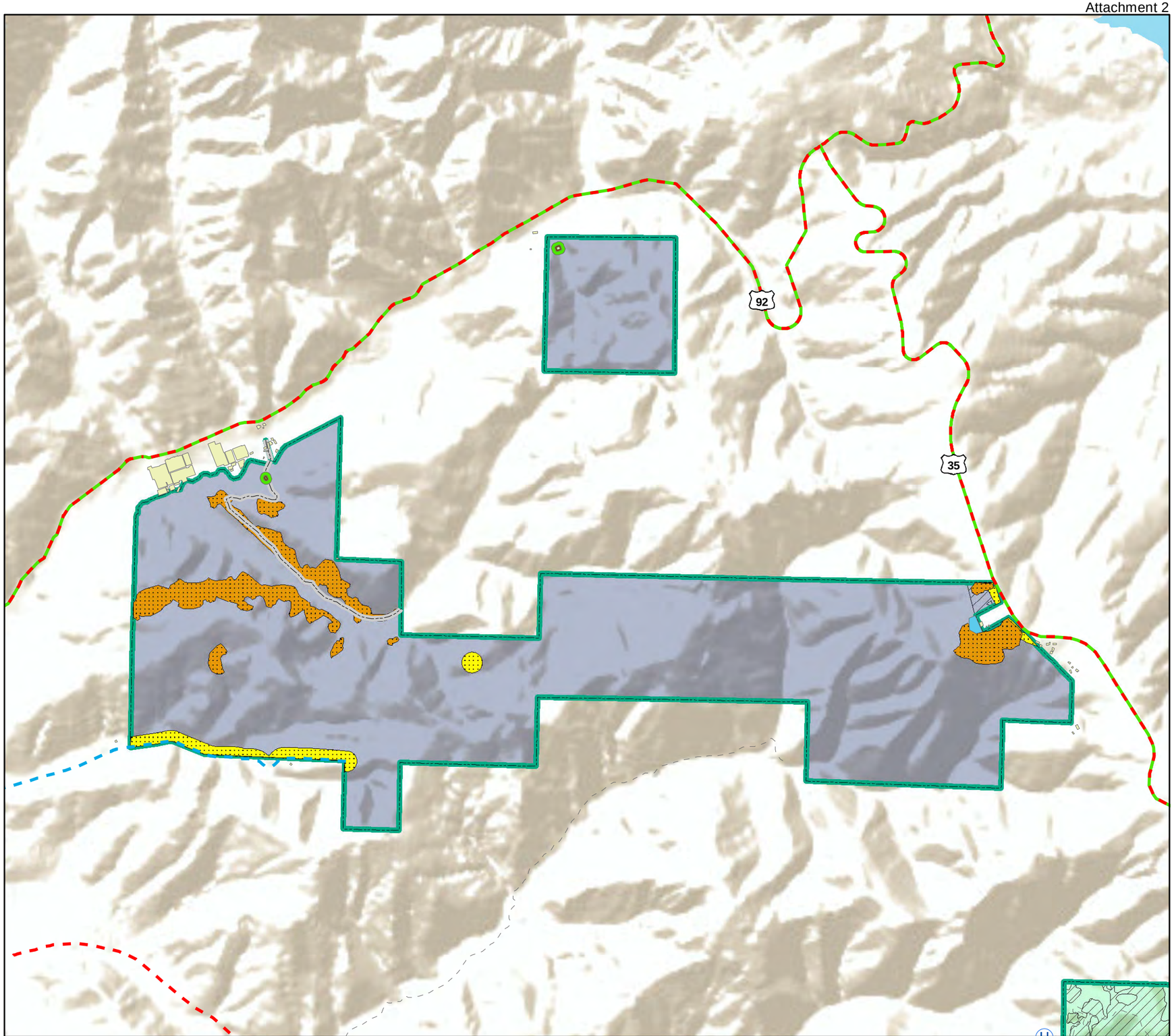
- Primary Evacuation Route
- Secondary Evacuation Route
- Road or Trail

Fire Management Logistics

- Helispot

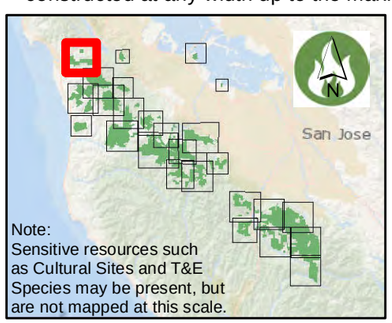
OSP & Managed Properties

- Boundary
- Miramontes Ridge
- Purisima Creek Redwoods



Date Printed: 7/13/2020

* See Table of Contents page for additional symbology.
** Fuel break widths are maximums. Fuelbreaks may be constructed at any width up to the maximum width.



0 0.25 0.5 Miles

Existing and Potential Treatments
Pulgas Ridge

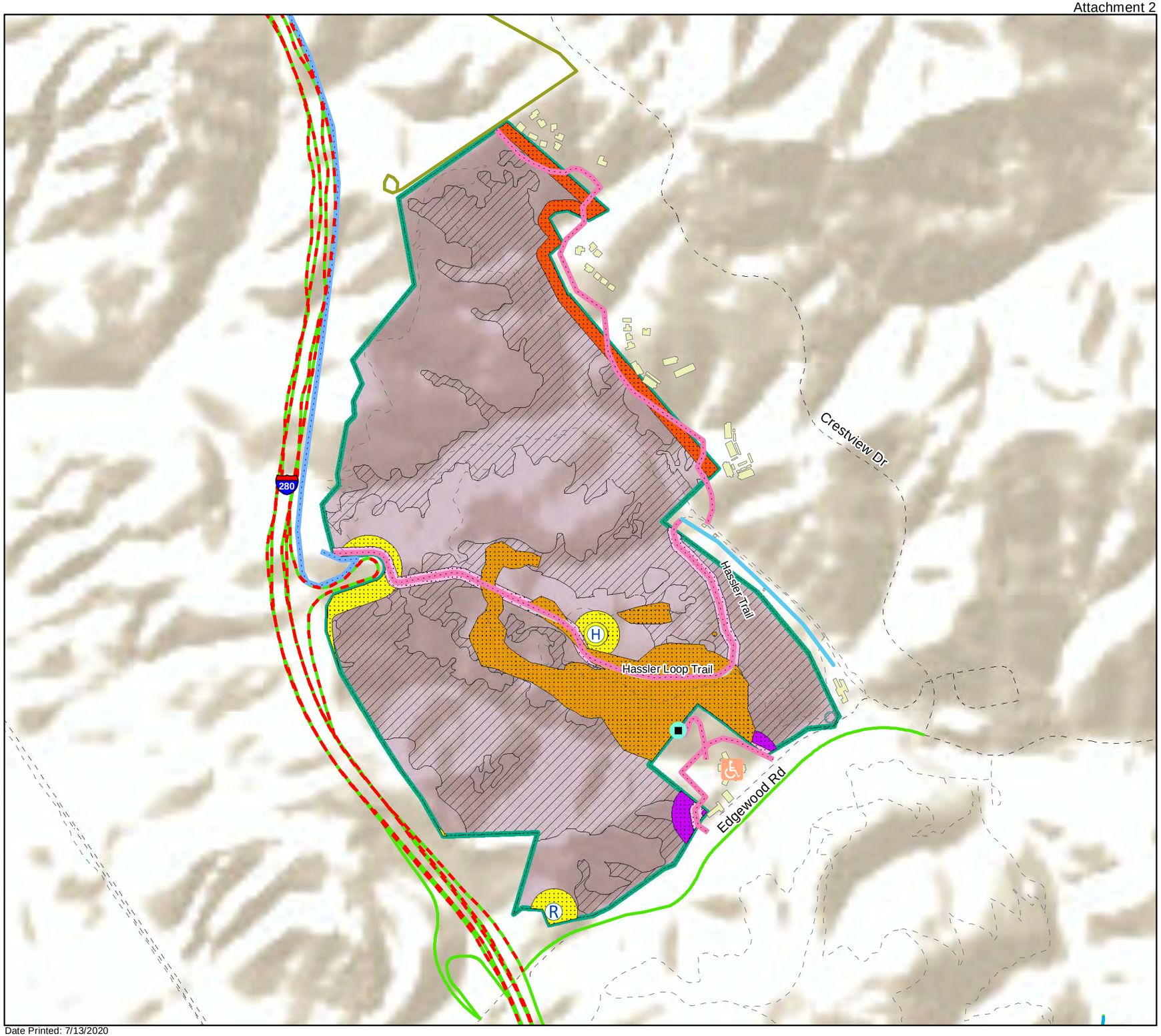
Existing Treatments
- Fuelbreak 200-foot
- Non-Shaded Fuelbreak
- Discline

Potential Fuels Treatments
- Fuelbreak 200-foot
- Fuelbreak 300-foot
- Eucalyptus and Acacia Removal
- Shaded Fuelbreak
- Fire Agency Recommended
- Potential FRAs for Ecosystem Resiliency
- Wildland Type 3 Ingress/Egress
- Road or Trail
- Communication
- Water Tank

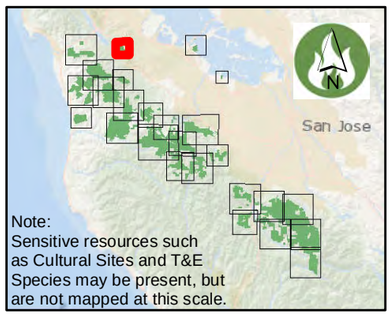
Target Hazards
- Assisted Living Facility

Fire Management Logistics
- Helispot

OSP & Managed Properties
- Boundary
- Pulgas Ridge



* See Table of Contents page for additional symbology.
** Fuel break widths are maximums. Fuelbreaks may be constructed at any width up to the maximum width.



0 0.25 0.5 Miles

Date Printed: 7/13/2020

Existing and Potential Treatments
Purisima Creek Redwoods

Existing Treatments
- Defensible Space 30-foot
- Defensible Space 100-foot
- Fuelbreak 200-foot
- Non-Shaded Fuelbreak
- Shaded Fuelbreak

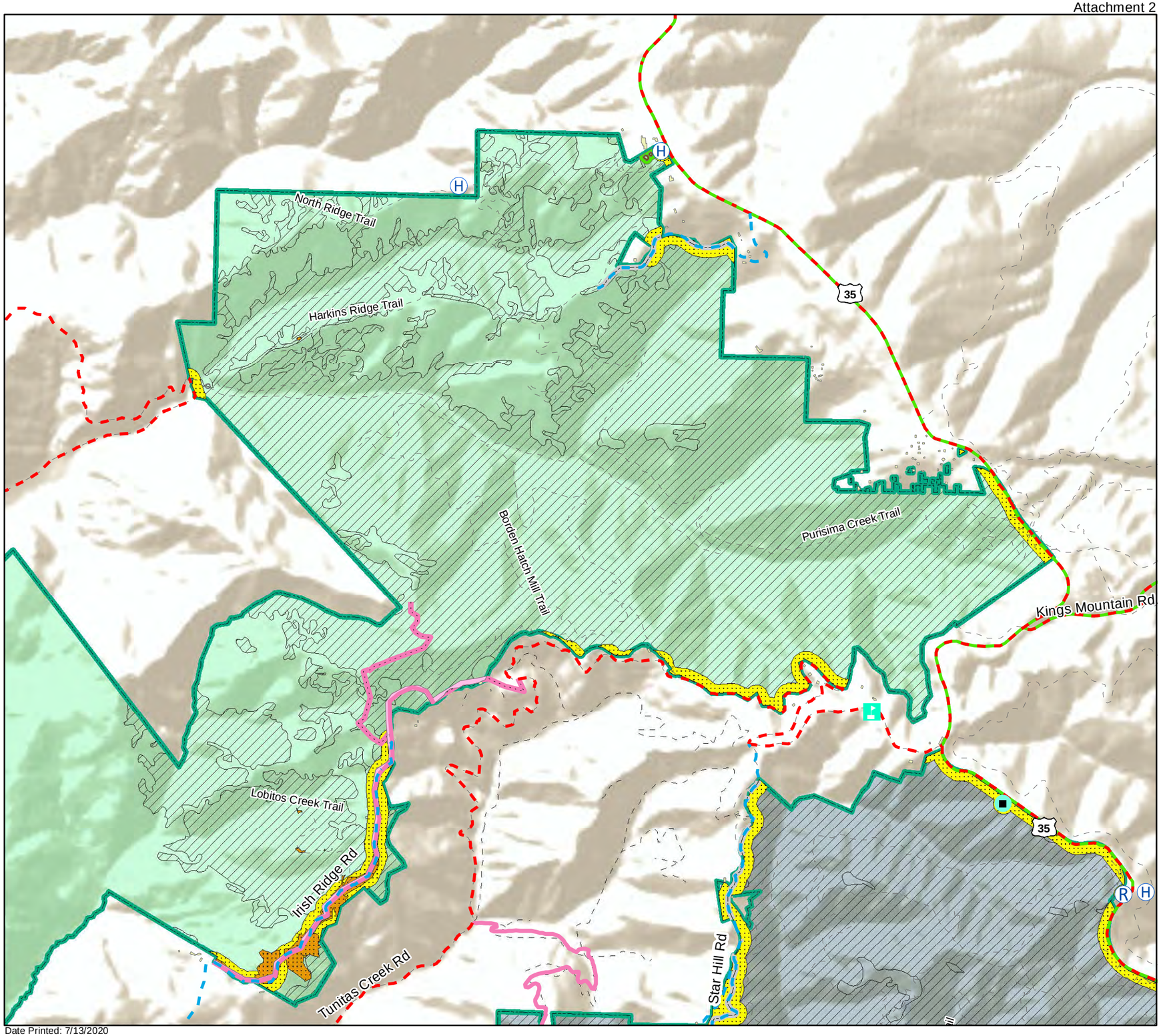
Potential Fuels Treatments
- Fuelbreak 200-foot
- Eucalyptus and Acacia Removal
- Shaded Fuelbreak
- Potential FRAs for Ecosystem Resiliency
- Wildland Type 3 Ingress/Egress

Critical Infrastructure
- Primary Evacuation Route
- Secondary Evacuation Route
- Road or Trail
- Communication
- Water Tank

Target Hazards
- School/Day Care

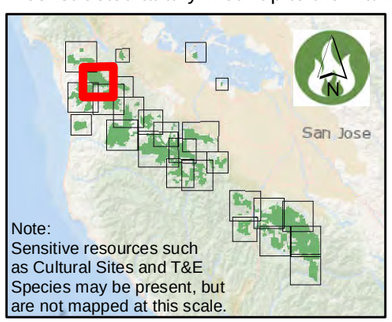
Fire Management Logistics
- Helispot

OSP & Managed Properties
- Boundary
- El Corte de Madera Creek
- Purisima Creek Redwoods



Date Printed: 7/13/2020

* See Table of Contents page for additional symbology.
** Fuel break widths are maximums. Fuelbreaks may be constructed at any width up to the maximum width.



0 0.25 0.5 Miles

Existing and Potential Treatments
Purisima Creek/Tunitas Creek

Existing Treatments

- Defensible Space 30-foot
- Defensible Space 100-foot
- Shaded Fuelbreak

Potential Fuels Treatments

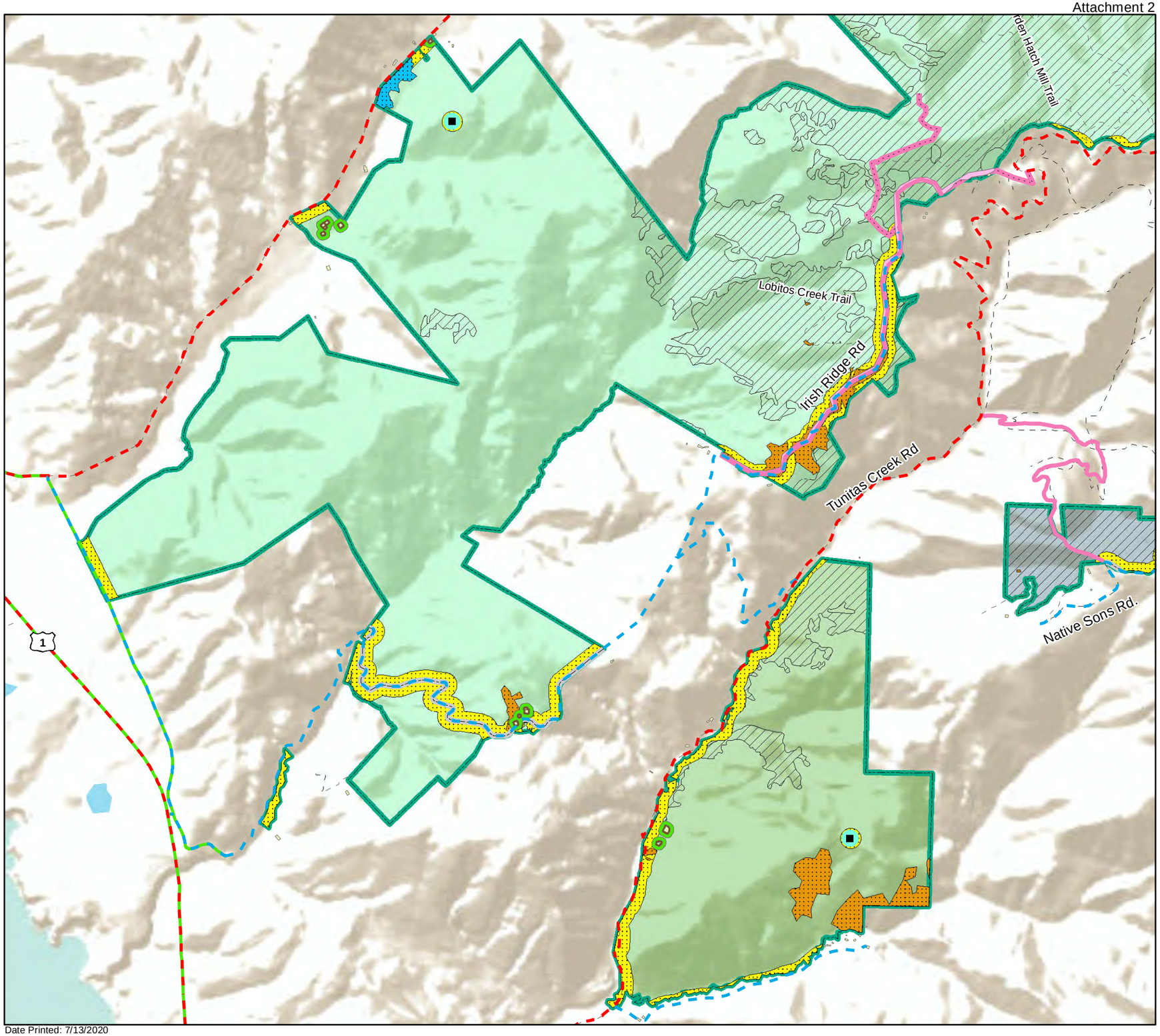
- Fuelbreak 200-foot
- Eucalyptus and Acacia Removal
- Non-Shaded Fuelbreak
- Shaded Fuelbreak
- Potential FRAs for Ecosystem Resiliency
- Wildland Type 3 Ingress/Egress

Critical Infrastructure

- Primary Evacuation Route
- Secondary Evacuation Route
- Road or Trail
- Water Tank

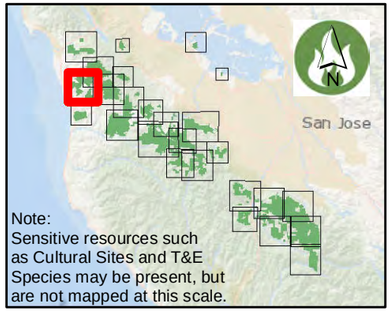
OSP & Managed Properties

- Boundary
- El Corte de Madera Creek
- Purisima Creek Redwoods
- Tunitas Creek



Date Printed: 7/13/2020

* See Table of Contents page for additional symbology.
** Fuel break widths are maximums. Fuelbreaks may be constructed at any width up to the maximum width.



0 0.25 0.5 Miles

Existing and Potential Treatments
Tunitas Creek

Existing Treatments

- Defensible Space 30-foot
- Defensible Space 100-foot
- Non-Shaded Fuelbreak

Potential Fuels Treatments

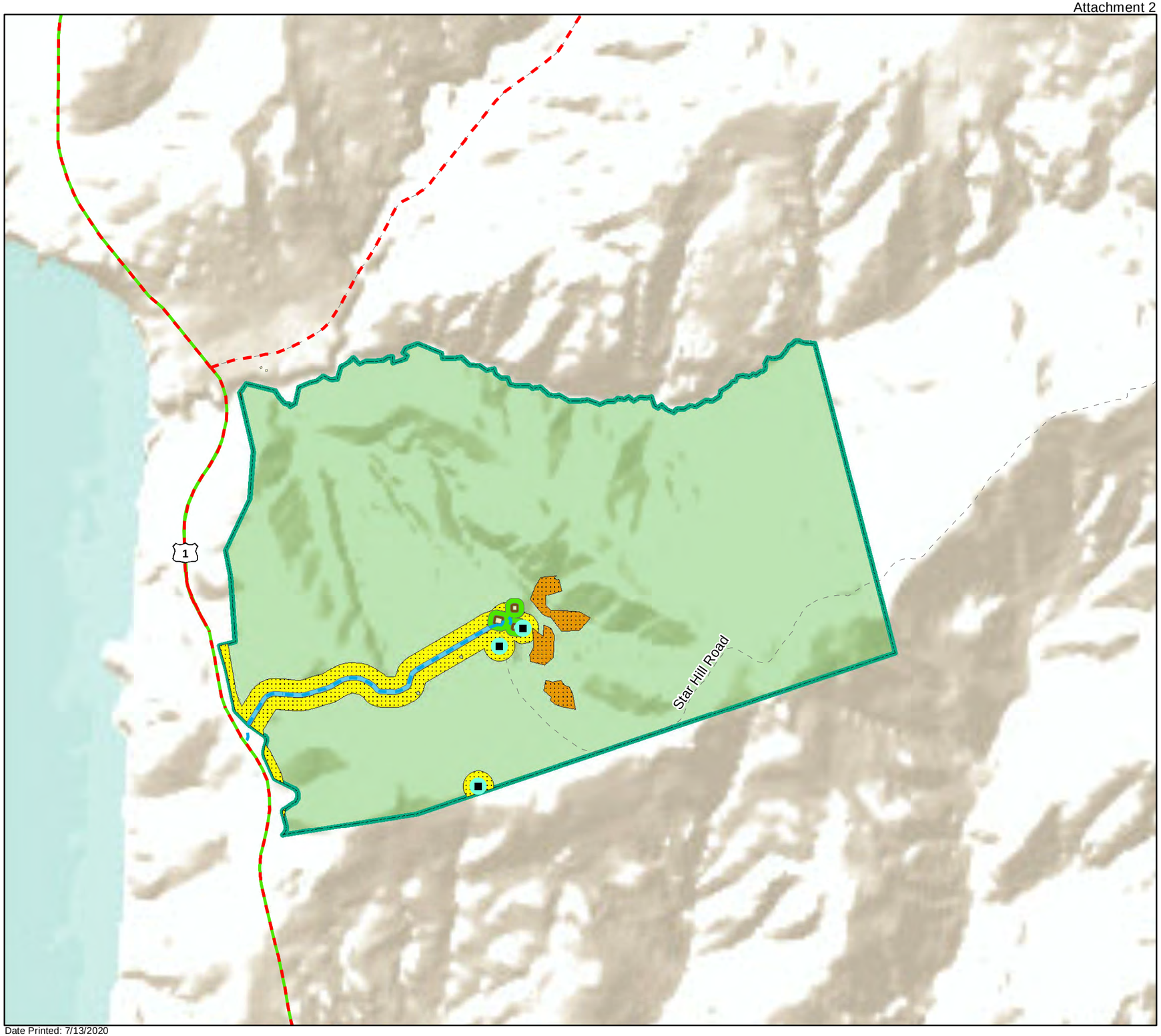
- Fuelbreak 200-foot
- Eucalyptus and Acacia Removal

Critical Infrastructure

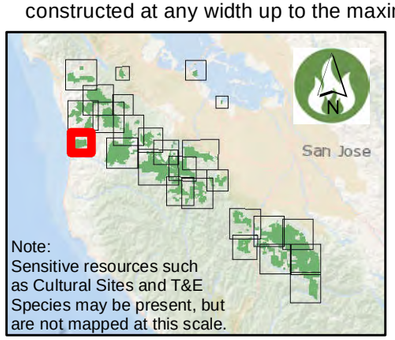
- Primary Evacuation Route
- Secondary Evacuation Route
- Road or Trail
- Water Tank

OSP & Managed Properties

- Boundary
- Tunitas Creek



* See Table of Contents page for additional symbology.
** Fuel break widths are maximums. Fuelbreaks may be constructed at any width up to the maximum width.



0 0.25 0.5 Miles

Date Printed: 7/13/2020

Existing and Potential Treatments
Teague Hill

Existing Treatments

- Shaded Fuelbreak

Potential Fuels Treatments

- Fuelbreak 200-foot
- Fire Agency Recommended
- Potential FRAs for Ecosystem Resiliency

Critical Infrastructure

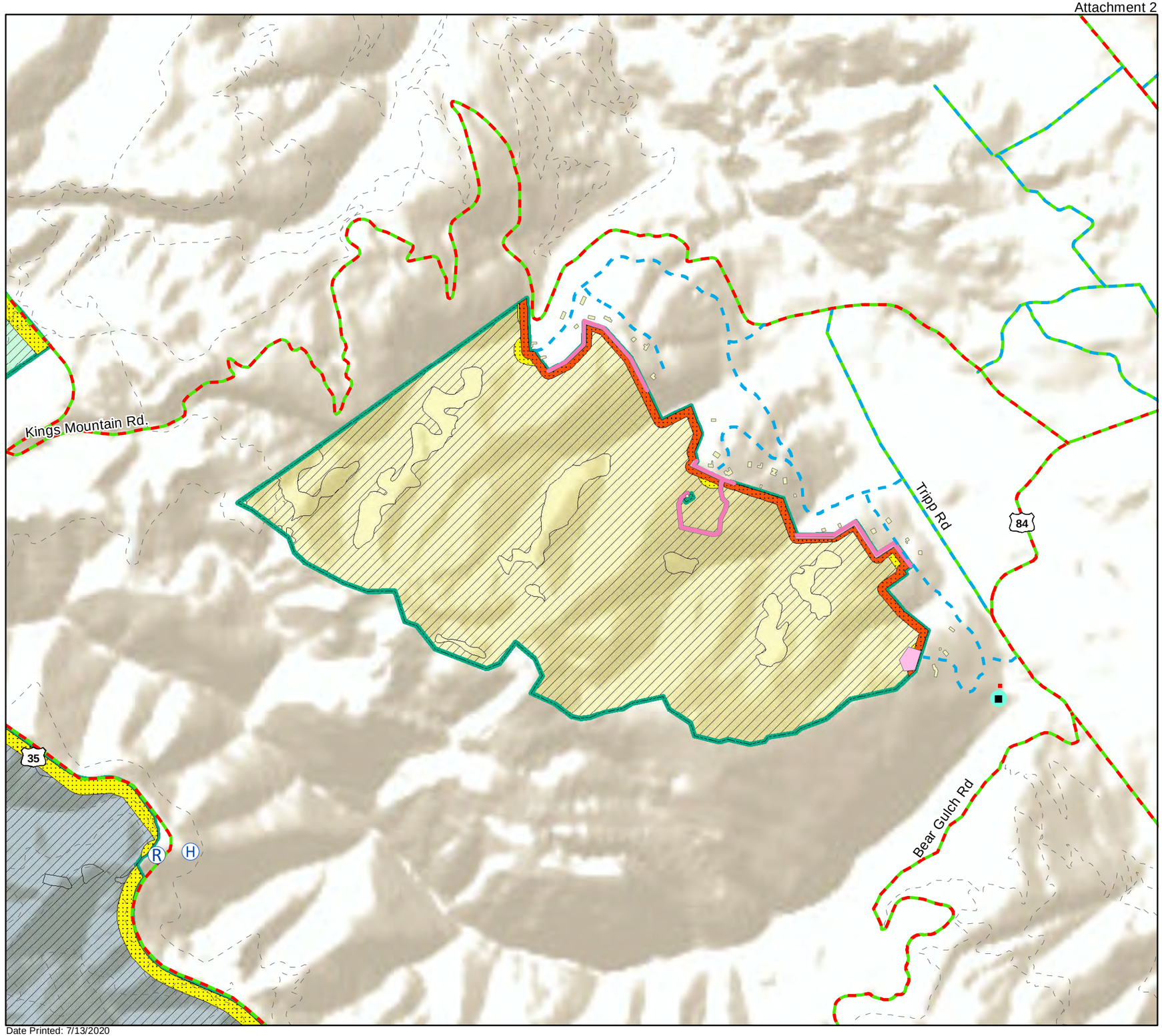
- Secondary Evacuation Route
- Road or Trail
- Communication
- Water Tank

Fire Management Logistics

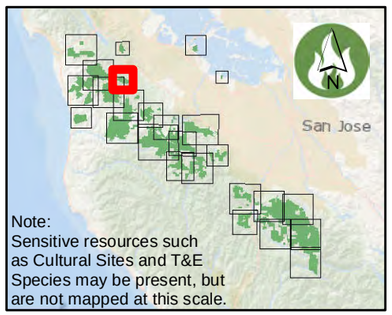
- Helispot

OSP & Managed Properties

- Boundary
- El Corte de Madera Creek
- Purisima Creek Redwoods
- Teague Hill



* See Table of Contents page for additional symbology.
** Fuel break widths are maximums. Fuelbreaks may be constructed at any width up to the maximum width.



0 0.25 0.5 Miles

Date Printed: 7/13/2020

Existing and Potential Treatments
El Corte de Madera Creek

Existing Treatments

- Defensible Space 30-foot
- Defensible Space 100-foot
- Fuelbreak 200-foot
- Non-Shaded Fuelbreak
- Shaded Fuelbreak

Potential Fuels Treatments

- Fuelbreak 200-foot
- Eucalyptus and Acacia Removal
- Fire Agency Recommended
- Potential FRAs for Ecosystem Resiliency
- Wildland Type 3 Ingress/Egress

Critical Infrastructure

- Primary Evacuation Route
- Secondary Evacuation Route
- Structure Type 1 (Tender)
- Road or Trail
- Communication
- Water Tank

Target Hazards

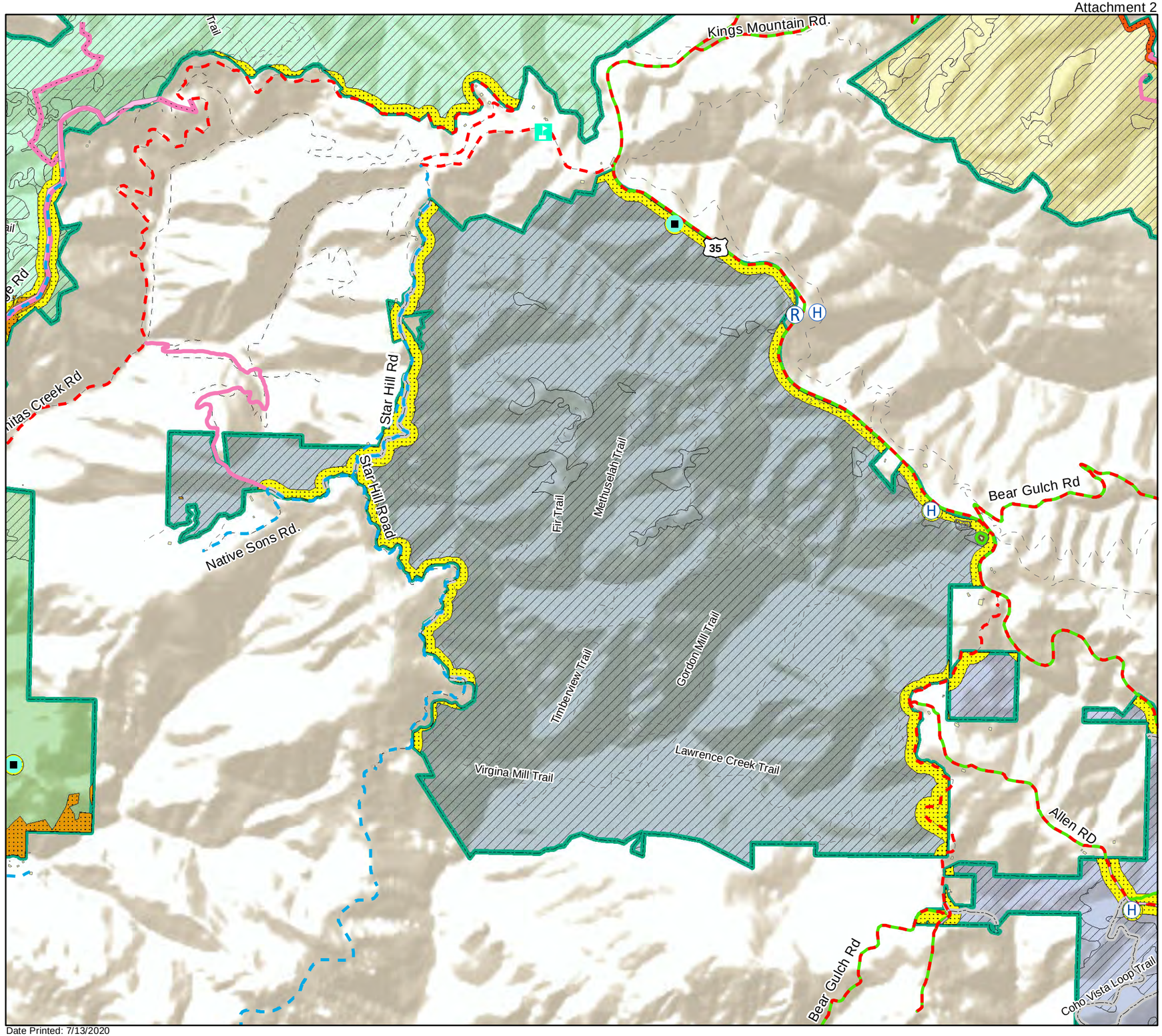
- School/Day Care

Fire Management Logistics

- Helispot

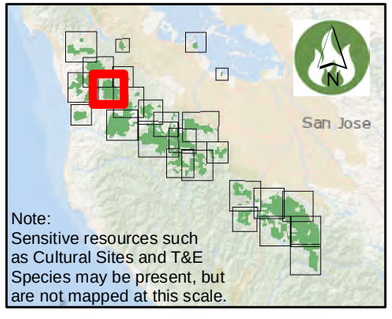
OSP & Managed Properties

- Boundary
- El Corte de Madera Creek
- La Honda Creek
- Purisima Creek Redwoods
- Teague Hill
- Tunitas Creek



Date Printed: 7/13/2020

* See Table of Contents page for additional symbology.
** Fuel break widths are maximums. Fuelbreaks may be constructed at any width up to the maximum width.



0 0.25 0.5 Miles

Existing and Potential Treatments
La Honda Creek/Thornewood

Existing Treatments

- Defensible Space 30-foot
- Defensible Space 100-foot
- Fuelbreak 200-foot
- Non-Shaded Fuelbreak
- Shaded Fuelbreak
- Discline

Potential Fuels Treatments

- Fuelbreak 200-foot
- Eucalyptus and Acacia Removal
- Non-Shaded Fuelbreak
- Shaded Fuelbreak
- Potential FRAs for Ecosystem Resiliency
- Wildland Type 3 Ingress/Egress

Critical Infrastructure

- Primary Evacuation Route
- Secondary Evacuation Route
- Structure Type 1 (Tender)
- Road or Trail
- Water Tank

Target Hazards

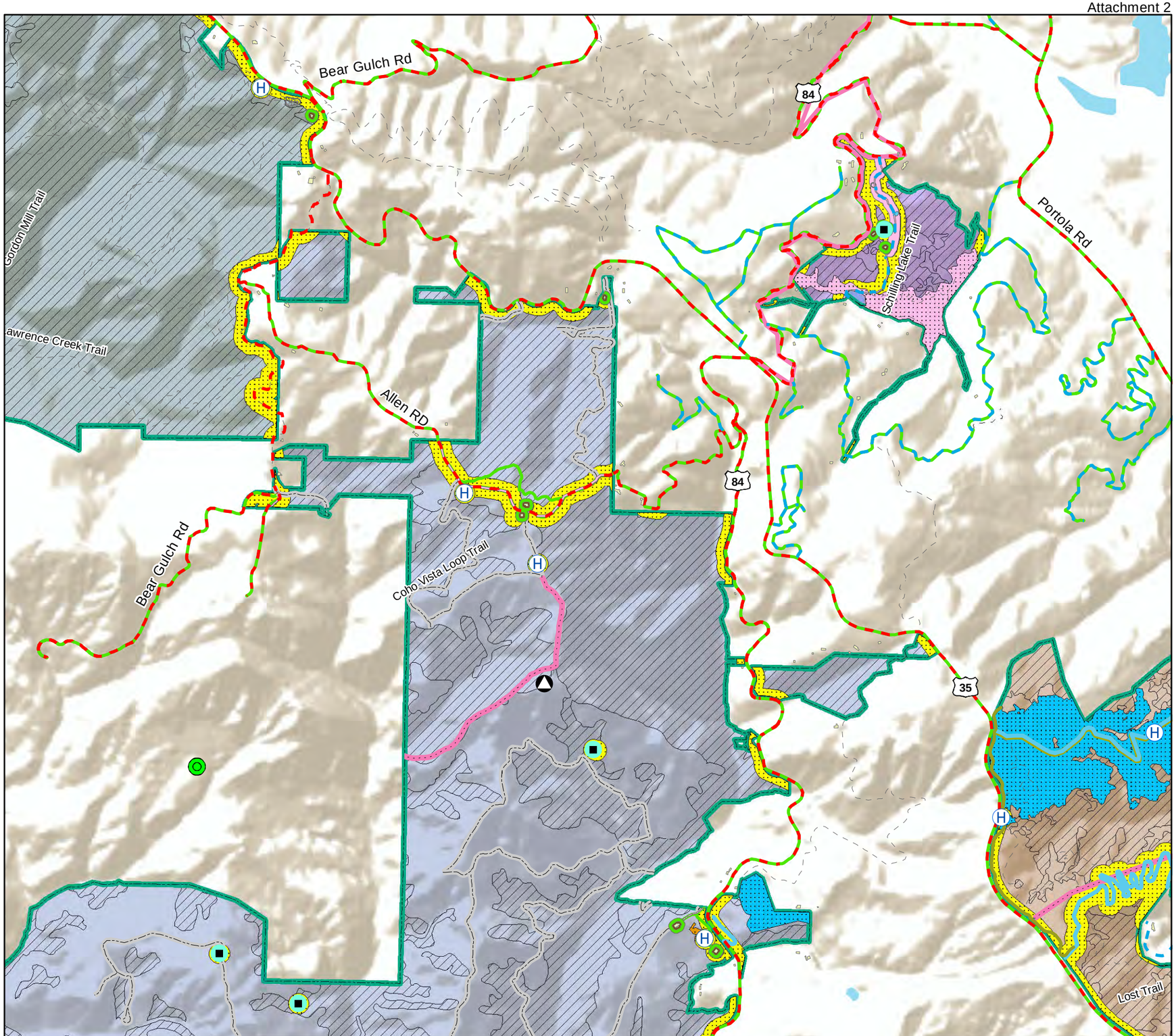
- Community Center

Fire Management Logistics

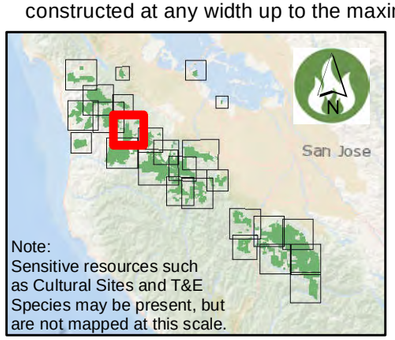
- Helispot
- Lookout

OSP & Managed Properties

- Boundary
- El Corte de Madera Creek
- La Honda Creek
- Thornewood
- Windy Hill



* See Table of Contents page for additional symbology.
** Fuel break widths are maximums. Fuelbreaks may be constructed at any width up to the maximum width.



0 0.25 0.5 Miles

Date Printed: 7/13/2020

Existing and Potential Treatments
La Honda Creek

Existing Treatments

- Defensible Space 30-foot
- Defensible Space 100-foot
- Fuelbreak 200-foot
- Non-Shaded Fuelbreak
- Shaded Fuelbreak

Potential Fuels Treatments

- Fuelbreak 200-foot
- Fuelbreak 300-foot
- Eucalyptus and Acacia Removal
- Non-Shaded Fuelbreak
- Fire Agency Recommended
- Potential FRAs for Ecosystem Resiliency
- Discline
- Wildland Type 3 Ingress/Egress

Critical Infrastructure

- Secondary Evacuation Route
- Structure Type 1 (Tender)
- Road or Trail
- Water Tank

Target Hazards

- School/Day Care
- Mobile Home Park

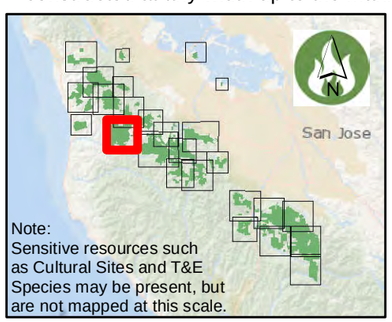
Fire Management Logistics

- Helispot
- Lookout
- Staging

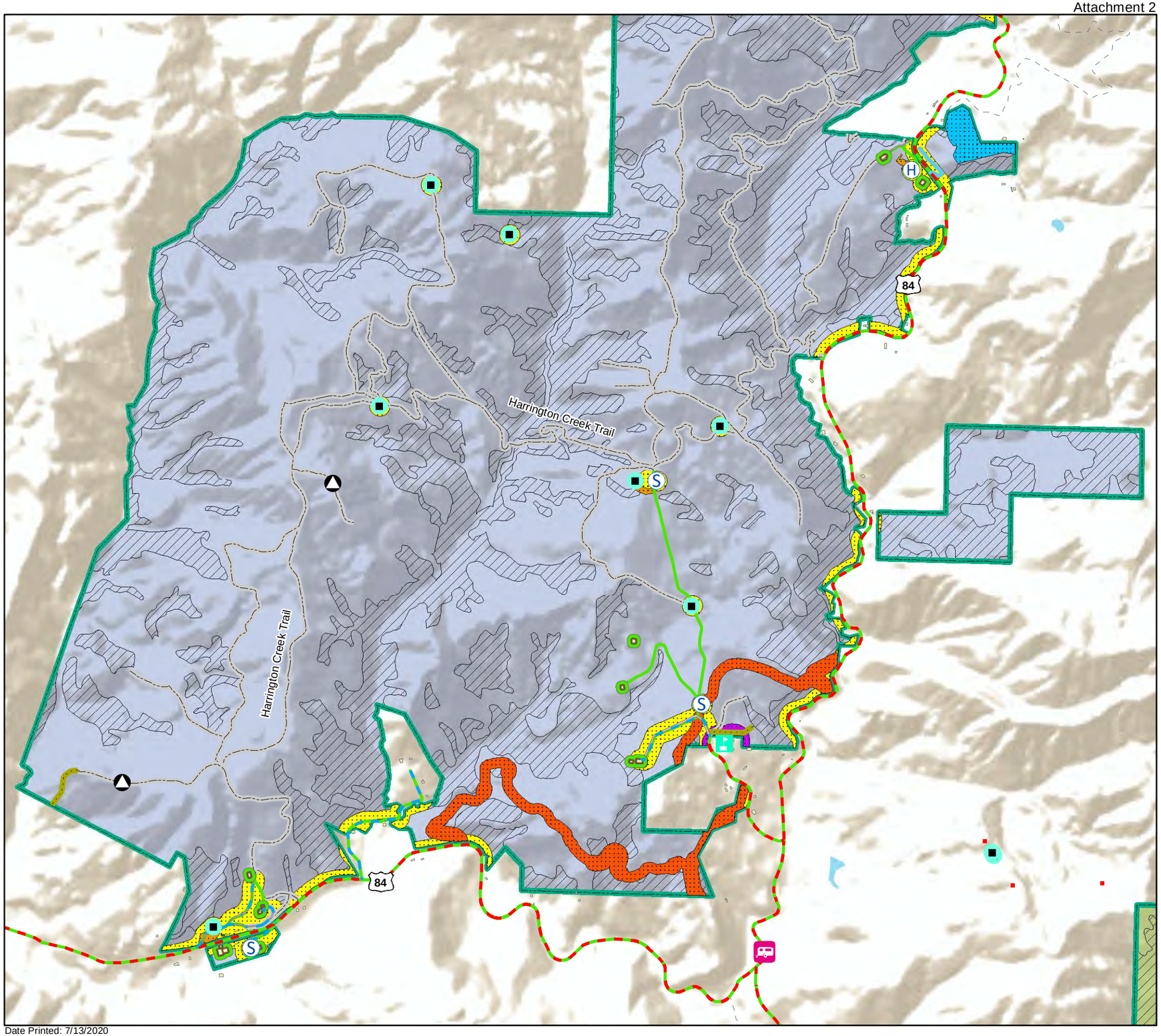
OSP & Managed Properties

- Boundary
- La Honda Creek
- Russian Ridge

* See Table of Contents page for additional symbology.
** Fuel break widths are maximums. Fuelbreaks may be constructed at any width up to the maximum width.



0 0.25 0.5 Miles



Date Printed: 7/13/2020

Existing and Potential Treatments
Windy Hill

Existing Treatments

- Defensible Space 30-foot
- Defensible Space 100-foot
- Fuelbreak 200-foot
- Non-Shaded Fuelbreak
- Shaded Fuelbreak
- Discline

Potential Fuels Treatments

- Fuelbreak 200-foot
- Fuelbreak 300-foot
- Eucalyptus and Acacia Removal
- Non-Shaded Fuelbreak
- Shaded Fuelbreak
- Potential FRAs for Ecosystem Resiliency
- Wildland Type 3 Ingress/Egress

Critical Infrastructure

- Primary Evacuation Route
- Secondary Evacuation Route
- Structure Type 1 (Tender)
- Road or Trail
- SIP Shelter-in-Place
- Water Tank

Target Hazards

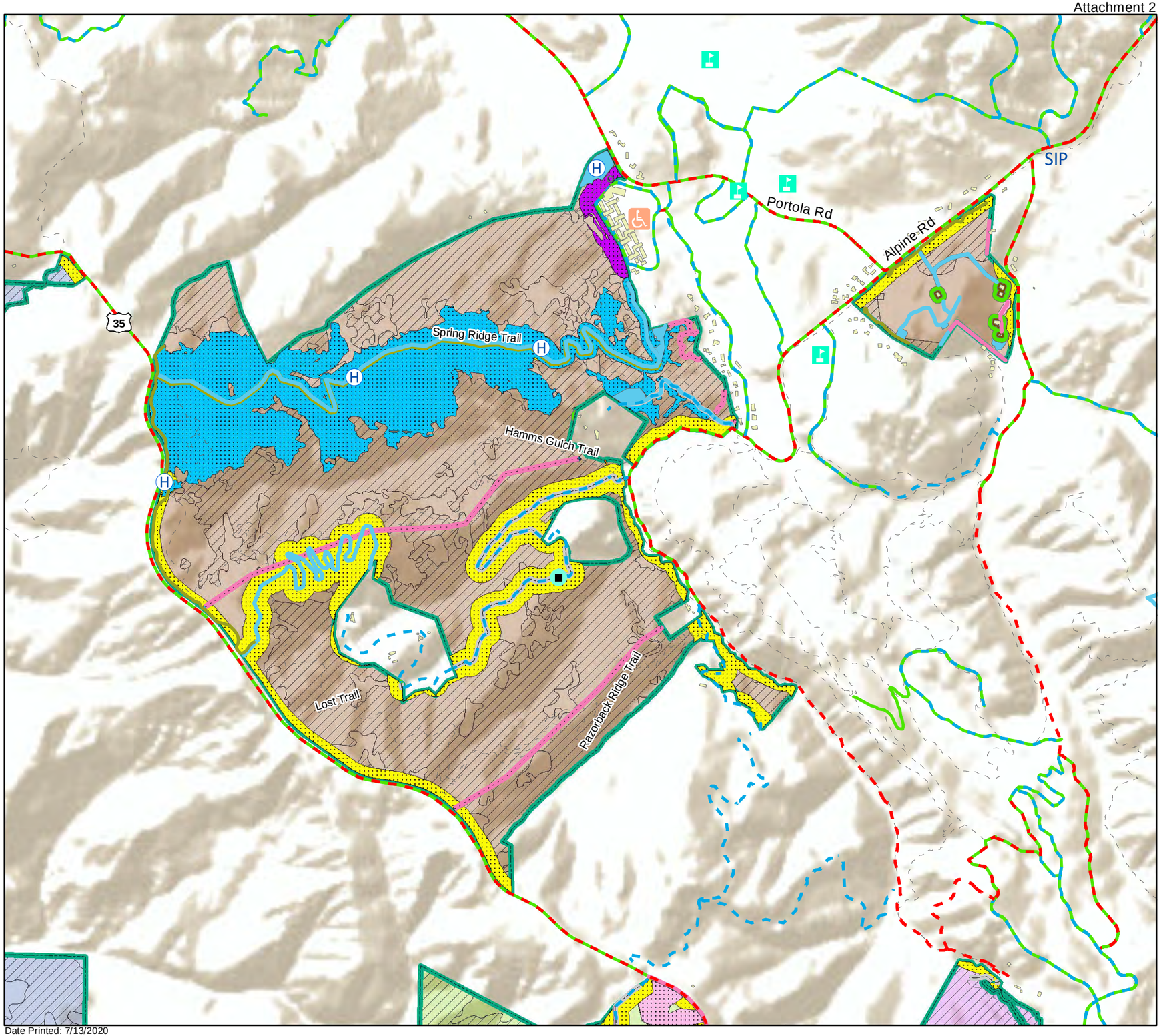
- Assisted Living Facility
- School/Day Care

Fire Management Logistics

- Helispot

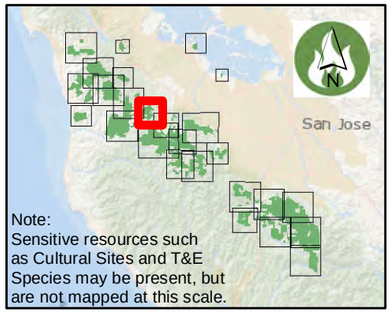
OSP & Managed Properties

- Boundary
- Coal Creek
- La Honda Creek
- Russian Ridge
- Windy Hill



Date Printed: 7/13/2020

* See Table of Contents page for additional symbology.
** Fuel break widths are maximums. Fuelbreaks may be constructed at any width up to the maximum width.



0 0.25 0.5 Miles

Existing and Potential Treatments
Russian Ridge/Coal Creek/Skyline Ridge

Existing Treatments
- Defensible Space 30-foot
- Defensible Space 100-foot
- Fuelbreak 200-foot
- Non-Shaded Fuelbreak
- Shaded Fuelbreak
- Discline

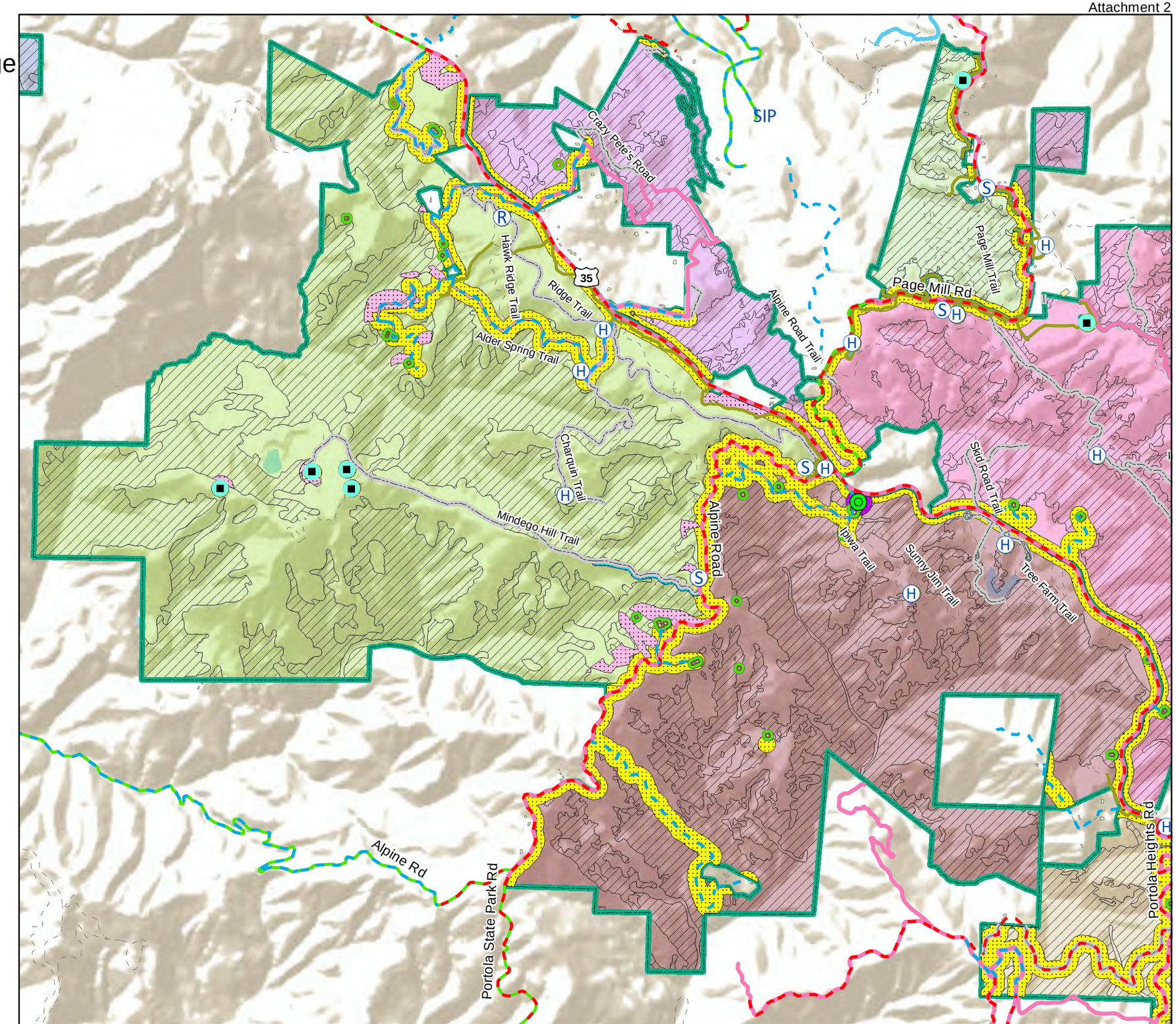
Potential Fuels Treatments
- Fuelbreak 200-foot
- Fuelbreak 300-foot
- Eucalyptus and Acacia Removal
- Non-Shaded Fuelbreak
- Shaded Fuelbreak
- Fire Agency Recommended
- Potential FRAs for Ecosystem Resiliency
- Wildland Type 3 Ingress/Egress

Critical Infrastructure
- Primary Evacuation Route
- Secondary Evacuation Route
- Structure Type 1 (Tender)
- Road or Trail
- (R) Communication
- SIP Shelter-in-Place
- Water Tank

Target Hazards
- Community Center

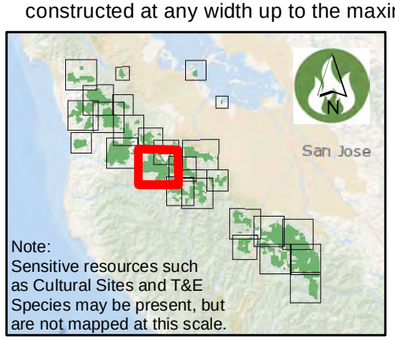
Fire Management Logistics
- (H) Helispot
- (S) Staging Area

OSP & Managed Properties
- Boundary
- Coal Creek
- Foothills
- La Honda Creek
- Long Ridge
- Los Trancos
- Monte Bello
- Russian Ridge
- Skyline Ridge



Date Printed: 7/13/2020

* See Table of Contents page for additional symbology.
** Fuel break widths are maximums. Fuelbreaks may be constructed at any width up to the maximum width.



0 0.25 0.5 Miles

Existing and Potential Treatments
Coal Creek/Foothills/Los Trancos

Existing Treatments

- Defensible Space 30-foot
- Defensible Space 100-foot
- Fuelbreak 200-foot
- Non-Shaded Fuelbreak
- Shaded Fuelbreak
- Discline

Potential Fuels Treatments

- Fuelbreak 200-foot
- Eucalyptus and Acacia Removal
- Non-Shaded Fuelbreak
- Shaded Fuelbreak
- Fire Agency Recommended
- Potential FRAs for Ecosystem Resiliency
- Wildland Type 3 Ingress/Egress

Critical Infrastructure

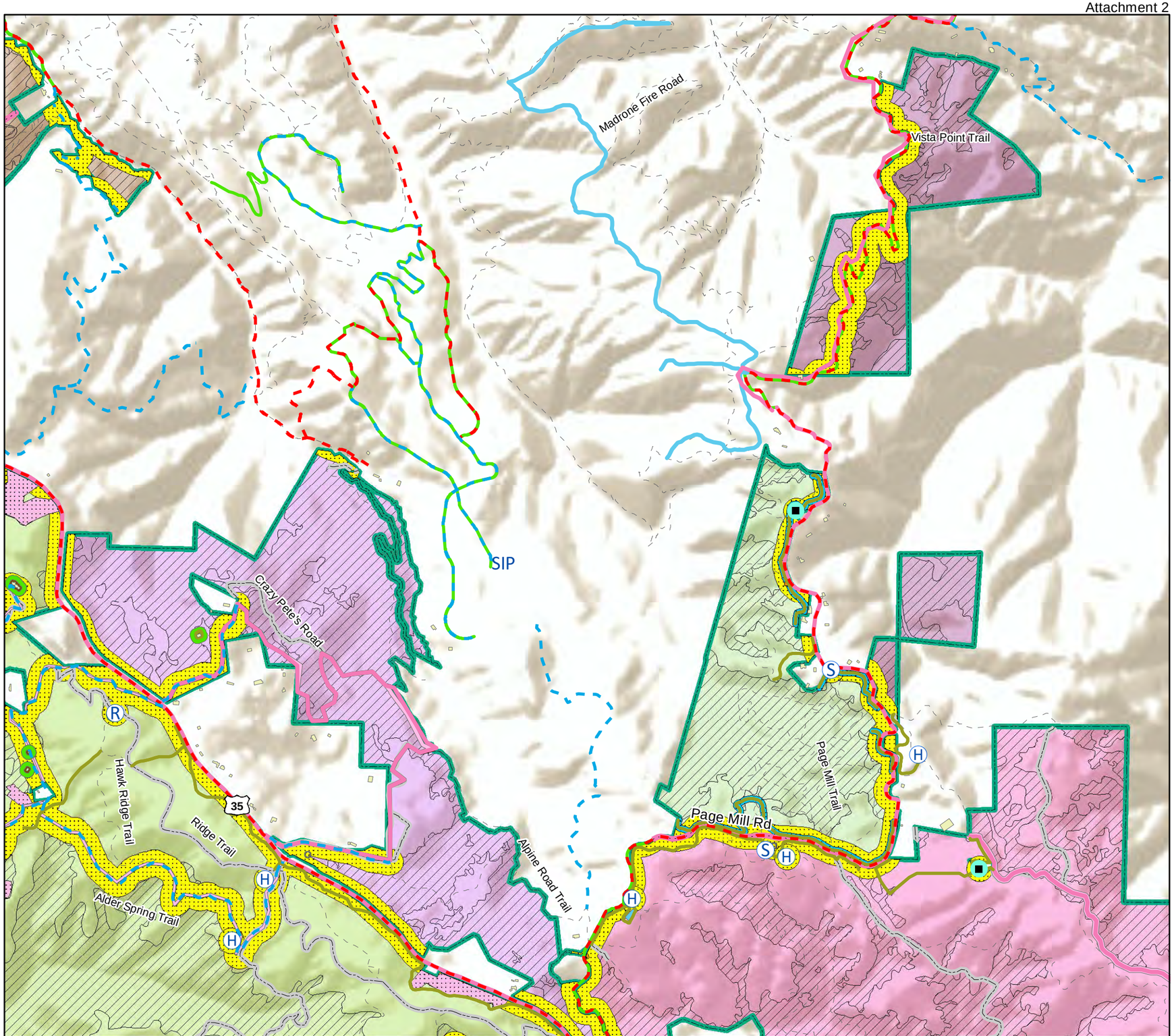
- Primary Evacuation Route
- Secondary Evacuation Route
- Structure Type 1 (Tender)
- Road or Trail
- Communication
- Shelter-in-Place
- Water Tank

Fire Management Logistics

- Helispot
- Staging Area

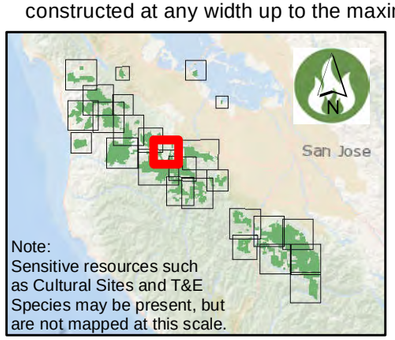
OSP & Managed Properties

- Boundary
- Coal Creek
- Foothills
- Los Trancos
- Monte Bello
- Russian Ridge
- Windy Hill



Date Printed: 7/13/2020

* See Table of Contents page for additional symbology.
** Fuel break widths are maximums. Fuelbreaks may be constructed at any width up to the maximum width.



0 0.25 0.5 Miles

Existing and Potential Treatments
Rancho San Antonio

Existing Treatments
- Defensible Space 30-foot
- Defensible Space 100-foot
- Fuelbreak 200-foot
- Non-Shaded Fuelbreak
- Shaded Fuelbreak
- Discline

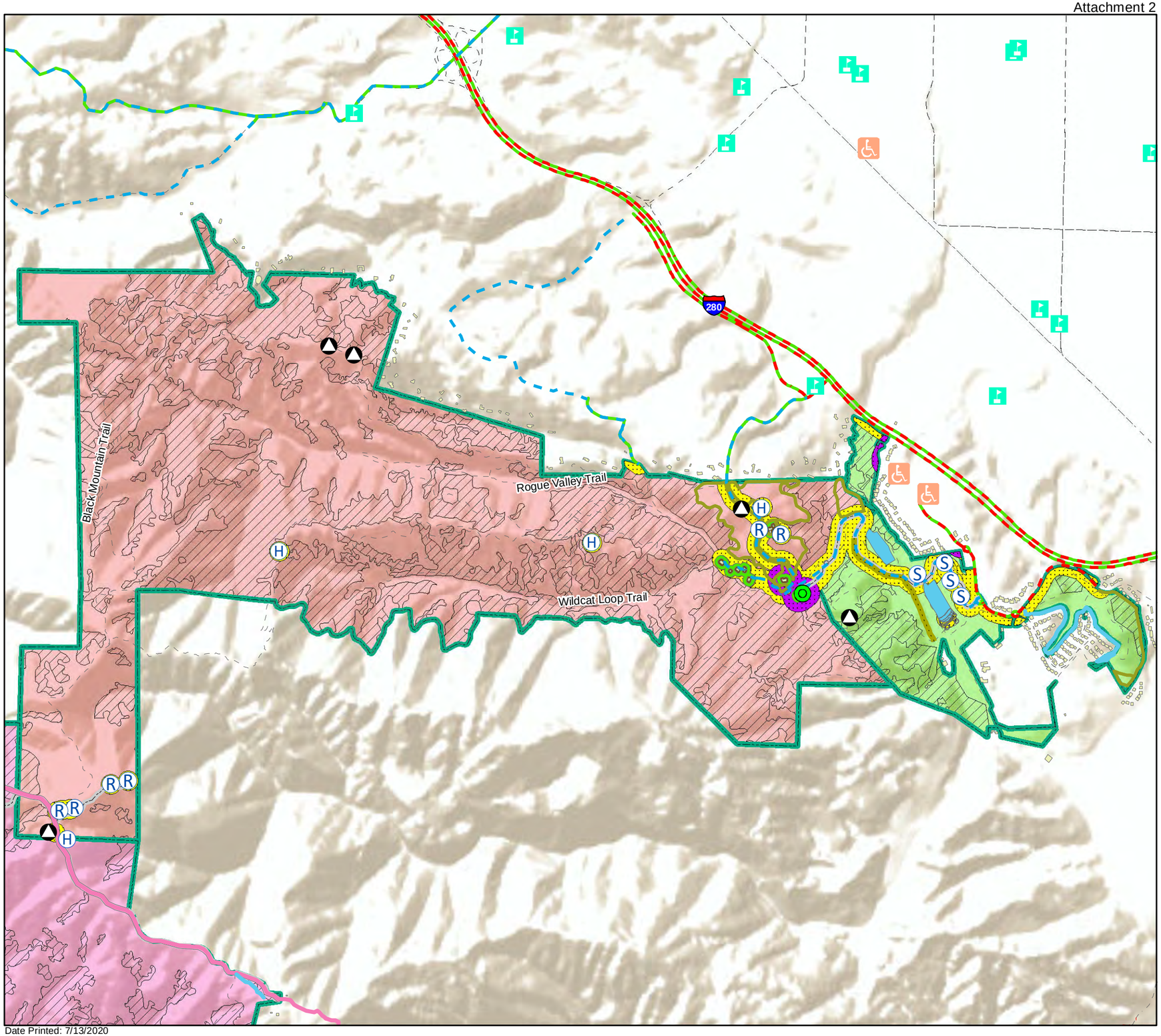
Potential Fuels Treatments
- Fuelbreak 200-foot
- Fuelbreak 300-foot
- Eucalyptus and Acacia Removal
- Non-Shaded Fuelbreak
- Potential FRAs for Ecosystem Resiliency
- Discline
- Wildland Type 3 Ingress/Egress

Critical Infrastructure
- Primary Evacuation Route
- Secondary Evacuation Route
- Structure Type 1 (Tender)
- Road or Trail
- Communication

Target Hazards
- Assisted Living Facility
- Community Center
- School/Day Care

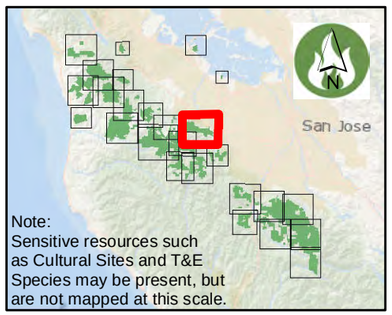
Fire Management Logistics
- Helispot
- Lookout
- Staging Area

OSP & Managed Properties
- Boundary
- Monte Bello
- Rancho San Antonio
- Rancho San Antonio County Park



Date Printed: 7/13/2020

* See Table of Contents page for additional symbology.
** Fuel break widths are maximums. Fuelbreaks may be constructed at any width up to the maximum width.



0 0.25 0.5 Miles

Existing and Potential Treatments
Monte Bello

Existing Treatments

- Defensible Space 30-foot
- Defensible Space 100-foot
- Fuelbreak 200-foot
- Non-Shaded Fuelbreak
- Shaded Fuelbreak
- Discline

Potential Fuels Treatments

- Fuelbreak 200-foot
- Fuelbreak 300-foot
- Non-Shaded Fuelbreak
- Shaded Fuelbreak
- Potential FRAs for Ecosystem Resiliency
- Wildland Type 3 Ingress/Egress

Critical Infrastructure

- Primary Evacuation Route
- Secondary Evacuation Route
- Road or Trail
- Communication
- Shelter-in-Place
- Water Tank

Target Hazards

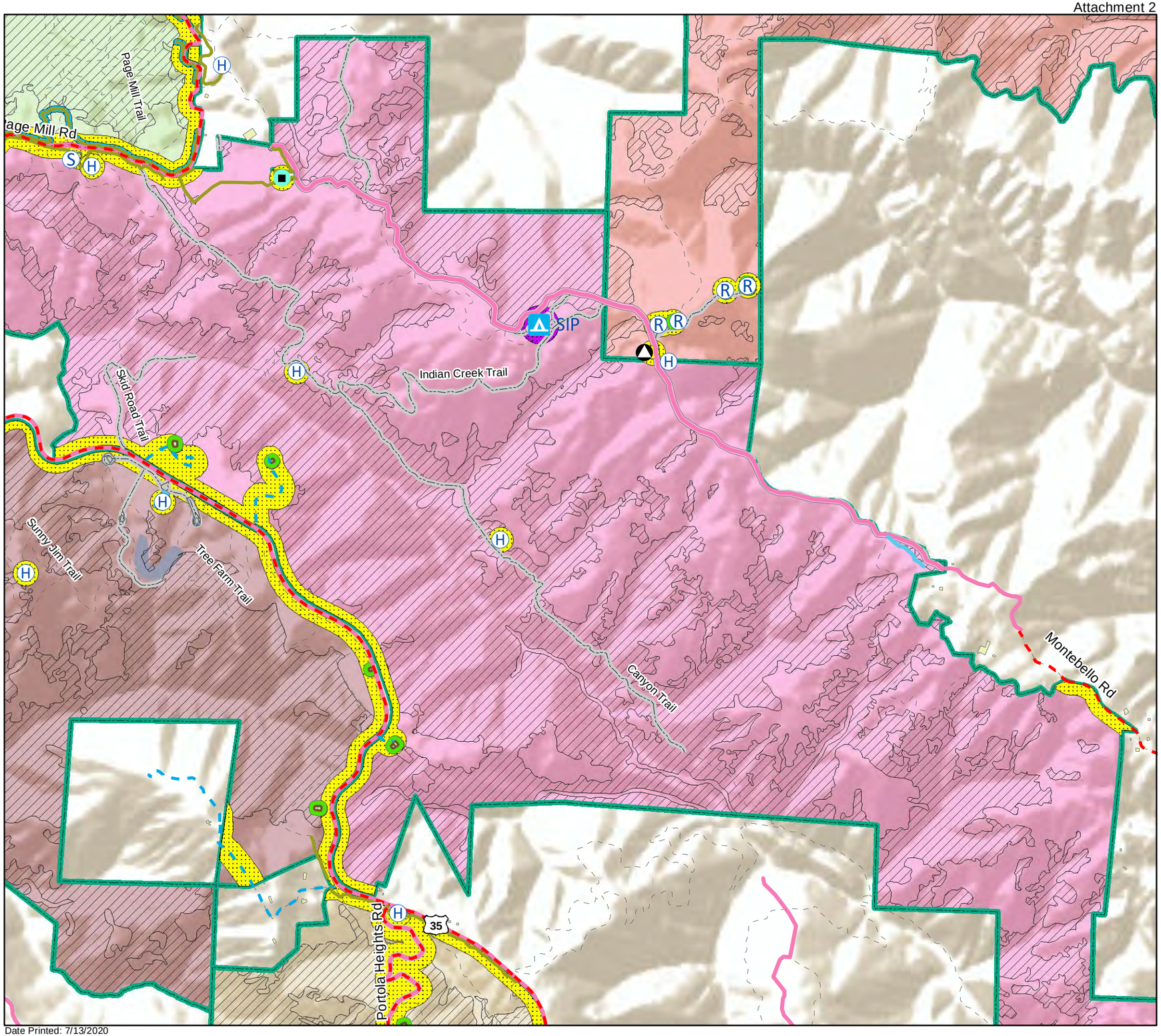
- Camp Site

Fire Management Logistics

- Helispot
- Lookout
- Staging Area

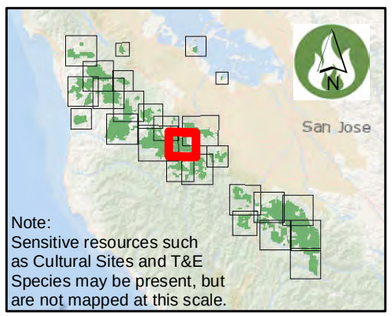
OSP & Managed Properties

- Boundary
- Foothills
- Long Ridge
- Los Trancos
- Monte Bello
- Rancho San Antonio
- Skyline Ridge



Date Printed: 7/13/2020

* See Table of Contents page for additional symbology.
** Fuel break widths are maximums. Fuelbreaks may be constructed at any width up to the maximum width.



0 0.25 0.5 Miles

Existing and Potential Treatments
Long Ridge

Existing Treatments

- Defensible Space 30-foot
- Defensible Space 100-foot
- Fuelbreak 200-foot
- Non-Shaded Fuelbreak
- Shaded Fuelbreak
- Discline

Potential Fuels Treatments

- Fuelbreak 200-foot
- Fuelbreak 300-foot
- Potential FRAs for Ecosystem Resiliency
- Wildland Type 3 Ingress/Egress

Critical Infrastructure

- Primary Evacuation Route
- Secondary Evacuation Route
- Road or Trail

Target Hazards

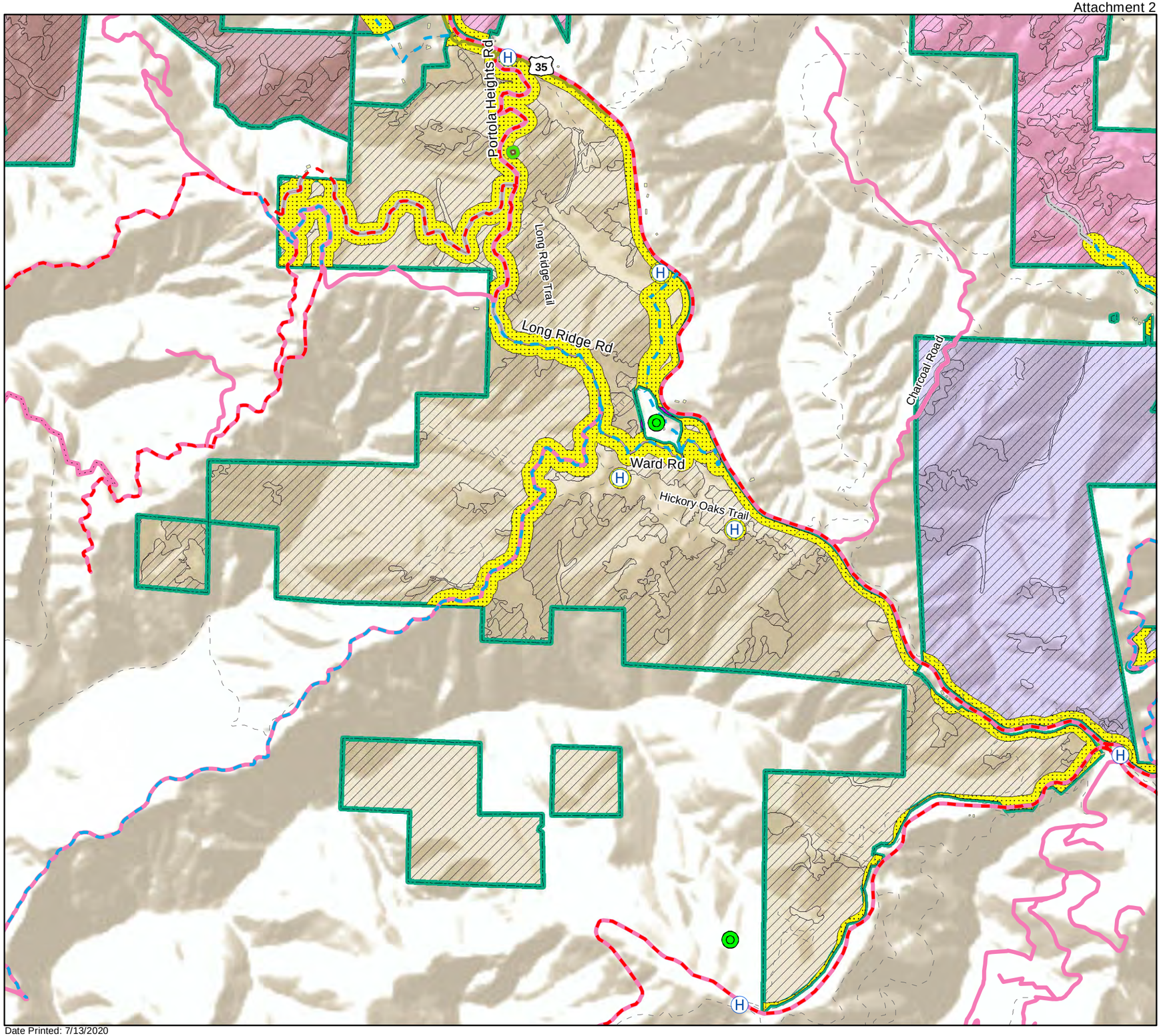
- Community Center

Fire Management Logistics

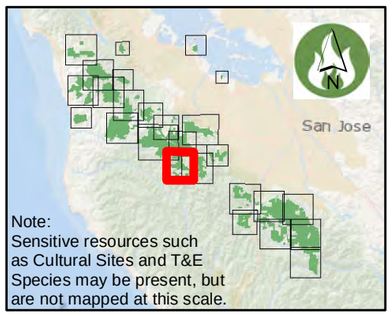
- Helispot

OSP & Managed Properties

- Boundary
- Long Ridge
- Monte Bello
- Saratoga Gap
- Skyline Ridge



* See Table of Contents page for additional symbology.
** Fuel break widths are maximums. Fuelbreaks may be constructed at any width up to the maximum width.



0 0.25 0.5 Miles

Date Printed: 7/13/2020

Existing and Potential Treatments
Saratoga Gap/Monte Bello/Long Ridge

Existing Treatments

- Defensible Space 30-foot
- Defensible Space 100-foot
- Fuelbreak 200-foot
- Non-Shaded Fuelbreak
- Shaded Fuelbreak
- Discline

Potential Fuels Treatments

- Fuelbreak 200-foot
- Fuelbreak 300-foot
- Eucalyptus and Acacia Removal
- Potential FRAs for Ecosystem Resiliency
- Wildland Type 3 Ingress/Egress

Critical Infrastructure

- Primary Evacuation Route
- Secondary Evacuation Route
- Road or Trail

Target Hazards

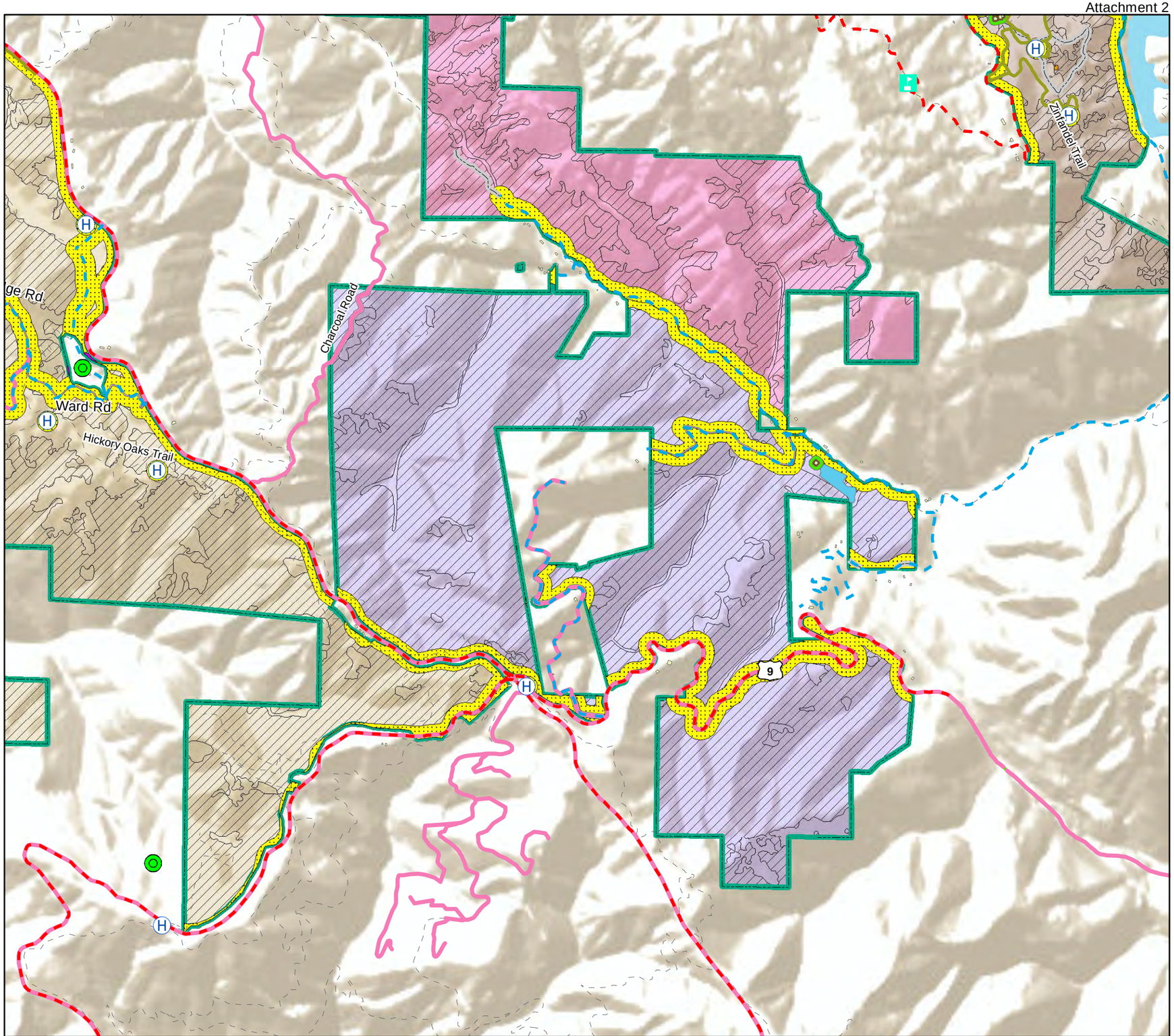
- Community Center
- School/Day Care

Fire Management Logistics

- Helispot

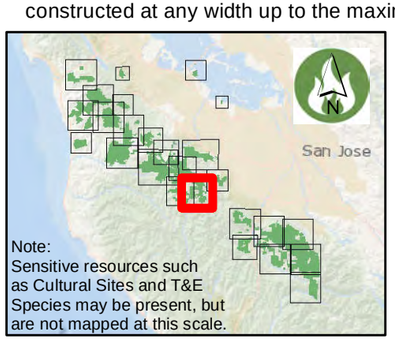
OSP & Managed Properties

- Boundary
- Long Ridge
- Monte Bello
- Picchetti Ranch
- Saratoga Gap



Date Printed: 7/13/2020

* See Table of Contents page for additional symbology.
** Fuel break widths are maximums. Fuelbreaks may be constructed at any width up to the maximum width.



0 0.25 0.5 Miles

Existing and Potential Treatments
Fremont Older/Picchetti Ranch

Existing Treatments

- Defensible Space 30-foot
- Defensible Space 100-foot
- Fuelbreak 200-foot
- Non-Shaded Fuelbreak
- Shaded Fuelbreak
- Discline

Potential Fuels Treatments

- Fuelbreak 200-foot
- Eucalyptus and Acacia Removal
- Shaded Fuelbreak
- Potential FRAs for Ecosystem Resiliency
- Wildland Type 3 Ingress/Egress

Critical Infrastructure

- Primary Evacuation Route
- Secondary Evacuation Route
- Structure Type 1 (Tender)
- Road or Trail
- Water Tank

Target Hazards

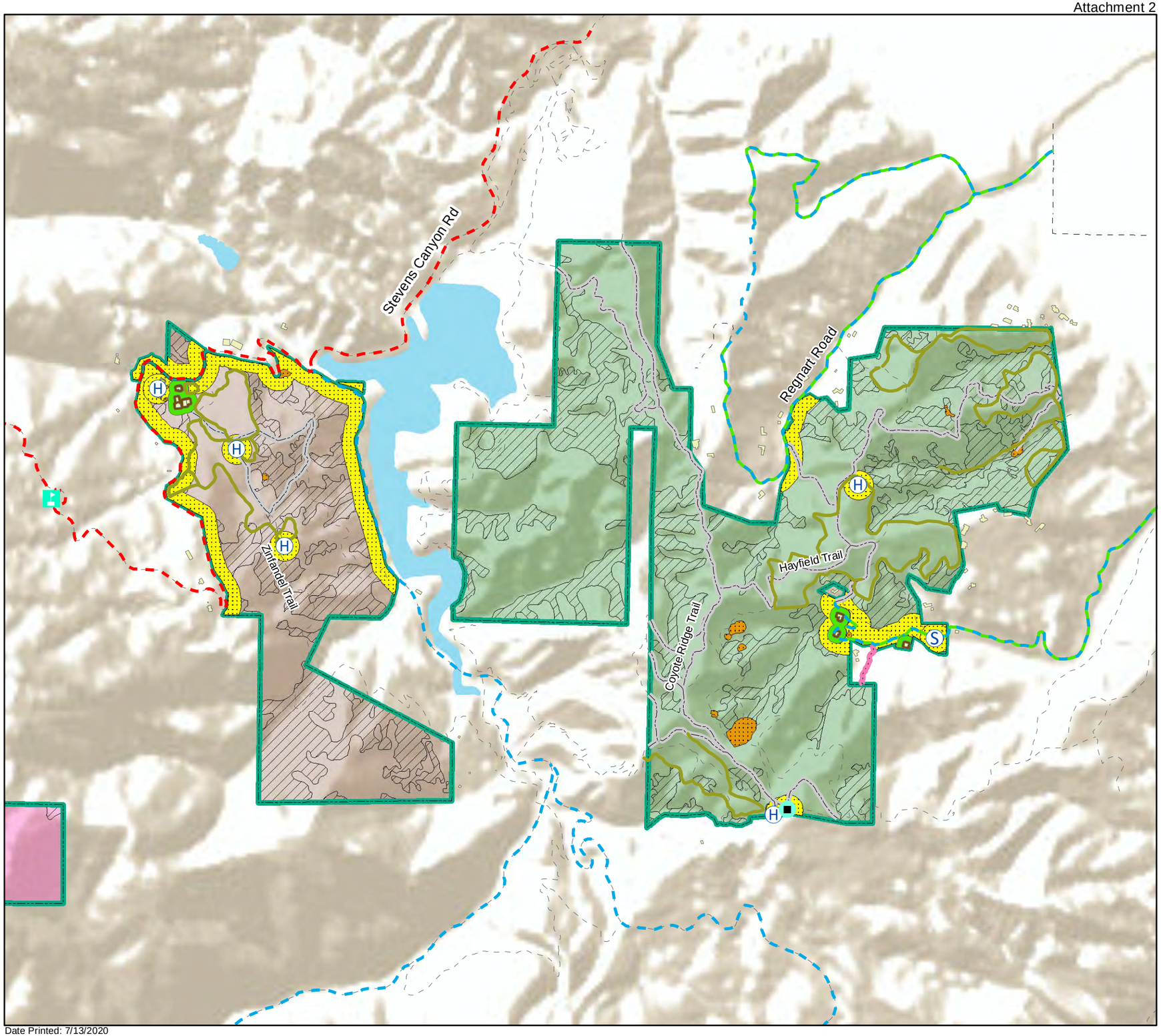
- School/Day Care

Fire Management Logistics

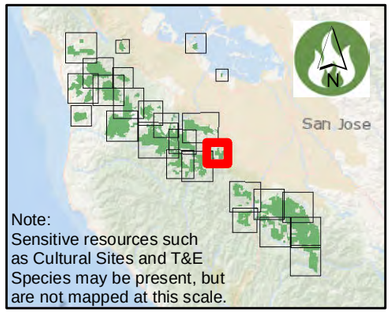
- Helispot
- Staging Area

OSP & Managed Properties

- Boundary
- Fremont Older
- Monte Bello
- Picchetti Ranch



* See Table of Contents page for additional symbology.
** Fuel break widths are maximums. Fuelbreaks may be constructed at any width up to the maximum width.



0 0.25 0.5 Miles

Date Printed: 7/13/2020

Existing and Potential Treatments
El Sereno/Felton Station/St. Joseph's Hill

Existing Treatments
- Fuelbreak 200-foot
- Non-Shaded Fuelbreak
- Shaded Fuelbreak
- Discline
- Wildland Type 3 Ingress/Egress

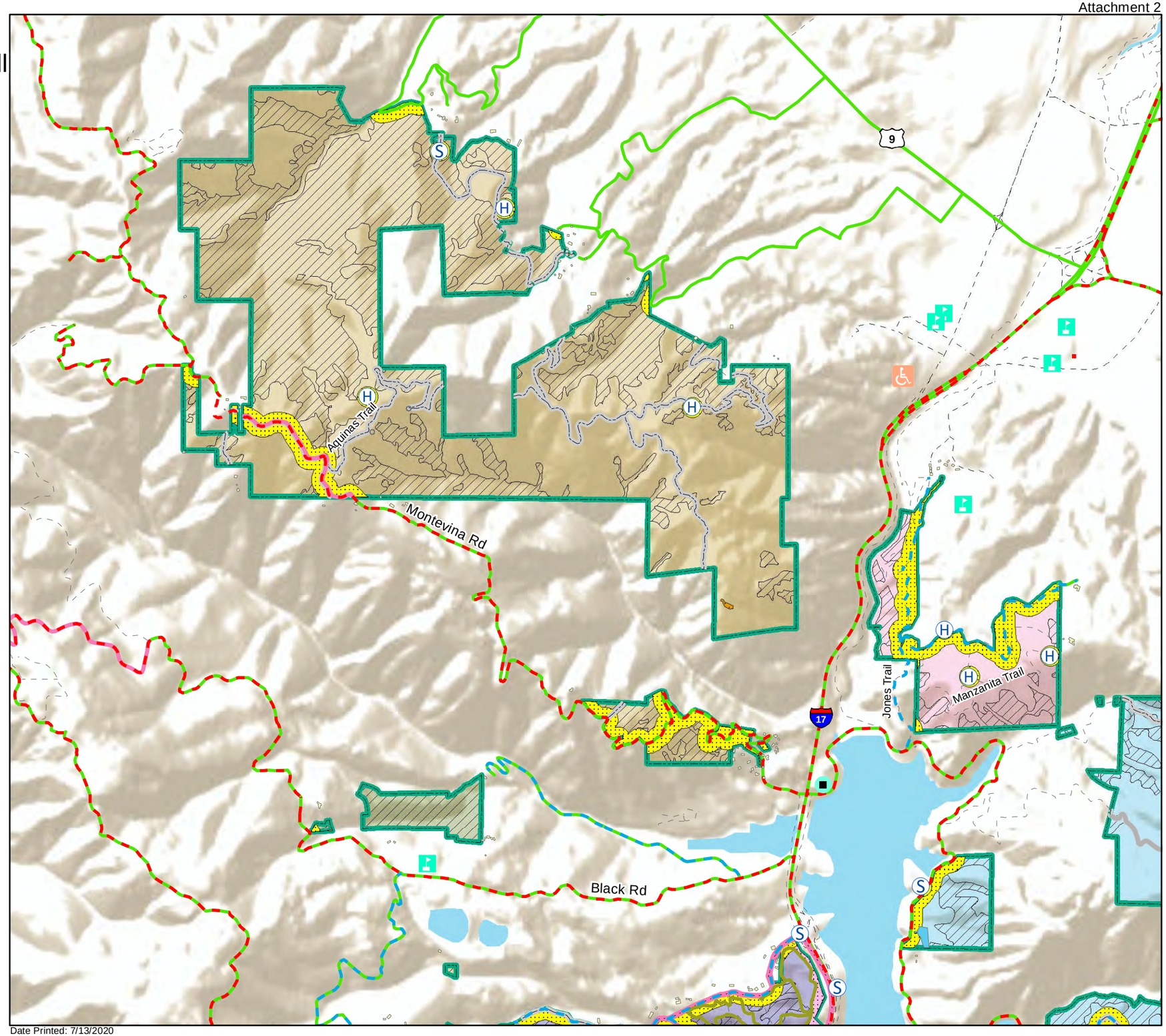
Potential Fuels Treatments
- Fuelbreak 200-foot
- Eucalyptus and Acacia Removal
- Shaded Fuelbreak
- Potential FRAs for Ecosystem Resiliency
- Wildland Type 3 Ingress/Egress

Critical Infrastructure
- Primary Evacuation Route
- Secondary Evacuation Route
- Structure Type 1 (Tender)
- Road or Trail
- Water Tank

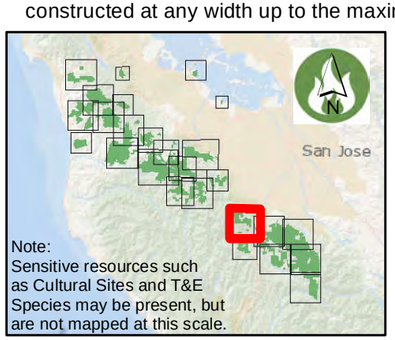
Target Hazards
- Assisted Living Facility
- School/Day Care

Fire Management Logistics
- Helispot
- Staging Area

OSP & Managed Properties
- Boundary
- Bear Creek Redwoods
- El Sereno
- Felton Station
- Sierra Azul
- St. Joseph's Hill



* See Table of Contents page for additional symbology.
** Fuel break widths are maximums. Fuelbreaks may be constructed at any width up to the maximum width.



0 0.25 0.5 Miles

Date Printed: 7/13/2020

Existing and Potential Treatments
Bear Creek Redwoods

Existing Treatments
- Defensible Space 30-foot
- Defensible Space 100-foot
- Fuelbreak 200-foot
- Non-Shaded Fuelbreak
- Shaded Fuelbreak
- Discline

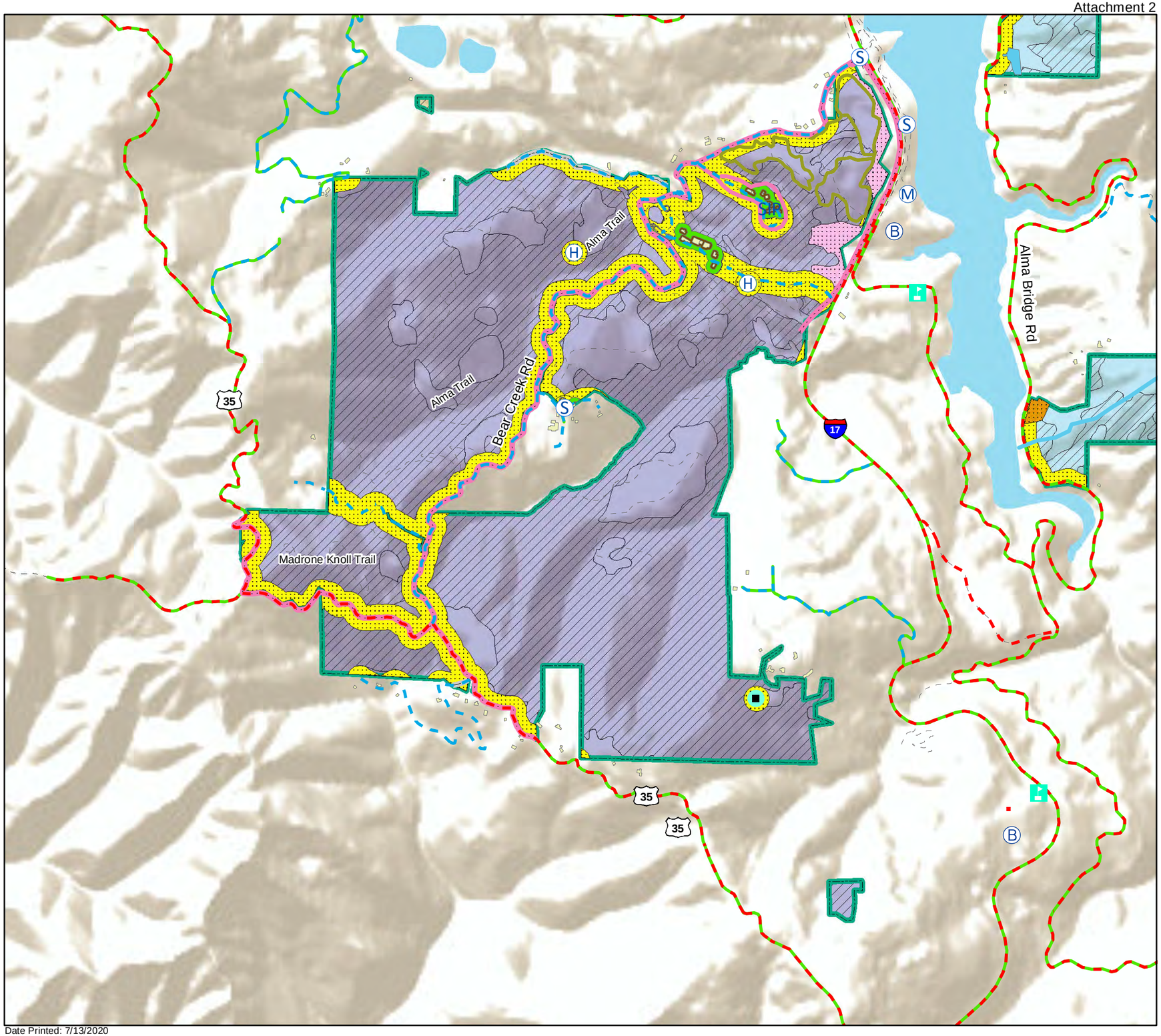
Potential Fuels Treatments
- Fuelbreak 200-foot
- Eucalyptus and Acacia Removal
- Shaded Fuelbreak
- Potential FRAs for Ecosystem Resiliency
- Wildland Type 3 Ingress/Egress

Critical Infrastructure
- Primary Evacuation Route
- Secondary Evacuation Route
- Structure Type 1 (Tender)
- Road or Trail
- Ⓑ Incident Command Post
- Ⓜ Medivac Site
- SIP Shelter-in-Place
- Water Tank

Target Hazards
- School/Day Care

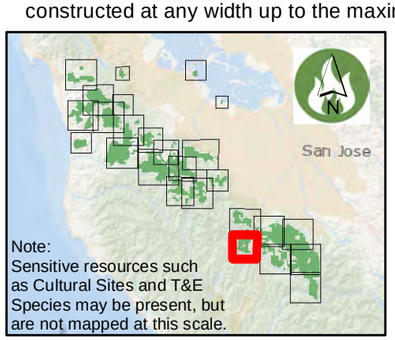
Fire Management Logistics
- Ⓗ Helispot
- Ⓢ Staging Area

OSP & Managed Properties
- Boundary
- Bear Creek Redwoods
- El Sereno
- Sierra Azul



Date Printed: 7/13/2020

* See Table of Contents page for additional symbology.
** Fuel break widths are maximums. Fuelbreaks may be constructed at any width up to the maximum width.



0 0.25 0.5 Miles

Existing and Potential Treatments
Sierra Azul (1 of 5)

Existing Treatments
- Defensible Space 100-foot
- Fuelbreak 200-foot
- Non-Shaded Fuelbreak
- Shaded Fuelbreak
- Discline
- Wildland Type 3 Ingress/Egress

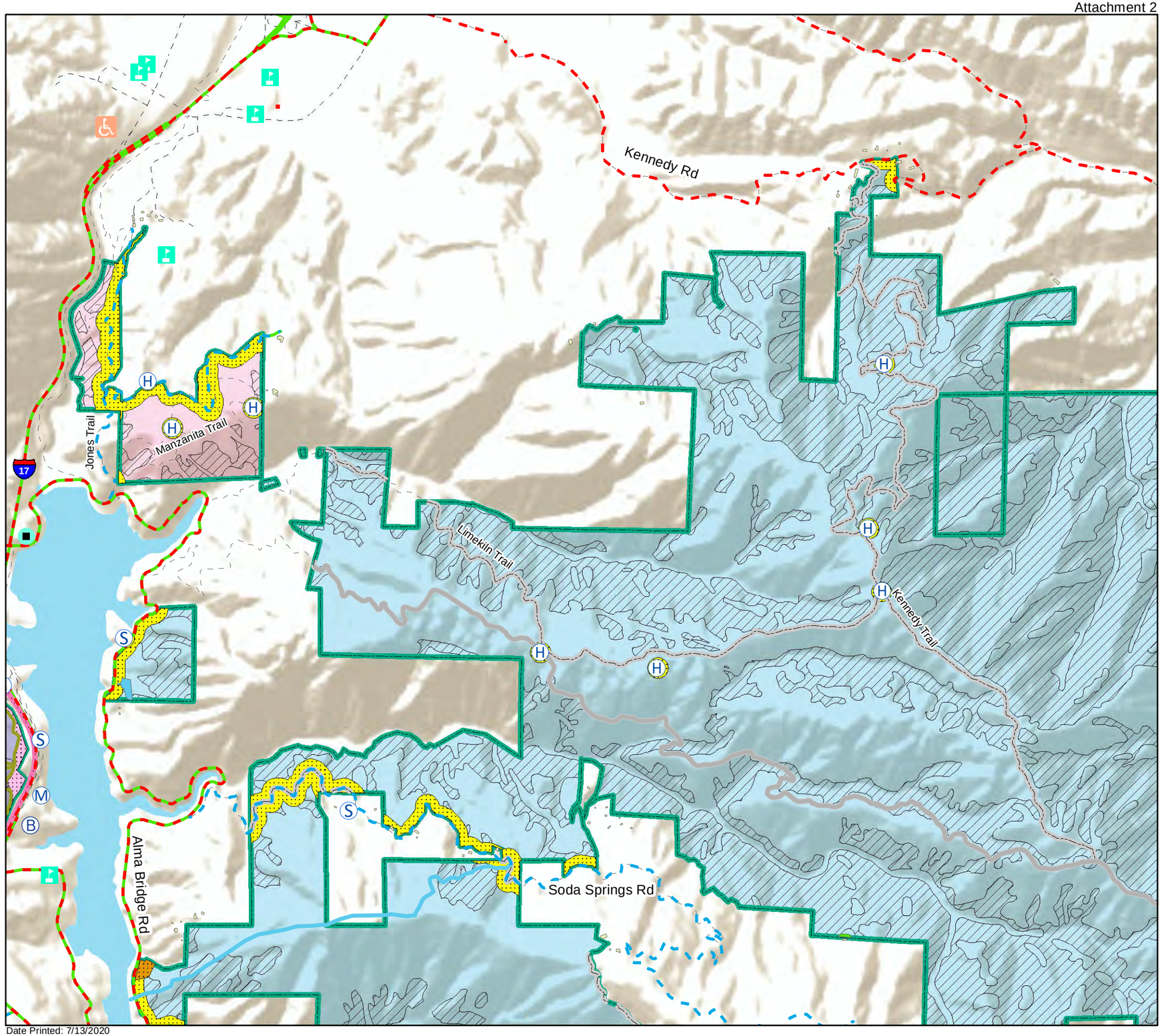
Potential Fuels Treatments
- Fuelbreak 200-foot
- Eucalyptus and Acacia Removal
- Shaded Fuelbreak
- Potential FRAs for Ecosystem Resiliency
- Wildland Type 3 Ingress/Egress

Critical Infrastructure
- Primary Evacuation Route
- Secondary Evacuation Route
- Structure Type 1 (Tender)
- Road or Trail
- Incident Command Post
- Medivac Site
- Water Tank

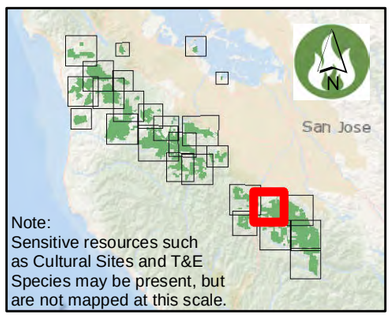
Target Hazards
- Assisted Living Facility
- School/Day Care

Fire Management Logistics
- Helispot
- Staging

OSP & Managed Properties
- Boundary
- Bear Creek Redwoods
- Sierra Azul
- St. Joseph's Hill



* See Table of Contents page for additional symbology.
** Fuel break widths are maximums. Fuelbreaks may be constructed at any width up to the maximum width.



0 0.25 0.5 Miles

Date Printed: 7/13/2020

Existing and Potential Treatments
Sierra Azul (2 of 5)

Existing Treatments
- Defensible Space 30-foot
- Defensible Space 100-foot
- Fuelbreak 200-foot
- Non-Shaded Fuelbreak
- Shaded Fuelbreak
- Discline
- Wildland Type 3 Ingress/Egress

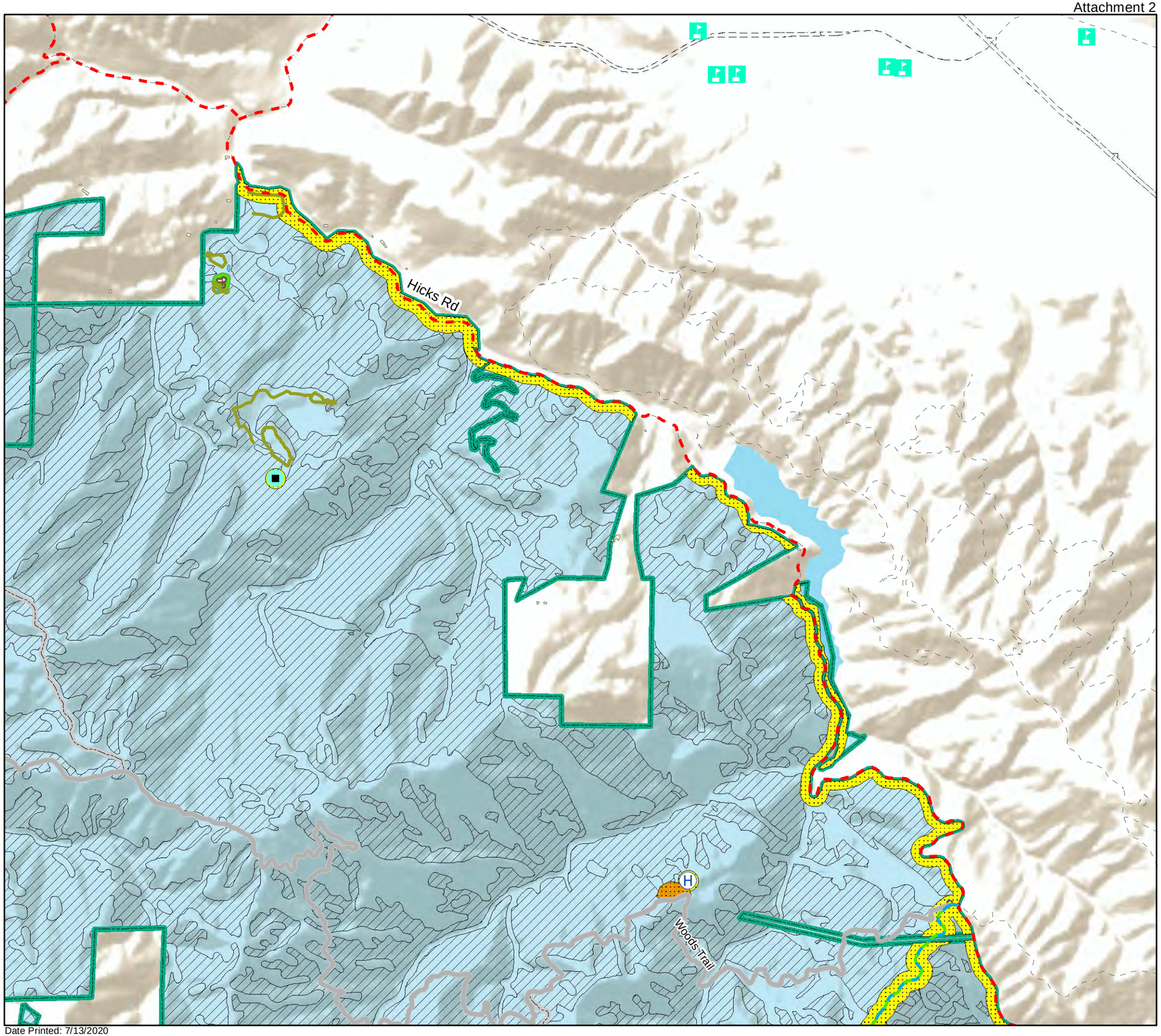
Potential Fuels Treatments
- Fuelbreak 200-foot
- Eucalyptus and Acacia Removal
- Potential FRAs for Ecosystem Resiliency
- Wildland Type 3 Ingress/Egress

Critical Infrastructure
- Primary Evacuation Route
- Secondary Evacuation Route
- Structure Type 1 (Tender)
- Road or Trail
- Water Tank

Target Hazards
- School/Day Care

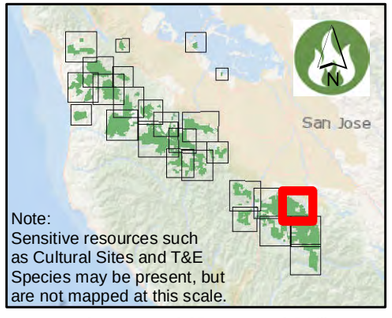
Fire Management Logistics
- Helispot

OSP & Managed Properties
- Boundary
- Sierra Azul



Date Printed: 7/13/2020

* See Table of Contents page for additional symbology.
** Fuel break widths are maximums. Fuelbreaks may be constructed at any width up to the maximum width.



0 0.25 0.5 Miles

Existing and Potential Treatments
Sierra Azul (3 of 5)

Existing Treatments

- Defensible Space 100-foot
- Fuelbreak 200-foot
- Non-Shaded Fuelbreak
- Shaded Fuelbreak
- Wildland Type 3 Ingress/Egress

Potential Fuels Treatments

- Fuelbreak 200-foot
- Potential FRAs for Ecosystem Resiliency
- Wildland Type 3 Ingress/Egress

Critical Infrastructure

- Secondary Evacuation Route
- Structure Type 1 (Tender)
- Road or Trail
- Communication
- Water Tank

Target Hazards

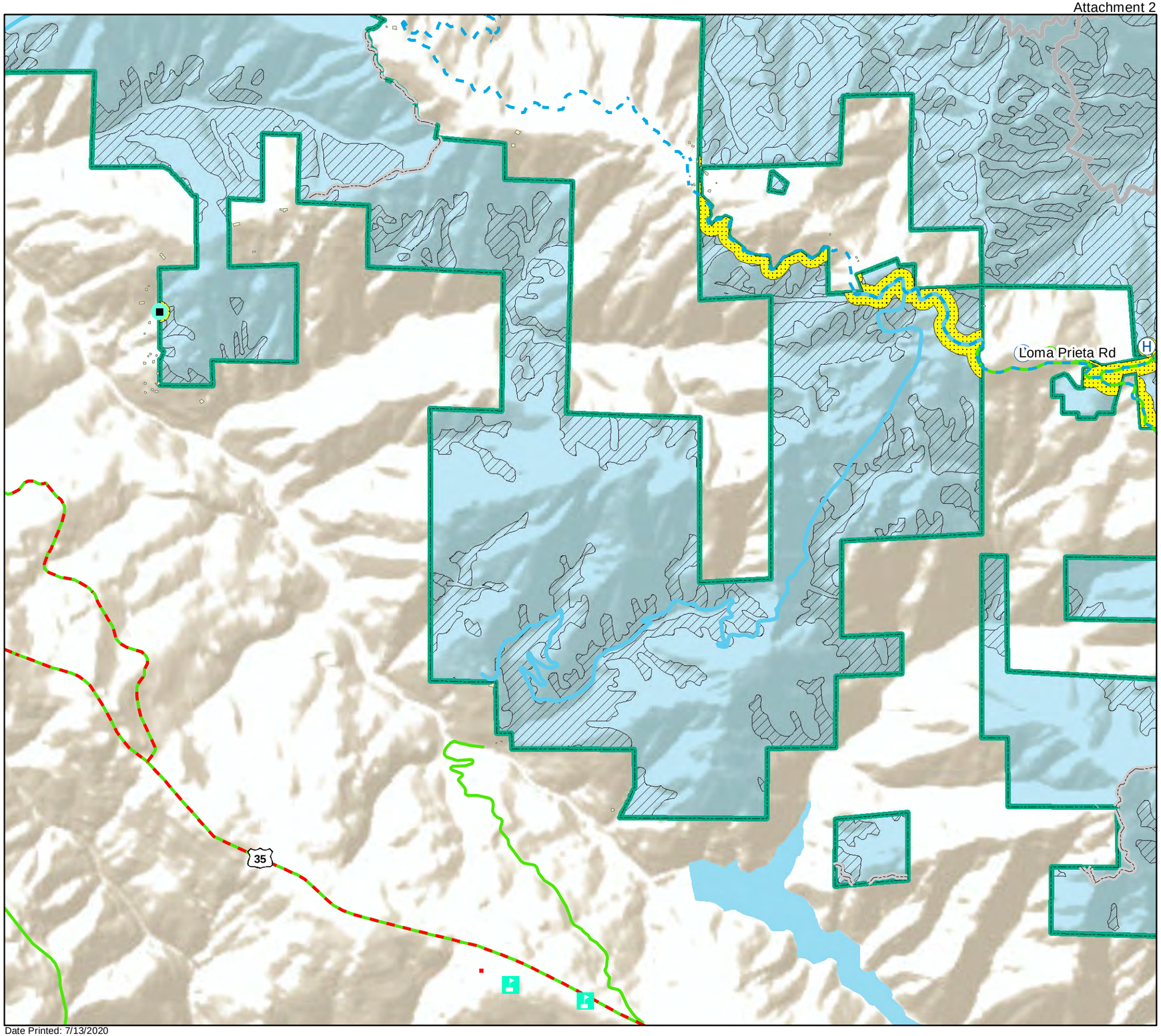
- School/Day Care

Fire Management Logistics

- Helispot

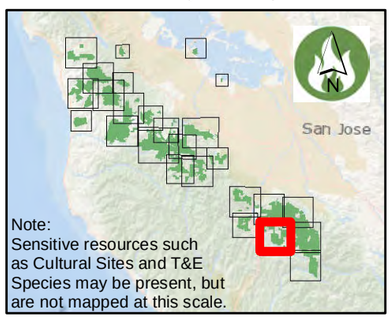
OSP & Managed Properties

- Boundary
- Sierra Azul



Date Printed: 7/13/2020

* See Table of Contents page for additional symbology.
** Fuel break widths are maximums. Fuelbreaks may be constructed at any width up to the maximum width.



0 0.25 0.5 Miles

Existing and Potential Treatments
Sierra Azul (4 of 5)

Existing Treatments

- Defensible Space 30-foot
- Defensible Space 100-foot
- Fuelbreak 200-foot
- Non-Shaded Fuelbreak
- Shaded Fuelbreak
- Wildland Type 3 Ingress/Egress

Potential Fuels Treatments

- Fuelbreak 200-foot
- Eucalyptus and Acacia Removal
- Shaded Fuelbreak
- Fire Agency Recommended
- Potential FRAs for Ecosystem Resiliency
- Wildland Type 3 Ingress/Egress

Critical Infrastructure

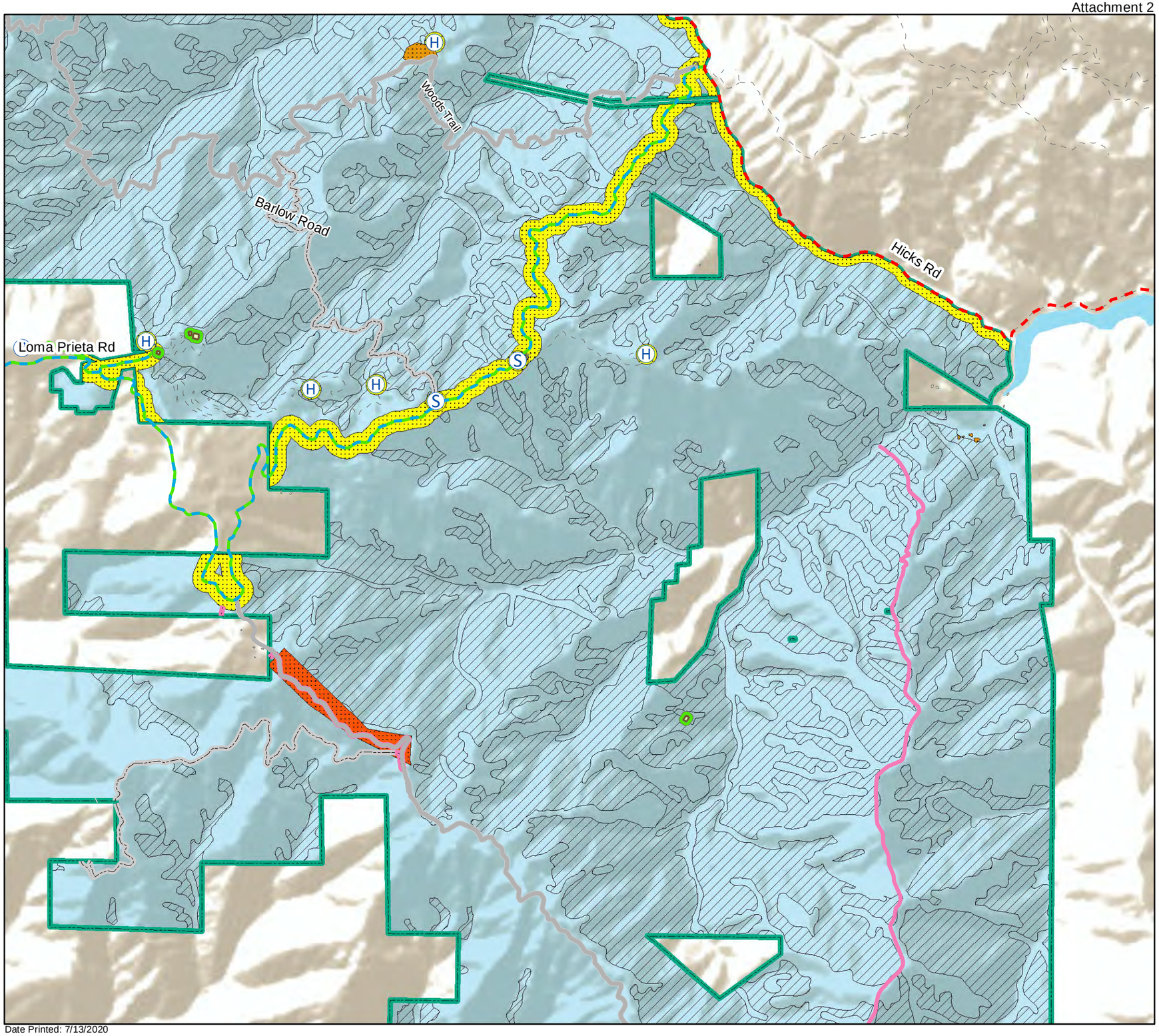
- Primary Evacuation Route
- Secondary Evacuation Route
- Structure Type 1 (Tender)
- Road or Trail
- Communication

Fire Management Logistics

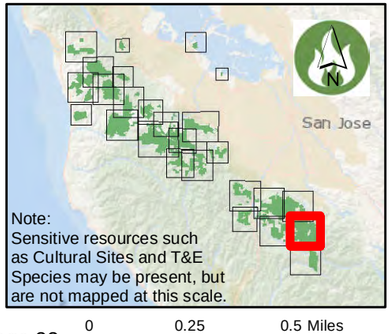
- Helispot
- Staging Area

OSP & Managed Properties

- Boundary
- Sierra Azul



* See Table of Contents page for additional symbology.
** Fuel break widths are maximums. Fuelbreaks may be constructed at any width up to the maximum width.



0 0.25 0.5 Miles

Date Printed: 7/13/2020

Existing and Potential Treatments
Sierra Azul (5 of 5)

Existing Treatments

- Shaded Fuelbreak
- Wildland Type 3 Ingress/Egress

Potential Fuels Treatments

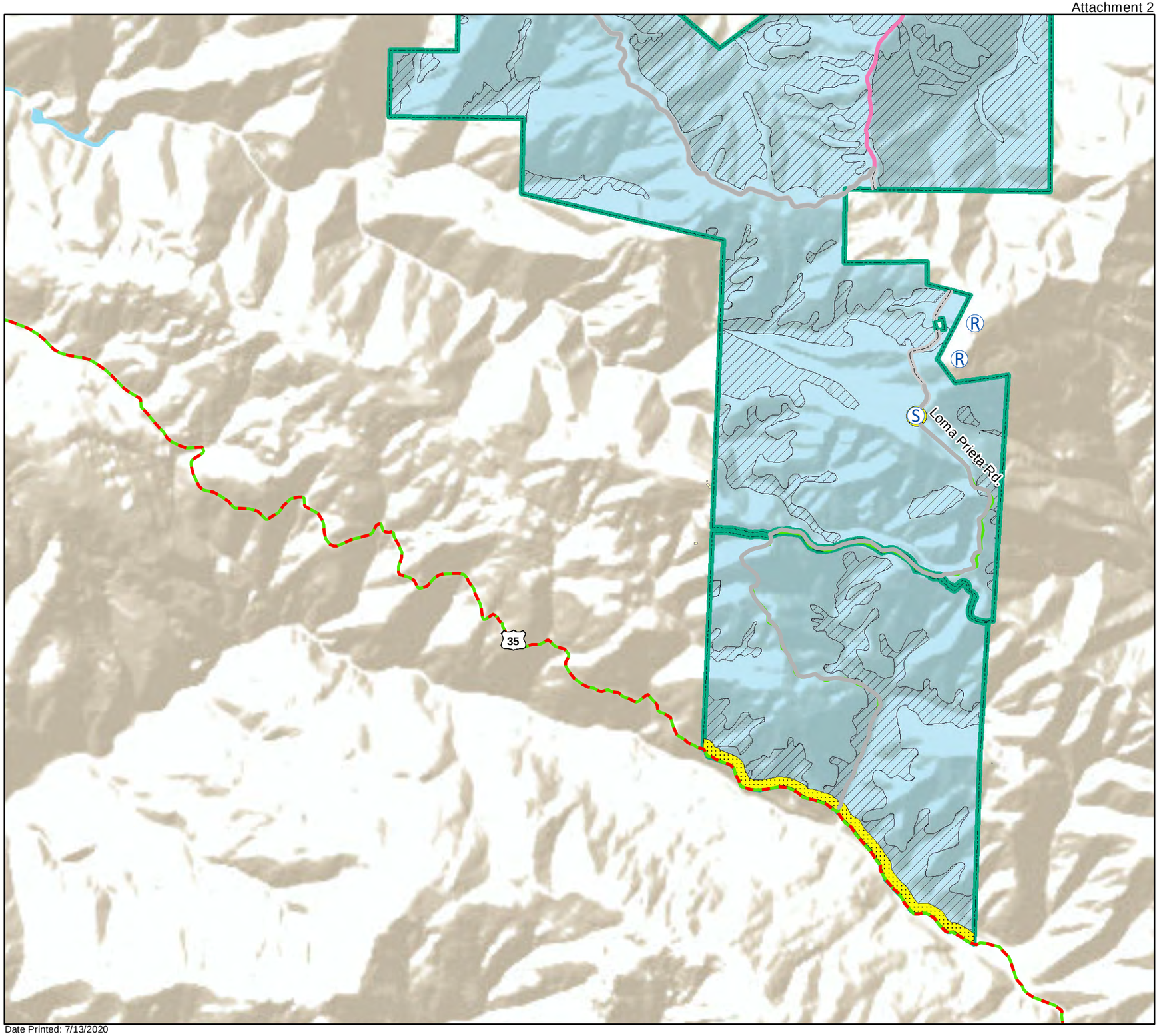
- Fuelbreak 200-foot
- Potential FRAs for Ecosystem Resiliency
- Wildland Type 3 Ingress/Egress
- Structure Type 1 (Tender)
- Ⓡ Communication

Fire Management Logistics

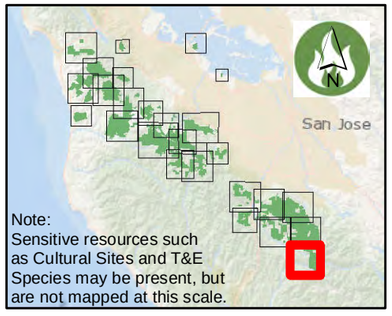
- Ⓢ Staging Area

OSP & Managed Properties

- Boundary
- Sierra Azul



* See Table of Contents page for additional symbology.
** Fuel break widths are maximums. Fuelbreaks may be constructed at any width up to the maximum width.



Date Printed: 7/13/2020

Existing and Potential Treatments
Ravenswood

Road or Trail

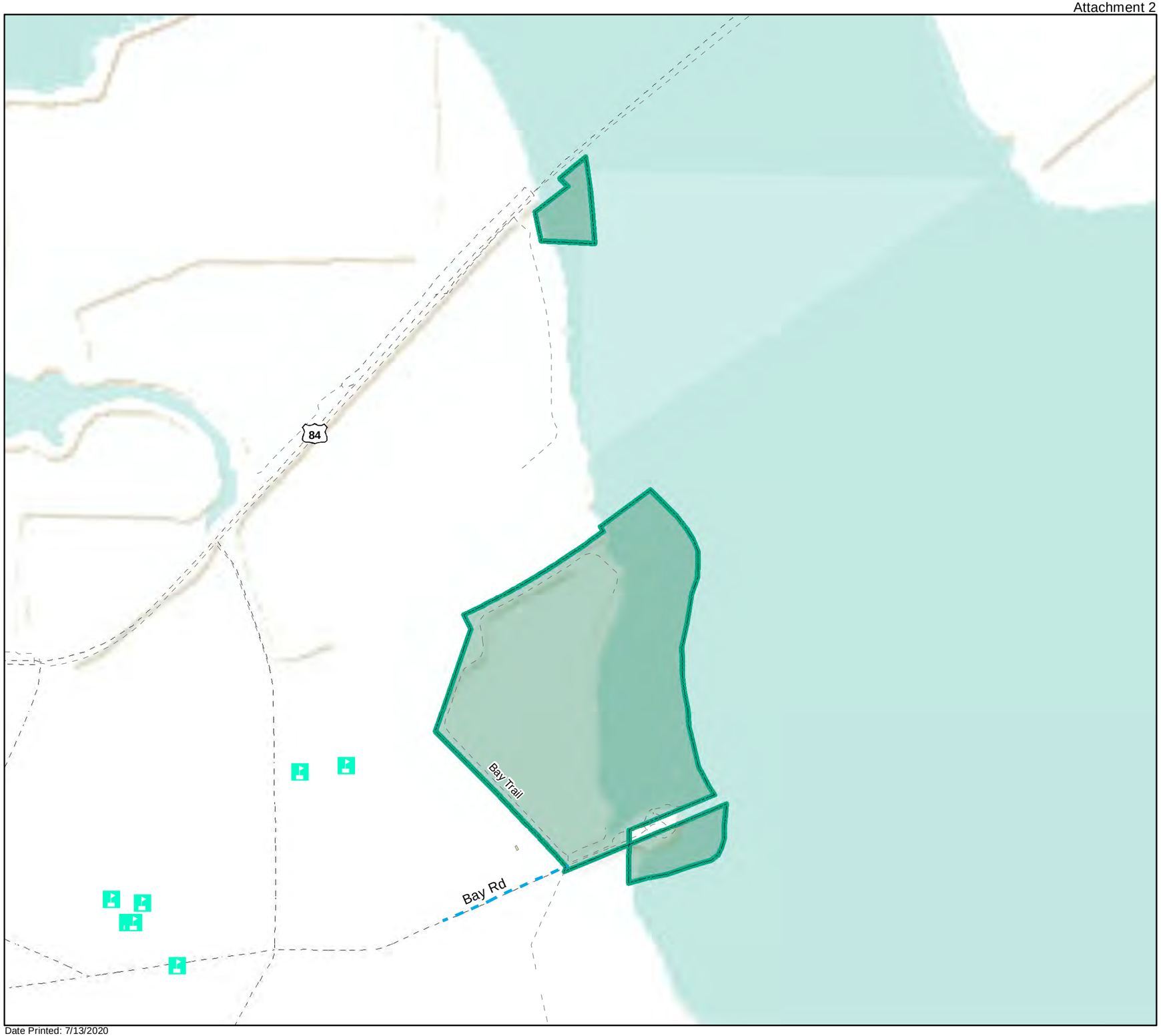
Target Hazards

School/Day Care

OSP & Managed Properties

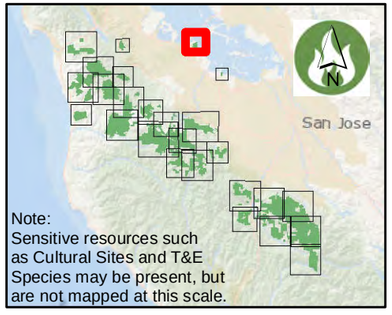
Boundary

Ravenswood



Date Printed: 7/13/2020

* See Table of Contents page for additional symbology.
** Fuel break widths are maximums. Fuelbreaks may be constructed at any width up to the maximum width.



0 0.25 0.5 Miles

Existing and Potential Treatments
Stevens Creek Shoreline NSA

Road or Trail

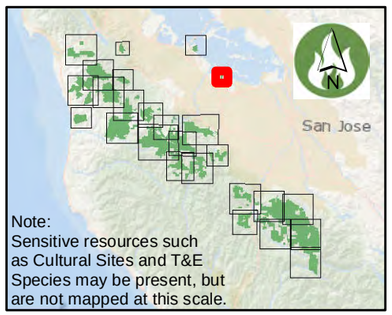
OSP & Managed Properties

Boundary

Stevens Creek Shoreline Nature Study Area

* See Table of Contents page for additional symbology.

** Fuel break widths are maximums. Fuelbreaks may be constructed at any width up to the maximum width.

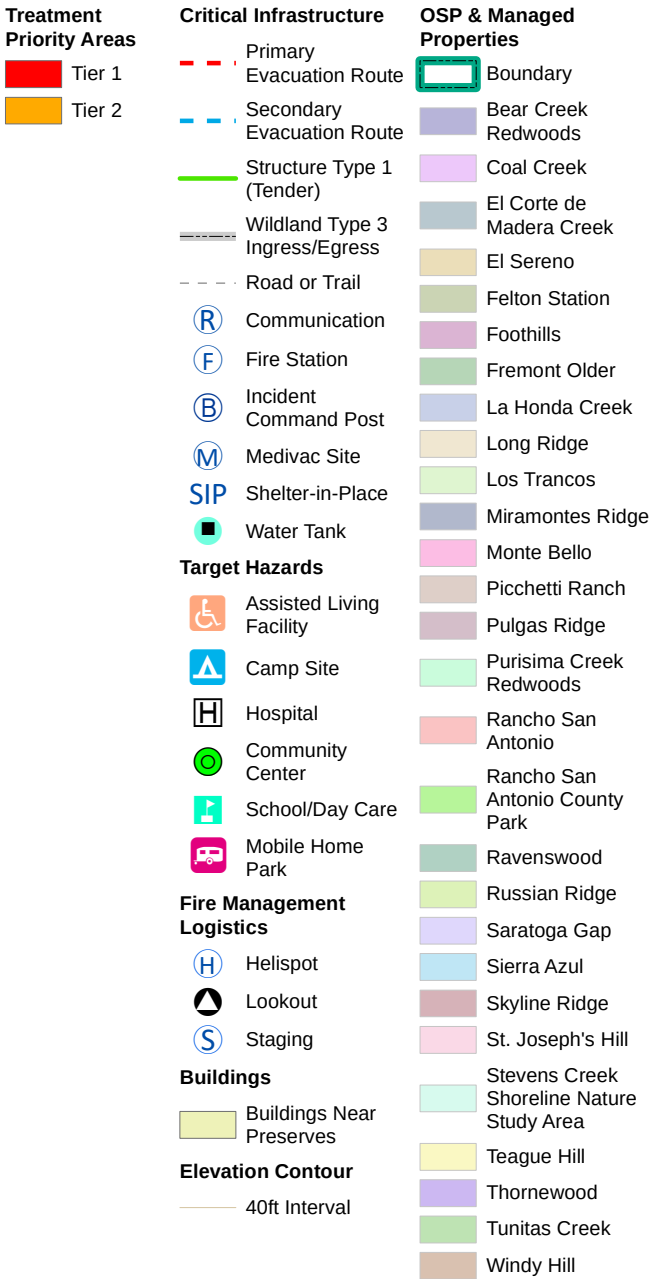


0 0.25 0.5 Miles

Date Printed: 7/13/2020

Appendix 3.0-1b Tier 1 and Tier 2 Prioritized Treatments (Overlaid on Topographic Maps)

Table of Contents



These maps are for reference only. Although every effort has been made to ensure the accuracy of information, errors and conditions originating from physical sources used to develop the data may be reflected on this map. Midpeninsula Regional Open Space District shall not be liable for any errors, omissions, or damages that result from inappropriate use of this document.

Treatment Priorities
Miramontes Ridge

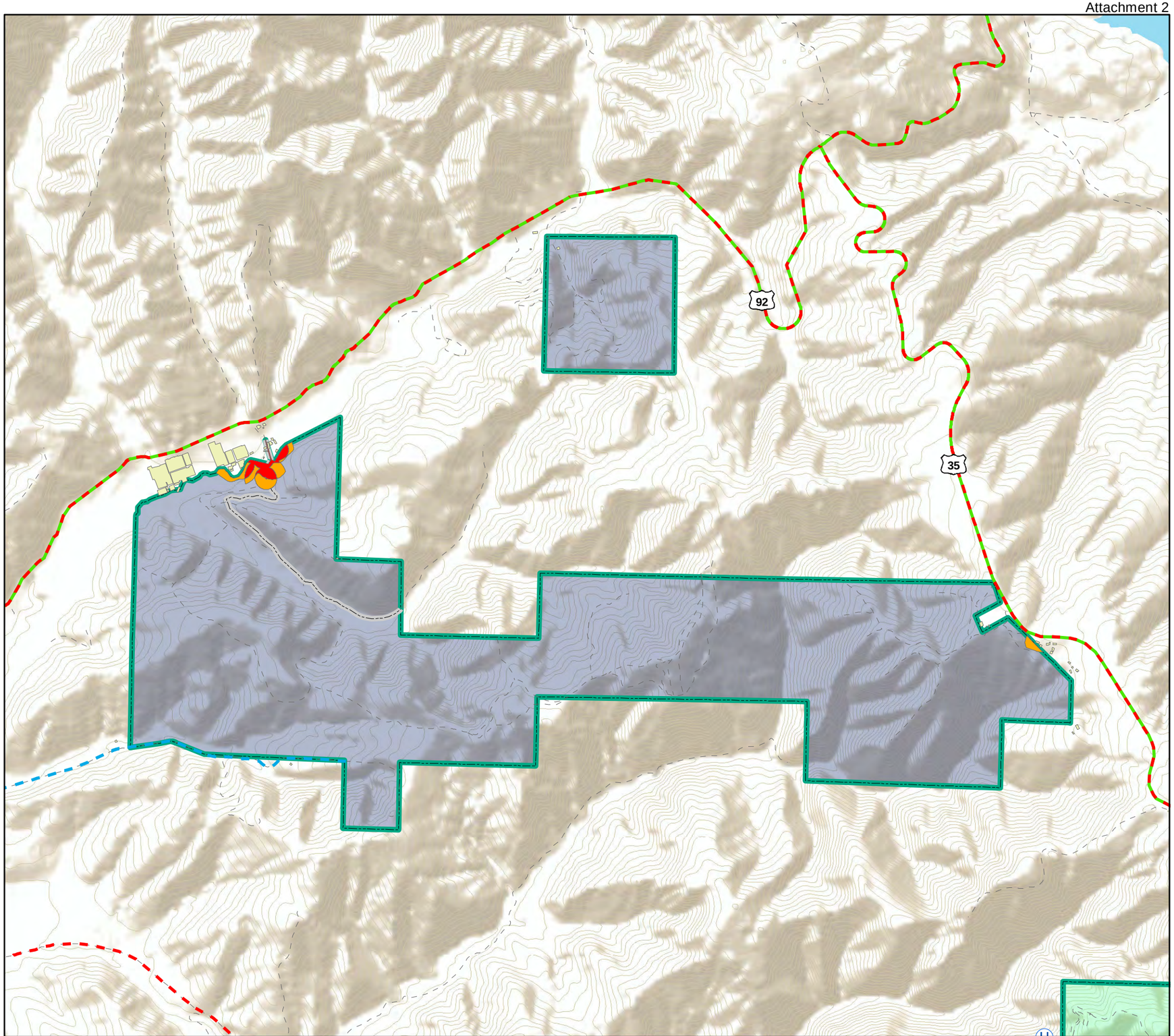
Treatment Priority Areas
- Tier 1
- Tier 2

Critical Infrastructure
- Primary Evacuation Route
- Secondary Evacuation Route
- Structure Type 1 (Tender)

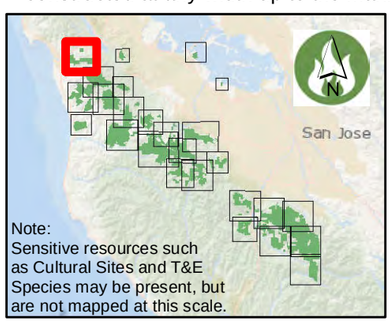
Maintained for Vehicle Class
- Wildland Type 3 Ingress/Egress
- Road or Trail

Fire Management Logistics
- Helispot

OSP & Managed Properties
- Boundary
- Miramontes Ridge
- Purisima Creek Redwoods



* See Table of Contents page for additional symbology.
** Fuel break widths are maximums. Fuelbreaks may be constructed at any width up to the maximum width.



0 0.25 0.5 Miles

Date Printed: 6/7/2020

Treatment Priorities
Pulgas Ridge

Treatment Priority Areas
- Tier 1
- Tier 2

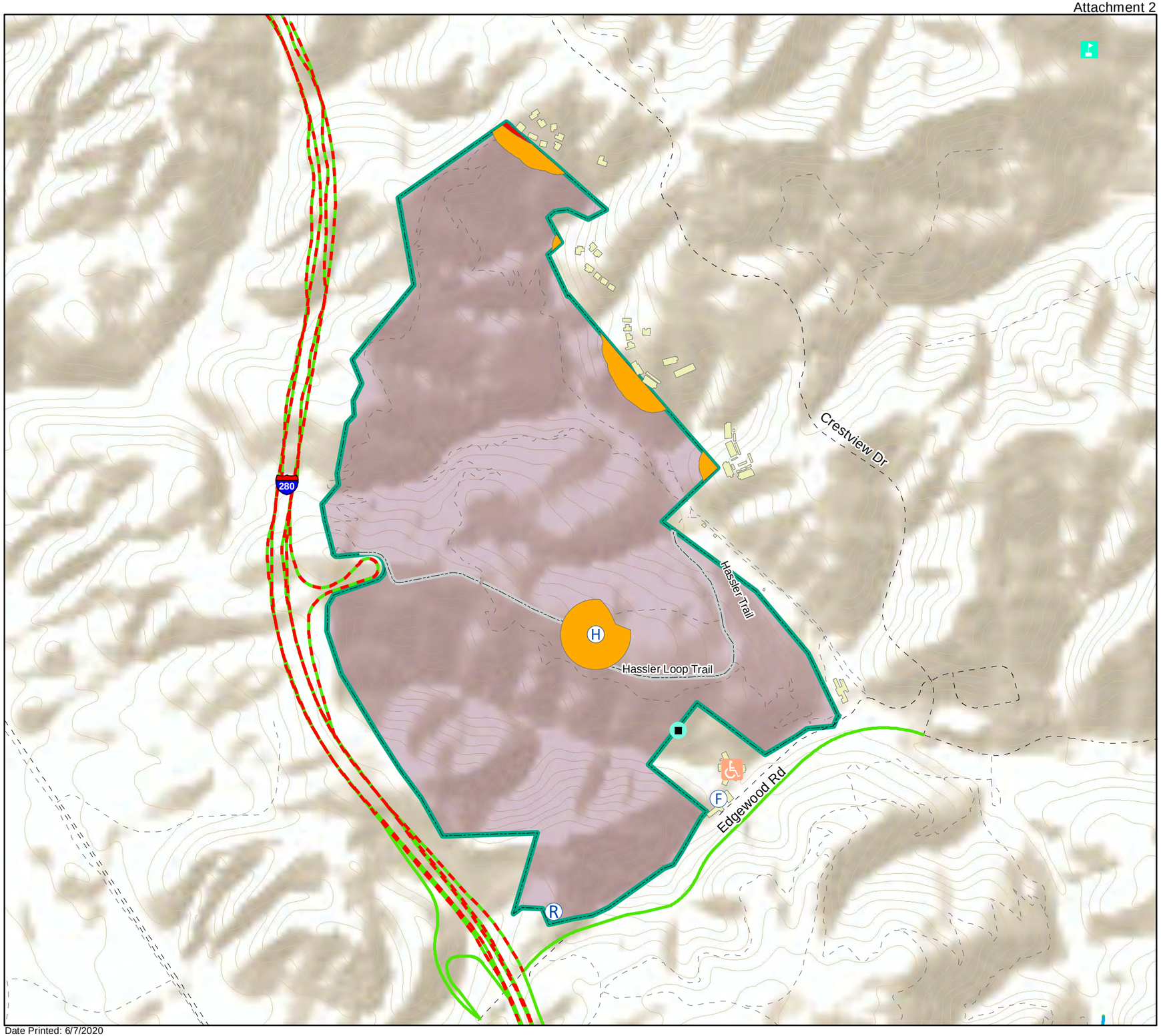
Critical Infrastructure
- Primary Evacuation Route
- Secondary Evacuation Route
- Structure Type 1 (Tender)

Maintained for Vehicle Class
- Wildland Type 3 Ingress/Egress
- Road or Trail
- Communication
- Fire Station
- Water Tank

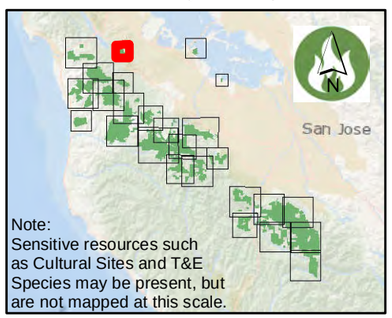
Target Hazards
- Assisted Living Facility
- School/Day Care

Fire Management Logistics
- Helispot

OSP & Managed Properties
- Boundary
- Pulgas Ridge



* See Table of Contents page for additional symbology.
** Fuel break widths are maximums. Fuelbreaks may be constructed at any width up to the maximum width.



0 0.25 0.5 Miles

Date Printed: 6/7/2020

Treatment Priorities
Purisima Creek Redwoods

Treatment Priority Areas
- Tier 1
- Tier 2

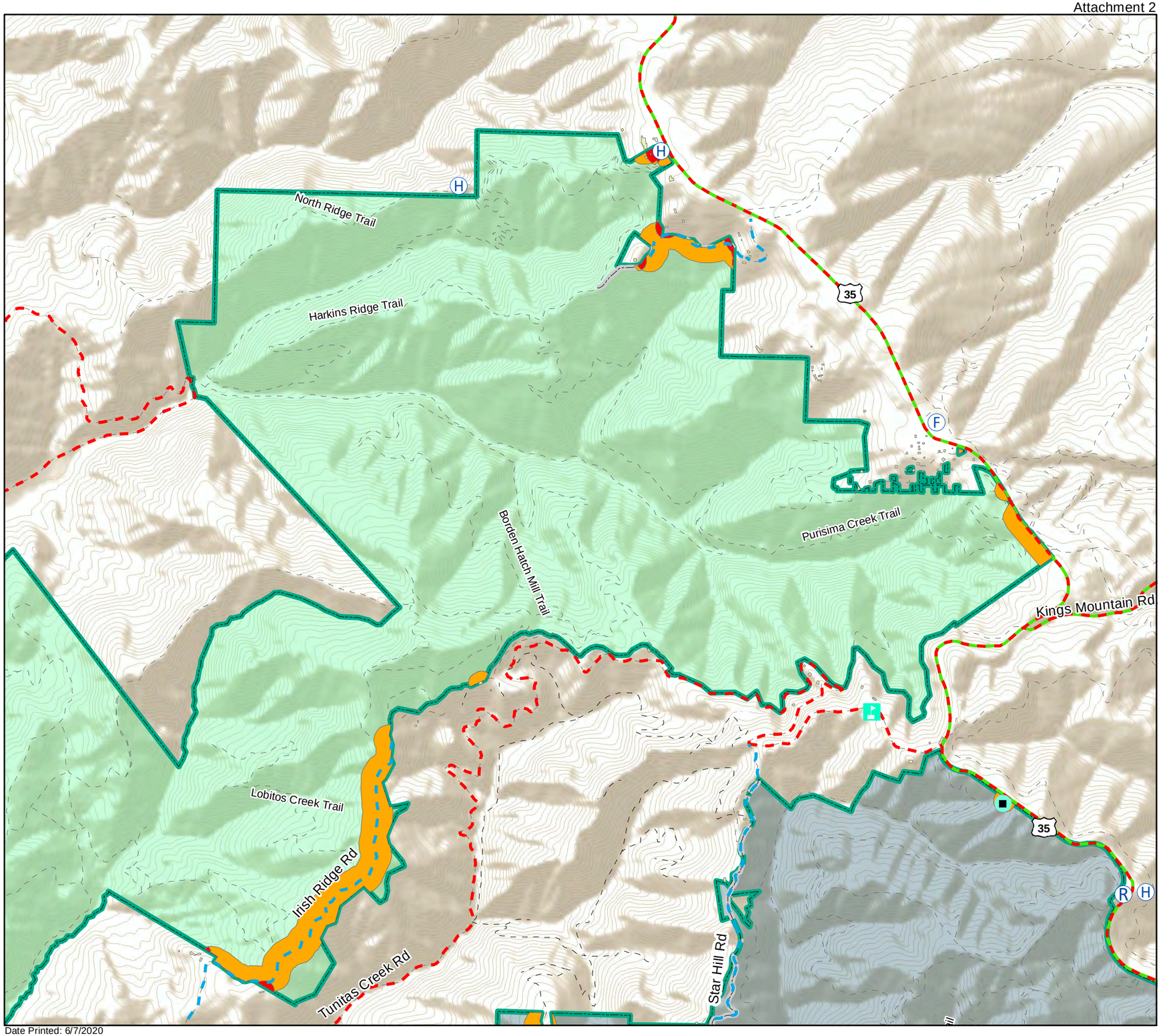
Critical Infrastructure
- Primary Evacuation Route
- Secondary Evacuation Route
- Structure Type 1 (Tender)

Maintained for Vehicle Class
- Wildland Type 3 Ingress/Egress
- Road or Trail
- Communication
- Fire Station
- Water Tank

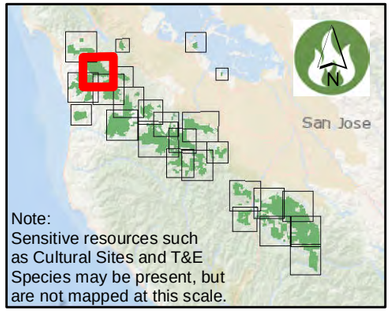
Target Hazards
- School/Day Care

Fire Management Logistics
- Helispot

OSP & Managed Properties
- Boundary
- El Corte de Madera Creek
- Purisima Creek Redwoods



* See Table of Contents page for additional symbology.
** Fuel break widths are maximums. Fuelbreaks may be constructed at any width up to the maximum width.



0 0.25 0.5 Miles

Date Printed: 6/7/2020

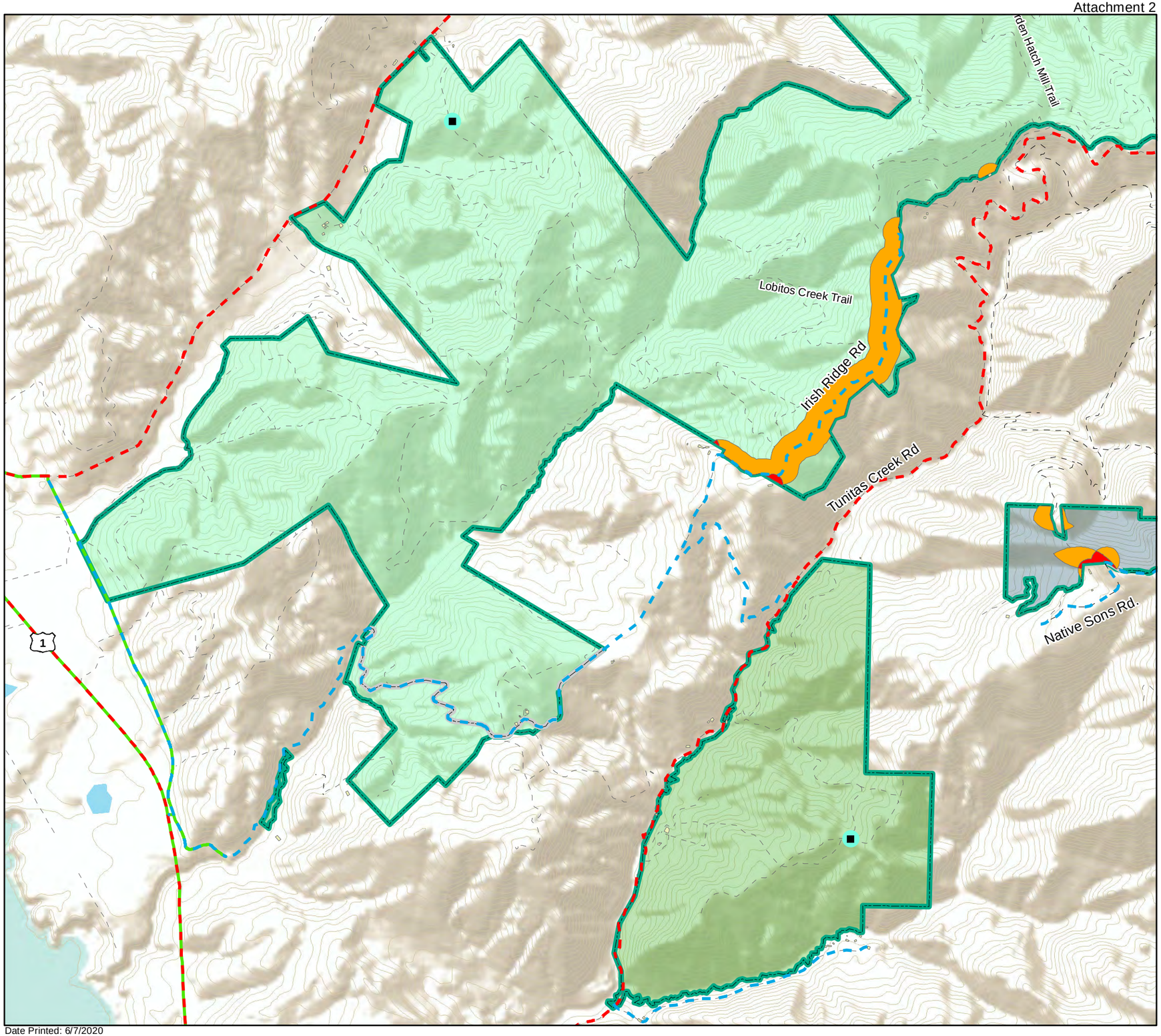
Treatment Priorities
Purisima Creek/Tunitas Creek

Treatment Priority Areas
- Tier 1
- Tier 2

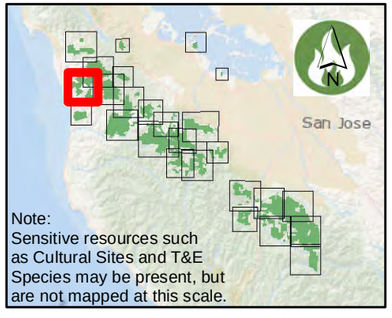
Critical Infrastructure
- Primary Evacuation Route
- Secondary Evacuation Route
- Structure Type 1 (Tender)

Maintained for Vehicle Class
- Wildland Type 3 Ingress/Egress
- Road or Trail
- Water Tank

OSP & Managed Properties
- Boundary
- El Corte de Madera Creek
- Purisima Creek Redwoods
- Tunitas Creek



* See Table of Contents page for additional symbology.
** Fuel break widths are maximums. Fuelbreaks may be constructed at any width up to the maximum width.



0 0.25 0.5 Miles

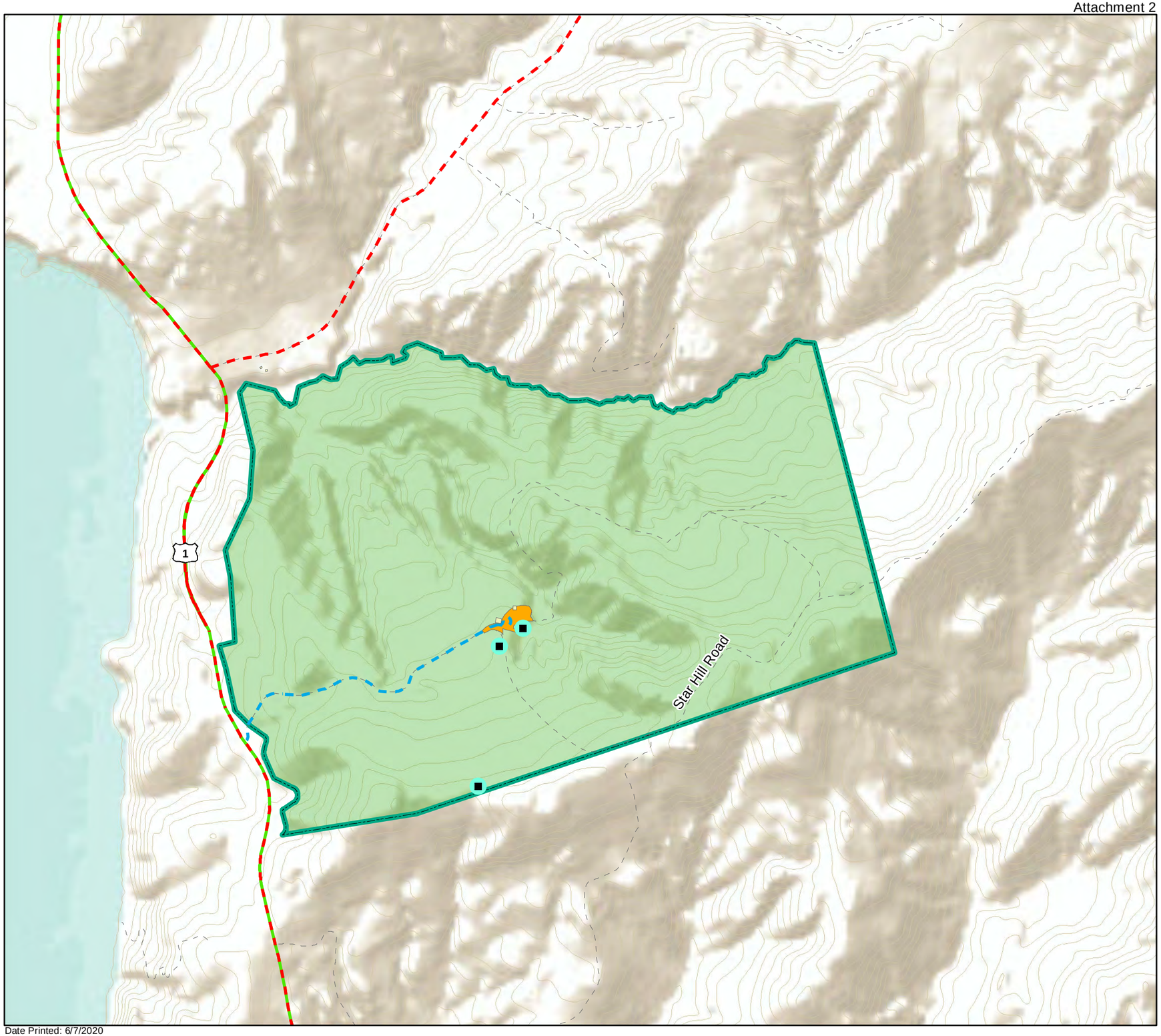
Date Printed: 6/7/2020

Treatment Priorities
Tunitas Creek

Treatment Priority Areas
- Tier 2

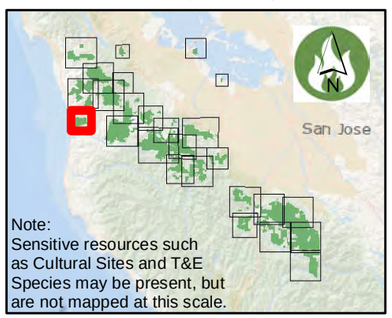
Critical Infrastructure
- Primary Evacuation Route
- Secondary Evacuation Route
- Structure Type 1 (Tender)
- Road or Trail
- Water Tank

OSP & Managed Properties
- Boundary
- Tunitas Creek



Date Printed: 6/7/2020

* See Table of Contents page for additional symbology.
** Fuel break widths are maximums. Fuelbreaks may be constructed at any width up to the maximum width.



0 0.25 0.5 Miles

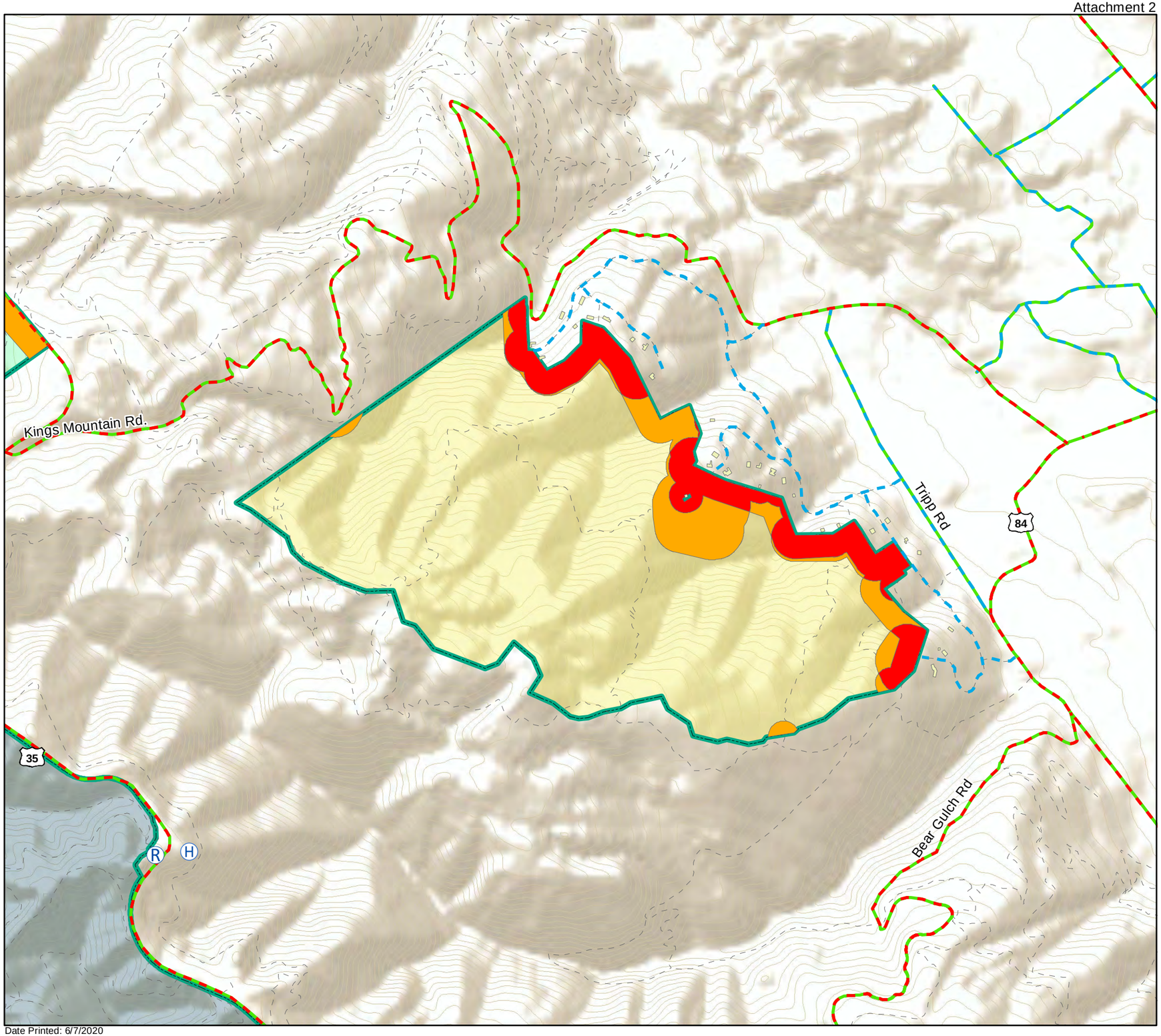
Treatment Priorities
Teague Hill

Treatment Priority Areas
- Tier 1
- Tier 2

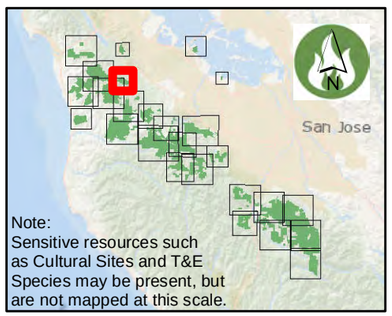
Critical Infrastructure
- Primary Evacuation Route
- Secondary Evacuation Route
- Structure Type 1 (Tender)
- Road or Trail
- Communication

Fire Management Logistics
- Helispot

OSP & Managed Properties
- Boundary
- El Corte de Madera Creek
- Purisima Creek Redwoods
- Teague Hill



* See Table of Contents page for additional symbology.
** Fuel break widths are maximums. Fuelbreaks may be constructed at any width up to the maximum width.



0 0.25 0.5 Miles

Date Printed: 6/7/2020

Treatment Priorities
El Corte de Madera Creek

Treatment Priority Areas
- Tier 1
- Tier 2

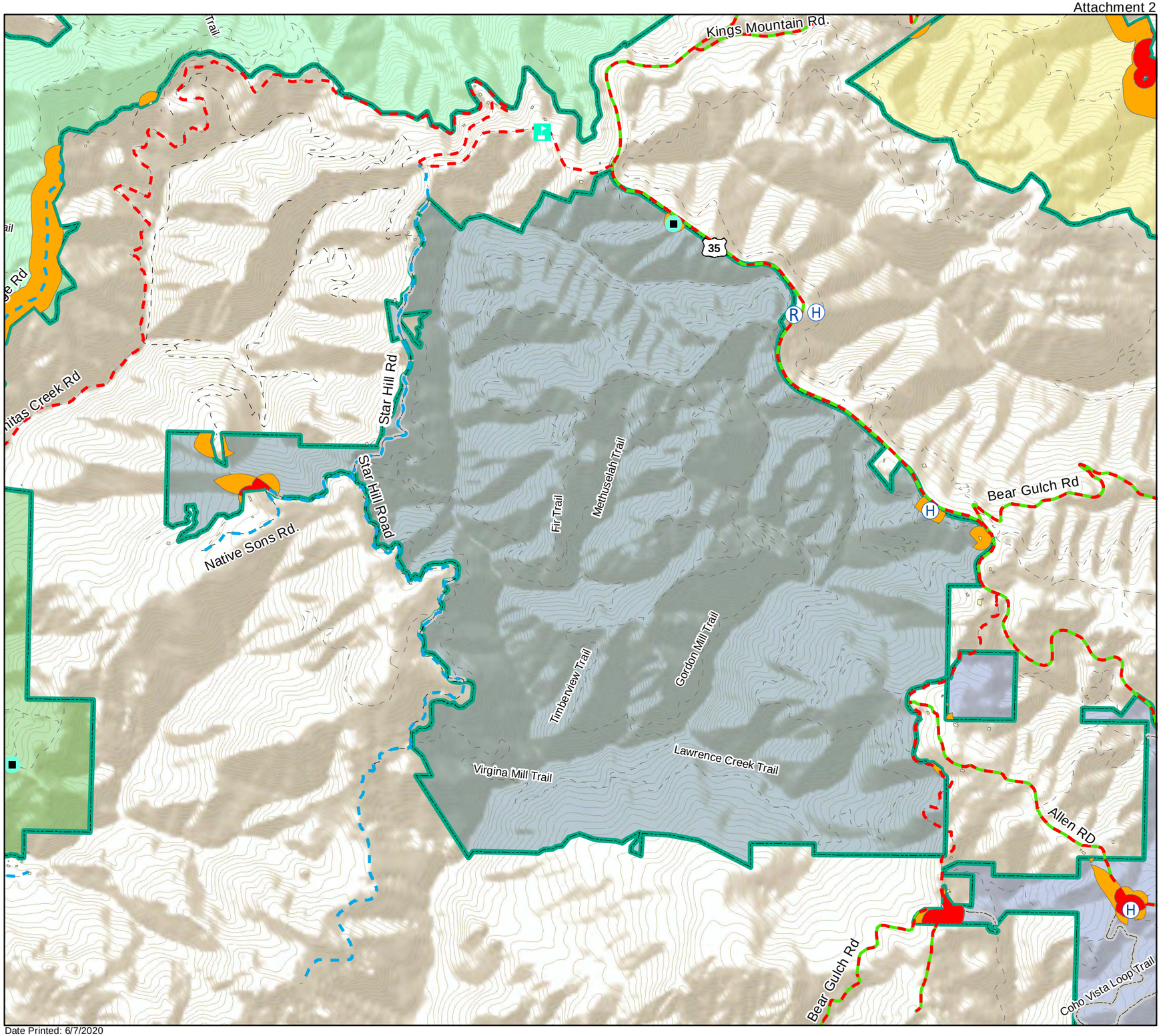
Critical Infrastructure
- Primary Evacuation Route
- Secondary Evacuation Route
- Structure Type 1 (Tender)

Maintained for Vehicle Class
- Wildland Type 3 Ingress/Egress
- Road or Trail
- Communication
- Water Tank

Target Hazards
- School/Day Care

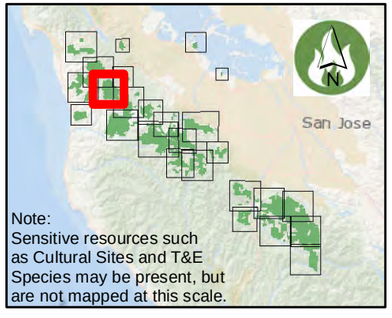
Fire Management Logistics
- Helispot

OSP & Managed Properties
- Boundary
- El Corte de Madera Creek
- La Honda Creek
- Purisima Creek Redwoods
- Teague Hill
- Tunitas Creek



Date Printed: 6/7/2020

* See Table of Contents page for additional symbology.
** Fuel break widths are maximums. Fuelbreaks may be constructed at any width up to the maximum width.



0 0.25 0.5 Miles

Treatment Priorities
La Honda Creek/Thornewood

Treatment Priority Areas
- Tier 1
- Tier 2

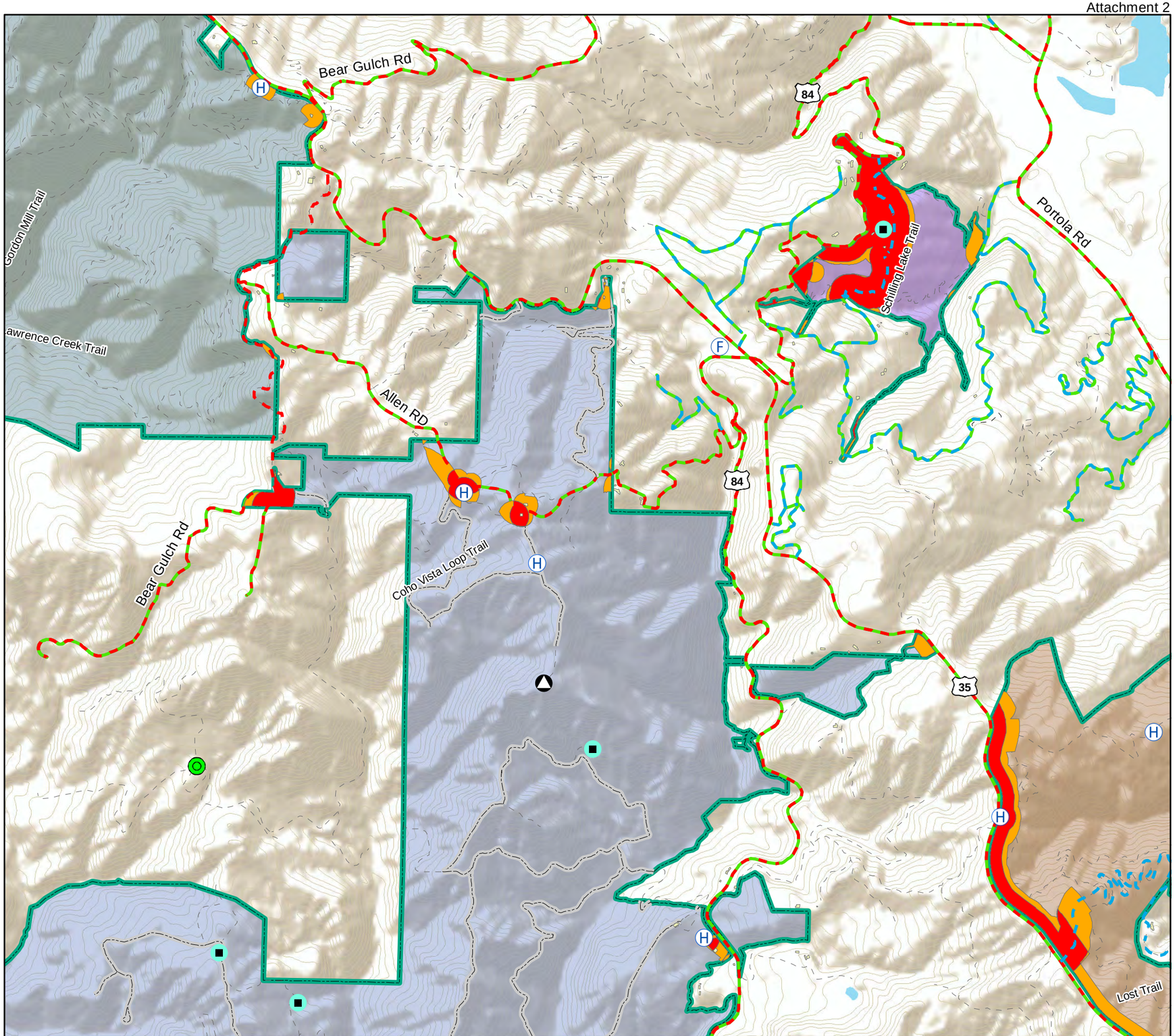
Critical Infrastructure
- Primary Evacuation Route
- Secondary Evacuation Route
- Structure Type 1 (Tender)

Maintained for Vehicle Class
- Wildland Type 3 Ingress/Egress
- Road or Trail
- Fire Station
- Water Tank

Target Hazards
- Community Center

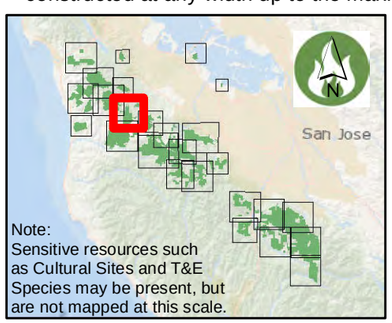
Fire Management Logistics
- Helispot
- Lookout

OSP & Managed Properties
- Boundary
- El Corte de Madera Creek
- La Honda Creek
- Thornewood
- Windy Hill



Date Printed: 6/7/2020

* See Table of Contents page for additional symbology.
** Fuel break widths are maximums. Fuelbreaks may be constructed at any width up to the maximum width.



0 0.25 0.5 Miles

Treatment Priorities
La Honda Creek

Treatment Priority Areas
- Tier 1
- Tier 2

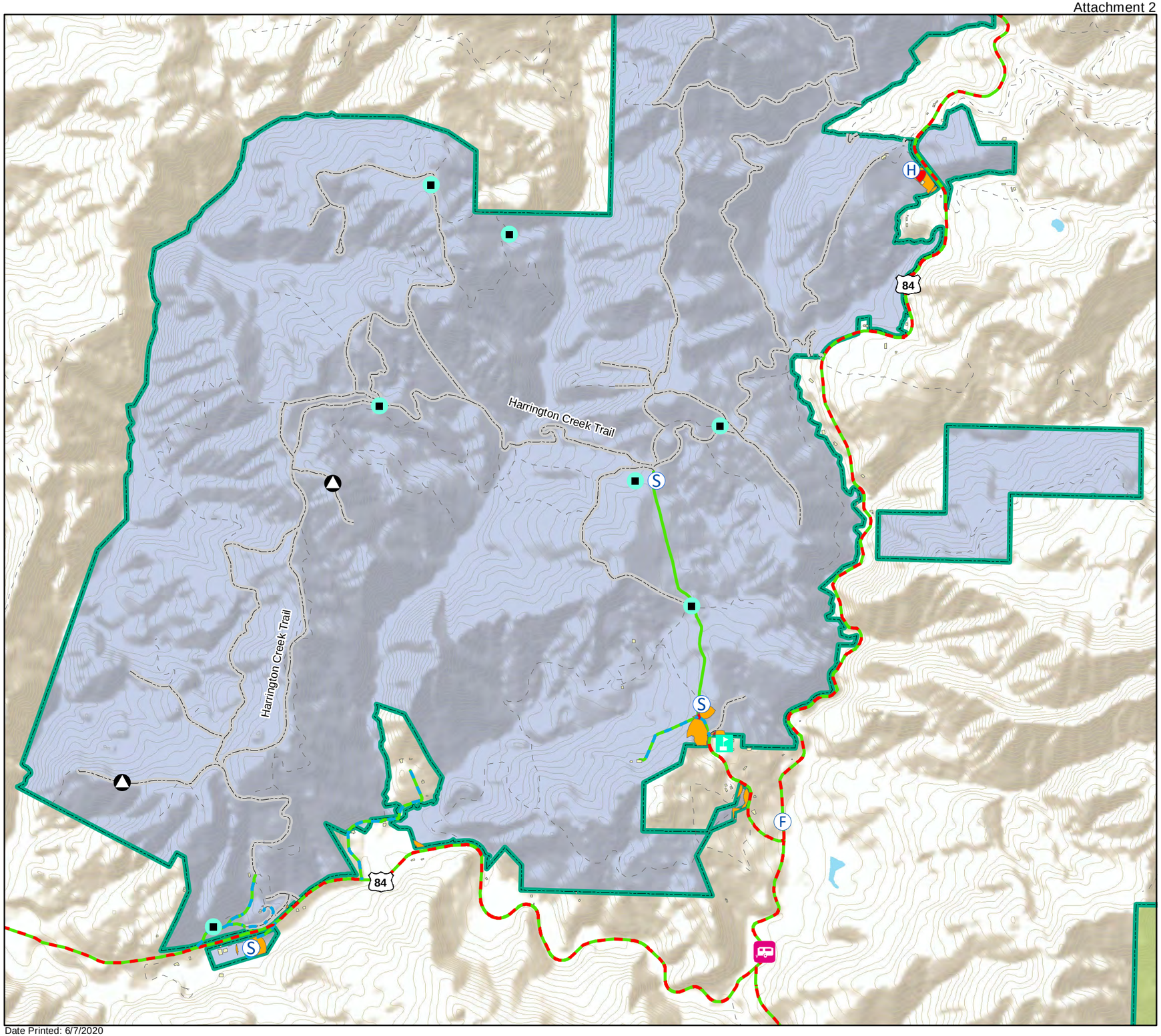
Critical Infrastructure
- Primary Evacuation Route
- Secondary Evacuation Route
- Structure Type 1 (Tender)

Maintained for Vehicle Class
- Wildland Type 3 Ingress/Egress
- Road or Trail
- Fire Station
- Water Tank

Target Hazards
- School/Day Care
- Mobile Home Park

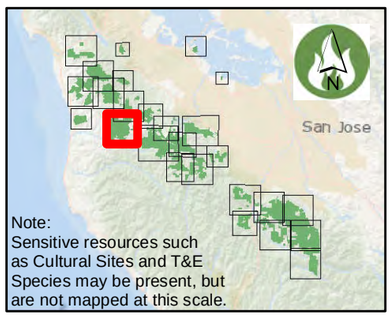
Fire Management Logistics
- Helispot
- Lookout
- Staging Area

OSP & Managed Properties
- Boundary
- La Honda Creek
- Russian Ridge



Date Printed: 6/7/2020

* See Table of Contents page for additional symbology.
** Fuel break widths are maximums. Fuelbreaks may be constructed at any width up to the maximum width.



0 0.25 0.5 Miles

Treatment Priorities
Windy Hill

Treatment Priority Areas
- Tier 1
- Tier 2

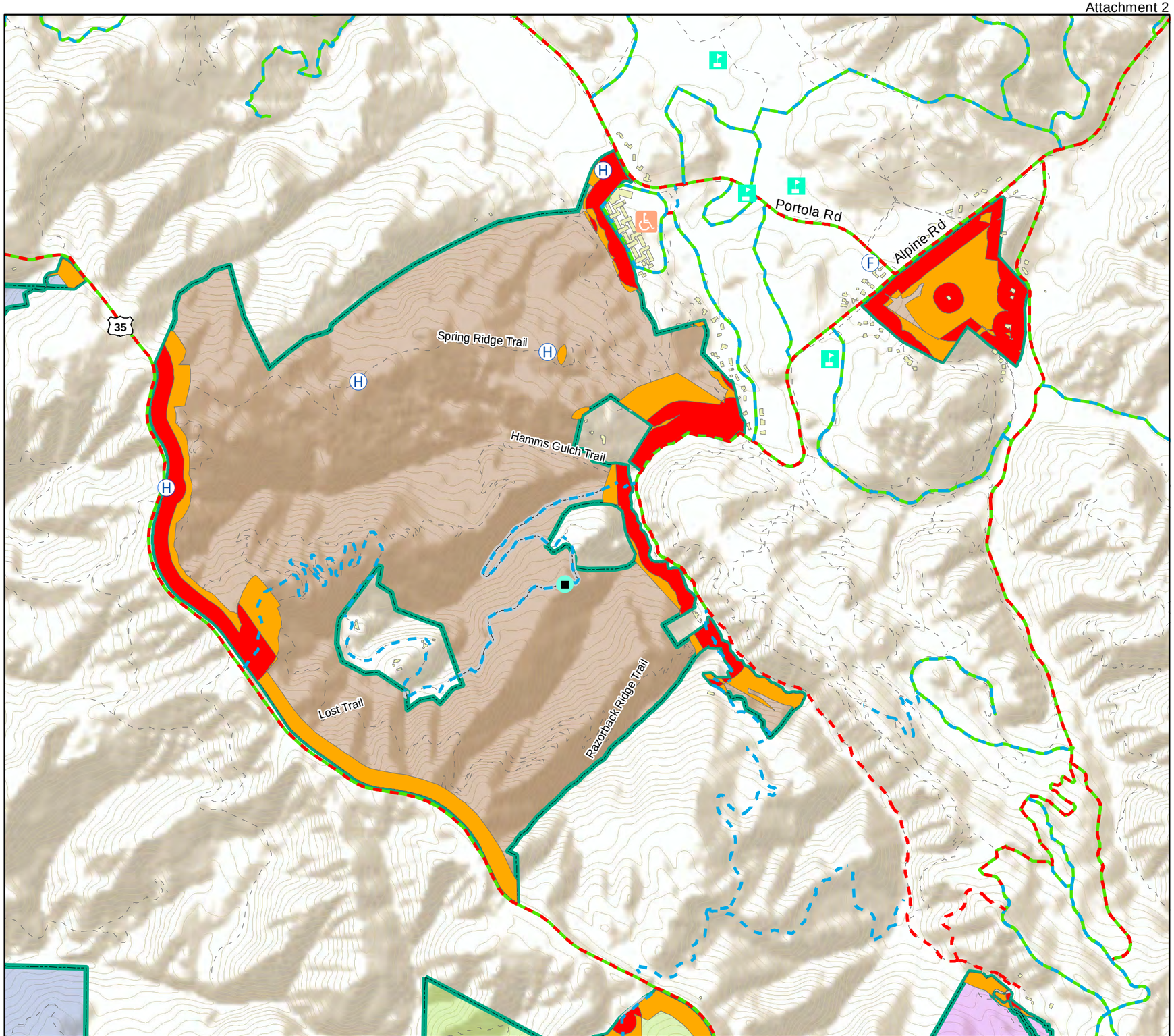
Critical Infrastructure
- Primary Evacuation Route
- Secondary Evacuation Route
- Structure Type 1 (Tender)

Maintained for Vehicle Class
- Wildland Type 3 Ingress/Egress
- Road or Trail
- Fire Station
- Water Tank

Target Hazards
- Assisted Living Facility
- School/Day Care

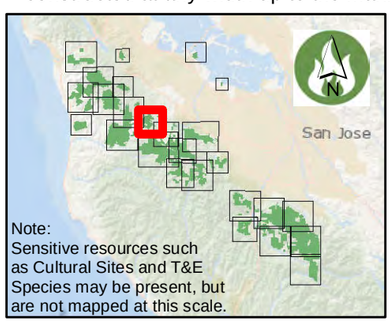
Fire Management Logistics
- Helispot

OSP & Managed Properties
- Boundary
- Coal Creek
- La Honda Creek
- Russian Ridge
- Windy Hill



Date Printed: 6/7/2020

* See Table of Contents page for additional symbology.
** Fuel break widths are maximums. Fuelbreaks may be constructed at any width up to the maximum width.



0 0.25 0.5 Miles

Treatment Priorities
Russian Ridge/Coal Creek/Skyline Ridge

Treatment Priority Areas
- Tier 1
- Tier 2

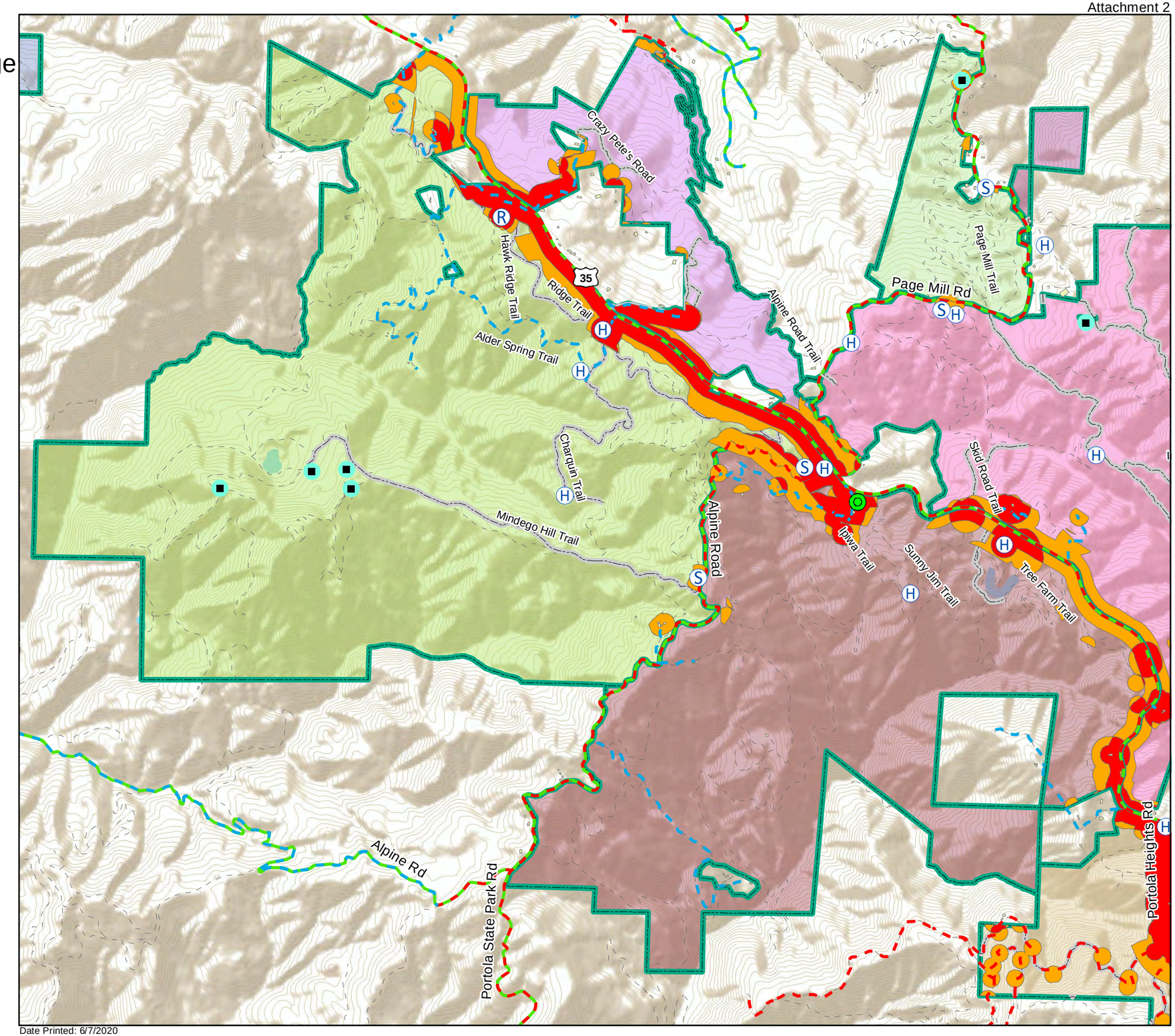
Critical Infrastructure
- Primary Evacuation Route
- Secondary Evacuation Route
- Structure Type 1 (Tender)

Maintained for Vehicle Class
- Wildland Type 3 Ingress/Egress
- Road or Trail
- Communication
- Water Tank

Target Hazards
- Community Center

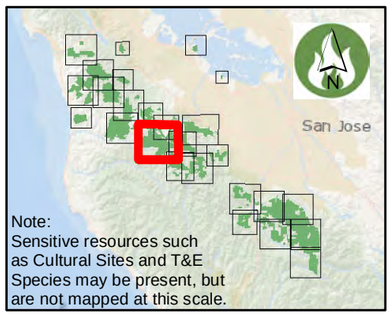
Fire Management Logistics
- Helispot
- Staging

OSP & Managed Properties
- Boundary
- Coal Creek
- Foothills
- La Honda Creek
- Long Ridge
- Los Trancos
- Monte Bello
- Russian Ridge
- Skyline Ridge



Date Printed: 6/7/2020

* See Table of Contents page for additional symbology.
** Fuel break widths are maximums. Fuelbreaks may be constructed at any width up to the maximum width.



0 0.25 0.5 Miles

Treatment Priorities
Coal Creek/Foothills/Los Trancos

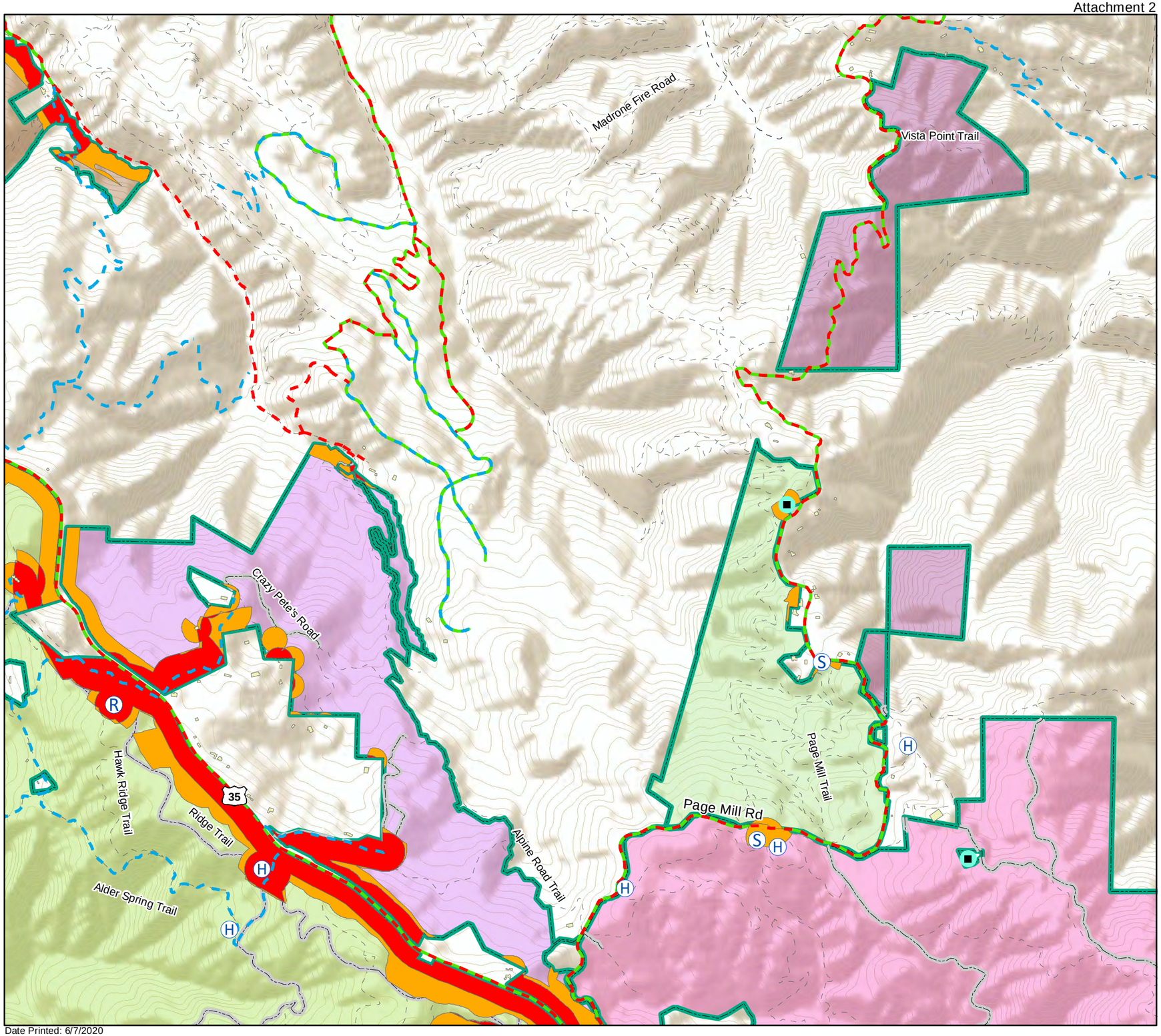
Treatment Priority Areas
- Tier 1
- Tier 2

Critical Infrastructure
- Primary Evacuation Route
- Secondary Evacuation Route
- Structure Type 1 (Tender)

Maintained for Vehicle Class
- Wildland Type 3 Ingress/Egress
- Road or Trail
- Communication
- Water Tank

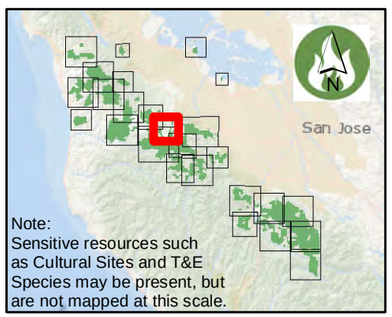
Fire Management Logistics
- Helispot
- Staging Area

OSP & Managed Properties
- Boundary
- Coal Creek
- Foothills
- Los Trancos
- Monte Bello
- Russian Ridge
- Windy Hill



Date Printed: 6/7/2020

* See Table of Contents page for additional symbology.
** Fuel break widths are maximums. Fuelbreaks may be constructed at any width up to the maximum width.



0 0.25 0.5 Miles

Treatment Priorities
Rancho San Antonio

Treatment Priority Areas
- Tier 1
- Tier 2

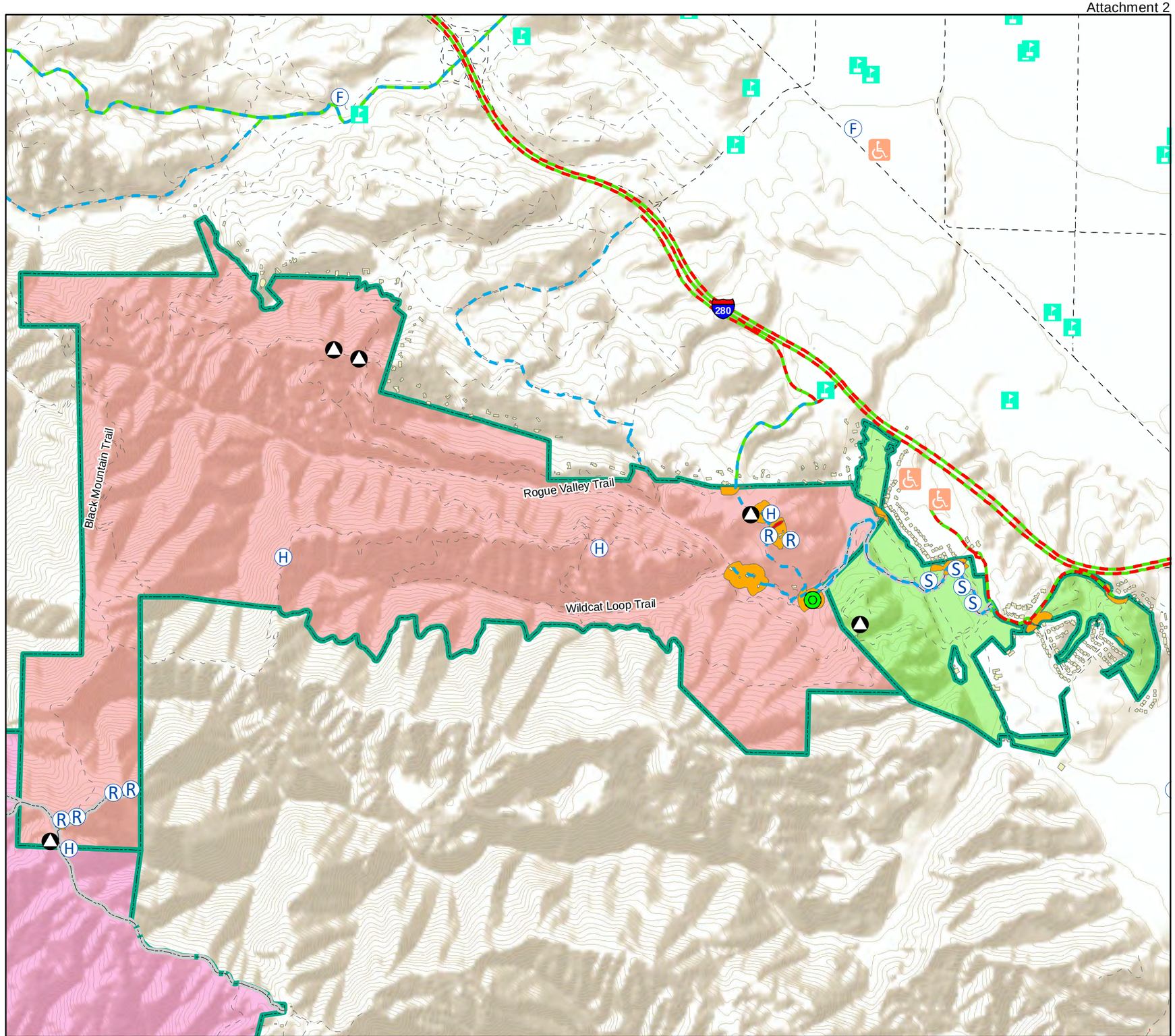
Critical Infrastructure
- Primary Evacuation Route
- Secondary Evacuation Route
- Structure Type 1 (Tender)

Maintained for Vehicle Class
- Wildland Type 3 Ingress/Egress
- Road or Trail
- Communication
- Fire Station

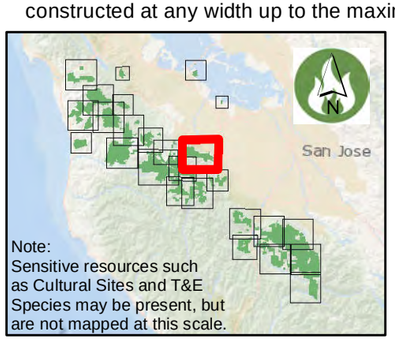
Target Hazards
- Assisted Living Facility
- Community Center
- School/Day Care

Fire Management Logistics
- Helispot
- Lookout
- Staging Area

OSP & Managed Properties
- Boundary
- Monte Bello
- Rancho San Antonio
- Rancho San Antonio County Park



* See Table of Contents page for additional symbology.
** Fuel break widths are maximums. Fuelbreaks may be constructed at any width up to the maximum width.



0 0.25 0.5 Miles

Date Printed: 6/7/2020

Treatment Priorities
Monte Bello

Treatment Priority Areas
- Tier 1
- Tier 2

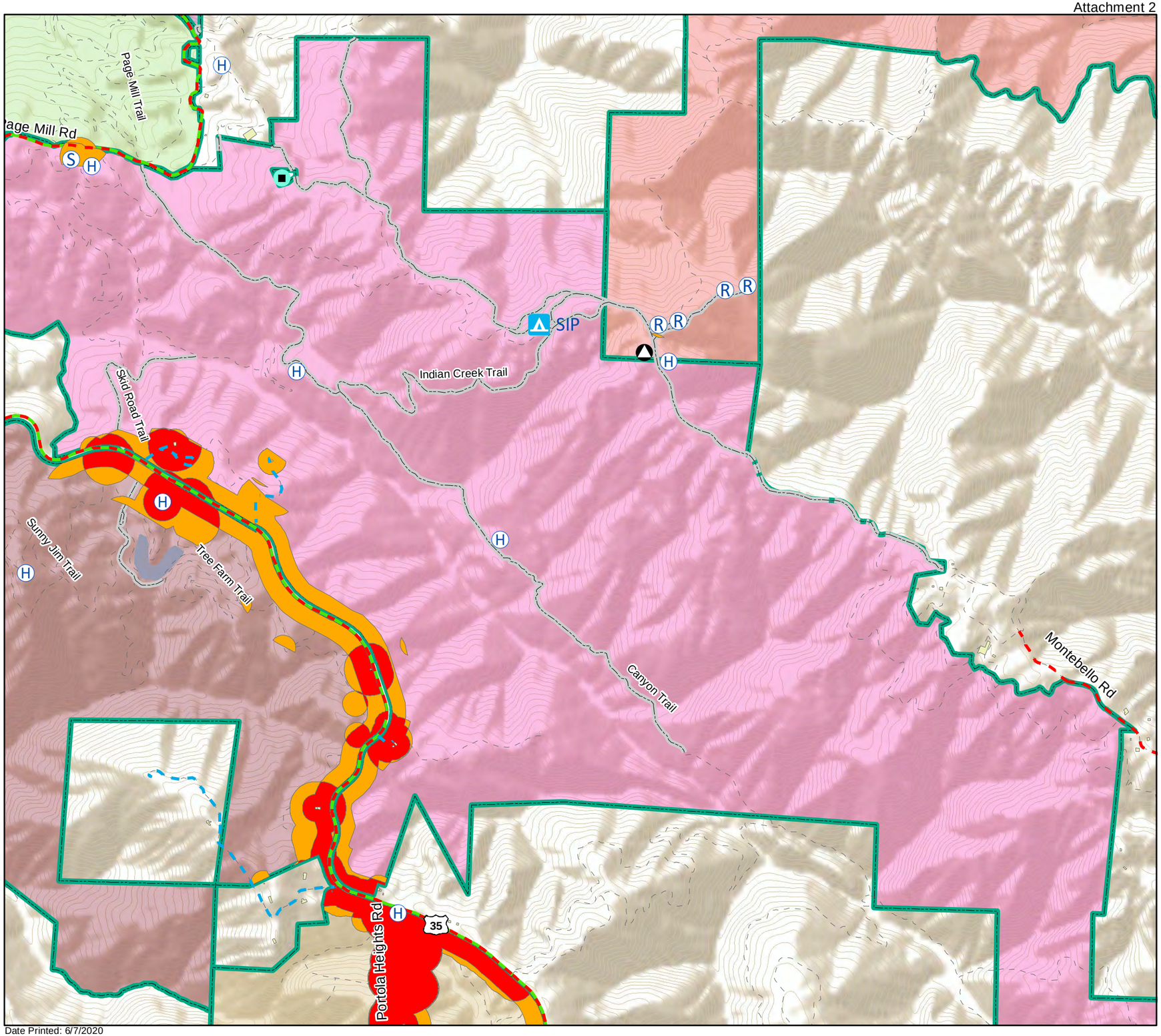
Critical Infrastructure
- Primary Evacuation Route
- Secondary Evacuation Route
- Structure Type 1 (Tender)

Maintained for Vehicle Class
- Wildland Type 3 Ingress/Egress
- Road or Trail
- Communication
- Shelter-in-Place
- Water Tank

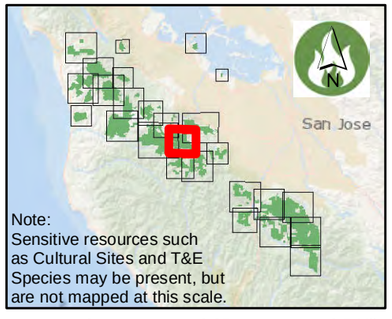
Target Hazards
- Camp Site

Fire Management Logistics
- Helispot
- Lookout
- Staging Area

OSP & Managed Properties
- Boundary
- Foothills
- Long Ridge
- Los Trancos
- Monte Bello
- Rancho San Antonio
- Skyline Ridge



* See Table of Contents page for additional symbology.
** Fuel break widths are maximums. Fuelbreaks may be constructed at any width up to the maximum width.



0 0.25 0.5 Miles

Date Printed: 6/7/2020

Treatment Priorities
Long Ridge

Treatment Priority Areas
- Tier 1
- Tier 2

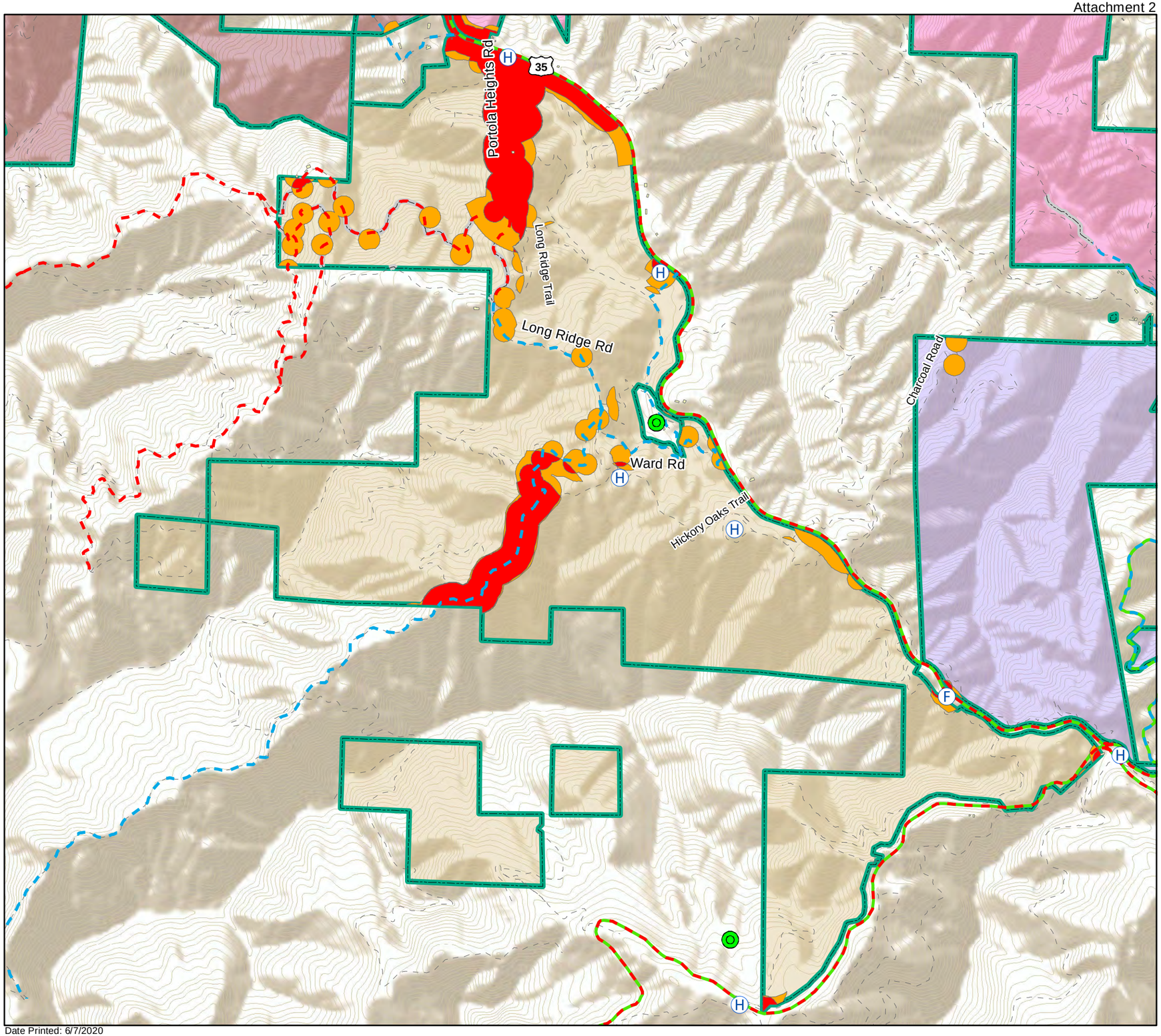
Critical Infrastructure
- Primary Evacuation Route
- Secondary Evacuation Route
- Structure Type 1 (Tender)

Maintained for Vehicle Class
- Wildland Type 3 Ingress/Egress
- Road or Trail
- (F) Fire Station

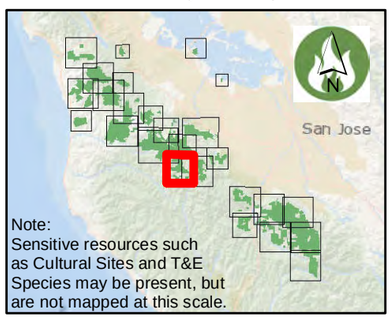
Target Hazards
- Community Center

Fire Management Logistics
- (H) Helispot

OSP & Managed Properties
- Boundary
- Long Ridge
- Monte Bello
- Saratoga Gap
- Skyline Ridge



* See Table of Contents page for additional symbology.
** Fuel break widths are maximums. Fuelbreaks may be constructed at any width up to the maximum width.



0 0.25 0.5 Miles

Date Printed: 6/7/2020

Treatment Priorities
Saratoga Gap/Monte Bello/Long Ridge

Treatment Priority Areas
- Tier 1
- Tier 2

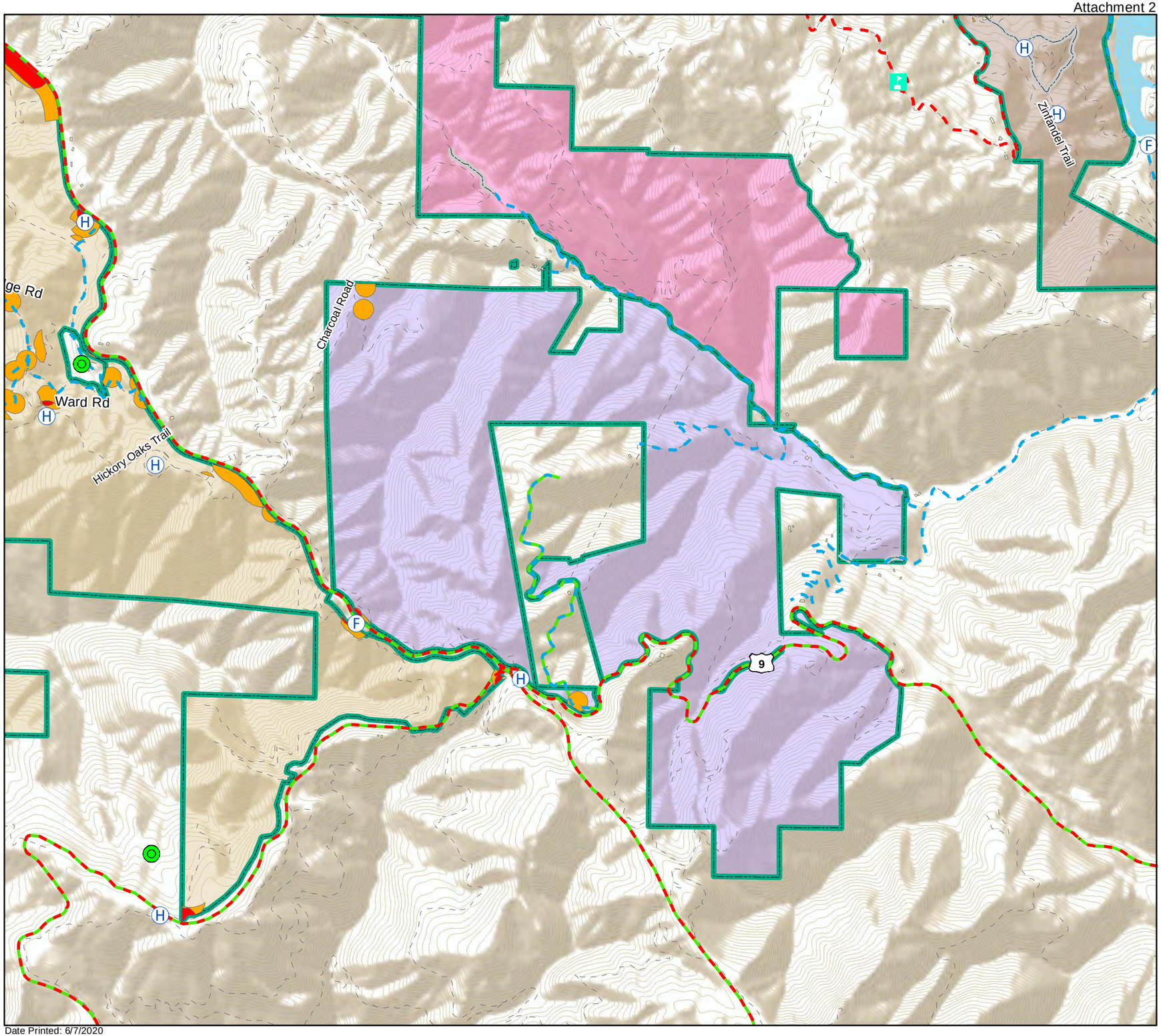
Critical Infrastructure
- Primary Evacuation Route
- Secondary Evacuation Route
- Structure Type 1 (Tender)

Maintained for Vehicle Class
- Wildland Type 3 Ingress/Egress
- Road or Trail
- Fire Station

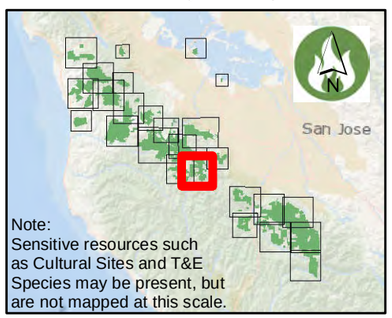
Target Hazards
- Community Center
- School/Day Care

Fire Management Logistics
- Helispot

OSP & Managed Properties
- Boundary
- Long Ridge
- Monte Bello
- Picchetti Ranch
- Saratoga Gap



* See Table of Contents page for additional symbology.
** Fuel break widths are maximums. Fuelbreaks may be constructed at any width up to the maximum width.



0 0.25 0.5 Miles

Date Printed: 6/7/2020

Treatment Priorities
Fremont Older/Picchetti Ranch

Treatment Priority Areas
- Tier 2

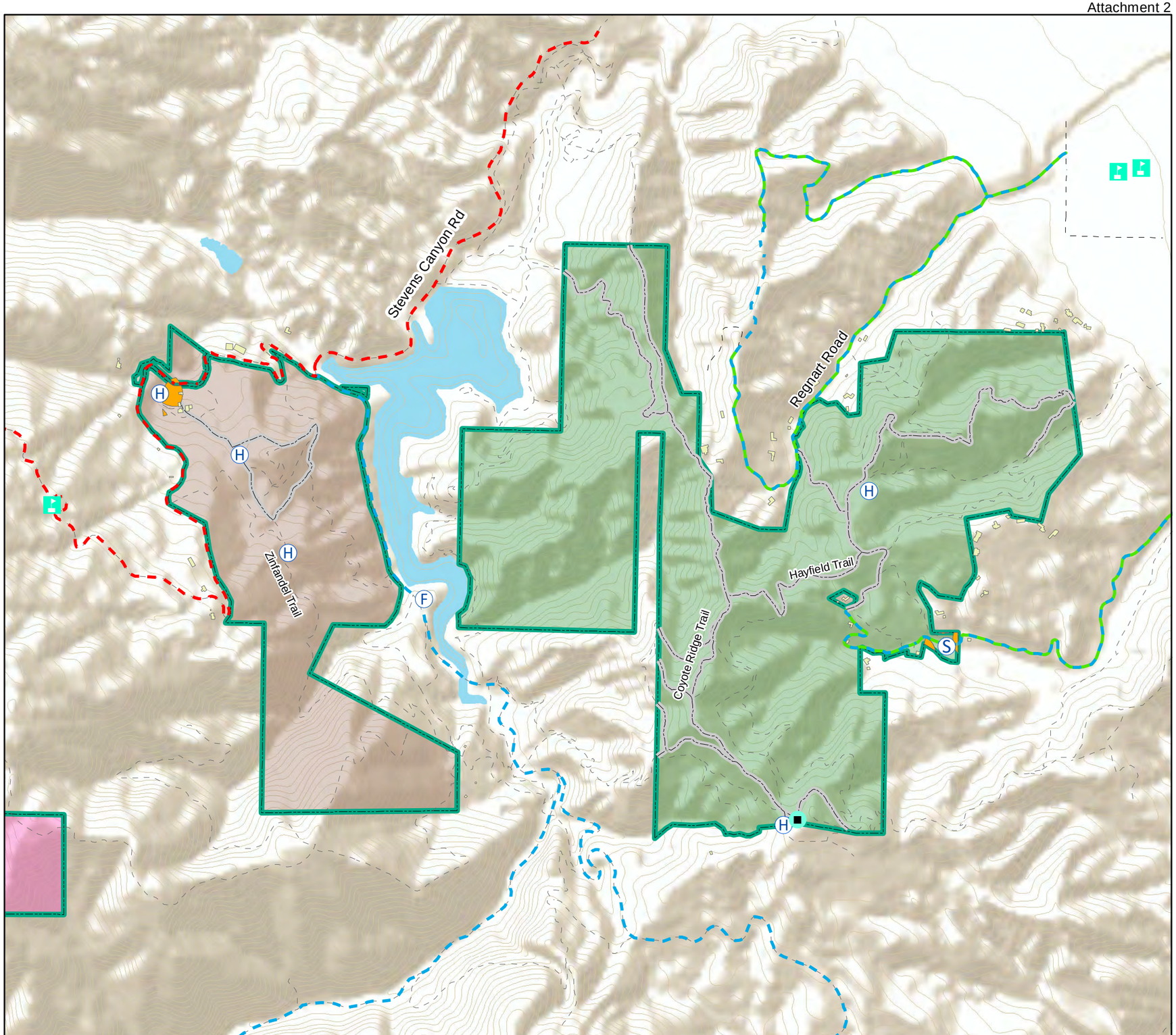
Critical Infrastructure
- Primary Evacuation Route
- Secondary Evacuation Route
- Structure Type 1 (Tender)

Maintained for Vehicle Class
- Wildland Type 3 Ingress/Egress
- Road or Trail
- Fire Station
- Water Tank

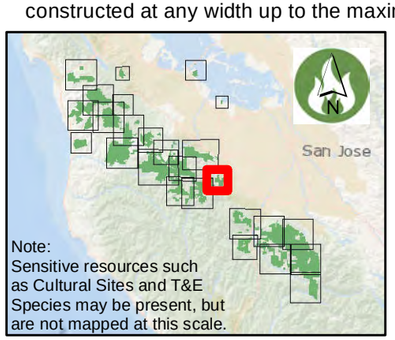
Target Hazards
- School/Day Care

Fire Management Logistics
- Helispot
- Staging

OSP & Managed Properties
- Boundary
- Fremont Older
- Monte Bello
- Picchetti Ranch



* See Table of Contents page for additional symbology.
** Fuel break widths are maximums. Fuelbreaks may be constructed at any width up to the maximum width.



0 0.25 0.5 Miles

Date Printed: 6/7/2020

Treatment Priorities
El Sereno/Felton Station/St. Joseph's Hill

Treatment Priority Areas
- Tier 1
- Tier 2

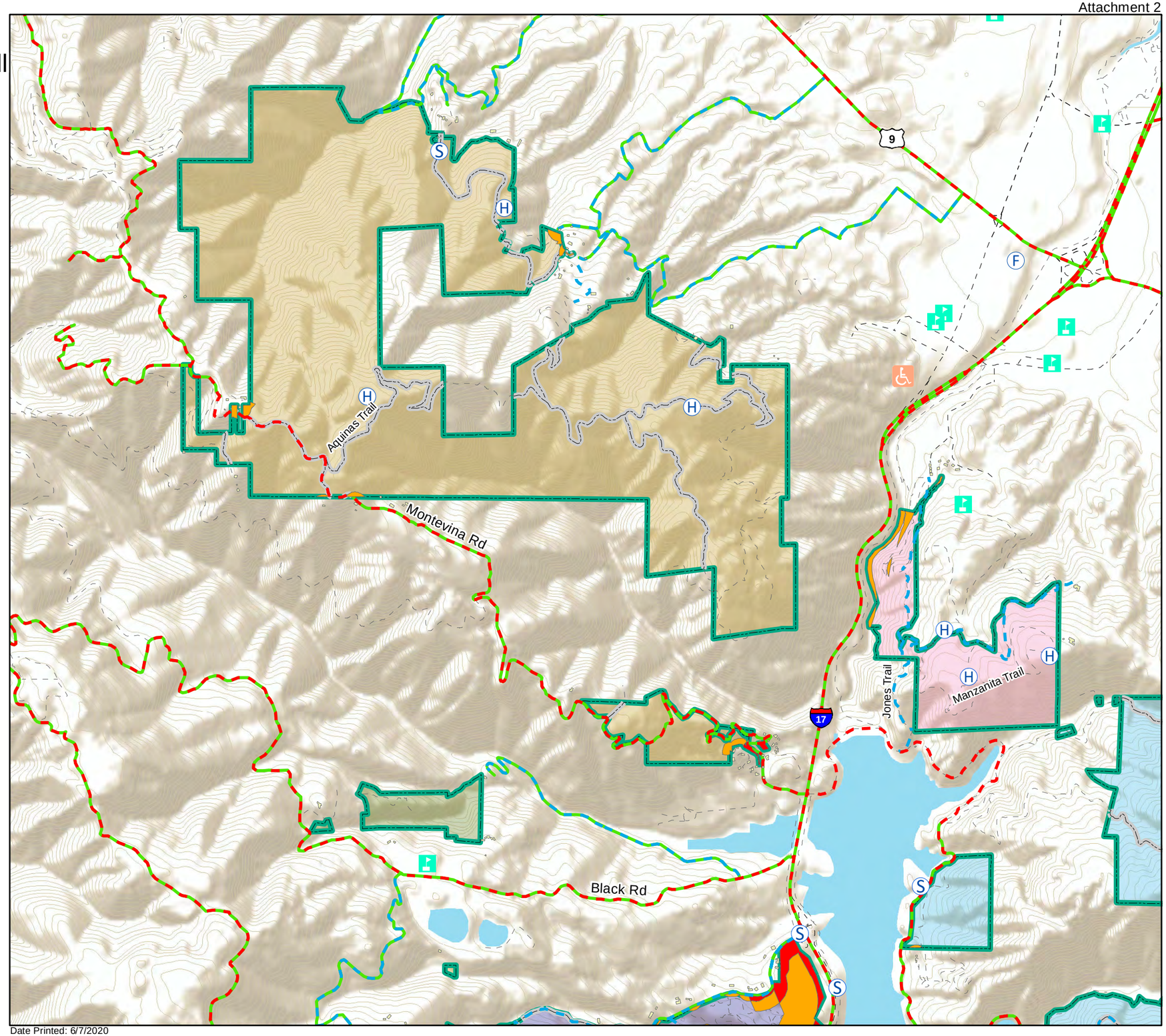
Critical Infrastructure
- Primary Evacuation Route
- Secondary Evacuation Route
- Structure Type 1 (Tender)

Maintained for Vehicle Class
- Wildland Type 3 Ingress/Egress
- Road or Trail
- Fire Station

Target Hazards
- Assisted Living Facility
- School/Day Care

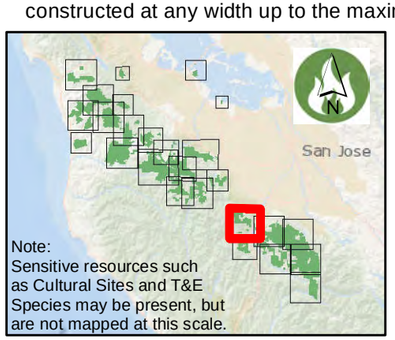
Fire Management Logistics
- Helispot
- Staging Area

OSP & Managed Properties
- Boundary
- Bear Creek Redwoods
- El Sereno
- Felton Station
- Sierra Azul
- St. Joseph's Hill



Date Printed: 6/7/2020

* See Table of Contents page for additional symbology.
** Fuel break widths are maximums. Fuelbreaks may be constructed at any width up to the maximum width.



0 0.25 0.5 Miles

Treatment Priorities
Bear Creek Redwoods

Treatment Priority Areas
- Tier 1
- Tier 2

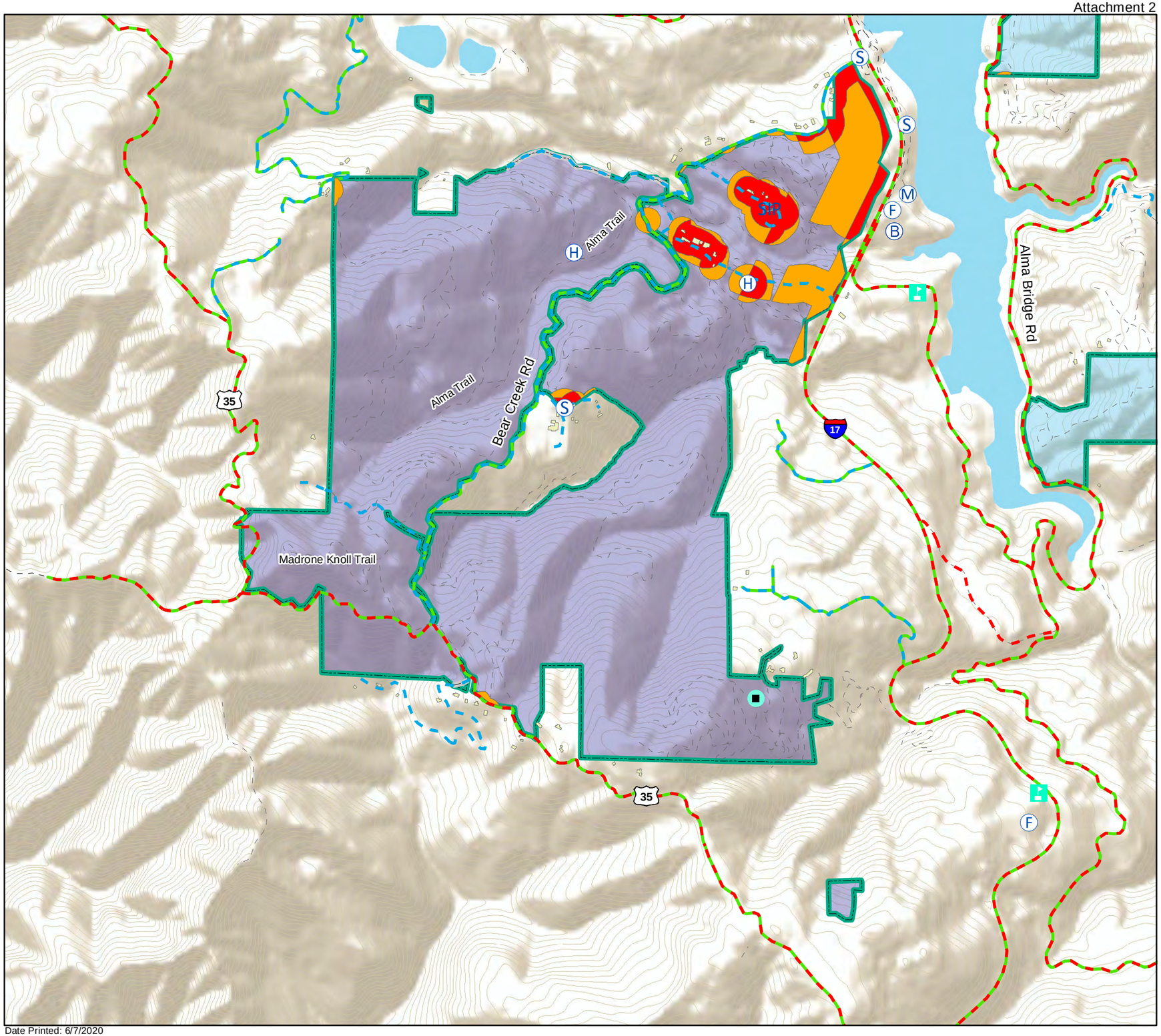
Critical Infrastructure
- Primary Evacuation Route
- Secondary Evacuation Route
- Structure Type 1 (Tender)

Maintained for Vehicle Class
- Wildland Type 3 Ingress/Egress
- Road or Trail
- (F) Fire Station
- (B) Incident Command Post
- (M) Medivac Site
- SIP Shelter-in-Place
- Water Tank

Target Hazards
- School/Day Care

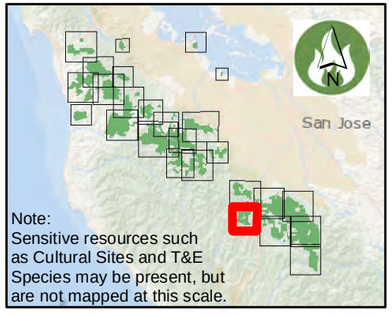
Fire Management Logistics
- (H) Helispot
- (S) Staging Area

OSP & Managed Properties
- Boundary
- Bear Creek Redwoods
- El Sereno
- Sierra Azul



Date Printed: 6/7/2020

* See Table of Contents page for additional symbology.
** Fuel break widths are maximums. Fuelbreaks may be constructed at any width up to the maximum width.



0 0.25 0.5 Miles

Treatment Priorities
Sierra Azul (1 of 5)

Treatment Priority Areas
- Tier 1
- Tier 2

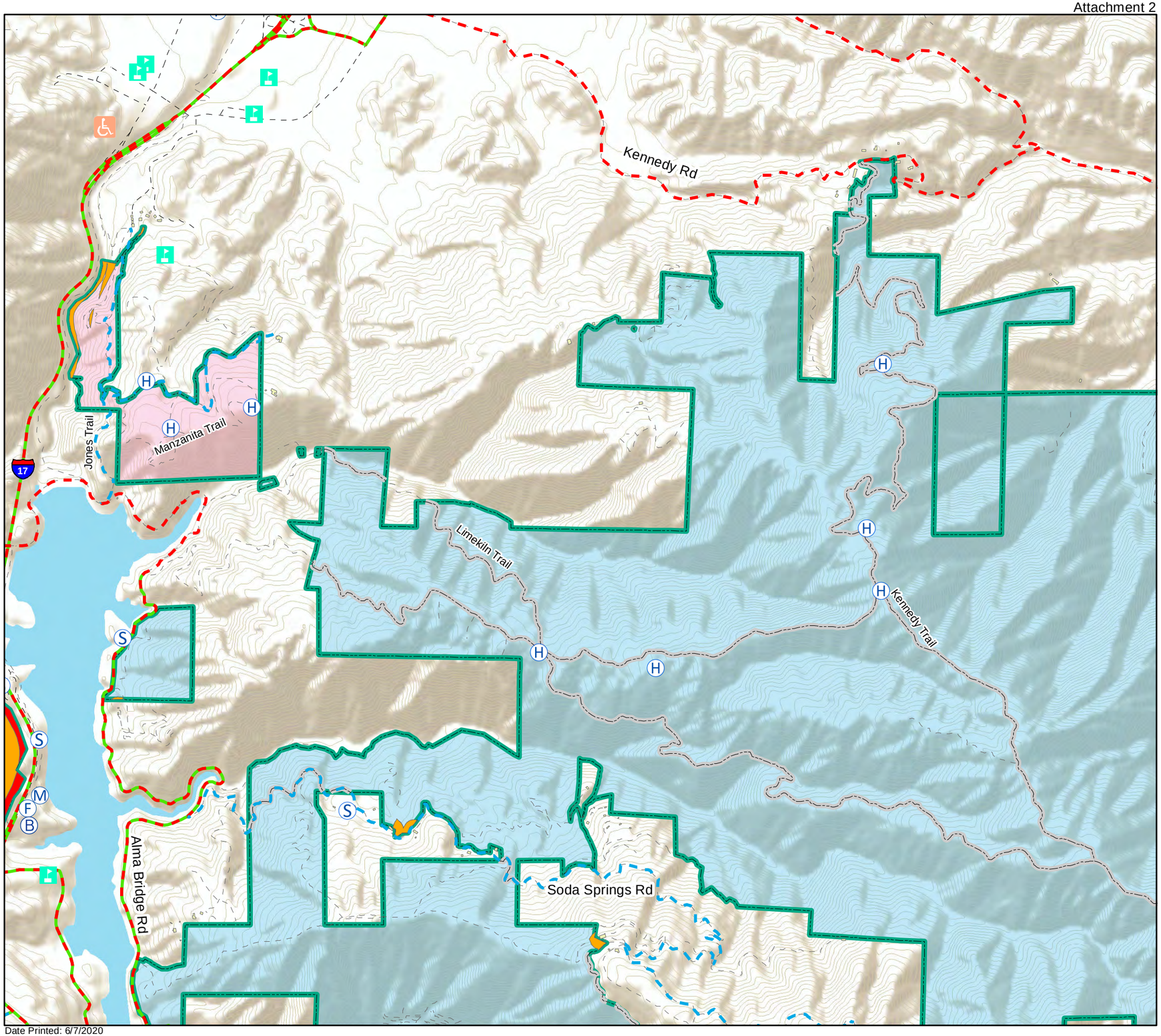
Critical Infrastructure
- Primary Evacuation Route
- Secondary Evacuation Route
- Structure Type 1 (Tender)

Maintained for Vehicle Class
- Wildland Type 3 Ingress/Egress
- Road or Trail
- Fire Station
- Incident Command Post
- Medivac Site

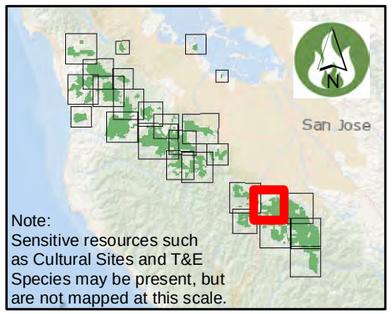
Target Hazards
- Assisted Living Facility
- School/Day Care

Fire Management Logistics
- Helispot
- Staging Area

OSP & Managed Properties
- Boundary
- Bear Creek Redwoods
- Sierra Azul
- St. Joseph's Hill



* See Table of Contents page for additional symbology.
** Fuel break widths are maximums. Fuelbreaks may be constructed at any width up to the maximum width.



0 0.25 0.5 Miles

Date Printed: 6/7/2020

Treatment Priorities
Sierra Azul (2 of 5)

Treatment Priority Areas
- Tier 2

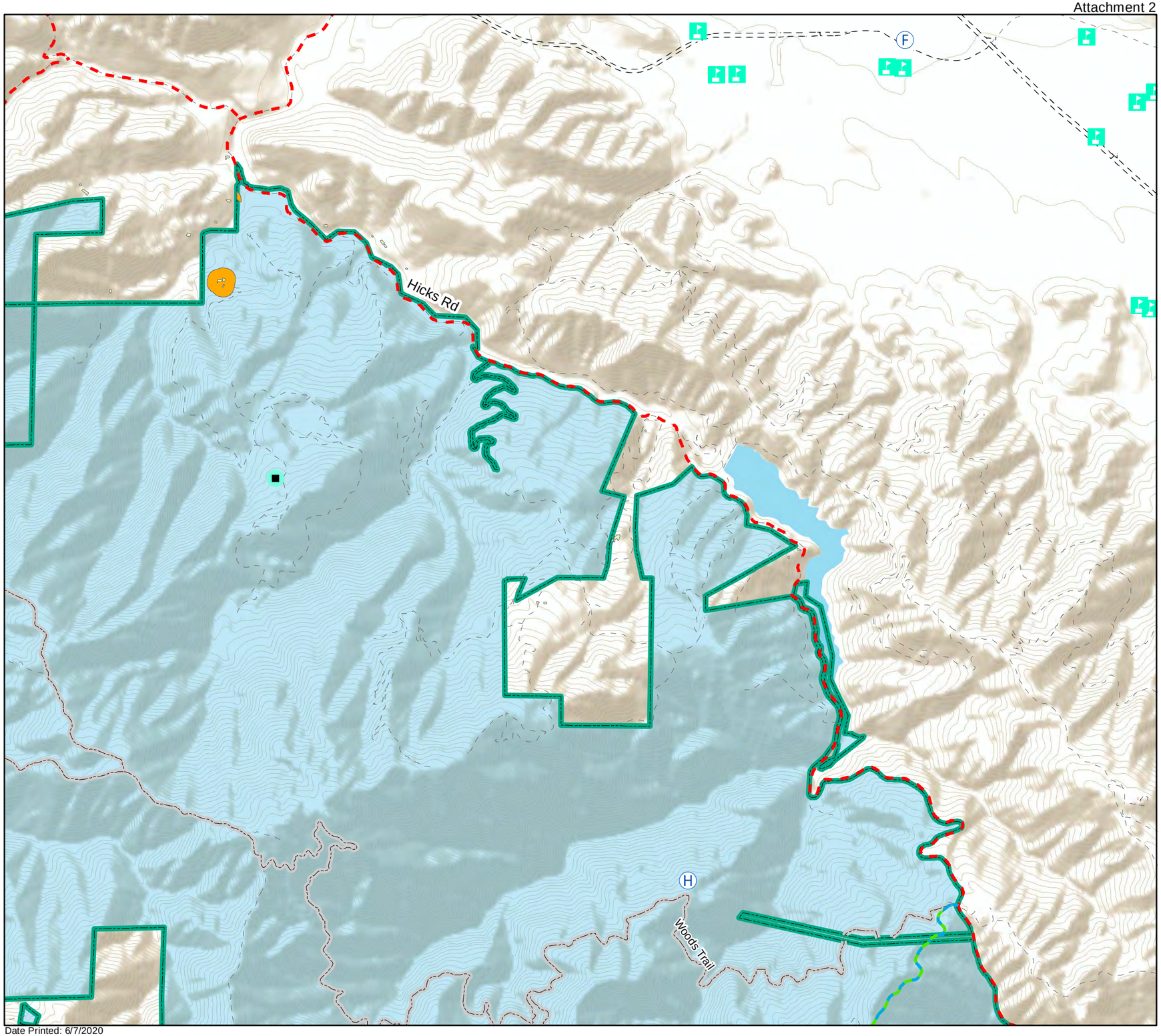
Critical Infrastructure
- Primary Evacuation Route
- Secondary Evacuation Route
- Structure Type 1 (Tender)

Maintained for Vehicle Class
- Wildland Type 3 Ingress/Egress
- Road or Trail
- Fire Station
- Water Tank

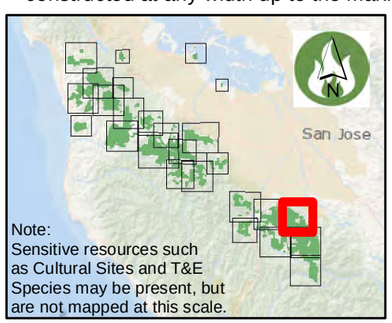
Target Hazards
- School/Day Care

Fire Management Logistics
- Helispot

OSP & Managed Properties
- Boundary
- Sierra Azul



* See Table of Contents page for additional symbology.
** Fuel break widths are maximums. Fuelbreaks may be constructed at any width up to the maximum width.



0 0.25 0.5 Miles

Date Printed: 6/7/2020

Treatment Priorities
Sierra Azul (3 of 5)

Treatment Priority Areas
- Tier 1
- Tier 2

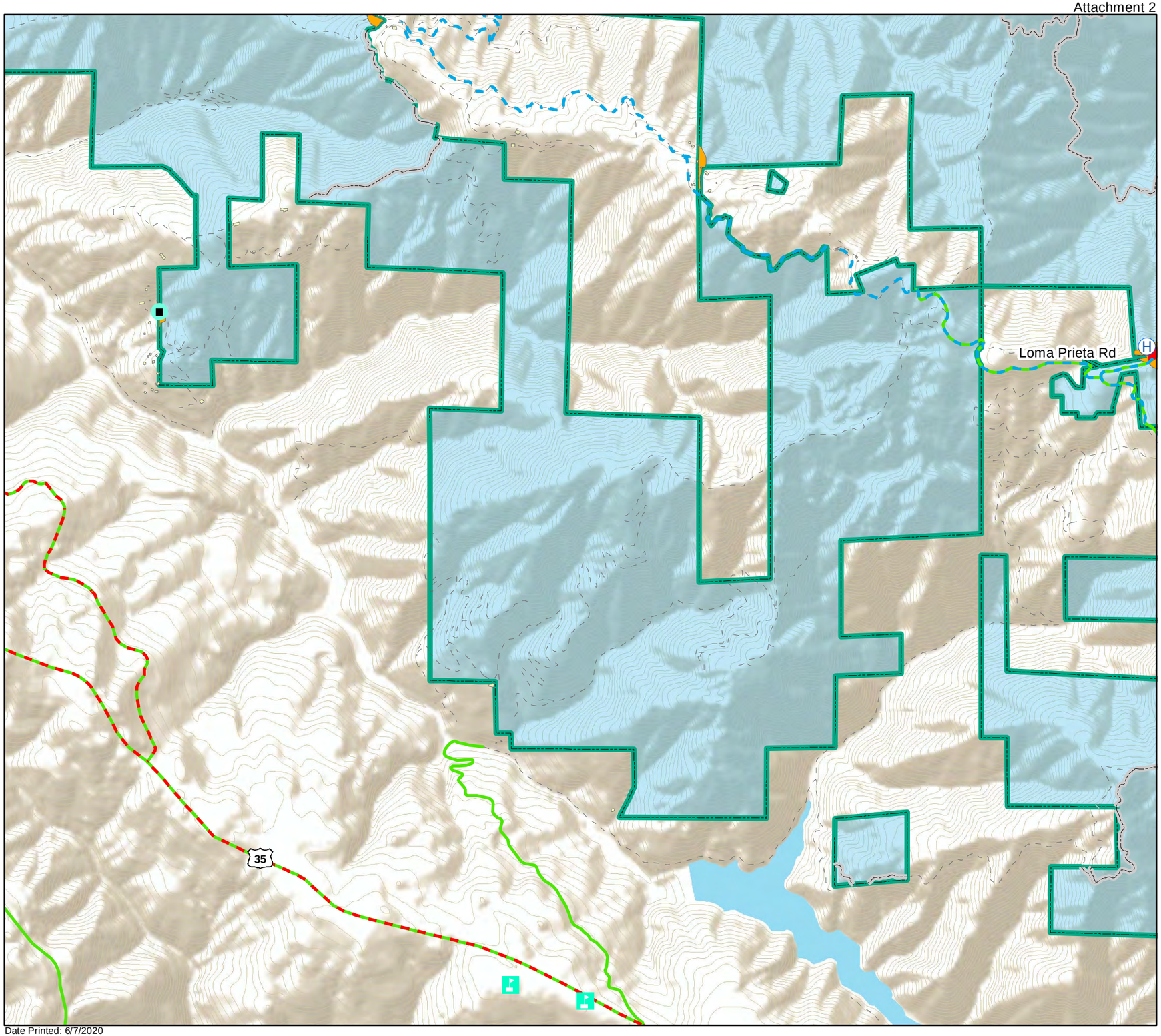
Critical Infrastructure
- Primary Evacuation Route
- Secondary Evacuation Route
- Structure Type 1 (Tender)

Maintained for Vehicle Class
- Wildland Type 3 Ingress/Egress
- Road or Trail
- Water Tank

Target Hazards
- School/Day Care

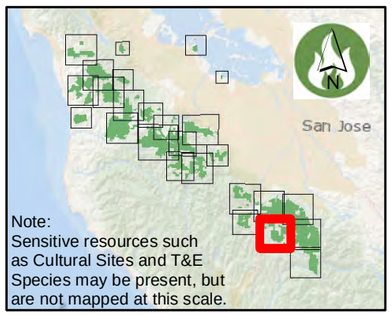
Fire Management Logistics
- Helispot

OSP & Managed Properties
- Boundary
- Sierra Azul



Date Printed: 6/7/2020

* See Table of Contents page for additional symbology.
** Fuel break widths are maximums. Fuelbreaks may be constructed at any width up to the maximum width.



0 0.25 0.5 Miles

Treatment Priorities
Sierra Azul (4 of 5)

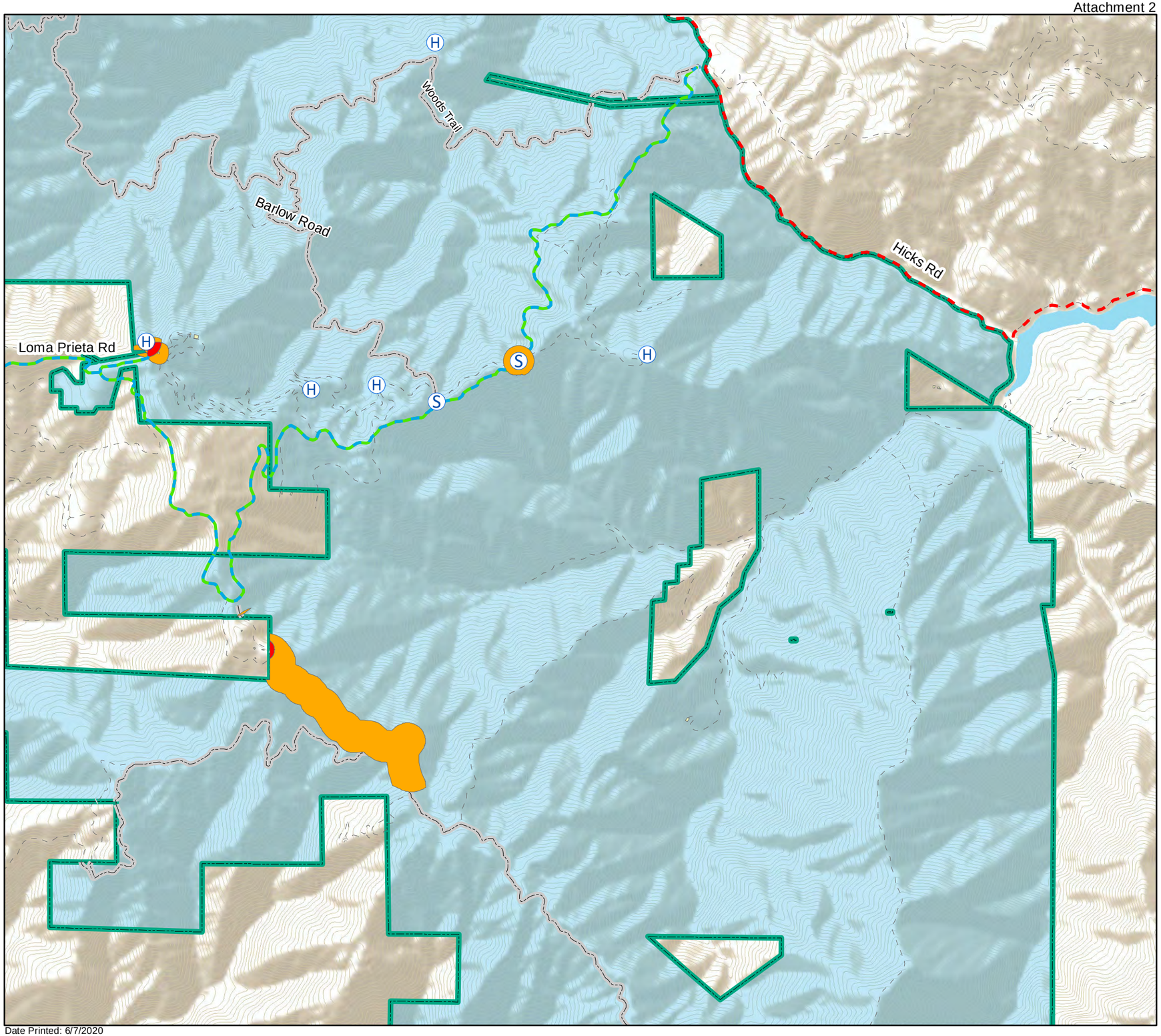
Treatment Priority Areas
- Tier 1
- Tier 2

Critical Infrastructure
- Primary Evacuation Route
- Secondary Evacuation Route
- Structure Type 1 (Tender)

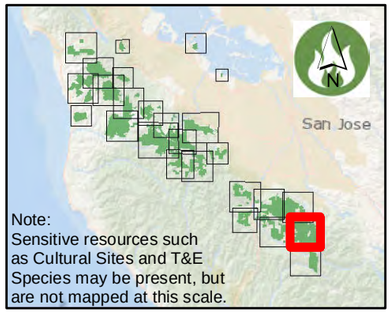
Maintained for Vehicle Class
- Wildland Type 3 Ingress/Egress
- Road or Trail

Fire Management Logistics
- Helispot
- Staging Area

OSP & Managed Properties
- Boundary
- Sierra Azul



* See Table of Contents page for additional symbology.
** Fuel break widths are maximums. Fuelbreaks may be constructed at any width up to the maximum width.



0 0.25 0.5 Miles

Date Printed: 6/7/2020

Treatment Priorities
Sierra Azul (5 of 5)

Critical Infrastructure

- Primary Evacuation Route
- Structure Type 1 (Tender)

Maintained for Vehicle Class

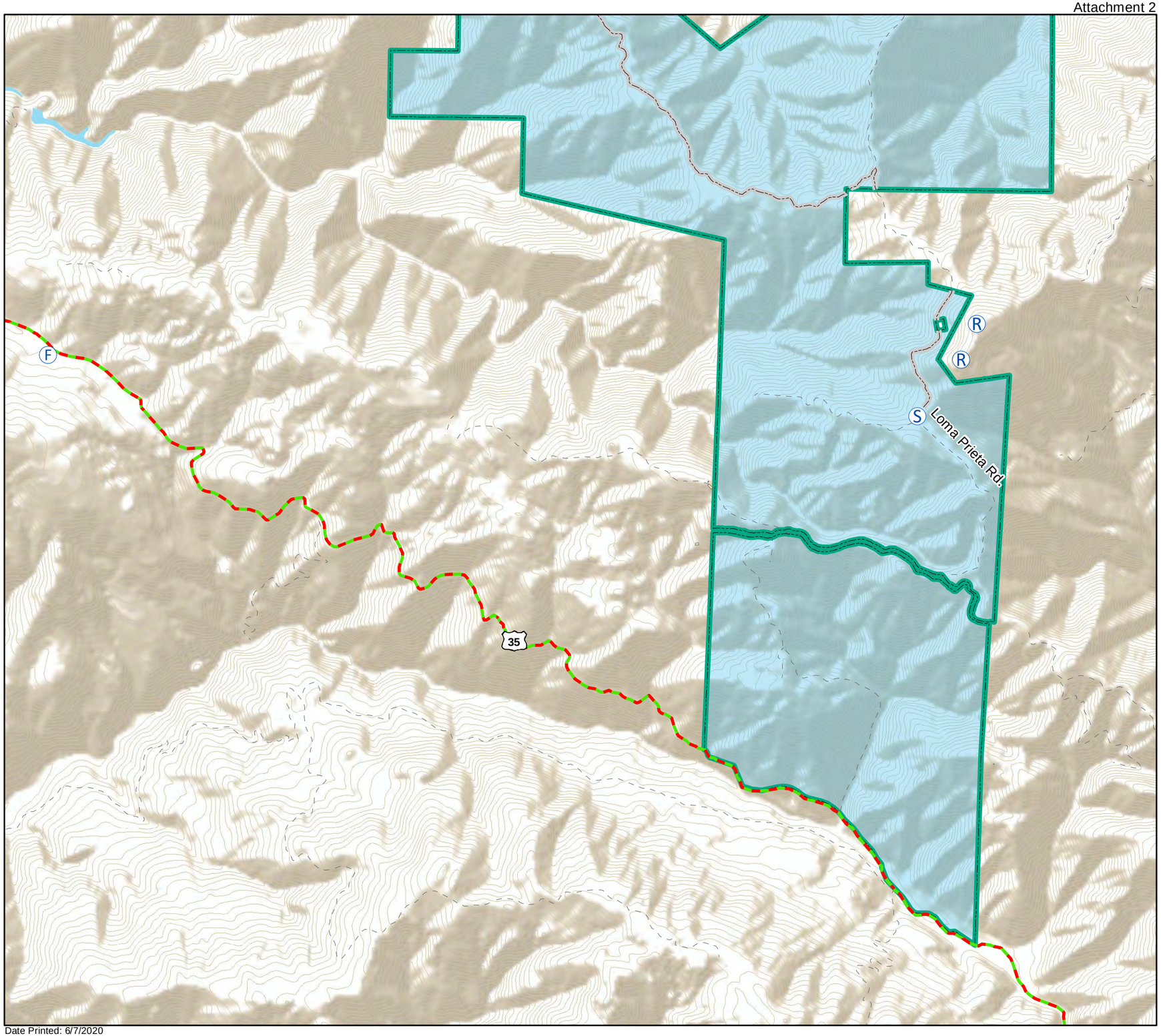
- Wildland Type 3 Ingress/Egress
- Road or Trail
- Communication
- Fire Station

Fire Management Logistics

- Staging Area

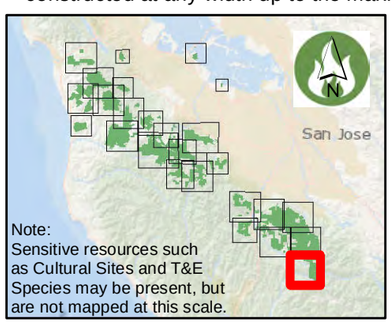
OSP & Managed Properties

- Boundary
- Sierra Azul



Date Printed: 6/7/2020

* See Table of Contents page for additional symbology.
** Fuel break widths are maximums. Fuelbreaks may be constructed at any width up to the maximum width.



0 0.25 0.5 Miles

Treatment Priorities
Ravenswood

Road or Trail

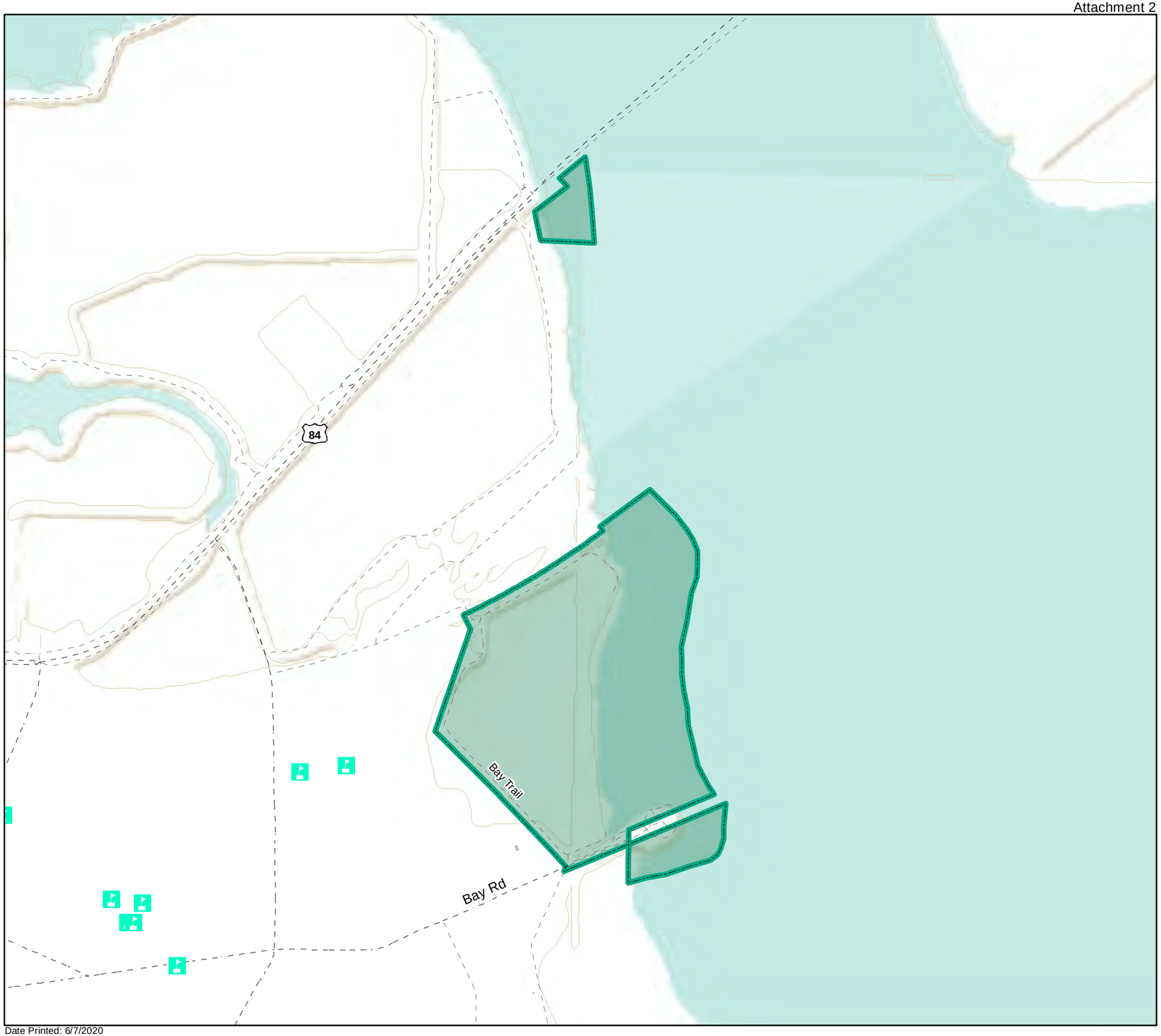
Target Hazards

School/Day Care

OSP & Managed Properties

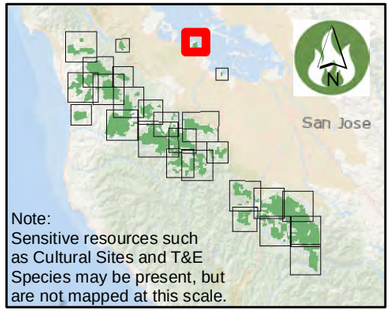
Boundary

Ravenswood



Date Printed: 6/7/2020

* See Table of Contents page for additional symbology.
** Fuel break widths are maximums. Fuelbreaks may be constructed at any width up to the maximum width.



0 0.25 0.5 Miles

Treatment Priorities
Stevens Creek Shoreline NSA

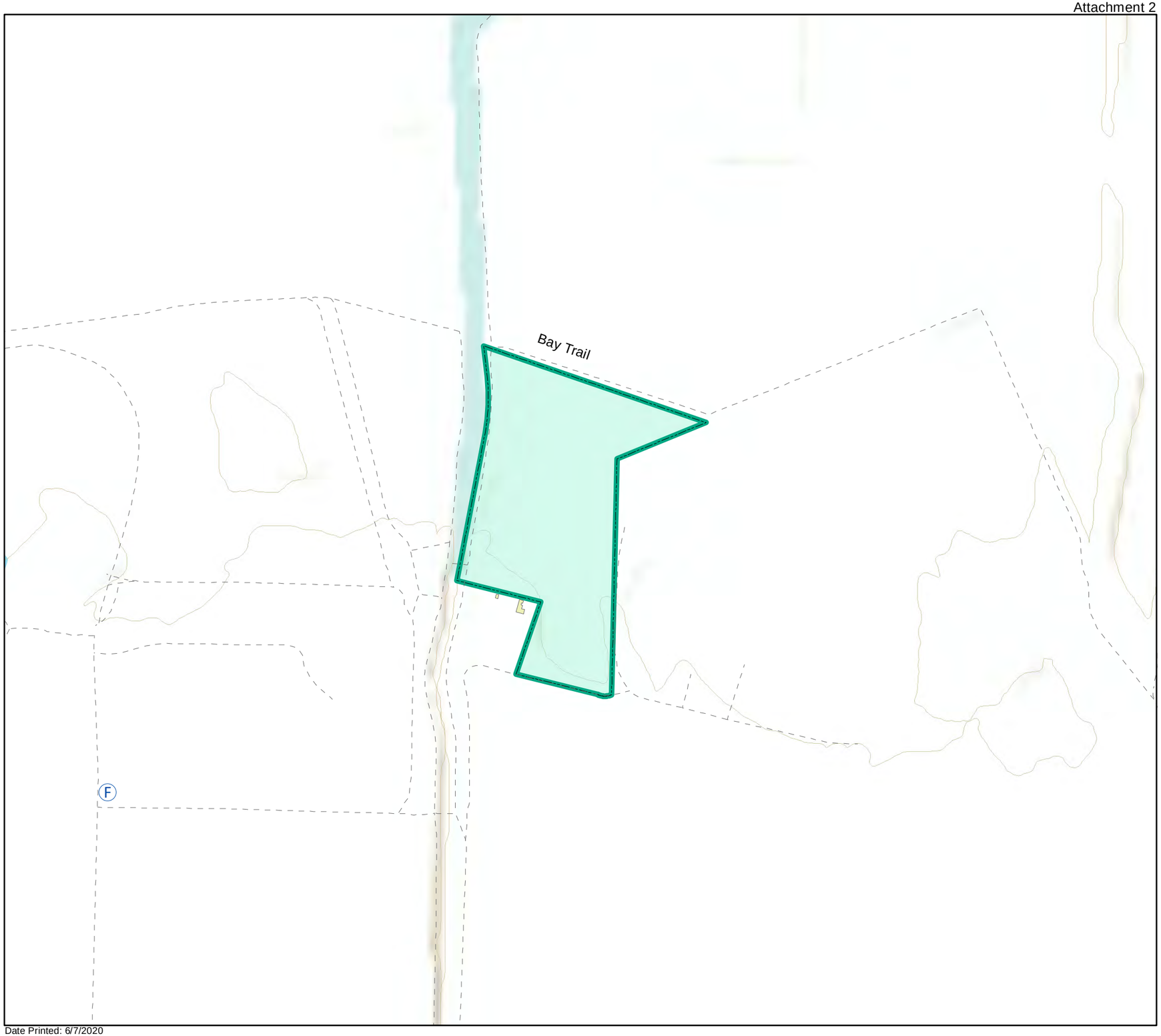
Road or Trail

Fire Station

OSP & Managed Properties

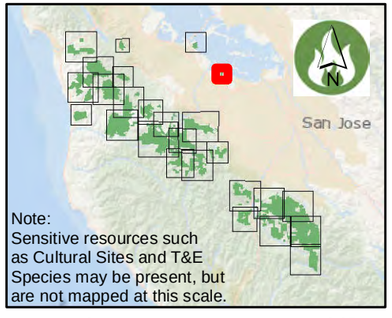
Boundary

Stevens Creek Shoreline Nature Study Area



* See Table of Contents page for additional symbology.

** Fuel break widths are maximums. Fuelbreaks may be constructed at any width up to the maximum width.



0 0.25 0.5 Miles

Date Printed: 6/7/2020

APPENDIX 3.0-2 APPLICABLE BEST MANAGEMENT PRACTICES

Appendix 3.0-2a	IPMP BMPs
Appendix 3.0-2b	Maintenance Operations Manual
Appendix 3.0-2c	Safety Manual
Appendix 3.0-2d	Resource Management Policies
Appendix 3.0-2e	Regulations for Use of Midpeninsula Regional Open Space District Lands
Appendix 3.0-2f	CDFW-Approved SFDFW Protocol
Appendix 3.0-2g	Bat BMPs

Appendix 3.0-2a IPMP BMPs

District BMPs for IPM	
BMP ID#	**Best Management Practices**
1	All pesticide use shall be implemented consistent with written Pest Control Recommendations prepared annually by a licensed Pest Control Adviser. The Pest Control Adviser shall ensure that all pesticide applications are performed at the time of year and phenological window for maximum effectiveness, thereby increasing treatment efficacy and reducing the need for follow-up applications.
2	Adjuvants shall be used and applied consistent with the District's Pest Control Recommendations.
3	Applicators shall follow all pesticide label requirements and refer to all other BMPs regarding mandatory measures to protect sensitive resources and employee and public health during pesticide application. All District field crew who perform herbicide treatments shall have specialized experience and training in pesticide safety, IPM principles, and special status species.
4	Pesticide applicators shall have or work under the direction of a person with a Qualified Applicator License (QAL) or Qualified Applicator Certificate (QAC). As appropriate, the District shall implement QAC certification requirements for additional field staff to enhance field crew training. Contractors and grazing and agricultural tenants may apply approved pesticides after review and approval by the District and under the direction of QAL/QAC field supervisors. After review and approval by the District and under the direction of QAL/QAC, contractors may apply approved fungicides to District preserves for the research and control of Sudden Oak Death (SOD). As needed for the control of mosquitos, cattle grazing rangers may apply District-approved bacterial pathogens to water troughs in District preserves. Employees, contractors and tenants may install approved ant and roach bait stations inside buildings in tamper-proof containers without review by a QAL/QAC. Tenants may not use rodenticides; only qualified District staff or District contractors may use approved rodenticides and these should only be used in the event of an urgent human health issue, in a manner consistent with the product label, and in anchored, tamper-proof containers inside buildings.
5	All storage, loading and mixing of pesticides shall be set back at least 300 feet from any aquatic feature or special-status species or their habitat or sensitive natural communities. Applicators shall use an air gap or anti-siphon device to prevent backflow while loading. All mixing and transferring shall occur within a contained area. Any transfer or mixing on the ground shall be within containment pans or over protective tarps and away from drain inlets, culverts, wells, areas with porous or erosion-prone soil, or other features that may allow for runoff.
6	As deemed necessary by the Pest Control Adviser, QAL, or QAC, appropriate, non-toxic colorants or dyes shall be added to the herbicide mixture to determine treated areas and prevent over-spraying, particularly in public areas.
7	Application Requirements - The following general application parameters shall be employed during pesticide application: ◢ Application shall cease when weather parameters exceed label specifications, when wind at site of application exceeds 7 miles per hour (MPH), or when precipitation (rain) occurs or is forecasted with greater than a 40 percent probability in the next 24-hour period to prevent loss of efficacy and lessen the potential for pesticides to enter surface water; ◢ All restrictions and limitations, including those on irrigation, cultivation, re-entry, etc., as described on the pesticide product label shall be followed for sites treated with pesticides; ◢ Spray nozzles shall be configured to produce a relatively large droplet size; ◢ Low nozzle pressures (30-70 pounds per square inch [PSI]) shall be observed; ◢ Spray nozzles shall be kept within 24 inches of vegetation during spraying; ◢ Application equipment shall be calibrated periodically per manufacturer specifications or frequently enough such that equipment is applying pesticides according to label directions; ◢ Drift and overspray avoidance measures shall be used to prevent drift in all locations. Particular attention shall be paid to areas where target weeds and pests are in proximity to special-status species or their habitat. Such measures can consist of, but would not be limited to the use of plastic shields around target weeds and pests and selecting and using appropriate spray nozzles and pressures. Spray areas may also be limited by using application methods such as spot treatments and thin line treatments of one-inch wide or less. ◢ Due to the potential presence of temperature inversion layers, no spraying shall be conducted on designated "Spare the Air" days.
8	Notification of Pesticide Application – Signs shall be posted notifying the public, employees, and contractors of the District's use of pesticides. The signs shall consist of the following information: product name, signal word, and manufacturer, active ingredient, and EPA registration number; target pest; preserve name; treatment location in preserve; date and time of application; date which notification sign may be removed; and contact person with telephone number. Signs shall generally be posted 24 hours before the start of treatment and

District BMPs for IPM	
BMP ID#	**Best Management Practices**
	notification shall remain in place for 72 hours after treatment ceases. In no event shall a sign be in place longer than 14 days without dates being updated. See the IPM Guidance Manual for details on posting locations, posting for pesticide use in buildings and for exceptions.
9	Disposal of Pesticide Containers – Cleanup of all pesticide and adjuvant containers shall follow the product label and local waste disposal regulations. This generally consists of triple rinsing with clean water at an approved site and adding the rinsate to the batch tank for application. Used containers shall be punctured on the top and bottom to render them unusable, unless said containers are part of a manufacturer's container recycling program, in which case the manufacturer's instructions shall be followed. Disposal of non-recyclable containers shall be at legal dumpsites. Equipment shall not be cleaned and personnel shall not bathe in a manner that allows contaminated water to directly enter any body of water within the treatment areas or adjacent watersheds.
10	All appropriate laws and regulations pertaining to the use of pesticides and safety standards for employees and the public, as governed by the U.S. Environmental Protection Agency, the California Department of Pesticide Regulation, and local jurisdictions shall be followed. All applications shall adhere to label directions for application rates and methods, storage, transportation, mixing, and container disposal. All contracted applicators shall be appropriately licensed by the state. District staff shall coordinate with the County Agricultural Commissioners, and all required licenses and permits shall be obtained prior to pesticide application.
11	Sanitation and Prevention of Contamination - All personnel working in infested areas shall take appropriate precautions to not carry or spread weed seed or SOD-associated spores outside of the infested area. Such precautions will consist of, as necessary based on site conditions, cleaning of soil and plant materials from tools, equipment, shoes, clothing, or vehicles prior to entering or leaving the site.
12	All staff, contractors, and volunteers shall be properly trained to prevent spreading weeds and pests to other sites.
13	District staff shall appropriately maintain facilities where tools, equipment, and vehicles are stored free from invasive plants.
14	District staff shall ensure that rental equipment and project materials (especially soil, rock, erosion control material and seed) are free of invasive plant material prior to their use at a worksite.
15	Suitable onsite disposal areas shall be identified to prevent the spread of weed seeds.
16	Invasive plant material shall be rendered nonviable when being retained onsite. Staff shall desiccate or decompose plant material until it is nonviable (partially decomposed, very slimy, or brittle). Depending on the type of plant, disposed plant material can be left out in the open as long as roots are not in contact with moist soil, or can be covered with a tarp to prevent material from blowing or washing away.
17	District staff shall monitor all sites where invasive plant material is disposed on-site and treat any newly emerged invasive plants.
18	When transporting invasive plant material off-site for disposal, the plant material shall be contained in enclosed bins, heavy-duty bags, or a securely covered truck bed. All vehicles used to transport invasive plant material shall be cleaned after each use.
19	Aquatic Areas – Shortly before treatment, a District-approved qualified biologist or other District-approved personnel shall survey the treatment site to determine whether any aquatic features are located onsite. In addition, on a repeating basis, grassland treatment sites shall be surveyed once every five years and brushy and wooded sites shall be surveyed by a District-approved biologist once every five years. Brush removal on rangelands will require biological surveys before work is conducted in any year. Aquatic features are defined as any natural or manmade lake, pond, river, creek, drainage way, ditch, spring, saturated soils, or similar feature that holds water at the time of treatment or typically becomes inundated during winter rains. Treatment sites are defined as areas where IPM activity, including manual, mechanical, and chemical treatment, is expected to occur. If during the survey it is found that aquatic features are present within 15 feet of the proposed treatment area, the District shall either eliminate all treatment activities within 15 feet of the aquatic feature from the project (i.e. do not implement treatment actions in those areas) or if the District chooses to continue treatment actions in these areas, it shall use pesticides and adjuvants labeled for aquatic use and follow the requirements of the mitigation measure for special-status wildlife species and the CDFW Streambed Alteration Agreement.
20	Application of pesticides shall be conducted in accordance with the California Red-Legged Frog Injunction (Center For Biological Diversity v. U.S. Environmental Protection Agency (2006) Case No.: 02-1580-JSW) in known or potential California red-legged frog habitat specifically by: not applying specified pesticides within 15 feet of aquatic features (including areas that are wet at time of spraying or areas that are dry at time of spraying but subsequently might be wet during the next winter season); utilizing only spot-spraying techniques and equipment by a certified applicator or person working under the direct supervision of a certified applicator; and

District BMPs for IPM	
BMP ID#	**Best Management Practices**
	not spraying during precipitation or if precipitation is forecast to occur within 24 hours before or after the proposed application. Preserves in which these precautions must be undertaken are: Miramontes Ridge, Purisima Creek Redwoods, El Corte de Madera, La Honda Creek, Picchetti Ranch, Russian Ridge, Sierra Azul, Tunitas Creek, Skyline Ridge, Rancho San Antonio, Monte Bello and Coal Creek OSPs and Toto Ranch.
21	A District-approved biologist shall survey all selected treatment sites shortly before work to determine site conditions and develop any necessary site-specific measures. Treatment sites are defined as areas where IPM activity, including manual, mechanical, and chemical treatment, is expected to occur. In addition, o a repeating basis, grassland treatment sites shall be surveyed by a District-approved biologist once every five years and brushy and wooded sites shall be surveyed once every five years. Brush removal on rangelands will require biological surveys before work is conducted in any year. Site inspections shall evaluate existing conditions at a given treatment site including the presence, population size, growth stage, and percent cover of target weeds and pests relative to native plant cover and the presence of special-status species and their habitat, or sensitive natural communities. In addition, annual worker environmental awareness training shall be conducted for all treatment field crews and contractors for special-status species and sensitive natural communities determined to have the potential to occur on the treatment site by a District approved biologist. The education training shall be conducted prior to starting work at the treatment site and upon the arrival of any new worker onto sites with the potential for special-status species or sensitive natural communities. The training shall consist of a brief review of life history, field identification, and habitat requirements for each special-status species, their known or probable locations in the vicinity of the treatment site, potential fines for violations, avoidance measures, and necessary actions if special-status species or sensitive natural communities are encountered.
22	Nesting Birds - For all IPM activities that could result in potential noise and other land disturbances that could affect nesting birds (e.g., tree removal, mowing during nesting season, mastication, brush removal on rangelands), treatment sites shall be surveyed within two weeks prior to initiating activity to evaluate the potential for nesting birds. Tree removal will be limited, whenever feasible, based on the presence or absence of nesting birds. For all other treatments, if birds exhibiting nesting behavior are found within the treatment sites during the bird nesting season: March 15 – August 30 for smaller bird species such as passerines and February 15 - August 30 for raptors, impacts on nesting birds will be avoided by the establishment of appropriate buffers around active nests. The distance of the protective buffers surrounding each active nest site are: 1,000 feet for large raptors such as buteos, 500 feet for small raptors such as accipiters, and 250 feet for passerines. The size of the buffer may be adjusted by a District biologist in consultation with CDFW and USFWS depending on site specific conditions. Monitoring of the nest by a District biologist during and after treatment activities will be required if the activity has potential to adversely affect the nest. These areas can be subsequently treated after a District biologist or designated biological monitor confirms that the young have fully fledged, are no longer being fed by the parents and have left the nest site. For IPM activities that clearly would not have adverse impacts to nesting birds (e.g. treatments in buildings and spot spraying with herbicides), no survey for nesting birds would be required.
23	San Francisco dusky-footed woodrat and Santa Cruz kangaroo rat – All District staff, volunteers or contractors who will implement treatment actions shall receive training from a qualified biologist on the identification of dusky-footed woodrat, Santa Cruz kangaroo rat, and their nests or burrows. Generally, all San Francisco dusky-footed woodrat and their nests, and Santa Cruz kangaroo rat and their burrows will be avoided and left undisturbed by proposed work activities. If a nest site or burrow will be affected, the District will consult with CDFW. Rodenticides, snap traps, and glue boards shall not be used in buildings within 100 feet of active San Francisco dusky-footed woodrat nests or Santa Cruz kangaroo rat burrows; instead rodent control in these areas will be limited to non-lethal exclusion and relocation activities including relocation of nests if approved by CDFW. Tenants will contact the District for assistance in managing rat populations in buildings and under no circumstances will be allowed to use rodenticides.
24	Where appropriate, equipment modifications, mowing patterns, and buffer strips shall be incorporated into manual treatment methods to avoid disturbance of grassland wildlife.
25	Rare Plants – Shortly before treatment, all selected treatment sites shall be surveyed by District-approved personnel with environmental awareness training (BMP #20) prior to work to determine the potential presence of special-status plants. Rare plant surveys shall also be conducted during the appropriate season to assess the occurrence, if any, of dormant or overwintering plant species that may not be visible during the pre-treatment survey. If special-status plants are reported, information such as species and location shall be uploaded into an electronic inventory system and a biomonitor shall be present to oversee the planned IPM treatment. On a

District BMPs for IPM	
BMP ID#	**Best Management Practices**
	repeating basis, grassland treatment sites shall be surveyed by a District-approved biologist once every five years and brushy and wooded sites shall be surveyed once every five years. Brush removal on rangelands will require biological surveys before work is conducted in any year. Treatment sites are defined as areas where IPM activity, including manual, mechanical, and chemical treatment, is expected to occur. A 30-foot buffer shall be established from special-status plants. No application of herbicides shall be allowed within this buffer. Non-herbicide methods can be used within 30 feet of rare plants but they shall be designed to avoid damage to the rare plants (e.g., pulling).
26	Cultural Resources – District staff, volunteer crew leaders, and contractors implementing treatment activities shall receive training on the protection of sensitive archaeological, paleontological, or historic resources (e.g., projectile points, bowls, baskets, historic bottles, cans, trash deposits, or structures). In the event volunteers would be working in locations with potential cultural resources, staff shall provide instruction to protect and report any previously undiscovered cultural artifacts that might be uncovered during hand-digging activities. If archaeological or paleontological resources are encountered on a treatment site and the treatment method consists of physical disturbance of land surfaces (e.g., mowing, brush cutting, pulling, or digging), work shall avoid these areas or shall not commence until the significance of the find can be evaluated by a qualified archeologist. This measure is consistent with federal guidelines 36 CFR 800.13(a), which protects such resources in the event of unanticipated discovery.
27	Post-Treatment Monitoring – District staff shall monitor IPM activities within two months after herbicide treatment (except for routine minor maintenance activities which can be evaluated immediately after treatment) to determine if the target pest or weeds were effectively controlled with minimum impact to the environment and non-target organisms. Future treatment methods in the same season or future years shall be designed to respond to changes in site conditions.
28	Erosion Control and Revegetation - For sites with loose or unstable soils, steep slopes (greater than 30 percent), where a large percentage of the groundcover will be removed, or near aquatic features that could be adversely affected by an influx of sediment, erosion control measures shall be implemented before or after treatment as appropriate. These measures could consist of the application of forest duff or mulches, straw bales, straw wattles, other erosion control material, seeding, or planting of appropriate native plant species to control erosion, restore natural areas, and prevent the spread or reestablishment of weeds. Prior to the start of the winter storm season, these sites shall be inspected to confirm that erosion control techniques are still effective. When possible, applicators may select vegetation control techniques to maintain sufficient vegetative cover to mitigate erosion.
29	Operation of noise-generating equipment (e.g., chainsaws, wood chippers, brush-cutters, pick-up trucks) shall abide by the time-of-day restrictions established by the applicable local jurisdiction (i.e., City and/or County) if such noise activities would be audible to receptors (e.g., residential land uses, schools, hospitals, places of worship) located in the applicable local jurisdiction. If the local, applicable jurisdiction does not have a noise ordinance or policy restricting the time-of-day when noise-generating activity can occur, then the noise-generating activity shall be limited to two hours after sunrise and two hours before sunset, generally Monday through Friday. Additionally, if noise-generating activity would take place on a site that spans over multiple jurisdictions, then the most stringent noise restriction, as described in this BMP or in a local noise regulation, would apply. For IPM sites where the marbled murrelet has the potential to nest, as identified in the District's 2014 maps (see attachment) if noise-generating activities would occur during its breeding season (March 24 to September 15), the IPM activities would be subject to the noise requirements listed in the most current in the CDFW RMA issued to the District (see attachment).
30	All motorized equipment shall be shut down when not in use. Equipment and off-highway vehicle idling will be limited to 5 minutes.
31	Grazing Animals – Some herbicides, such as Milestone, Transline, and Capstone contain label language restricting grazing and/or use of compost. Always read and follow label directions.
32	Surface and Groundwater Protection – Applicators shall use BMPs regarding the prevention of drift, runoff, erosion, and water quality impairment. All work shall be in compliance with the 3 CCR § 6800 (Groundwater Protection). When possible, plant covers such as landscaping shall be established on bare soil and hillsides to minimize pesticide and sediment runoff. Pesticides without an aquatic label shall not be applied to: 1) permeable soils, soils prone to or with evidence of erosion without containment strategies (e.g., vegetative buffers, sediment barriers); or 2) in areas where aquatic habitats are located within 15 feet of the application site. In no cases should pesticides be applied to surface water bodies unless appropriate permits are obtained.

District BMPs for IPM	
BMP ID#	**Best Management Practices**
33	Application of glyphosate and cholecalciferol shall be conducted in accordance with the Goby -11 Injunction (Center for Biological Diversity v. EPA, Case No. 07-2794-JCS (N.D. Cal.), May 30, 2007) in applicable and relevant habitats for those species named in the Injunction that occur within the District. Applicable habitats for each species named in the Injunction are defined in the 2010 court order for the Center for Biological Diversity v. EPA. Because the interim protective measures (i.e., no-use buffer zones adjacent to certain features within certain geographic areas) established in the 2010 order vary depending on the species at issue and the pesticide being used, the USEPA webpage should be consulted: https://www.epa.gov/endangered-species/interim-use-limitations-eleven-threatened-or-endangered-species-san-francisco-bay. In addition, District internal special status species mapping resources, buffer zones established on the CNDDB webpage, and an interactive species location map (https://www.epa.gov/endangered-species/san-francisco-bay-area-map-tool-identify-interim-pesticide-use-limitations) should be consulted. The interim use limitations remain in effects until USEPA completes effects determinations for four pesticides named under the 2015 revised settlement agreement for the Center for Biological Diversity v. EPA. The effects determinations are expected to be completed by 2020.
34	Glyphosate Use Reduction – Where feasible, the District shall reduce the use of glyphosate in its preserves. For IPM projects currently utilizing glyphosate as a management tool, the District shall identify suitable sites to implement alternative treatment methods. The District shall seek to replace glyphosate with the safest available, broad-spectrum, post-emergent herbicide with minimal residual soil activity.
35	Trails – To reduce potential staff and visitor exposure to pesticides, no-spray trail buffers shall be established at least 5 feet from any trails, trailheads, or parking lots unless a 24-hour trail closure is observed.
36	Annual Pesticide Literature Review – To inform updates to the IPM Program, the District shall conduct an annual pesticide literature review of all newly published toxicological research and court proceedings related to pesticides on the "Approved Pesticides List."
37	Insect Repellents and Water Quality – To protect water quality and aquatic organisms, District Staff shall not come into contact with a water body when skin, boots or clothing is contaminated with insect repellents.

Appendix 3.0-2b Maintenance Operations Manual

7 - Vehicle Operations	Section 07.005
	Page 1 of 1
Title: Specialized Utility Vehicles – Procedures for Use of	04/23/2019

I. Purpose

To assure proper training in the use of all-terrain vehicles (ATVs) and Specialized Utility Vehicles, such as 2wd Rokon, Ubco eBike, Bobcat utility vehicle, and Quad Runners.

II. Policy

All Maintenance Staff will complete an ATV safety training before operating any District Quad Runner. Before operating the 2wd Rokon, fuel-powered utility vehicles, or electric utility vehicles, Maintenance Staff will be required to take safety training and operating procedure checkout by a District-trained and designated Maintenance Staff member. In addition, Maintenance Staff will complete daily check out of the equipment before use and wear all required safety equipment appropriate to the piece of equipment being used or driven.

III. Procedure

A. Maintenance Staff must complete ASI training before operating an ATV (Quad Runner)
    1. After ASI training staff will be given an in-house checkout on ATV operation.

B. Maintenance Staff will be given in-house checkout on other Specialty Utility Vehicles, 2wd Rokon and 2wd Ubco ebike including training on properly loading/unloading and securing the Specialty Utility Vehicles on a trailer or in a truck bed.
    1. Maintenance Staff shall be trained in the use of trailers before towing the ATV on a trailer.

C. Maintenance Staff must complete a daily check out of equipment before use.

D. Seasonal OSTs may operate the Specialty Utility Vehicles after completing the District safety checkout. See Maintenance, Construction, and Resource Supervisor's list of vehicles approved for seasonal Maintenance Staff use.

E. All Maintenance Staff will operate vehicles at appropriate speeds within the preserves 15 mph maximum, and 5 mph when passing pedestrians, bicycles, and horses.

F. Maintenance Staff will not operate the District patrol motorcycles.

8 - Equipment Operations	Section 08.008
	Page 1 of 1
Title: Equipment Servicing	04/23/2019

I. Purpose

To assure all District heavy equipment are routinely serviced and daily/periodic inspections are completed to keep equipment in proper operating condition.

II. Policy

Maintenance Staff using heavy equipment are responsible for checking equipment before use and determining when routine service is required

III. Procedure

A. Routine service and maintenance of District tractors will be completed by the Equipment Mechanic Operator, qualified District Maintenance Staff, or a designated vendor.

1. Routine service can include daily inspections and various inspections based on hours of use, mileage, or on a calendar schedule.
2. Appropriate records of recurring inspections or service should be maintained depending on the needs for the equipment.

8 - Equipment Operations	Section 08.016
	Page 1 of 1
Title: Spotting & Equipment Signing During Heavy Equipment Operation	04/23/2019

I. Purpose

To assure visitor and employee safety while operating heavy equipment on District lands.

II. Policy

When heavy equipment is being operated, warning signs or trail closure signs will be placed on all roads and trails leading into the work site. In addition, a spotter will be present to warn operator of and control visitors around the equipment.

III. Procedure

A. The Maintenance, Construction, and Resource Supervisor who is responsible for the project shall ensure that as many spotters as necessary are assigned to ensure scene security and safety.

B. Refer to Safety Manual sections 1.6.5.15 and 1.6.5.16, Tractor and Heavy Equipment Work Site Safety.

C. Heavy equipment is defined as any equipment that may be sat upon, and that is used for earth moving and/or vegetation removal.

8 – Equipment Operations	Section 08.017
	Page 1 of 1
Title: Diesel Engine Idling Policy	04/23/2019

I. Purpose

To assure all Maintenance Staff are following the California Air Resources Board and California Code of Regulations Title 13 for diesel engine idling. *Italicized sections are from the ARB informational advisory.*

II. Policy

When operating or using any diesel fueled vehicle or equipment, Maintenance Staff will not allow the engine to idle for more than five consecutive minutes.

"*No vehicle or engine subject to the in use, off-road diesel regulation may idle for more than five consecutive minutes. The idling limits took effect on June 15th, 2008, the day that the off road diesel regulation became effective under California law."*

Please contact a District Maintenance, Construction, and Resource Supervisor for more information if this policy is unclear or if there are additional questions.

III. Procedure

A. If Maintenance Staff needs to be away from equipment for an extended period, Maintenance Stuff will shut down engine so it does not exceed the five-minute idling regulation.

B. There is an exception to this policy and ARB regulation: if Maintenance Staff is actively using the equipment, i.e., dragging material to feed into a chipper, loading a bucket of a tractor, etc., then the equipment can continue to idle while actively working.

C. Examples of when idling limit does not apply:

1. Idling when waiting in line is allowed (Idling to wait for other vehicles or materials is not allowed)
2. Idling to accomplish secondary functions, such as, concrete agitation, load hoisting, PTO operation, or other necessary function is allowed.
3. Idling to keep equipment (including equipment windows) clear of ice and snow is allowed.
4. Idling to provide air conditioning or heat to ensure the health and safety of the operator is allowed.
5. Idling to test or repair a vehicle/equipment is allowed.
6. Idling to warm up a vehicle/equipment to operating temperature as specified by the manufacturer is allowed.

D. Any changes or updates to California Code of Regulations or Air Resources Board regulations for Idling Limits will supersede this policy.

13 - Fire Prevention and Fire Operations	Section 13.005
	Page 1 of 1
Title: Fire Operations - Maintenance Staff	04/23/2019

I. Purpose

To define the scope of responsibility to participate in the District's Fire Suppression Program.

II. Policy

All Equipment Mechanic Operators and Maintenance, Construction and Resource Supervisors are required to participate in the Fire Suppression Program.

Other Maintenance Staff may voluntarily participate in the District Fire Suppression Program within the scope of the District's provided training and expectations.

III. Procedure

A. Mandatory training for participants in the Fire Suppression Program:
   1. Basic 32-hour Wildland Firefighter training (S-130 or equivalent)
   2. Annual wildland firefighting refresher (RT-130 or equivalent)
   3. Annual Fire Shelter training refresher
   4. ICS-100 training (ICS-200 training for supervisors and water tender operators)
   5. Pass annual fitness test per current standards
   6. Required training for water truck operators is covered in the training outline and includes water operations, driving, vehicle operation, and working in a fire suppression setting. Training includes annual in-house training and annual training with coastal fire agencies.

B. Recommended training for participants in the Fire Suppression Program:
   1. Annual training in progressive hose lays, pumper operation, hand-line construction, and other appropriate tasks
   2. Live fire training whenever possible
   3. Periodic participation in multi-agency wildland fire training
   4. Participation in District Fitness Program to maintain conditioning

C. Maintenance Staff typically participates in fire suppression activities under the direction of qualified personnel, which may include more experienced District Staff and/or Fire Department personnel.

D. Right to refuse a task:
   1. If assigned a task that is beyond the skills or experience of a Maintenance Staff member participating in the District's Fire Suppression Program, that Maintenance Staff member has the right and the responsibility to respectfully advise the supervisor/lead why they cannot implement the request.

13 - Fire Prevention and Fire Operations	Section 13.008
	Page 1 of 2
Title: Prescribed Fires and Burn Piles	04/23/2019

I. Purpose

Define the recommended procedures for conducting prescribed fires and pile burns.

II. Policy

Maintenance Staff should conduct prescribed fires and pile burns in a safe, legal manner.

III. Procedure

A. Prescribed fires

1. The District can only conduct prescribed fires with the approval of the Natural Resources Department under the direction of an appropriate jurisdictional fire agency.
2. Maintenance Staff should only participate in prescribed fires (including off-site prescribed fires) within the scope of their training at the District approved Basic Wildland Firefighter level.

B. Pile Burns

1. Permit required
    a) Bay Area Air Quality Management District—must be a permissive burn day
2. Required Notifications
    a) Natural Resources Department Manager, Visitor Services Department Manager, Resource Advisor, Land and Facilities Services Department Manager, Area Manager, Maintenance, Construction, and Resource Supervisor
    b) Other field office
    c) Administrative Office front desk
    d) Radio Dispatch
    e) BAAQMD permit and notification based on their current procedures
    f) Local fire jurisdiction just prior to burn—often the local station will notify their dispatch center
    g) Any other County or fire jurisdiction that is likely to receive phone calls regarding the smoke or fire
    h) Notify neighbors who have concerns or who have asked for notification.
    i) Radio Dispatch should be notified at the end of a burn.
3. Pile burning limitations
    a) Responsible Maintenance Staff member on the day of the burn must make a final determination that it is safe to burn considering all the potential hazards, regardless of the burn day status or permission to burn.
    b) Appropriate conditions for smoke dispersal will be a consideration of whether

to burn or not even if all other permit requirements are met.

c) Material to burn is only locally cut natural vegetation; no debris.

d) Material should be sufficiently dry.

e) Size of pile may be regulated by local jurisdictions.

f) Material should be piled to burn quickly with minimum smoke.

g) Material must not be under tree canopy.

h) Sufficient water is present to extinguish the fire if needed.

i) Fire shall be monitored by Maintenance Staff until it is completely extinguished.

j) Burning only occurs between 1000 and 1600 with the fire completely extinguished (CAL FIRE time restraint – other jurisdictions may be different).

k) BAAQMD or local fire jurisdiction may have additional requirements—read the information provided on the permit.

l) Generally, the Personal Protection Equipment (PPE) should be the same for pile burning as for wildland firefighting (not necessary to wear fire shelter).

m) During the burn, always have a means of communications and know whom to call if things go wrong.

13 - Fire Prevention and Fire Operations	Section 13.010
	Page 1 of 3
Title: Safe Use of Equipment in Wildlands	06/13/19

I. Purpose

Reduce the risk of fire ignition in wildlands while operating equipment from which a spark, fire, or flame may originate.

II. Policy

Maintenance Staff must carry out all procedures in a manner that ensures safe operation of equipment to minimize risk of starting a fire in a wildland. Hired or contracted private equipment must meet the requirements of this policy.

III. Procedure

A. Equipment Inspection

1. Prior to use, inspect equipment for safe and operational condition, including a functional spark arrestor (re: Public Resource Code [PRC] 4442).

B. Weather Check

1. ***High risk*** operations (flailing, masticating, disking, grading in heavy brush, operating a mower or brush cutter equipped with metal blades, welding, grinding, etc. or any operation given current conditions that could start a fire) within or adjacent to any wildland areas will be conducted using the following protocols::

   a) Whenever possible, complete projects with potential to start fires in wildland areas outside of Fire Season (May 1 through November 30, or as declared by the District) and plan operations so that areas of greatest risk are mowed early in the day.

   b) No high-risk operations shall occur within a red flag area during a red flag event or within 24 hours of a predicted red flag event as determined by the National Weather Service.

National Weather Service Monterey Office Website: http://www.wrh.noaa.gov/mtr/

   c) Before beginning high-risk operations, a weather sampling will be taken. . Weather samples will be taken every 2 hours if the ambient temperature is below 80 degrees Fahrenheit. Weather samples will be taken hourly if ambient temperature is at or over 80 degrees Fahrenheit. If one of the following conditions occur and the ambient temperature is at or over 80

degrees Fahrenheit, **operations should not start.** If one of these conditions occur while running equipment, **all operations should cease immediately**.

(1) RH (relative humidity) is at 30 percent or lower.

(2) Sustained wind speeds reach 10 mph or higher.

d) Maintenance Staff should assess the surrounding wildland fire risk conditions and make a judgment regarding what would be threatened if a fire got started. Maintenance Staff may choose to stop activity at a lower threshold than described above if it is determined to be a risk to life or property.

e) If ambient temperature is, 95 degrees Fahrenheit or higher, all high-risk operations will cease for remainder of shift.

f) If a fire district within District boundaries recommend a moratorium on mowing due to conditions, and we are aware of the moratorium, staff will not operate within their jurisdiction. Unless Area Manager contacts and informs the fire district of our mowing operations and deems staff can continue, and we are operating within our guidelines.

C. Operation

1. Be aware of risks related to driving and parking in tall, dry grass—particularly with catalytic converters.
2. Have an “Action Plan” in mind if a fire starts and have an “Escape Plan” if it gets beyond your ability to control with suppression equipment on-hand. Plan how to communicate with nearby coworkers or others threatened by fire.
3. If possible plan mowing operations so that prevailing wind will blow over areas that have already been mowed. If a fire starts, it will initially burn in mowed grass with a better chance of stopping the fire early.
4. Before starting *high-risk* operations using tractor mowers on District roads, a non-divertible pumper-equipped pickup will be assigned to the operation. An observer that is familiar with pumper operations; vehicle radio; must staff the truck. .. The employee acting as spotter will be in close proximity to *high-risk* operation.

a) Any deviation from having a pumper truck and spotter on site must be approved by Area Manager.

5. When operating a hand mower or small riding mower, staff must have one round point shovel with an overall length of at least forty-six (46) inches backpack pump water-type fire extinguisher available in the immediate area.

6. When on or near a wildland and operating **stationary** power equipment such as a generator, motor, welder, cutting torch, grinder or similar device from which a spark, fire, or flame may originate, ***all*** of the following are required (re: PRC 4427):

   a) Clear away all flammable material around the area for a distance of 10 feet.

   b) Have one round point shovel with an overall length of at least forty-six (46) inches backpack pump water-type fire extinguisher available in the immediate area.

7. When operating chainsaws and other **portable** gas-powered tools in a wildland, ***one*** of the following is required for use within 25 feet of the area (re: PRC 4431):

   a) One round point shovel with an overall length of at least forty-six (46) inches ***or*** a fire extinguisher appropriate to provide fire control for the area and conditions.

D. Fueling

1. When fueling equipment, allow it to cool where there is no flammable vegetation that can be ignited by the hot exhaust, preferably in a dirt area.

2. See Safety Manual Chapter 1.7.00 regarding fire prevention requirements and Sections 1.6.5.4 to 1.6.5.7 regarding safe fueling of equipment.

14 - Hazardous Materials Operations	Section 14.005
	Page 1 of 2
Title: Hazardous Materials Incidents	04/23/2019

I. Purpose

To provide guidelines on dealing with hazardous material spills or contained hazardous materials (HazMat) found on or near District property.

II. Policy

All Maintenance Staff shall follow the guidelines provided in the Annual Hazardous Waste Operations and Emergency Response First Responder Awareness (HAZWOPER FRA) training when dealing with HazMat incidents. Additional training shall be provided to contain or clean up small spills of known products. The Federal Department of Transportation Emergency Response Guidebook defines small spills as 55 gallons or less.

III. Procedure

A. Hazardous materials can include a wide variety of products such as paint, fuel, oil, anti-freeze, rat poison, fertilizer, asbestos, lead, batteries, pesticide, or any product that may cause harm to the person handling it.

B. If there are any concerns about the safety of handling of a product, stop and contact a Maintenance, Construction, and Resource Supervisor.

C. Refer to procedures contained in the Safety Manual Hazardous Materials Response Guidelines section 1.11.2.0.

D. Maintenance Staff shall be trained to HAZWOPER FRA level before handling any hazardous materials incident.

E. Hazardous material discovered during work time

1. Follow procedures from HAZWOPER FRA course.
2. Notify a Maintenance, Construction, and Resource Supervisor.
3. If material is not contained or material is not on District property, notify Radio Dispatch and a District Ranger for a response from the jurisdictional HazMat Agency.
4. Do not bring any hazardous materials back to the office without Maintenance, Construction, and Resource Supervisor approval. A Maintenance, Construction, and Resource Supervisor may allow transport of a known product if safe transport, storage, and disposal exist.

F. Incidents where Maintenance Staff may take action to contain or clean up a spill

1. Herbicide spill by Maintenance Staff
   a) District shall provide training to contain or clean-up small herbicide spills. Information about herbicide spill procedures are in the herbicide binder that must be on site for any herbicide application.
   b) Maintenance Staff must know what chemical is spilled and what absorbent is appropriate to pick up the substance (oil-based or water-based).
   c) All contaminated absorbent, soil, or other materials shall be properly contained for transport and disposal.
2. Small fuel, oil, paint, or anti-freeze spill by Maintenance Staff
   a) Promptly place a bucket or plastic sheet under the source of the spill to

contain further contamination.

b) Use rags to absorb and dispose of in waste rag bin (use caution with linseed oil coated rags for risk of spontaneous combustion).

c) If necessary, use absorbent material such as cornhusk or pillow.

d) Promptly sweep up absorbent and place in an appropriate container.

e) Confirm with Maintenance, Construction, and Resource Supervisor how to dispose of absorbent. Some absorbents can be placed in Mixed Waste Fuel disposal drum, some cannot.

f) If needed, dig up soil surrounding spill and place contaminated soil in appropriate container. Consult with a Maintenance, Construction, and Resource Supervisor regarding proper disposal.

3. Large spill of fuel (e.g., rupture of fuel storage tank)

   a) Make careful evaluation of safety of attempting containment

   b) Dam flow if safe to do so

   c) More likely, evacuate area and notify Maintenance, Construction, and Resource Supervisor and agency with jurisdiction to respond.

4. Any spill not caused by Maintenance Staff (such as a contractor or other incident) should be managed by the contractor or agency with jurisdiction over the incident until a Maintenance, Construction, and Resource Supervisor directs Maintenance Staff to take action.

5. Maintenance Staff may assist a contractor with containment if the substance is known and they have appropriate training until the contractor can take over clean-up with their own resources.

G. Refer to Facility Emergency Action Guidelines for specific issues at each facility.

14 - Hazardous Materials Operations	Section 14.006
	Page 1 of 4
Title: Hazardous Materials Handling, Storage, and Disposal Procedures	04/23/2019

I. Purpose

To define the proper procedure for handling, storage, and disposal of hazardous materials/waste.

II. Policy

The District will provide Maintenance Staff with the appropriate training, tools, personal protective equipment, and procedures to properly address hazardous materials/waste during the performance of their job.

All Maintenance Staff will follow the procedures outlined in this policy and in their annual training. All Maintenance Staff are required to handle, store, and dispose of hazardous materials in the safest manner possible.

III. Procedure

Definitions:

"Hazardous Material" Any item that can cause injury or damage to people or the environment.

"Hazardous Waste" A byproduct of operational processes that can be harmful to humans or the environment and must be disposed of in a safe manner.

Refer to Safety Manual section 1.11.2.0, Storage and Disposal of Hazardous Materials.

A. Minimizing hazardous materials in the workplace

1. Choose materials/products based on researching their hazard to employees.
2. Choose products that are least hazardous whenever possible.
3. Do not buy or use products that staff do not have the means (training, personal protective equipment [PPE], etc.) to use safely.
4. Obtain a Safety Data Sheet (SDS) from the manufacturer.
5. Use engineering controls (such as venting or use of a different product) to minimize risk whenever possible.

B. Training

Maintenance Staff must be trained in proper handling, types of hazards, PPEs, first aid, and spill cleanup for any hazardous material/waste that they use in the workplace. Training must be provided prior to handling hazardous materials/waste, after any change in procedures, or after any new hazardous material/waste is introduced into the workplace.

C. Storage, use, and transport of hazardous materials/waste:

1. All hazardous materials must be labeled with:
   a) The name of the product (in a form that can be used to easily locate the SDS).
   b) The manufacturer's name (including address) and any acute hazards (such

as “Poison” or “Flammable”).

c) Other information as required (such as “Keep Away from Children”).

d) If possible, use the original container for the product that includes use and spill information. If using service container, be sure enough information is available to quickly identify the product after an incident and easily locate the SDS for required information.

2. Secondary containment requirements – All hazardous materials/waste should be stored and transported with appropriate secondary containment. Office and vehicle cleaning products do not need to be placed in secondary containment.

   a) Do not mix or store incompatible items such as bleach with oils in the same secondary containment or location.

3. Use of proper containers

   a) Correct can type for transporting fuel

   b) Proper labeling for containers holding hazardous materials

4. PPE must be worn as directed by the product label and SDS.

5. Sources of information and procedures

   a) SDS

   b) Product label

   c) Training

D. Disposal of hazardous waste

1. Universal wastes are hazardous wastes that are widely produced by households and many different types of businesses. Universal wastes include televisions, computers, and other electronic devices as well as batteries, fluorescent lamps, mercury thermostats, and other mercury containing equipment, among others. The disposal process is streamlined for these common items.

   a) Do not dispose of in trash.

   b) Wastes should be labeled with a Universal Waste sticker and disposed of within one year.

   c) As a small generator, have less than 5,000 pounds of waste at any one time.

   d) Training required

      (1) Can be written information or posting at site where waste is generated and handled.

      (2) Includes safe handling information and clean-up information

2. Oil (and similar mixed waste) and waste fuel – Container needs to be labeled with proper sticker containing information about the contents, generator, accumulation

start date, and Environmental Protection Agency (EPA) ID number.

a) Containers must be inspected weekly.

b) Containers must be closed when not in use.

c) Containers must be compatible with product stored.

d) Containers must be secured to prevent rupture or leaks.

e) Disposal of these items must be handled by a registered hazardous waste transporter and will require a hazardous waste manifest.

f) Two copies of the manifest stay with the generator. One must be kept on file for 3 years, the other must be sent to the California Department of Toxic Substance Control within 30 days. A copy of the manifest acknowledging receipt must be received within 45 days. If it is not received, notify the Department of Toxic Substance Control within 60 days.

g) Alternatively, small containers (under 5 gallons) can be transported to hazardous waste disposal site without manifest procedures. Place receipt for disposal with hazardous waste disposal records.

h) The container can be kept for one year or until full, whichever comes first.

3. Disposal of all other hazardous waste should be handled through a Maintenance, Construction, and Resource Supervisor

a) Materials may be transported to a disposal facility, such as a site set up by Santa Clara or San Mateo County for the purpose of accepting business hazardous waste by appointment.

b) Materials may be disposed of by contract with a company that is an authorized hazardous materials disposal company.

c) Some items, such as car batteries, may be taken to sites like auto parts stores.

d) Many online references are available for identifying current places that handle disposal of waste.

4. Storage and disposal of Treated Wood Waste (TWW), follow Santa Clara County Department of Environmental Health protocols.

a) All pressure-treated/creosote-treated wood waste must be treated as a hazardous material and must be stored and disposed of properly.

b) TWW should be stored in a covered area away from the weather and properly labeled until disposal (typically 30 days after accumulation start).

c) TWW must be disposed of at a facility that accepts TWW, and a hazardous waste manifest must be obtained from the facility before transport.

(1) Alternatively pressure-TWW can be disposed of at a facility that accepts the waste without a manifest. Obtain a receipt of disposal and put in hazardous waste disposal records.

E. The California Department of Toxic Substance Control is the oversight agency for all hazardous materials.

1. Santa Clara County Department of Environmental Health (Hazardous Materials Compliance Division) permits to handle and store hazardous wastes as a small

quantity generator (less than 100 kg per year).

a) Annual fee

b) Business Plan – annual updates

2. California EPA identification number

a) Annual fee to maintain – must have number to dispose of hazardous wastes

b) Must be maintained for each site that generates waste

c) To remain a Conditionally Exempt Small Quantity Generator, must generate less than 100 kg per month of hazardous waste

17 - Pesticide Program	Section 17.005
	Page 1 of 2
Title: Pesticide Use	04/23/2019

I. Purpose

To provide guidelines for safely and effectively applying pesticides.

II. Policy

Used properly, herbicide (a pesticide) is an effective tool for managing vegetation. Pesticide storage and use are regulated by county, state, and federal law. It is the District's policy to adhere to applicable laws. Any Maintenance Staff member applying herbicide on District property shall follow the following guidelines. Only District approved herbicides shall be used; the Approved Pesticide List is maintained on the Natural Resources Department Sherlock SharePoint site.

III. Procedure

A. All Maintenance Staff applying herbicide must complete the annual safety training. This is offered in-house by a Qualified Applicator or Pest Control Advisor and covers topics specified by state law. Application location and technique must be consistent with the Pest Control Recommendation and the current District IPM Guidance Manual and Best Management Practices. A Daily Use Report shall be approved by the Maintenance, Construction, and Resource Supervisor, completed and returned promptly. The day's activities shall be recorded onto CalFlora within 24 hours of an application.

B. An Applicators Binder must be in possession or carried in the vehicle at the time of application. It contains:

1. Safety Data Sheet for herbicide being used
2. Product label
3. Copy of Pest Control Recommendation
4. IPM Program Best Management Practices
5. Pesticide Safety Information Series Brochures
6. Daily Use checklist
7. Emergency Procedures – Including a list of nearby hospitals
8. Copy of the Operator Permit
9. Other useful information (i.e. mixing chart)

C. Maintenance Staff must be checked out on specific types of pesticide and their application equipment, application techniques, and mixing procedures (e.g., backpack sprayer) prior to use.

D. Proper Personal Protective Equipment (PPEs) listed below must be worn while mixing or applying herbicide. Follow specific guidelines on product label and SDS.

E. Eye protection must be worn at all times. Splash resistant goggles must be worn when mixing or spraying alone. Approved safety glasses with brow guards and side shields must

otherwise be worn.

1. Long sleeve shirts and long pants
2. At least 14 mil nitrile unlined gloves
3. Boots with socks (rubber boots if walking through wet vegetation)
4. Optional Tyvek suits and booties are encouraged to be worn if the nature of the application may result in product being splashed on the applicator.

F. After applying herbicide, all outwear and boots should be cleaned prior to leaving the job site to avoid contaminating vehicles and offices.

G. Maintenance Staff shall ensure that appropriate safety equipment is available and is used. Appropriate safety equipment includes:

1. Eye wash equipment
2. Spill containment materials
3. An extra full Tyvek suit for each person on the job site

17 - Pesticide Program	Section 17.006
	Page 1 of 1
Title: Pesticide Use - Public Notification of	04/23/2019

I. Purpose

To provide guidelines for notifying the public, employees, and contractors of pesticide application on District preserves.

II. Policy

Prior, during, and after the application of a pesticide (including herbicides, insecticides, or other types of pesticides) on District preserves, employees or contractors will post signs at the treatment area notifying the public, staff, and contractors of the District's use of pesticide. Use the appropriate warning sign located on the Natural Resources Sherlock website.

III. Procedure

A. For pesticide application in all preserves, post treatment area 24 hours prior to the start of treatment and 72 hours after the end of treatment. Signs can be up no longer than two weeks. **Exception:** Pesticide application for human safety and health (e.g., wasps) do not need the 24-hour prior notice.

B. Signs stating "Herbicide Treated Area" will be placed at each end of the treatment area and any trails intersecting the treatment area.

C. The information contained in the postings will include signal word, product name and manufacturer, active ingredient, EPA registration number, target pest, preserve name, treatment location in preserve, date and time of application, date which notification sign may be removed, and contact person with telephone number.

D. Maintenance Staff and contractors will be subject to "Restricted Entry Interval" (REI) consistent with the product label or the Pest Control Recommendation, whichever provides a longer period. If Maintenance Staff or contractors need to re-enter the treatment area prior to the end of the REI, they must follow all conditions of the label or Pest Control Recommendation such as wearing personal protective equipment.

E. Pesticide application at Rancho San Antonio County Park will be consistent with the Santa Clara County Parks and Recreation Department's Integrated Pest Management Program including any prior reviews and approvals required by the County.

F. Any exceptions to this notification policy should be rare and compelling and considered on a case-by-case basis by the Natural Resources, Land and Facilities Services, or Visitor Services Department Manager. Exceptions should be reported to the Integrated Pest Management Coordinator within 24 hours.

Appendix 3.0-2c Safety Manual

and trail machines.

1.6.1.1 Any employee with knowledge of any equipment that may be unsafe to operate shall tag it out of service and its use must cease. Red "DANGER" tags shall be used to "tag out" an item, and a supervisor will be notified

1.6.2.0. Qualifications and Authorization of Operators

1.6.2.1. District personnel shall operate only the equipment which they have been qualified and authorized to use.

1.6.2.2. Apprentices or trainees shall operate equipment only under the direct supervision of a skilled operator.

1.6.3.0. Standard Safety Features

1.6.3.1. Machine equipment will be outfitted with appropriate safety features for District use.

1.6.3.2. If safety features are damaged, defective, or missing, the equipment will not be operated.

1.6.3.3. Heavy equipment shall be equipped with an automatic back-up warning device. However, it is still the operator's duty to check that it is clear behind before backing.

1.6.3.4. Provide all gears, sprockets, drive belts, chains, pulleys, drums, and fans with guards when practicable. Guards must not be removed or made ineffective except for repairs.

1.6.4.0. Auxiliary Safety Supplies

1.6.4.1. On every equipment job, keep a basic set of safety supplies close at hand:

a. First Aid kit
b. Fire extinguisher
c. Personal protective equipment.

1.6.4.2. In addition to those supplies mentioned above, the job may call for chock blocks, "Slow Moving Vehicle" sign, red flagging for loads, traffic cones and vests for traffic control, flares, spill kit, etc. Each supervisor must see that these and any other needed safety supplies are on hand at all times during operation.

1.6.5.0. Operating Procedures

1.6.5.1. Before starting on each day, check out the machine in accordance with the operating procedure for the specific equipment.

a. Check the oil level; fill up if necessary.
b. Check the coolant level; top up if necessary.
c. Check the tires.

d. Check for loose or missing nuts, bolts, and pins. Replace or tighten as needed.
e. Lubricate grease points according to manufacturer's recommendation.
f. Check fuel.
g. Check battery.
h. Check radiator and screen.

1.6.5.2. Important: The surest way to keep your machine in safe operating condition is to follow the Operator's Manual for that machine.

1.6.5.3. IF YOU DO NOT HAVE A MANUAL FOR A PIECE OF YOUR MACHINE EQUIPMENT, REQUEST ONE.

1.6.5.4. Stop the engine before refueling.

1.6.5.5. Never remove the fuel tank cap or fill the tank while the engine is running, or when it is near open flame.

1.6.5.6. When pouring the fuel, keep the hose and nozzle or funnel and container in contact with the metal of the fuel tank to avoid a static spark.

1.6.5.7. NO SMOKING while refueling.

1.6.5.8. Leave a safe distance between you and operating equipment. Make sure the operator is aware of your presence and location at all times.

1.6.5.9. Never go under, or in dangerous places around equipment without notifying the operator. Leave a note on the control panel if necessary.

1.6.5.10. Never start up without double checking that the "coast is clear." Put the transmission in neutral and depress the clutch fully before starting. On some machines a SAFETY STARTING SWITCH is provided, making it impossible to crank the engine unless the transmission is in neutral and/or the clutch depressed.

1.6.5.11. When the machine is stopped and engine idling, place the transmission in neutral and engage the master clutch (if applicable) and drop blades or loader to prevent the machine from being jarred into motion.

1.6.5.12. Never get on or off moving equipment or equipment that is stopped without first notifying the operator.

1.6.5.13. Permit no one to ride on the seat with the operator.

1.6.5.14. PRACTICE DEFENSIVE OPERATION AT ALL TIMES. This means:
a. Understand the operating limitations of the equipment and operate within those limitations at all times.
b. Avoid doubtful or spectacular operations.
c. Avoid hazardous situations created by ground, weather, or fire conditions.

1.6.5.15. Tractor and heavy work equipment site safety

a. Projects involving the use of tractors and heavy equipment often require employees to perform a variety of related tasks in conjunction with the operation of the equipment. Safety at the work site is the responsibility of every employee present. The work site shall be under the direction of the employee operating the equipment, unless direction of the project is otherwise assigned by a supervisor.
b. Before starting work each day, or each time there is a significant change in the safety needs of the work site, the employee directing the project shall review work site and visitor safety procedures with all employees assigned to the project.
c. Any work site condition that compromises the safety of any employee or visitor shall be corrected immediately. If it cannot be corrected, work must be stopped and a supervisor notified immediately.
d. When equipment is being operated in visitor use areas, warning signs will be placed on all roads and trails leading into the worksite.
e. Employees assigned spotter duties at stationary work sites shall be out of the vehicle and available to contact visitors entering the work area. Spotters may remain in the vehicle on projects where the equipment is continually moving in the same direction, such as road or trail grading or mowing, only if visitor traffic can be effectively controlled from the vehicle.

1.6.5.16. Always have a spotter at the worksite or nearby, except when mowing in grassland areas where the potential for accidents is extremely low. Heavy equipment operators shall have a portable radio at all times.

a. The spotter shall not permit visitors to enter the work site until the equipment operation is stopped and the operator is aware of the visitor's presence. The spotter will then either escort visitors or allow them to pass through the work site.
b. Any deviation from these procedures must be approved by a supervisor.

1.6.6.0. Equipment Inspection

1.6.6.1. When machinery or equipment, including rentals, is received, remodeled, or repaired, it shall be the responsibility of the operator to see that it is inspected for safe operating conditions before it is operated.

1.6.6.2. Inspect your equipment daily. You and your supervisor should work out a checklist to make sure all key items are covered.

1.6.6.3. Where safety of the operator, crew or equipment is concerned, a defective machine shall be shut down and conspicuously "tagged out" until repairs are made.

1.6.7.0. Transporting Equipment

1.6.7.1. Check the route of travel before transporting. Look for overhead and side clearance, culverts and bridges, and overhead lines.

1.6.7.2. The operator must know the weight, width and height limits set by the Vehicle Code and comply with State requirements for flagging, signaling, and signing, such as "Wide Load" or "Slow Moving Vehicle" signs.

1.6.7.3. When necessary, heavy equipment shall be blocked lengthwise and sideways on truck or trailer beds. It must be bound securely both front and rear or on both sides with chain or cable and tightened with load binders.

1.6.7.4. Planks, chains and other loose items on trucks or transports must be crated or secured before moving.

1.6.7.5. Only essential personnel shall be near the transport while loading or unloading equipment.

1.7.0.0. FIRE PREVENTION

1.7.1.0. General

1.7.1.1. The fire prevention program shall include: 1) provision for regular training sessions, 2) regular fire safety inspections, 3) upkeep of fire-fighting equipment, 4) evacuation

plans, and 5) storage of flammable materials.

1.7.1.2. Following adequate training, all personnel shall know and understand the fire protection plan for their area, including 1) fire safety inspection, 2) location and proper use of fire extinguishers, 3) proper storage and handling of flammables, and 4) evacuation plans.

1.7.2.0. Forest, Brush and Grass Fire Prevention

1.7.2.1. Fire suppression equipment will be kept in a ready condition commensurate with the level of fire danger.

1.7.2.2. Refer to Maintenance Operations Manual (MOM) for maintenance equipment operations during fire season.

1.7.3.0. Office, Shop and Storage Facilities

1.7.3.1. All structures and storage facilities shall be designed, constructed and maintained according to national, State and local fire codes as applicable.

1.7.4.0. Special Fire Safety Rules

1.7.4.1. Provide facilities for the safe storage of flammables at all installations.

1.7.4.2. Post "NO SMOKING" signs on the inside and outside of all buildings and locations where flammables are stored.

1.7.4.3. Smoking, open flames or sparks shall not be permitted within 50 feet of where flammables are stored or used.

1.7.4.4. Containers containing flammables should be tagged to show contents. These containers must be tightly shut when not in use.

1.7.4.5. When filling containers, leave a vapor space above the liquid level to permit expansion with rising temperatures.

1.7.4.6. Do not allow smoking, open flame, or sparks when checking or charging wet-cell batteries.

1.7.4.7. No one shall work in clothing saturated in flammables.

1.7.4.8. Keep flammable liquids away from radios or other non-vaporproof electrical equipment in unventilated places.

1.7.4.9. Observe the refueling rules in section 1.6.5.4. to 1.6.5.8.

1.7.4.10. Never store or transport flammables with flashpoints below 100 degrees F. in unapproved plastic or glass containers. Gasoline (flash point = 45 degrees F.) may be stored only in approved containers.

1.7.4.11. Maintain CLEAR SPACES and READY ACCESS to fire extinguishing equipment, hydrants and electrical panels at all times.

1.7.4.12. Immediately report any oil, gas or vapor leaks or other fire hazards you may observe to your supervisor. Oil or gas spills should be cleaned up immediately.

1.7.4.13. Fire extinguishers must be kept fully charged, inspected monthly, and serviced annually.

1.7.4.14 Portable fire extinguishers are to be placed within 75 feet of work areas.

1.8.0.0 COMMON OPERATIONS

1.8.1.0. Lifting and Carrying

1.8.1.1. Preparing to lift:

a. Size up the job

1.11.0.0 HAZARDOUS MATERIALS

1.11.1.0. Hazardous Materials Response Guidelines

a. It is important for field staff to be aware of the potential presence of hazardous materials on District lands. The following guidelines will be followed whenever any staff member observes what is believed to be a hazardous material. This includes any abandoned chemicals that may be toxic, flammable, or corrosive; can cause fires or explosions; or may be a serious health or environmental hazard. Response by field staff should be consistent with the training received in the Hazardous Materials First Responder training.
b. If an employee observes what is believed to be a hazardous material, the appropriate fire department shall be notified immediately. A supervisor shall also be notified at once. The supervisor will ensure that all appropriate agencies are notified and that District procedures are followed. Keep a safe distance until material is identified and risk confirmed.
c. Safely attempt to isolate and deny entry by establishing a perimeter around the hazard area.
d. No employee shall handle, transport, or dispose of hazardous materials without authorization from a supervisor.
e. Under no circumstances shall hazardous materials discovered in the field be brought to the field offices.

1.11.2.0. Storage and Disposal of Hazardous Materials

a. Each field office has hazardous waste containers located in the Haz Mat sheds.
    1. No hazardous materials found in the field may be placed in the field office hazardous materials shed or hazardous waste containers.
    2. Only materials generated by the District may be stored in these containers.
    3. Only the Construction and Maintenance Supervisor, or their designee, is authorized to dispose of chemicals in these containers.
    4. All chemicals placed in the containers shall be recorded on a log sheet.
b. Use of the hazardous materials shed and hazardous waste containers are for District use only. No personal use is permitted.

Appendix 3.0-2d Resource Management Policies

SCENIC AND AESTHETIC RESOURCES GOAL, POLICIES, AND IMPLEMENTATION MEASURES

Goal SA- Preserve lands with natural appearance, diversity, and minimal evidence of human impacts

Policy SA-1 Minimize evidence of human impacts within preserves.

- Clarify and document appropriate standards for designing and locating trails, parking areas, and buildings.
- Locate trails to minimize their visibility from a distance.
- Where feasible, locate telecommunication towers, power lines, water towers, firebreaks, and other infrastructure along margins of roads, next to existing structures or where vegetation and terrain help ease undesirable visual and environmental impacts. Install utility lines underground, if practical.
- Cluster new facilities near existing development, where possible.
- Design facilities such as structures, bridges, fencing, benches, and barriers to harmonize with natural landscape features, colors, and materials.
- Cluster, reduce, and place signs to lessen their visual impact.
- Rehabilitate areas degraded by human use by restricting access or type(s) of use, rerouting trails and roads, removing unsightly human-made features and **non-native** plants, restoring natural contours, and revegetating with native plants.

District development consists of facilities such as trails, restrooms, parking lots, fencing, offices, and residences. District facilities are designed to blend into the natural surroundings and are located within or adjacent to previously disturbed areas such as placing parking lots along existing roadways, or improving, remodeling, or placing new structures in previously developed areas.

Policy SA-2 Maintain significant landscapes or features that were formerly maintained by natural processes.

- Control encroaching vegetation where it adversely affects significant scenic, historic or **habitat** resources (See **Vegetation Management**, **Cultural Resources**, and **Integrated Pest** Management policies).

- Control vegetation to create or maintain important scenic viewpoints and vistas (See Vegetation Management and Integrated Pest Management policies).
- Require District tenants to maintain landscapes and improvements to acceptable visual standards that do not detract from a visitor's experience or adversely impact wildlife.

Policy SA-3 Minimize unnatural noise within preserves

- Prevent or reduce unnatural sounds that adversely impact preserves resources or a visitors' enjoyment of them.

WILDLAND FIRE MANAGEMENT GOAL, POLICIES, AND IMPLEMENTATION MEASURES

Goal WF-	**Manage District land to reduce the severity of wildland fire and to reduce the impact of fire suppression activities within District Preserves and adjacent residential areas; manage habitats to support fire as a natural occurrence on the landscape; and promote District and regional fire management objectives.**

Policy WF-1 Implement necessary fire and fuel management practices to protect public health and safety, protect natural **resources**, and to reduce the impacts of wildland fire.

- Prepare wildland fire management plans for District lands that address, at a minimum, public safety, District staff and firefighter safety, District infrastructure including residences and roads, natural resource protection (particularly **special status** species), **cultural resources,** and vegetation management for fire protection and **fire behavior** and hazardous fuels modification.
- Identify, with input from responsible fire agencies and neighboring public agencies, essential roads for wildland fire access. Maintain designated roads for fire access and patrol purposes, and improve with surfacing, additional turnouts and safety zones when necessary.
- Coordinate with fire agencies and local communities to identify locations where additional fire infrastructure is desirable and practical (e.g. hydrants, water tanks, helicopter zones, safety zones, **fuel breaks**, consistent with the **incident command system (ICS**). Work cooperatively with these groups to install needed infrastructure.
- Work with Cal Fire and other appropriate fire management and regulatory agencies to develop and carry out plans that use prescribed burns to maintain and restore natural systems.
- Maintain adequate fire clearance around District structures and facilities. (See FM-5 and WF-4:Measure 5)
- Require lessees of District land or structures to maintain fire hazard reduction measures as directed.

- Prohibit activities that have a high risk of sparking fires during periods of **extreme fire hazard**.
- Close Preserve areas of particular concern during **extreme fire weather**, as appropriate, and increase patrol levels where appropriate.
- Seek grant opportunities and partnerships for fuel management and monitoring projects.

Policy WF-2 Aggressively support the immediate suppression of all unplanned fires that threaten human life, private property or public safety.

- Respond to wildland and structure fires on District lands in coordination with responding fire agencies.
- Prioritize and prepare Preserve specific wildland fire response plans that identify appropriate fire suppression activities for District lands in the event of a wildland fire. Plans should include detailed maps of infrastructure such as roads, fuel breaks, structures, water sources (hydrants, water tanks, ponds), as well as sensitive natural and cultural resources to be avoided during fire suppression activities.
- Direct bulldozer actions to areas identified in wildland fire response plans to minimize and reduce ground disturbance, erosion, and rehabilitation efforts wherever possible.
- Develop guidelines for appropriate rehabilitation measures to address erosion, **revegetation**, invasive species, trail and road stability, security, public safety, and natural and cultural resources following fires.

Defensible space is the area adjacent to a structure where basic wildfire protection practices are implemented, providing a key point of defense for an approaching wildland fire or area to escape from a structure fire. Cal Fire publishes guidelines for fuel (vegetation) treatments to create a perimeter around buildings and structures in order to maintain minimum conditions for firefighters to defend a property.

Policy WF-3 Work with adjacent landowners and fire agencies to maintain adequate fire clearance around qualifying structures. (See FM-5 and WF-1: Measure 5)

- Maintain a permit system that enables adjacent landowners to maintain defensible space clearance surrounding homes and other qualifying structures across property boundaries and onto District land as long as the activity is recommended by the local fire agency and is consistent with the District's resource management policies, including protection of environmentally sensitive habitat.
- Work with fire agencies and local governments to develop requirements for new development to maintain required fire clearance distance from District land wherever possible.

District GHG emissions are divided into administrative emissions, which come directly from District operations such as vehicles and facilities, and non-administrative emissions, which are related to District activities but the District has less control over. A numerical GHG reduction goal is set only for administrative emissions.

- Evaluate the full life-cycle footprint of equipment, services, and supplies, and choose lower impact/responsible services and supplies.
- Develop sustainability guidelines for facilities, operations, projects, and events.

Policy CC-2 Reduce non-administrative GHG emissions related to District activities, such as visitor transportation and livestock.

- Implement Climate Action Plan strategies to reduce or offset GHG emissions from visitor transportation to preserves.
- Implement Climate Action Plan strategies to reduce or offset GHG emissions from livestock, and research additional techniques or technologies.
- Where agricultural sustainability is not a leading factor, select appropriate livestock species to accomplish vegetation management objectives (See GM-4).

Policy CC-3 Increase **carbon sequestration** in vegetation and soils and minimize carbon release from wildfire.

- Manage conifer forests to sustain and encourage the development of late-seral habitat conditions (FM-4). Evaluate the potential to reduce forest fuel loading through the removal of smaller trees to reduce fuel buildup and ladder fuels (See FM-5).
- Manage vegetation communities to reduce the risk of catastrophic fire and to maintain biological diversity (WF-4). Conduct prescribed burns to re-introduce fire into native ecosystems and maintain natural ecological processes on District lands (See WF-5).
- Evaluate, study, and implement additional land management strategies to increase carbon sequestration in vegetation and soils.
- Improve data on carbon sequestration in District lands.
- Evaluate opportunities to create and sell carbon offsets on the California Cap and Trade market or other voluntary offset markets.

Resilience is the capacity of natural and human communities to withstand and bounce back from climate stress and hazardous events.

Policy CC-4 Prepare for climate change impacts and promote **resilience** for both natural and built environments.

- Prioritize ecosystem function, resilience, and ecological diversity focused on multiple species benefits, rather than aiming to prevent ecological change or return to past conditions.

Appendix 3.0-2e Regulations for Use of Midpeninsula Regional Open Space District Lands

SECTION 404. FIRES.

404.1 General. No person shall light, build, maintain, or attempt to light, build, or maintain, a fire of any nature on District Lands, except in permanent fixed barbecues, camp stoves or fireplaces established and authorized by the District. A fire shall include, but not be limited to any campfire, ground fire, warming fire, signal fire, charcoal fire, stove, gas lantern, punk, candle, smudge stick, flare, fusee, or any other incendiary device. This shall not apply to the permitted use of gas camp stoves or gas lanterns when used in Designated Area specified for camping.

404.2 Smoking. No person shall smoke on District Lands, except in Designated Areas.

SECTION 405. SANITATION.

405.1 Disposal of Effluent. No person shall deposit waste water, sewage or effluent from vehicles, trailers, sinks, portable toilets, or other fixtures upon or into the ground or water. Violation of this sub-section is punishable as a misdemeanor.

405.2 Use of Facilities. No person shall deposit any waste in or on any portion of any restroom or other structure except into fixtures provided for that purpose.

405.3 Protection of Facilities. No person shall place any bottle, can, cloth, rag, metal, wood, paper, stone, or other substances in any fixture in such a manner as would interfere with the normal operation of such fixture.

405.4 Defecation. No person shall defecate in Public View or within twenty-five (25) feet of a Designated Trail.

405.5 Urination. No person shall urinate in Public View.

SECTION 406. METAL DETECTORS.

406.1 General. No person shall possess or use a metal detector or similar device on District Lands, except as provided in subsection 702.5.

SECTION 407. DISTURBING THE PEACE.

407.1 Obstructing Free Passage. No person shall by force, threat, intimidation, or by any unlawful signing, fencing or enclosing, or any other unlawful means, prevent or obstruct any person from peacefully entering any District Lands, or prevent or obstruct free passage or transit over or through any District Lands. Violation of this sub-section is punishable as a misdemeanor.

CHAPTER V.
PRESERVE USES - RIDING/HIKING TRAILS

SECTION 500. RIDING / HIKING TRAILS.

500.1 Trail Use Speed Limit. All users of District Lands shall comply with all established trail use speed limits. The maximum speed for all trail uses is 15 miles per hour, unless otherwise posted. Bicyclists and equestrians are required to slow to 5 miles per hour when passing others or approaching blind turns.

500.2 One-way Trails. No person shall operate a bicycle or unicycle or similar device, or ride or lead a saddle horse, pony, mule, or other such animal on a one-way trail in a direction or travel designated or signed to prohibit such use.

500.3 Gates. Any person opening a gate shall close the gate.

500.4 Dangerous Trail Use. No person shall run or jog in such a way as to endanger hikers, equestrians, bicyclists or others using District Lands.

SECTION 501. SADDLE ANIMALS.

501.1 Closed Areas. No person shall ride, drive, or lead a Saddle or Pack Animal on any trail, roadway or established firebreak designated or signed to restrict horse use. Saddle or pack animals must stay on Designated Trails roadways which are Designated Areas for such use, and established firebreaks.

501.2 Unsafe Use. No person shall ride, drive, or lead any saddle or pack animal in a reckless or negligent manner so as to endanger public property, or the life, limb, or property of any person or animal, including the rider. No person shall allow his/her saddle or pack animal to stand unattended or insecurely tied. Violation of this sub-section is punishable as a misdemeanor.

501.3 Carts and Wagons. No person shall possess or operate a cart, wagon, or similar device attached to any animal on District Lands without a written permit.

Appendix 3.0-2f CDFW-Approved SFDFW Protocol

San Francisco Dusky-Footed Woodrat (SFDFW) Protocol

Midpeninsula Regional Open Space District Preserves provide many areas of habitat for SFDFW that is conserved as open space in perpetuity. However in some instances District projects, operations, and/or maintenance activities have the potential to impact SFDFW individuals and/or their nests.

For projects occurring in suitable SFDFW habitat, prior to project implementation, a qualified biologist shall survey the site for evidence of nesting SFDFW *(i.e.,* large stick nests). Since woodrats use their nests year round, surveys for nests may be conducted at any time of the year. If woodrats or their nests are present, a biological awareness training shall be provided by a qualified biologist prior to project implementation.For any woodrat and/or nest that are found within project boundaries, the measures listed below shall be implemented:

In natural areas:

All wood rat nests will be flagged in the field and delineated on project site maps. In all instances, every effort should be made to avoid impacts to woodrat nests. Avoidance, even with a small buffer area is considered preferable to relocation. Avoidance buffers of a minimum of 3-10 feet shall be implemented, flagged where appropriate, and avoided during project implementation. Smaller buffers allow work to occur in close proximity without displacing and relocating individuals each time these activities occur which may be on an annual or recurring basis (defensible space around structures, road and trail side brushing, invasive plant removal etc.). As evaluated by the project biologist, where appropriate to minimize impacts from project activities, fencing will be installed around the nest and include the buffer area. When removing materials from around a woodrat nest be cognizant of tree branches, fencing, or other materials that may support the nest structure. Whenever possible leave these materials in place. However, if they must be removed and the nest may become compromised, live trapping may be necessary.

For all woodrat nests that cannot be avoided by project activities (i.e. will require relocation), a qualified biologist shall live trap to determine if the nest is in use. Trapping activities should occur prior to April and after mid-July each year to prevent impacts to woodrats rearing young or young woodrats. If a nest is found to be unoccupied or not in use for 3 full days (2 nights of trapping), then it may be removed. The nest shall be relocated or a pile of replacement sticks shall be placed outside of the development footprint for future colonization or re-use. If a lactating female is trapped, project actitivies shall be postponed until young have become independent.

Trapped woodrats may be kept in captivity by a qualified biologist until their nests are relocated to suitable habitat outside of the development footprint. Every effort should be made to minimize the time the animal is held in captivity. A CNDDB form shall be filled out and submitted to CDFW for any San Francisco dusky-footed woodrats that are trapped. Once trapped, nests shall be torn down and rebuilt surrounding a log based structure, an inverted wooden planter, or similar structure having at least one entrance and exit hole that is slightly buried into the ground to anchor. Any cached food and nest material encountered shall be placed within the new structure during rebuilding. Whenever possible, the structure shall be "over-built" by adding

larger branches for predator protection to create an area for the individual to safely emerge outside of the nest. One or more persons shall remain outside the release structure for up to 10 minutes to mimic a predator. Relocated nests are intended to provide a release site and opportunity for the woodrats to relocate to another nest (most woodrats average more than one nest and may or may not remain with a relocated nest), or to colonize the new structure.

Once nests are relocated, any trapped woodrats should be released into the reconstructed nest using a "soft release," by plugging the individual into the shelter using loose dirt over the entrance.

Relocated nests are expected to eventually be re-colonized and should be monitored one year post construction using visual surveys and/or wildlife cameras to determine if a relocated nest has returned to use. A monitoring report should be submitted to CDFW to document use or non/use of relocated nests.

<u>In non-natural areas such as structures, abandoned vehicles, human debris piles or other areas:</u>

In some District locations, woodrats have colonized abandoned buildings, old vehicles, diffuse garbage piles, or other locations where nests are difficult to locate, individuals cannot be live-trapped consistently, and/or there is a lack of woody materials for nest reconstruction. In these instances, live trapping is not required (especially if there is a risk to human health) if the surrounding area provides suitable habitat or supports a healthy colony that is being avoided and/or can be enhanced. Work at these locations must occur prior to April and after mid July to prevent impacts to woodrats rearing young.

In these types of projects (cleanup, demolitions etc.) if individual rats are present, they will be encouraged to leave the area on their own which may include demolition or cleanup in phases, and/or hand removal of materials. If individual woodrats are observed during implementation, work in the immediate area shall cease until the animal leaves the area on its own. Work may continue at other locations away from the observation location. If the animal does not leave the area on its own, the project biologist or a biological monitor shall be notified. Work may proceed at the observation site, once the animal has left the area on its own or a biological monitor is present to ensure that the individual SFDFWs are not harmed.

If nests are present that cannot be trapped or removed, woody debris piles that look like woodrat houses can be constructed to provide opportunities for sheltering and colonization by displaced woodrats. Woody debris piles shall be constructed under the guidance of the project biologist or onsite biological monitor. Woody debris piles will consist of dead branches of various sizes that are collected from the surrounding area. Each pile will generally be ~3-5 feet high by 8-10 feet in diameter. A variety of stem sizes shall be used ranging from ~0.5 to 6 inches in diameter. The intent is to provide a relatively safe location for an SFDFW to build a house with respect to predators, and to provide some amount of accessible woody material to facilitate colonization.

Nest replacement ratios will be determined based on the number of woodrats and/or nests observed, as well as the size and number of undisturbed nests in the surrounding areas.

Appendix 3.0-2g Bat BMPs

Best Management Practices for Avoiding and Minimizing Impacts to Bat Species

- In areas of suitable habitat, preconstruction surveys are required for the following bat species:
    - Pallid Bat (*Antrozous pallidus*)
    - Townsend's Big-eared Bat (*Corynorhinus townsendii*)
    - Western Red Bat (*Lasiurus blossevillii*)
    - Western Mastiff Bat (*Eumops perotis californicus*)

- Bat surveys should take place during the April 15 through August 31 maternity roost season whenever possible. Surveys may also take place between February 16 and April 14, or between September 1 and November 15. Findings during spring and fall surveys may indicate that a second summer survey is necessary
- Bats generally breed April through Aug, no building or tree work (over 16" dbh) is allowable during this time if surveys determine that special status bats or maternity roosts are present
- Bats may go into a deep torpor period November 16 through February 15, no building or tree work (over 16" dbh) is allowable during this time if surveys determine that special status bats or hibernaculum roosts are present
- If individual non breeding and non-special status bats are present, a qualified biologist may be retained to remove the bats and work may proceed year round
- If maternity roosting or special status bat species are present at any time, no work is allowed without first excluding and providing alternate roost site(s), or identifying suitable nearby existing roosting sites, outside of the breeding season
- Alternate roost site(s) must be determined by District Natural Resources staff or a consulting biologist and submitted to California Department of Fish and Wildlife before installation
- Whenever possible alternative roost site(s) will be provided 6 months to 1 year prior to the removal of maternity roosting habitat to allow bats adequate time to discover the new locations
- Alternative roost site(s) shall be monitored for occupancy by a qualified biologist within one year of installation
- Contractors, Midpen staff, and others working in areas known to support maternity roost site(s) and/or special status bat species will be provided biological awareness training by a qualified biologist prior to the commencement of work

Mitigation for impacts to maternity roost(s) and special status bat species:

<u>Buildings and other human structures:</u>

- To mitigate for demolition activities, fumigation, or other activities that involve the removal or disturbance of roosting bats in buildings, bridges, outbuildings, dilapidated structures, old vehicles (buses, trailers etc.), or other human created structures (including debris piles):

- If signs of bats are evident and removal or disturbance of bats is necessary, a qualified biologist will conduct surveys for roosting bats prior to beginning work. Surveys will consist of daytime pedestrian surveys to look for visual signs of bats (e.g., guano), and if determined necessary, evening emergence surveys to note the presence or absence of bats. If evidence of bat roosting is found, the number and species of roosting bats will be determined. If congregations of more than five bats are found within a single human-made structure during the maternity roosting

season it may be assumed that the colony constitutes a maternity roost and the location will be recorded in the District's wildlife database. If no evidence of bat roosts is found, then no further study will be required. Bat detectors and/or infrared detectors may be used to supplement survey efforts, but are not required.

- When bat roosting sites are located in buildings, exclusion of bats from the building will occur outside of the April through August nursery season.

- If roosts of special-status bats are determined to be present and must be removed, a bat exclusion plan will be prepared and submitted to CDFW. The exclusion plan will describe the method of exclusion, which may include the use of one-way doors at roost entrances (bats may leave but not re-enter), or sealing roost entrances when the site can be confirmed by a bat expert to contain no bats. No bats will be excluded until the plan is approved by CDFW and alternative roosting habitat is approved. The bats will be excluded from the roosting site before the site is disturbed or modified in any way.

Tree Removal:

- Avoid removal of trees greater than sixteen inches dbh during the April through August nursery season whenever possible.

- If removal of trees greater than sixteen inches dbh during the nursery season cannot be avoided, a qualified biologist will conduct surveys for roosting bats where suitable large trees are to be removed. Surveys will consist of daytime pedestrian surveys to look for visual signs of bats (e.g., guano), and if determined necessary, evening emergence surveys to note the presence or absence of bats. If evidence of roosting bats is found, the number and species of roosting bats will be determined. If no evidence of bat roosts is found, then no further study will be required. Bat detectors and/or infrared detectors may be used to supplement survey efforts, but are not required.

- If roosts of special-status bats are determined to be present and must be removed during the April through August nursery season, a bat exclusion plan shall be prepared and submitted to CDFW. The exclusion plan will describe the method of exclusion, which may include the use of one-way doors at roost entrances (bats may leave but not re-enter), or sealing roost entrances when the site can be confirmed by a bat expert to contain no bats. The use of sonic bat deterrents may also be allowed when called for by a qualified biologist. No bats will be excluded until the plan is approved by CDFW and alternative roosting habitat is approved. Exclusion efforts may be restricted during periods of sensitive activity (e.g., during hibernation or while females in maternity colonies are nursing young). The bats will be excluded from the roosting site before the site is disturbed, closed or modified in any way. When possible alternative roosting sites will be provided 6 months to a year prior to the removal of existing roosts. Once the replacement roosts are constructed and it is confirmed that bats are not present in the original roost site, the structures may be removed or sealed.

Work in or adjacent to areas known to support special status bats and/or maternity roosts:

- Whenever possible work shall take place outside of the April through August nursing season.
- Natural Resources staff shall provide and/or consult with qualified biologists having knowledge specific to the bat species present at the site. Species specific noise tolerance levels (including

high frequency noise) shall be established for work taking place within a determined buffer around the maternity roost. All equipment working within the site during the nursing season must be tested for high frequency noise outputs prior to use on the site. If equipment is determined to produce any noise that is expected to cause bats to abandon a maternity roost it will not be used on the site within the biologist established buffer during the nursing season.

Relocation of bat boxes:

- Relocation requires the approval of the Natural Resources department and may be performed by a qualified biologist.
- Bat boxes may be relocated between mid-September to mid-October, or from mid-February to mid-March (during warm periods outside of the nursing season). Bat boxes may be relocated outside of these recommended time periods with sign off from a qualified biologist.
- Relocation of boxes that support special status bat species requires notification to CDFW before implementation.
- If a bat box is determined to be unoccupied by a qualified biologist, it may be relocated at any time without modification. If occupied, a one way door shall be installed on the entrance/exit of the bat box, preferably during a warm period when bats are likely to be active. The one way door shall remain in place for a period of 3-7 days. After this period a qualified biologist shall arrive on site and check the box for occupancy. If the box is still occupied then the one way door shall remain in place for an additional 3-7 days. Once the box is determined to be unoccupied then it may be relocated with direction from Natural Resources or a qualified biologist to a nearby suitable habitat. The new location will be recorded and added to the Districts' GIS database. The one way door shall then be removed to allow bats to access the box. Relocated bat boxes shall be monitored for occupancy by a qualified biologist within one year of installation.

APPENDIX 4.3 AIR QUALITY MODELING ASSUMPTIONS AND CALCULATIONS

Appendix 4.3a Air Quality Modeling Assumptions

Emission Factors and Burn Assumptions

Pollutant emissions will be estimated based on the emission factors developed in the California Air Resources Board's (CARB's) EMission FACtors 2017 (EMFAC2017) model, CARB's OFFROAD model, and United States Environmental Protection Agency (USEPA) AP-42 Compilation of Air Pollutant Emission Factors methodologies. Vehicle emission factors (including running exhaust, brake wear, and tire wear emissions) were derived based on modeling results from the EMFAC2017 model.[1] Offroad equipment emission factors (such as backhoes, Fugitive dust emissions from vehicles traveling unpaved roads and drip torch burning were estimated based on the USEPA AP-42 methodologies.

Emission factors were determined from the following estimation models:

- California Air Resources Board's (CARB) EMFAC[2]emissions inventory model. EMFAC is the latest emission inventory model that calculates emission inventories and emission rates for motor vehicles operating on roads in California. This model reflects CARB's current understanding of how vehicles travel and how much they emit. EMFAC can be used to show how California motor vehicle emissions have changed over time and are projected to change in the future.
- CARB OFFROAD[3] emissions inventory model. OFFROAD is the latest emission inventory model that calculates emission inventories and emission rates for off-road equipment such as loaders, excavators, and off-road haul trucks operating in California. This model reflects CARB's current understanding of how equipment operates and how much they emit. OFFROAD can be used to show how California off-road equipment emissions have changed over time and are projected to change in the future.
- USEPA AP-42, Compilation of Air Pollutant Emission Factors, has been published since 1972 as the primary compilation of USEPA's emission factor information. It contains emission factors and process information for more than 200 air pollution source categories. A source category is a specific industry sector or group of similar emitting sources. The emission factors have been developed and compiled from source test data, material balance studies, and engineering estimates.[4]

On-Road Vehicles

[1] On September 27, 2019, the USEPA and the National Highway Traffic Safety Administration (NHTSA) published the "Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule Part One: One National Program." (84 Fed. Reg. 51,310 (Sept. 27, 2019) The Part One Rule revokes California's authority to set its own greenhouse gas emissions standards and set zero-emission vehicle mandates in California. CARB have estimated the vehicle tailpipe and evaporative emissions impacts from the SAFE Vehicles Rule Part One: One National Program. The SAFE Vehicle Rule Part One impacts some of the underlying assumptions in the EMFAC2017 model. Model adjustment factors were applied to adjust emission factors to account for the impacts of this rule. EMFAC Off-Model Adjustment Factors to Account for the SAFE Vehicle Rule Part One, November 20, 2020, https://ww3.arb.ca.gov/msei/emfac_off_model_adjustment_factors_final_draft.pdf and EMFAC Off-Model Adjustment Factors for Carbon Dioxide (CO2) Emissions to Account for the SAFE Vehicles Rule Part One and the Final SAFE Rule, June 26, 2020, https://ww3.arb.ca.gov/msei/emfac_off_model_co2_adjustment_factors_06262020-final.pdf?utm_medium=email&utm_source=govdelivery

[2] California Air Resources Board, EMFAC2017 User's Guide, March 1, 2018, https://ww3.arb.ca.gov/msei/downloads/emfac2017-volume-i-users-guide.pdf and https://www.arb.ca.gov/emfac/2017/

[3] California Air Resources Board, OFFROAD Instructions, http://www.arb.ca.gov/msprog/ordiesel/info_1085/oei_write_up.pdf

[4] US Environmental Protection Agency, AP 42, Compilation of Air Pollutant Emission Factors, Fifth Edition, Volume I Chapter 3: Stationary Internal Combustion Source, https://www3.epa.gov/ttn/chief/ap42/ch03/index.html

Vehicular emissions were computed using the CARB's emission factor model, EMFAC2017, to estimate on-road emissions. Vehicle trips were modeled using the light-duty auto, light-duty truck, motorcycle (designated for ATV), T6 heavy (designated for fire engine), and T6 small (designated for water truck) classifications. Paved road dust, break wear, and tire wear particulate emissions were also accounted for and included in the analysis using EMFAC2017 factors. Vehicles speeds and fuel type were based on an aggregate sample within EMFAC2017.

Pollutant emissions associated with on-road vehicles will then be calculated by combining the activity information with running emissions factors, in grams per mile, derived using the EMFAC2017. Emissions calculations were based on **Equation 1**. The EMFAC2017 running emissions factors are summarized on **Table 1**.

Equation 1

*Running Emission Rate (tons/year) = EMFAC Emission Factor (gram/mile) * trips per day * miles per trip * days/year * (453.59/2000 tons/gram)*

Table 1: On-Road Vehicle Running Emission Factors (gram/mile)

Vehicle Type	ROG	CO	NOx	CO_2	PM_{10}	$PM_{2.5}$	SO_2
Water Truck/Water Tender	0.19	0.57	2.93	1,217.72	0.20	0.12	0.01
ATV	2.34	20.32	1.17	216.15	0.02	0.01	<0.01
Truck	0.02	0.86	0.08	322.77	0.05	0.02	<0.01
Fire Engine	0.11	0.84	0.98	806.38	0.10	0.05	0.01
Heavy Truck	0.16	0.42	3.34	1,220.91	0.19	0.10	0.01

Source: CARB EMFAC2017 Emissions Model.
CO = carbon monoxide; NO_X = oxides of nitrogen; PM10 = particulate matter with diameter equal to or less than 10 micrometers; PM2.5 = particulate matter with diameter equal to or less than 2.5 micrometers; ROG = reactive organic gas; CO_2 = carbon dioxide

Pollutant emissions associated with on-road vehicles will then be calculated by combining the activity information with idling emissions factors, in grams per vehicle per day, derived using the EMFAC2017. Emissions calculations were based on **Equation 2**. EMFAC2017 idling emissions factors are summarized on **Table 2**.

Equation 2

*Idling Emission Rate (tons/year) = EMFAC Emission Factor (gram/vehicle/day) * vehicle/day * days/year * (453.59/2000 tons/gram)*

Table 2: On-Road Vehicle Idling Emission Factors (gram/vehicle/day)

Vehicle Type	ROG	CO	NOx	CO_2	PM_{10}	$PM_{2.5}$	SO_2
Water Truck/Water Tender	0.08	2.04	5.03	646.45	0.01	0.01	0.01
Fire Engine	0.29	2.43	1.00	139.03	0.01	0.01	<0.01
Heavy Truck	0.06	1.91	3.81	641.92	<0.01	<0.01	0.01

Source: CARB EMFAC2017 Emissions Model.
CO = carbon monoxide; NO_X = oxides of nitrogen; PM10 = particulate matter with diameter equal to or less than 10 micrometers; PM2.5 = particulate matter with diameter equal to or less than 2.5 micrometers; ROG = reactive organic gas; CO_2 = carbon dioxide

Off-Road Equipment

The project would require the use of off-road equipment, such as backhoe, chainsaws, excavators, skid loaders, and tractors. Emission factors from the CARB's OFFROAD2017 model will be used. Emission factors were determined based on the off-road equipment type, fuel type, and horsepower. This information will then be applied to pollutant emissions factors, in grams per horsepower-hour. **Equation 3** outlines how off-road construction equipment emissions will be computed, and the emissions factors used are summarized, by equipment type within **Table 3**. Emisson factors were adjusted based on the USEPA's *A Comprehensive Analysis of Biodiesel Impacts on Exhaust Emissions* (dated October 2002) to account for the use of R99 blend (99 percent renewable, 1 pecent conventional) produced by ConocoPhillips.

Equation 3

*Emission Rate (tons/year) = OFFROAD Emission Factor (gram/hp-hour) * size (hp) * hours of operation * (453.59/2000 tons/gram)*

Table 3: Off-Road Equipment Emissions Factors (g/hp-hour)

Equipment Type	HP	ROG	CO	NOx	CO_2	PM_{10}	$PM_{2.5}$	SO_2
Skid steer	71	0.02	0.63	0.88	194.53	0.02	0.01	<0.01
Backhoe	83	0.03	0.67	1.03	195.21	0.03	0.02	<0.01
Excavator	146	0.02	0.61	0.71	201.64	0.02	0.02	<0.01
Tractor	18	0.13	0.97	3.29	397.80	0.06	0.06	0.01
String trimmer	67	0.08	5.38	0.87	431.38	0.02	0.01	<0.01
Chainsaw	10	1.54	110.42	4.19	334.94	1.31	0.99	0.01

Power pole saw	10	1.54	110.42	4.19	334.94	1.31	0.99	0.01
Chipper	67	0.08	5.38	0.87	431.38	0.02	0.01	<0.01
Leaf blower	9	1.12	68.52	2.54	214.70	0.69	0.52	0.01
Generator	143	0.02	0.52	0.44	157.97	0.01	0.01	<0.01
Crane	74	0.14	9.14	1.30	364.42	0.01	0.01	<0.01

Source: CARB OFFROAD2017 Emissions Model.
CO = carbon monoxide; NO_X = oxides of nitrogen; PM10 = particulate matter with diameter equal to or less than 10 micrometers; PM2.5 = particulate matter with diameter equal to or less than 2.5 micrometers; ROG = reactive organic gas; CO_2 = carbon dioxide

Propane Flaming

Propane flaming mayalso be conducted to remove weeds. Propane flaming ("green flaming") uses a propane torch attached to a cylinder to heat seedling or annual plants until their cells burst and wilting occurs, but not to the point of ignition. Propane flamers come in hand-held models as well as on ATV mounts. The ignition source emissions factors are summarized on **Table 3**.

Table 3: Ignition Source Emissions Factors (lb/1000 gallons)

Equipment Type	ROG	CO	NOx	CO_2	PM_{10}	$PM_{2.5}$	SO_2
Propane Torch	1.00	7.50	13.00	12,500.00	0.70	0.70	<0.01

Source: USEPA AP-42 Compilation of Air Pollutant Emission Factors.

Prescribed Burning

Prescribed burning is a specific technique in which fire is applied to most or all of a well-defined area with discrete boundaries for the combined purpose of fuel load reduction and habitat improvement. The burn event is an activity when fire is intentionally applied at one or more ignition points and allowed to run between control lines across the designated unit. Ignitions are achieved using drip torches with a 1:4 mix of gasoline and diesel. Fire apparatus on-site would include multiple Type III fire engines and one or more water tenders to provide control and on-scene safety. The drip torch emissions factors are summarized on **Table 4**.

Table 4: Ignition Source Emissions Factors (lb/1000 gallons)

Equipment Type	ROG	CO	NOx	CO_2	PM_{10}	$PM_{2.5}$	SO_2
Drip Torch	107.19	123.88	469.89	20,786.62	32.51	32.51	30.08

Source: USEPA AP-42 Compilation of Air Pollutant Emission Factors.

The analysis of smoke emissions from prescribed fire was conducted using the First Order Fire Effects Model (FOFME6). This USDA Forest Service program was developed to predict smoke production from wildland fires, along with effects to soils and tree mortality from fires.

The model determines the regulated emissions of PM2.5, PM10, CO, CO2, NOX as well as CNH4 based on fuel volume of the vegetation burned and the moisture of the fuels when burned. FOFEM does not include a method for calculating ROG emissions. Applicable ROG emissions factors were used to estimate emissions from prescribed burning in various vegetation types[5,6].

Fuel volumes were determined by categorizing the life forms provided into those for which fuel volumes were available in the FOFEM6 model. This resulted in three different FOFEM Vegetation Types: SRM 906 - Broadleaf Forest, SRM 215 Valley Grassland (Annual grassland), and SRM 206 - Chamise Chaparral, from Shiftlet, 1994, (https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1044255.pdf).

The moisture of fuels plays greatly influences the amount of smoke produced, with more emissions being produced from wetter fuels (due to more incomplete combustion). Air quality impacts due to fire emissions are affected even more by environmental conditions than by the amount of fuel consumed (CAL FIRE 2013). The conditions of the analysis were conservative, assuming that the prescribed burns would occur under the highest moisture typically used. The inputs assumed a duff moisture of 40%, 10-hr fuel moisture of 10%, and a 1000-hr fuel of 15%.

FOFEM requires that the acres of each vegetation type be determined, since each vegetation type as a different set of emission factors. Inputs used the proportion of each vegetation type and air basin are shown in **Table 5.**

Table 5: Breakdown of Vegetation Types by Acre

Vegetation Type	Maximum Acres
Valley Annual Grasslands (60 percent of total)	270.0
Broadleaf Forest (30 percent of total)	135.0
Chamise Chaparral (10 percent of total)	45.0
SFBAAB Total	*450*
Valley Annual Grasslands (100 percent) NCCAB Total	*50*
Grand Total	**500**

All treatments are assumed to be a constant proportion of vegetation types throughout the life of Wildland Fire Resiliency Program even though it is there will be some variation in the vegetation types when treatments are applied in different locations at different times.

The justification for the proportion of vegetation types in the treatments, and resulting acres of each vegetation type, follows.

[5] USEPA. (1996, October). 13.1 Wildfires and Prescribed Burning.

[6] CARB. (2020, June 17). *Preliminary Estimates of Fire Emissions, 2000-2019*. Retrieved from https://ww2.arb.ca.gov/wildfire-emissions

Emissions varied greatly between the type of vegetation to be burned. Vegetation types with a deep duff layer generally produce more emissions of all types. Grass and shrubby vegetation types with little building up of fuels do not produce large quantities of emissions. The table below indicates the relative contribution to emissions. In almost every case, forests produced the most emissions, and grass the least.

In forest types, approximately 90 percent of emissions are produced during the smoldering phase of combustion, for all types of monitored emissions with the exception for NOX. In shrub types a majority of emissions occur during smoldering for PM10, PM 2.5 and CH4 and CO2, but it comprises less than 20% of emissions of NOX, CO and SO2. Because almost all fuels are consumed in the flaming front of grassfires, smoldering contributed nearly nothing to emissions.

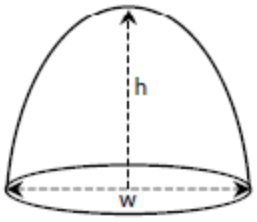
In every treatment, the volume CO2 were the highest of all types of emissions. This is true for all types of prescribed burning, whether it is from pile burning or Prescribed burning, and regardless of vegetation types involved.

Total emissions were the highest for Hardwood Forests, and the lowest for Annual Grass. The greatest amount of all emissions is produced during the smoldering stage, with the exception of grass, which does not tend to smolder.

Pile Burning

Predicted emissions from piles of dry vegetation were calculated using "Consume" software, an industry standard for estimating the amounts of particulates, carbon dioxide, carbon monoxide, methane, and non-methane hydrocarbons (NMHC). In comparison to predicted emissions using FOFEM, Consume does not include NOx or SOx as outputs, but includes the non-methane hydrocarbons. Non-methane hydrocarbons are key to producing ozone (O_3) in atmosphere which can significantly affect the atmospheric photochemical chemistry and human health. Applicable NOx and SOx emission factors were used to estimate emissions from pile burning[7].

Piles were categorized as hardwood/shrub, and were comprised of cut, dried and piled forest slash and debris from oak and tanoak or shrubs. The analysis assumed 90 percent of the piles were burned assuming that all piles were uniform in dimensions and volume. The dimensions of all piles were permitted to be 6 feet high and 10 feet wide, shaped in a parabola.



Parabolic shape of piles

[7] Urbanski, S. (2014). Wildland fire emissions, carbon and climate: Emission factors. *Forest Ecology and Management*, 51-60.

Appendix 4.3b Air Quality Calculations

			Existing Treatments			Potential Treatments		
Units	**VMA/ Activity**	**Create New or Maintain Existing**	**SFBAAB**	**NCCAB**	**Total**	**SFBAAB Maximum**	**NCCAB Maximum (Based on VMA Treatments)**	**Total Maximum**
Acres	Shaded Fuelbreaks	New				50.00		50.00
		Maintain	202.97	7.03	210.00	96.65	3.35	100.00
	Non-Shaded Fuelbreaks	New				5.00		5.00
		Maintain	75.20		75.20	80.00		80.00
	Evacuation Routes, Critical Infrastructure, Fire Management Logistics Fuelbreaks	New				383.80	16.20	400.00
		Maintain				383.80	16.20	400.00
	Target Hazards Fuelbreaks	New				19.97	0.03	20.00
		Maintain				19.97	0.03	20.00
	Fire Agency New Recommended Fuelbreaks	New				100.00		100.00
		Maintain						
	Ingress/Egress Route Fuelbreaks	New				25.00		25.00
		Maintain	9.10		9.10	25.00		25.00
	Disclines	New				10.00		10.00
		Maintain	61.50		61.50	60.00		60.00
	Midpen Structures and Facilities Defensible Space	New						
		Maintain	115.51	0.09	115.60	174.86	0.14	175.00
	Emergency Staging Areas, Emergency Landing Zones, and Other Fire Management Logistics Areas	New				95.81	4.19	100.00
		Maintain	32.13	1.17	33.30	28.95	1.05	30.00
	Eucalyptus and Acacia Removal	New				20.00		20.00
		Maintain				10.00		10.00
	Fuel Reduction Areas	New				486.39	13.61	500.00
		Maintain				486.39	13.61	500.00
	Total	**New**				**1195.98**	**34.02**	**1230.00**
	Total	**Maintain**	**496.41**	**8.29**	**504.70**	**1365.62**	**34.38**	**1400.00**
Tons	Pile Burning	New	1.00		1.00	475.00	25.00	500.00
Acres	Prescribed Burning	New				450.00	50.00	500.00
Acres	Construction	New				6.70		6.70

Note: NCCAB Maximum Potential Treatments are determined from the percent that the total area of VMAs in NCCAB compared to the overall area of VMAs.

Baseline pile burn data was converted from 24 cubic yards of shrub/broom to tons. https://depts.washington.edu/nwfire/piles/

VMA	Primary Mechanical Methods	Ratio Per Method
Shaded Fuelbreaks	Cutting	0.7
	Pulling	0.1
	Masticating	0.2
Non-Shaded Fuelbreaks	Mowing	0.7
	Masticating	0.2
	Cutting	0.1
Evacuation Routes, Critical Infrastructure, Fire Management Logistics	Mowing	0.2
	Masticating	0.5
	Cutting	0.3
Target Hazards Fuelbreaks	Mowing	0.3
	Masticating	0.2
	Cutting	0.5
Fire Agency New Recommended Fuelbreaks	Mowing	0.1
	Masticating	0.4
	Cutting	0.5
	Mowing	0.5

Ingress/Egress Route Fuelbreaks	Masticating	0.3
	Cutting	0.2
Disclines	Discing	0.9
	Cutting	0.1
Midpen Structures and Facilities Defensible Space	Mowing	0.3
	Masticating	0.2
	Cutting	0.5
Emergency Staging Areas, Emergency Landing Zones, and Other Fire Management	Mowing	0.3
	Masticating	0.5
	Cutting	0.2
Eucalyptus and Acacia Removal	Cutting	0.8
	Masticating	0.1
	Pulling	0.1
Fuel Reduction Areas	Cutting	0.7
	Masticating	0.2
	Mowing	0.1

Notes: Non-power techniques are not considered as no emissions are generated; Pile burning, prescribed herbivory, and chemical use is in addition to manual and mechanical powered techniques.

Ratios of each method were determined through professional experience of SIG and Prometheus Fire Consulting, as well as taking into account types of vegetation communities present in each overall VMA area.

Average Daily SFBAAB Existing Treatment							
Type	**Method**		**Crew Size (Average)**	**Maximum Acres**	**Days/Year**	**Acres/Day**	
Manual and Mechanical	Masticating	Maintain	5	97.5	17	6	
	Mowing	Maintain	5	101.5	17	6	
	Cutting	Maintain	5	221.8	56	4	
	Discing	Maintain	5	55.4	7	8	
	Pulling	Maintain	5	20.3	21	1	
	Chipping	50 percent cutting	Refer to Cutting	NA	27.71875	NA	
	Pile Burning	New	15	NA	1	14	(Tons/Day)
	Flaming	1 percent of total	2	5.0	3	2	
Chemical	Glyphosate Round-up Promax; Clethodim; Aminopyralid; Clopyralid; Imazapyr; Triclopyr BEE/TEA	Maintain (10 percent of total)	8	49.6	25	2	
		Total Worker days	**811**	**Total Workdays**	**147**		
		Average Workers	**6**				

Note: Ten 6-foot piles of hardwood/shrub is about 4 tons if hand piled. MidPen could burn anywhere from 20 - 50 piles in a day; average 35 piles (Phil Dye 2020)

Maximum Daily NCCAB Existing Treatment					Annual NCCAB Existing Treatment			
Type	**Method**		**Crew Size (Maximum)**	**Acres/Day**	**Crew Size (Average)**	**Maximum Acres**	**Days/Year**	**Acres/Day**
Manual and Mechanical	Masticating	Maintain	10	6	5	2.0	1	6
	Mowing	Maintain	10	6	5	0.4	1	6
	Cutting	Maintain	10	4	5	5.2	2	4
	Discing	Maintain	NA	NA	NA	NA	NA	NA
	Pulling	Maintain	10	1	5	0.7	1	1
	Chipping	50 percent cutting	Refer to Cutting	NA	Refer to Cutting	NA	0.65	NA
	Flaming	1 percent of total	4	1	2	0.1	1	0.5
Chemical	Glyphosate Round-up Promax; Clethodim; Aminopyralid; Clopyralid; Imazapyr; Triclopyr BEE/TEA	Maintain (10 percent of total)	15	2	8	0.8	1	2
		Peak Day	**55**					
		Total Worker days			**35**	**Total Workdays**	**7**	
		Average Workers			**5**			

Note: No disclines occur in NCCAB.

Flaming could occur December through March, and as such would not occur at the same time as the other treatments. The other activities highlighted in purple would constitute a second possible peak day.

If the maximum acres was less than the possible acres per day that could be achieved, then the acres per day was reduced accordingly

Average Daily SFBAAB Potential Program Activities						
Type	**Method**		**Crew Size (Average)**	**Maximum Acres**	**Days/Year**	**Acres/Day**
Manual and Mechanical	Masticating (FRA)	New	5	97.3	17	6
		Maintain	5	97.3	9	12

	Masticating	New	5	304.3	102	3	
		Maintain	5	289.2	49	6	
	Mowing (FRA)	New	5	48.6	9	6	
		Maintain	5	48.6	5	12	
	Mowing	New	5	137.5	46	3	
		Maintain	5	212.4	36	6	
	Cutting (FRA)	New	5	340.5	86	4	
		Maintain	5	340.5	43	8	
	Cutting	New	5	251.8	126	2	
		Maintain	5	313.0	79	4	
	Discing	New	5	9.0	3	3	
		Maintain	5	54.0	7	8	
	Pulling	New	5	7.0	14	0.5	
		Maintain	5	10.7	11	1	
	Chipping	50 percent cutting	Refer to Cutting	NA	165.9	NA	
	Pile Burning	New (95 percent of total)	15	NA	34	14	(Tons/Day)
	Flaming	1 percent of total	2	25.6	13	2	
Chemical	Glyphosate Round-up Promax; Clethodim; Aminopyralid;	New (10 percent of total)	8	119.6	240	0.5	
		Maintain (10 percent of total)	8	136.6	69	2	
Prescribed Herbivory	Livestock	Pre-Treatment (95 percent of 100 acres)	4	95.0	48	2	
Burning	Prescribed Burning	New	50	450.0	14	NA	
		Grasslands (60 percent of total)	50	270.0	5.4	50	
		Woodlands (30 percent of total)	50	135.0	5.4	25	
		Shrublands (10 percent of total)	50	45.0	3	15	
	Pre-Treatment	New	25	18.5	20	NA	
		grasslands (1 percent)	25	2.7	5.4	0.5	
		woodlands (10 percent)	25	13.5	10.8	1.25	
		Shrublands (5 percent)	25	2.3	3	0.75	
	Mop Up	New	25	10.8	14	NA	
		grasslands (1 percent)	25	2.7	5.4	0.5	
		woodlands (5 percent)	25	6.8	5.4	1.25	
		Shrublands (3 percent)	25	1.4	3	0.45	
Construction and Installation		New (0.2-acre 1 water storage tank and associated water infrastructure; 1 5-acre staging/landing zone; 1 mile of spur raod)	5	6.7	28	NA	
		Total Worker days	**8100**	**Total Workdays**	**1122**		
		Average Workers	**7**				

Notes: 50 acres of prescribed burn at MBARD removed from total 500 acres of prescribed burn possible.

Chipping crew is included in cutting. Days of work are half as long as cutting.

On average for grassland, pre-treatment occurs for 1 day, the burn occurs for 1 day, and mop up occurs for 1 day. For understory, 2 to 3 days of pre-treatment, 1 day for burn, and 1 to 2 days for mop up. (Phil Dye 2020)

Prescribed burning per day in grasslands, could cover 20 - 100 acres; for woodland, 10 - 50 acres; for shrublands 5 to 25, average 15 acres (Phil Dye 2020)

No new firefighting infrastructure is assumed to be installed in Long Ridge/MBARD based on current understanding of needs.

Maintenance would be less intense than creation, which is accounted for in the acres per day.

Creation and maintenance of Fuel Reduction Areas would be 50% less intense than typical creation/maintenance, which is accounted for in the acres per day.

Ten 6-foot piles of hardwood/shrub is about 4 tons if hand piled. MidPen could burn anywhere from 20 - 50 piles in a day; average 35 piles (Phil Dye 2020)

Maximum Daily NCCAB Potential Program Activities					**Annual NCCAB Potential Program Activities**			
Type	**Method**		**Crew Size (Maximum)**	**Acres Per Day**	**Crew Size (Average)**	**Maximum Acres**	**Days/Year**	**Acres/Day**
Manual and Mechanical	Masticating (FRA)	New	10	6	5	2.7	1	6
		Maintain	10	12	5	2.7	1	12
	Masticating	New	10	3	5	10.2	4	3
		Maintain	10	6	5	9.3	2	6
	Mowing (FRA)	New	10	6	5	1.4	1	6
		Maintain	10	12	5	1.4	1	12
	Mowing	New	10	3	5	4.5	2	3
		Maintain	10	6	5	3.6	1	6
	Cutting (FRA)	New	10	4	5	9.5	3	4
		Maintain	10	8	5	9.5	2	8
	Cutting	New	10	2	5	5.7	3	2
		Maintain	10	4	5	7.5	2	4
	Discing	New	NA	NA	NA	NA	NA	NA
		Maintain	NA	NA	NA	NA	NA	NA
	Pulling	New	10	0.5	5	0.0	0	0.5
		Maintain	10	1.0	5	0.3	1	1

	Chipping	50 percent cutting	Refer to Cutting	NA	Refer to Cutting	NA	4.2	NA	
	Pile Burning	New (5 percent of total)	50	14	15	NA	2	14	(Tons/Day)
	Flaming	1 percent of total	4	2	2	0.7	1	2	
Chemical	Glyphosate Round-up Promax;	New (10 percent of total)	15	0.5	8	3.4	7	0.5	
	Clethodim; Aminopyralid;	Maintain (10 percent of total)	15	2	8	3.4	2	2	
Prescribed Herbivory	Livestock	Pre-Treatment (5 percent of 100 acres)	8	2	4	5.0	3	2	
Burning	Prescribed Burning	New (Grasslands only)	100	50	50	50.0	1	50	
	Pre-Treatment	New (5 percent of total burn area)	25	2.5	25	2.5	1	2.5	
	Mop Up	New (5 percent of total burn area)	25	2.5	25	2.5	1	2.5	
		Peak Day 1 Total	**100**						
		Peak Day 2 Total	**50**						
		Peak Day 3 Total	**55**						
		Total Worker days			**296**	**Total Workdays**	**42.0**		
		Average Workers			**7**				

Note: No disclines could be treated in NCCAB.

Flaming could occur December through March, and as such would not occur at the same time as the other treatments.

Prescribed burning would constitute one possible peak day (green). Pile burning would constitute a second possible peak day (blue). Creation activities that can occur simultaneously would constitute a third possible peak day (purple).

On average for grassland, pre-treatment occurs for 1 day, the burn occurs for 1 day, and mop up occurs for 1 day.

If the maximum acres was less than the possible acres per day that could be achieved, then the acres per day was reduced accordingly

A 50-acre burn was assumed in Long Ridge. No burn was assumed in southern Sierra Azul as this aread burned in the 2016 Loma Fire.

Type	Method	Equipment	Number of equipment	Treatment (hours/day)	Existing (hours/acre)	New (hours/acre)	Maintain (hours/acre)	One-way paved miles/day	One-way unpaved miles/day SFBAAB	One-way unpaved miles/day NCCAB
Manual and Mechanical	Masticating (FRA)	Skid steer	1	8	NA	1.3	0.9			
		Backhoe								
		Excavator								
		Tractor								
	Masticating	Skid steer	1	8	1.3	2.7	1.3			
		Backhoe								
		Excavator								
		Tractor								
	Mowing (FRA)	Skid steer								
		Backhoe								
		Excavator								
		String trimmer	1	8	NA	1.3	0.7			
		Tractor	1	6	NA	1.0	0.5			
	Mowing	Skid steer								
		Backhoe								
		Excavator								
		Tractor	1	8	1.3	2.7	1.3			
	Cutting (FRA)	Skid steer	1	8	NA	2.0	1.0			
		Tractor								
		Chainsaw	5	6	NA	1.5	0.8			
		Power pole saw	1	6	NA	1.5	0.8			
		Non-powered tools (pole pruner, jawz implement)								
	Cutting	Skid steer	1	8	2.0	4.0	2.0			
		Tractor								
		Chainsaw	4	6	1.5	3.0	1.5			
		Power pole saw	2	6	1.5	3.0	1.5			
		Non-powered tools (pole pruner, jawz implement)								
	Discing	Tractor with disc harrow	1	8	1.0	2.7	1.0			
	Pulling	Backhoe	1	4	4.0	8.0	4.0			
		Excavator	1	4	4.0	4.0	4.0			
		Non-powered tools								
	Chipping	Chipper (50 percent of cutting)	1	8	NA	NA	NA			
	Propane flaming	Propane torch (e)	1	8	4.0	4.0				
	Pile burning	Water truck (c)	1	10	NA	NA		16.4	6.4	2.6
		Leaf blower	1	10	NA	NA				
		drip torch (1.5 gallons each) (a)	4							
Chemical		ATV (c)	1					0.4	6.4	2.6
		Chainsaw	1	2	1.0	4.0	1.0			
		Power pole saw	1	2	1.0	4.0	1.0			
Prescribed herbivory		Generator (f)	1	8		NA	NA			
		Pickup Truck (c)	Refer to Vehicle Travel					Refer to Vehicle Travel	Refer to Vehicle Travel	Refer to Vehicle Travel
Prescribed burning	Burn	Fire engine (Wildland Type 3) (b)(c)	3	10		NA		16.4	6.4	2.6
		Fire engine (Wildland Type 6) (b)(c)	2	8		NA		16.4	6.4	2.6
		Water truck/tender (b)(c)	1	10		NA		16.4	6.4	2.6
		drip torch (1.5 gallons each) (a)	6							
	Pre-Treatment (Cutting)	Skid steer	1	8		NA				
		Tractor								
		Chainsaw	1	4		NA				
		Power pole saw	1	4		NA				
	Mop Up (Cutting)	Fire engine (Wildland Type 6) (b)(c)	2	8		NA		16.4	6.4	2.6
		Skid steer	1	8		NA				
		Tractor								
		Chainsaw	1	4		NA				
		Power pole saw	1	4		NA				
Vehicle Travel		Automobile (single occupancy to Midpen offices) (d)	Varies		NA	NA	NA	12.8	0.0	0.0
		Pickup truck/van (five-person occupancy; average to and from preserves to Midpen offices) (b)	Varies		NA	NA	NA	16.0	0.0	0.0
		Pickup truck/van (five-person occupancy; within preserves) (c)	Varies		NA	NA	NA	0.4	8.8	4.1
Installation of Infrastructure		Backhoe	1	8		NA				
		Excavator	1	8		NA				
		Skid steer	2	6		NA				
		Generator	1	8		NA				
		Crane	1	4		NA				
		Water truck (b)	1	2		NA		16.0	0.0	0.0
		Heavy truck (b)	1			NA		16.0	0.0	0.0

Note: (a) For drip torch use, one full torch can burn (1) About 10 piles (if dry) or 40 tons. (2) About 5 acres for a prescribed burn (Phil Dye 2020)

(b) Average distance from administrative field office to the OSPs. (GIS calc)

(c) Distance determined as average miles of internal road access (excluding trails for larger trucks) within each preserve/managed area. (GIS calc)

(d) Average one-way commuter distance in the bay area. (ABAG 2017)

(e) 4.24 pounds propane/gallon, 10 pounds per 1 hour (The Nature Conservancey 2001)

(f) For a 143 HP generator, 10.4 gallons of fuel per hour (Hardy Diesel 2020)

The renewable diesel Midpen uses is an R99 blend (99% renewable, 1% conventional) produced by ConocoPhillips. The feedstock is tallow.

Equipment	HP	ROG	CO	NOx	CO2	PM10	PM2.5	SOx	CH4	N2O	Units
String trimmer	67	0.08	5.38	0.87	431.38	0.02	0.01	0.00			Emission Factor (g/hp-hr)
Chipper	67	0.08	5.38	0.87	431.38	0.02	0.01	0.00			Emission Factor (g/hp-hr)
Propane torch		1.00	7.50	13.00	12,500.00	0.70	0.70				Emission Factor (lb/10^3gal)
Leaf blower	9	1.12	68.52	2.54	214.70	0.69	0.52	0.01			Emission Factor (g/hp-hr)
drip torch		107.19	123.88	469.89	20,786.62	32.51	32.51	30.08			Emission Factor (lb/10^3gal)
ATV		2.34	20.32	1.17	216.15	0.02	0.01	0.00	0.34	0.07	Emission Factor (g/mile)
Fire engine (Wildland Type 3)		0.11	0.84	0.98	806.38	0.10	0.05	0.01	0.01	0.05	Emission Factor (g/mile)
Fire engine (Wildland Type 6)		0.11	0.84	0.98	806.38	0.10	0.05	0.01	0.01	0.05	Emission Factor (g/mile)
Tractor (with or without disc harrow)	18	0.13	0.97	3.29	397.80	0.06	0.06	0.01			Emission Factor (g/hp-hr)
Chainsaw	10	1.54	110.42	4.19	334.94	1.31	0.99	0.01			Emission Factor (g/hp-hr)
Power pole saw	10	1.54	110.42	4.19	334.94	1.31	0.99	0.01			Emission Factor (g/hp-hr)
Automobile		0.03	0.82	0.06	275.25	0.05	0.02	0.00	0.01	0.01	Emission Factor (g/mile)
Pickup truck/van		0.02	0.86	0.08	322.77	0.05	0.02	0.00	0.00	0.01	Emission Factor (g/mile)
Backhoe	83	0.03	0.67	1.03	195.21	0.03	0.02	0.00			Emission Factor (g/hp-hr)
Excavator	146	0.02	0.61	0.71	201.64	0.02	0.02	0.00			Emission Factor (g/hp-hr)
Skid steer	71	0.02	0.63	0.88	194.53	0.02	0.01	0.00			Emission Factor (g/hp-hr)
Generator	143	0.02	0.52	0.44	157.97	0.01	0.01	0.00			Emission Factor (g/hp-hr)
Crane	74	0.14	9.14	1.30	364.42	0.01	0.01	0.00			Emission Factor (g/hp-hr)
Water truck/tender		0.19	0.57	2.93	1,217.72	0.20	0.12	0.01	0.01	0.19	Emission Factor (g/mile)
Heavy truck		0.16	0.42	3.34	1,220.91	0.19	0.10	0.01	0.01	0.19	Emission Factor (g/mile)

	ROG	CO	NOx	CO2	PM10	PM2.5	SOx	CH4	N2O	
Water truck	0.08	2.04	5.03	646.45	0.01	0.01	0.01	0.00	0.10	Emission Factor (g/vehicle/day)
Water tender	0.08	2.04	5.03	646.45	0.01	0.01	0.01	0.00	0.10	Emission Factor (g/vehicle/day)
Fire engine (Wildland Type 3)	0.29	2.43	1.00	139.03	0.01	0.01	0.00	0.07	0.01	Emission Factor (g/vehicle/day)
Fire engine (Wildland Type 6)	0.29	2.43	1.00	139.03	0.01	0.01	0.00	0.07	0.01	Emission Factor (g/vehicle/day)
Heavy truck	0.06	1.91	3.81	641.92	0.00	0.00	0.01	0.00	0.10	Emission Factor (g/vehicle/day)

Activities	Uncontrolled Emission Factor PM10	Units	Controlled Emission Factor PM10	Units	Uncontrolled Emission Factor PM2.5	Units	Controlled Emission Factor PM2.5	Units	Source	Notes
Paved Roads - Passenger Vehicle/ATV/Mower Traffic	0.0028	lb/VMT			0.00068	lb/VMT			AP-42, Section 13.2.1 Paved Roads	With Precipitation
	0.0029	lb/VMT			0.00071	lb/VMT				Without Precipitation
Paved Roads - Medium Truck Traffic	0.008	lb/VMT			0.0020	lb/VMT			AP-42, Section 13.2.1 Paved Roads	With Precipitation
	0.0082	lb/VMT			0.0020	lb/VMT				Without Precipitation
Paved Roads - Fire/Water Truck Traffic	0.026	lb/VMT			0.0065	lb/VMT			AP-42, Section 13.2.1 Paved Roads	With Precipitation
	0.028	lb/VMT			0.0068	lb/VMT				Without Precipitation
Unpaved Roads - Passenger Vehicle/ATV/Mower Traffic	0.467	lb/VMT	0.353	lb/VMT	0.046	lb/VMT	0.035	lb/VMT	AP-42, Section 13.2.2 Unpaved Roads	With Precipitation
	0.576	lb/VMT			0.057	lb/VMT			CalEEMod User's Guide, November 2017	Without Precipitation
Unpaved Roads - Medium Truck Traffic	0.469	lb/VMT	0.287	lb/VMT	0.046	lb/VMT	0.028	lb/VMT	AP-42, Section 13.2.2 Unpaved Roads	With Precipitation
	0.469	lb/VMT			0.047	lb/VMT			CalEEMod User's Guide, November 2017	Without Precipitation
Unpaved Roads - Fire/Water Truck Traffic	0.300	lb/VMT	0.226	lb/VMT	0.030	lb/VMT	0.022	lb/VMT	AP-42, Section 13.2.2 Unpaved Roads	With Precipitation
	0.370	lb/VMT			0.037	lb/VMT			CalEEMod User's Guide, November 2017	Without Precipitation

Paved Roads Emission Factor Assumptions

0.0022	PM10 k Constant
0.00054	PM2.5 k Constant
1.8	ton Passenger Vehicle
5.0	ton Medium truck
17	ton Heavy truck (average full/empty)
0.7	silt content

Vehicle speed control (BAAQMD Basic Emission Reduction Measures and Midpen requirement for vehicles to travel no more than 15 mph on unpaved, unposted roads

Results in Control Efficiency of about 39%

61.2%	61.0%	Unpaved Roads - Passenger Vehicle/ATV/Mower Traffic
61.2%	60.9%	Unpaved Roads - Medium Truck Traffic
61.2%	60.9%	Unpaved Roads - Fire/Water Truck Traffic

Unpaved Roads Emission Factor Assumptions

1.8	PM10 k Constant	
0.18	PM2.5 k Constant	
1.8	ton Passenger Vehicle	
5.0	ton Medium truck	
17	ton Heavy truck (average full/empty)	
4.3	silt content	
0.5	moisture content	
40	speed	15 speed
69	Days of Measurable Precipitation	

Source: CalEEMod User's Guide, November 2017, page 39.

Driptorch Emission Factor Calculations

Diesel

Emission Factor (lb/10^3 gal)

CO	*ROG*	*NOx*	*SOx*	*TOTAL PM*	*CO2*
126.81	46.72115	588.6865	38.71181	41.38159	21892.2

Heating value (MMBtu/10^3 gal)

133.489

Gas

Emission Factor (lb/10^3 gal)

CO	*ROG*	*NOx*	*SOx*	*TOTAL PM*	*CO2*
117.04	248.2767	192.71	9.931068	11.8227	18206.96

Heating value (MMBtu/10^3 gal)

118.227

70 diesel/30 gas Mix

Emission Factor (lb/10^3 gal)

CO	*ROG*	*NOx*	*SOx*	*TOTAL PM*	*CO2*
123.88	107.1878	469.8935	30.07759	32.51392	20786.62

Heating value (MMBtu/10^3 gal)

118.227

Emssion factors obtained from USEPA 1996 AP-42

Mix of fuel (70/30) from Oaklahoma State University 2020

Heating value obtained from California Department of Energy 2014

G E I O L N J Q P

Existing Treatments

Emission Factors

Vehicle Type	Emission Factors (g/mile for exhaust or lb/mile for fugitive) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Light Duty Automobile	0.8243	0.0278	0.0586	0.0027	0.0461	0.0191	275.2545	0.0057	0.0052
Light Duty Auto on Paved Road					0.0029	0.0007			

Annual Emissions

Unit	Emissions (tons/year)								
miles/year	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
20761.60	0.0189	0.0006	0.0013	0.0001	0.0011	0.0004	6.2994	0.0001	0.0001
					0.0301	0.0074			
	0.0189	**0.0006**	**0.0013**	**0.0001**	**0.0311**	**0.0078**	**6.2994**	**0.0001**	**0.0001**

Emission Factors

Vehicle Type	Emission Factors (g/mile for exhaust or lb/mile for fugitive) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Van/Medium Truck	0.8620	0.0159	0.0772	0.0032	0.0463	0.0192	322.7684	0.0067	0.0038
Van/Medium Truck on Unpaved Road					0.4695	0.0466			

Annual Emissions

Unit	Emissions (tons/year)									Controlled	
miles/year	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4	PM10	PM2.5
2837.12	0.0027	0.0000	0.0002	0.0000	0.0001	0.0001	1.0094	0.0000	0.0000		
					0.6660	0.0662				0.4076	0.0403
	0.0027	**0.0000**	**0.0002**	**0.0000**	**0.6661**	**0.0662**	**1.0094**	**0.0000**	**0.0000**		

Note: Removed personnel who would arrive by water tender (pile burning)

Emission Factors

Vehicle Type	Emission Factors (g/mile for exhaust or lb/mile for fugitive) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Van/Medium Truck	0.8620	0.0159	0.0772	0.0032	0.0463	0.0192	322.7684	0.0067	0.0038
Van/Medium Truck on Paved Road					0.0082	0.0020			

Annual Emissions

Unit	Emissions (tons/year)								
miles/year	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
5295.42	0.0050	0.0001	0.0005	0.0000	0.0003	0.0001	1.8841	0.0000	0.0000
					0.0217	0.0053			
	0.0050	**0.0001**	**0.0005**	**0.0000**	**0.0220**	**0.0054**	**1.8841**	**0.0000**	**0.0000**

Note: Removed personnel who would arrive by water tender (pile burning)

Emission Factors

Vehicle Type	Emission Factors (g/mile for exhaust or lb/mile for fugitive) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Water Truck	0.5724	0.1931	2.9264	0.0115	0.2037	0.1175	1217.7201	0.1914	0.0090
Water Truck on Unpaved Road					0.3696	0.0367			

Annual Emissions

Unit	Emissions (tons/year)									Controlled	
miles/year	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4	PM10	PM2.5
12.80	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0172	0.0000	0.0000		
					0.0024	0.0002				0.0014	0.0001
	0.0000	**0.0000**	**0.0000**	**0.0000**	**0.0024**	**0.0002**	**0.0172**	**0.0000**	**0.0000**		

Emission Factors

Vehicle Type	Emission Factors (g/mile for exhaust or lb/mile for fugitive) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Water Truck	0.5724	0.1931	2.9264	0.0115	0.2037	0.1175	1217.7201	0.1914	0.0090
Water Truck on Paved Road					0.0278	0.0068			

Annual Emissions

Unit	Emissions (tons/year)								
miles/year	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
32.85	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	0.0441	0.0000	0.0000
					0.0005	0.0001			
	0.0000	**0.0000**	**0.0001**	**0.0000**	**0.0005**	**0.0001**	**0.0441**	**0.0000**	**0.0000**

Emission Factors

Vehicle Type	Emission Factors (g/vehicle/day) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Water Truck	2.0424	0.0796	5.0303	0.0061	0.0145	0.0138	646.4472	0.1016	0.0037

Annual Emissions

Unit	Emissions (tons/year)								
days/year	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
1.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0007	0.0000	0.0000
	0.0000	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0007**	**0.0000**	**0.0000**

Emission Factors

Vehicle Type	Emission Factors (g/vehicle/day) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Type III Fire Engine Truck	2.4272	0.2872	1.0018	0.0013	0.0131	0.0126	139.0304	0.0131	0.0675

Annual Emissions

Unit	Emissions (tons/year)								
days/year	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Emission Factors

Vehicle Type	Emission Factors (g/vehicle/day) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Type VI Fire Truck	2.4272	0.2872	1.0018	0.0013	0.0131	0.0126	139.0304	0.0131	0.0675

Annual Emissions

Unit	Emissions (tons/year)								
days/year	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Emission Factors

Vehicle Type	Emission Factors (g/mile for exhaust or lb/mile for fugitive) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
ATV	20.3222	2.3442	1.1694	0.0021	0.0178	0.0079	216.1491	0.0670	0.3430
ATV on Unpaved Road					0.5760	0.0573			

Annual Emissions

Unit	Emissions (tons/year)									Controlled	
miles/year	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4	PM10	PM2.5
320.00	0.0072	0.0008	0.0004	0.0000	0.0000	0.0000	0.0762	0.0000	0.0001		
					0.0922	0.0092				0.0564	0.0056
	0.0072	**0.0008**	**0.0004**	**0.0000**	**0.0922**	**0.0092**	**0.0762**	**0.0000**	**0.0001**		

Emission Factors

Vehicle Type	Emission Factors (g/mile for exhaust or lb/mile for fugitive) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
ATV	20.3222	2.3442	1.1694	0.0021	0.0178	0.0079	216.1491	0.0670	0.3430
ATV on Paved Road					0.0029	0.0007			

Annual Emissions

Unit	Emissions (tons/year)								
miles/year	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
21.25	0.0005	0.0001	0.0000	0.0000	0.0000	0.0000	0.0051	0.0000	0.0000
					0.0000	0.0000			
	0.0005	**0.0001**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0051**	**0.0000**	**0.0000**

Emission Factors

Equipment Type	Emission Factor (g/hp-hr) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Generator	0.5247	0.0191	0.4421	0.0015	0.0101	0.0093	157.9734	0.0000	0.0000

Annual Emissions

Horsepower	Unit hours/year	Emissions (tons/year) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
143.18	0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
		0.0000	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Emission Factors

Equipment Type	Emission Factor (g/hp-hr) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Chainsaw	110.4151	1.5355	4.1945	0.0092	1.3066	0.9872	334.9362	0.0000	0.0000

Annual Emissions

Horsepower	Unit hours/year	Emissions (tons/year) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
10.45	1380.14	1.7552	0.0244	0.0667	0.0001	0.0208	0.0157	5.3243	0.0000	0.0000
		1.7552	**0.0244**	**0.0667**	**0.0001**	**0.0208**	**0.0157**	**5.3243**	**0.0000**	**0.0000**

Emission Factors

Equipment Type	Emission Factor (g/hp-hr) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Chipper	5.3797	0.0798	0.8650	0.0042	0.0159	0.0120	431.3772	0.0000	0.0000

Annual Emissions

Horsepower	Unit hours/year	Emissions (tons/year) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
67.00	221.75	0.0881	0.0013	0.0142	0.0001	0.0003	0.0002	7.0648	0.0000	0.0000
		0.0881	**0.0013**	**0.0142**	**0.0001**	**0.0003**	**0.0002**	**7.0648**	**0.0000**	**0.0000**

Emission Factors

Equipment Type	Emission Factor (g/hp-hr) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Skid Steer Loader	0.6255	0.0198	0.8807	0.0018	0.0155	0.0143	194.5350	0.0000	0.0000

Annual Emissions

Horsepower	Unit hours/year	Emissions (tons/year) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
70.56	573.54	0.0279	0.0009	0.0393	0.0001	0.0007	0.0006	8.6783	0.0000	0.0000
		0.0279	**0.0009**	**0.0393**	**0.0001**	**0.0007**	**0.0006**	**8.6783**	**0.0000**	**0.0000**

Emission Factors

Equipment Type	Emission Factor (g/hp-hr) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Tractor	0.9740	0.1295	3.2925	0.0054	0.0601	0.0553	397.8031	0.0000	0.0000

Annual Emissions

Horsepower	Unit hours/year	Emissions (tons/year) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
18.07	190.66	0.0037	0.0005	0.0125	0.0000	0.0002	0.0002	1.5111	0.0000	0.0000
		0.0037	**0.0005**	**0.0125**	**0.0000**	**0.0002**	**0.0002**	**1.5111**	**0.0000**	**0.0000**

Emission Factors

Equipment Type	Emission Factor (g/hp-hr) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Excavator	0.6109	0.0243	0.7104	0.0019	0.0166	0.0153	201.6426	0.0000	0.0000

Annual Emissions

Horsepower	Unit hours/year	Emissions (tons/year) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
146.03	81.19	0.0080	0.0003	0.0093	0.0000	0.0002	0.0002	2.6352	0.0000	0.0000
		0.0080	**0.0003**	**0.0093**	**0.0000**	**0.0002**	**0.0002**	**2.6352**	**0.0000**	**0.0000**

Emission Factors

Equipment Type	Emission Factor (g/hp-hr) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Backhoe	0.6710	0.0300	1.0309	0.0018	0.0261	0.0240	195.2141	0.0000	0.0000

Annual Emissions

Horsepower	Unit hours/year	Emissions (tons/year) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
83.17	81.19	0.0050	0.0002	0.0077	0.0000	0.0002	0.0002	1.4530	0.0000	0.0000

												0.0050	**0.0002**	**0.0077**	**0.0000**	**0.0002**	**0.0002**	**1.4530**	**0.0000**	**0.0000**

	Emission Factor (g/hp-hr)									Unit	Emissions (tons/year)									
Equipment Type	*CO*	*ROG*	*NOx*	*SOx*	*PM10*	*PM2.5*	*CO2*	*N2O*	*CH4*	*Horsepower*	*hours/year*	*CO*	*ROG*	*NOx*	*SOx*	*PM10*	*PM2.5*	*CO2*	*N2O*	*CH4*
Crane	9.1355	0.1356	1.2963	0.0035	0.0135	0.0102	364.4179	0.0000	0.0000	74.00	0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
												0.0000	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

	Emission Factor (g/hp-hr)									Unit	Emissions (tons/year)									
Equipment Type	*CO*	*ROG*	*NOx*	*SOx*	*PM10*	*PM2.5*	*CO2*	*N2O*	*CH4*	*Horsepower*	*hours/year*	*CO*	*ROG*	*NOx*	*SOx*	*PM10*	*PM2.5*	*CO2*	*N2O*	*CH4*
String Trimmer	5.3797	0.0798	0.8650	0.0042	0.0159	0.0120	431.3772	0.0000	0.0000	67.00	0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
												0.0000	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

	Emission Factor (g/hp-hr)									Unit	Emissions (tons/year)									
Equipment Type	*CO*	*ROG*	*NOx*	*SOx*	*PM10*	*PM2.5*	*CO2*	*N2O*	*CH4*	*Horsepower*	*hours/year*	*CO*	*ROG*	*NOx*	*SOx*	*PM10*	*PM2.5*	*CO2*	*N2O*	*CH4*
Power pole saw	110.4151	1.5355	4.1945	0.0092	1.3066	0.9872	334.9362	0.0000	0.0000	10.45	714.89	0.9092	0.0126	0.0345	0.0001	0.0108	0.0081	2.7579	0.0000	0.0000
												0.9092	**0.0126**	**0.0345**	**0.0001**	**0.0108**	**0.0081**	**2.7579**	**0.0000**	**0.0000**

	Emission Factor (g/hp-hr)									Unit	Emissions (tons/year)									
Equipment Type	*CO*	*ROG*	*NOx*	*SOx*	*PM10*	*PM2.5*	*CO2*	*N2O*	*CH4*	*Horsepower*	*hours/year*	*CO*	*ROG*	*NOx*	*SOx*	*PM10*	*PM2.5*	*CO2*	*N2O*	*CH4*
Leaf blower	68.5165	1.1224	2.5378	0.0059	0.6918	0.5227	214.7015	0.0000	0.0000	9.39	10.00	0.0071	0.0001	0.0003	0.0000	0.0001	0.0001	0.0222	0.0000	0.0000
												0.0071	**0.0001**	**0.0003**	**0.0000**	**0.0001**	**0.0001**	**0.0222**	**0.0000**	**0.0000**

	Emission Factor ($lb/10^3$ gal)									Unit	Emissions (tons/year)									
Activity	*CO*	*ROG*	*NOx*	*SOx*	*PM10*	*PM2.5*	*CO2*	*N2O*	*CH4*	*gal/year*		*CO*	*ROG*	*NOx*	*SOx*	*PM10*	*PM2.5*	*CO2*	*N2O*	*CH4*
Drip Torch (Prescribed Burn) 70/30	123.8836	107.1878	469.8935	30.0776	32.5139	32.5139	20786.6246	0.0000	0.0000	0.00		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
												0.0000	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

	Emission Factor ($lb/10^3$ gal)									Unit	Emissions (tons/year)									
Activity	*CO*	*ROG*	*NOx*	*SOx*	*PM10*	*PM2.5*	*CO2*	*N2O*	*CH4*	*gal/year*		*CO*	*ROG*	*NOx*	*SOx*	*PM10*	*PM2.5*	*CO2*	*N2O*	*CH4*
Drip Torch (Pile Burn) 70/30	123.8836	107.1878	469.8935	30.0776	32.5139	32.5139	20786.6246	0.0000	0.0000	0.53		0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	0.0055	0.0000	0.0000
												0.0000	**0.0000**	**0.0001**	**0.0000**	**0.0000**	**0.0000**	**0.0055**	**0.0000**	**0.0000**

	Emission Factor ($lb/10^3$ gal)									Unit	Emissions (tons/year)									
Activity	*CO*	*ROG*	*NOx*	*SOx*	*PM10*	*PM2.5*	*CO2*	*N2O*	*CH4*	*gal/year*		*CO*	*ROG*	*NOx*	*SOx*	*PM10*	*PM2.5*	*CO2*	*N2O*	*CH4*
Propane Torch	7.5000	1.0000	13.0000	0.0160	0.7000	0.7000	12500.0000	0.9000	0.2000	46.83		0.0002	0.0000	0.0003	0.0000	0.0000	0.0000	0.2927	0.0000	0.0000
												0.0002	**0.0000**	**0.0003**	**0.0000**	**0.0000**	**0.0000**	**0.2927**	**0.0000**	**0.0000**

Percent PM2.5 and PM10 assumed to be 100%

Drip Torch (Prescribed Burn) 70/30	0.30	gal/ac
Drip Torch (Pile Burn) 70/30	0.04	gal/ton
Propane Torch	2.36	gal/hr
Generator 143 hp	10.39	gal/hr

	Emissions (tons/year)									Controlled	
	CO	*ROG*	*NOx*	*SOx*	*PM10*	*PM2.5*	*CO2*	*N2O*	*CH4*	*PM10*	*PM2.5*
Total	**2.84**	**0.04**	**0.19**	**0.00**	**0.85**	**0.11**	**39.08**	**0.00**	**0.00**		
Exhaust	**2.84**	**0.04**	**0.19**	**0.00**	**0.03**	**0.03**	**39.08**	**0.00**	**0.00**		
Fugitive (Paved)					**0.05**	**0.01**					
Fugitive (Unpaved)					**0.76**	**0.08**				**0.47**	**0.05**

Existing Treatments

Emission Factors

Vehicle Type	Emission Factors (g/mile for exhaust or lb/mile for fugitive) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Light Duty Automobile	0.8243	0.0278	0.0586	0.0027	0.0461	0.0191	275.2545	0.0057	0.0052
Light Duty Auto on Paved Road					0.0029	0.0007			

Vehicle Type	Emission Factors (g/mile for exhaust or lb/mile for fugitive) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Van/Medium Truck	0.8620	0.0159	0.0772	0.0032	0.0463	0.0192	322.7684	0.0067	0.0038
Van/Medium Truck on Unpaved Road					0.4695	0.0466			

Vehicle Type	Emission Factors (g/mile for exhaust or lb/mile for fugitive) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Van/Medium Truck	0.8620	0.0159	0.0772	0.0032	0.0463	0.0192	322.7684	0.0067	0.0038
Van/Medium Truck on Paved Road					0.0082	0.0020			

Vehicle Type	Emission Factors (g/mile for exhaust or lb/mile for fugitive) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
ATV	20.3222	2.3442	1.1694	0.0021	0.0178	0.0079	216.1491	0.0670	0.3430
ATV on Unpaved Road					0.5760	0.0573			

Vehicle Type	Emission Factors (g/mile for exhaust or lb/mile for fugitive) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
ATV	20.3222	2.3442	1.1694	0.0021	0.0178	0.0079	216.1491	0.0670	0.3430
ATV on Paved Road					0.0029	0.0007			

Equipment Type	Emission Factor (g/hp-hr) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Chainsaw	110.4151	1.5355	4.1945	0.0092	1.3066	0.9872	334.9362	0.0000	0.0000

Equipment Type	Emission Factor (g/hp-hr) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Chipper	5.3797	0.0798	0.8650	0.0042	0.0159	0.0120	431.3772	0.0000	0.0000

Equipment Type	Emission Factor (g/hp-hr) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Skid Steer Loader	0.6255	0.0198	0.8807	0.0018	0.0155	0.0143	194.5350	0.0000	0.0000

Equipment Type	Emission Factor (g/hp-hr) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Tractor	0.9740	0.1295	3.2925	0.0054	0.0601	0.0553	397.8031	0.0000	0.0000

Equipment Type	Emission Factor (g/hp-hr) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Excavator	0.6109	0.0243	0.7104	0.0019	0.0166	0.0153	201.6426	0.0000	0.0000

Maximum Daily Emissions

Vehicle Type	Unit miles/day	Emissions (tons/day) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Light Duty Automobile	1408.00	0.0013	0.0000	0.0001	0.0000	0.0001	0.0000	0.4272	0.0000	0.0000
Light Duty Auto on Paved Road						0.0020	0.0005			
		0.0013	**0.0000**	**0.0001**	**0.0000**	**0.0021**	**0.0005**	**0.4272**	**0.0000**	**0.0000**

Vehicle Type	Unit miles/day	Emissions (tons/day) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4	Controlled PM10	PM2.5
Van/Medium Truck	90.20	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0321	0.0000	0.0000		
Van/Medium Truck on Unpaved Road						0.0212	0.0021				0.0130	0.0013
		0.0001	**0.0000**	**0.0000**	**0.0000**	**0.0212**	**0.0021**	**0.0321**	**0.0000**	**0.0000**		

Vehicle Type	Unit miles/day	Emissions (tons/day) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Van/Medium Truck	361.35	0.0003	0.0000	0.0000	0.0000	0.0000	0.0000	0.1286	0.0000	0.0000
Van/Medium Truck on Paved Road						0.0015	0.0004			
		0.0003	**0.0000**	**0.0000**	**0.0000**	**0.0015**	**0.0004**	**0.1286**	**0.0000**	**0.0000**

Vehicle Type	Unit miles/day	Emissions (tons/day) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4	Controlled PM10	PM2.5
ATV	5.20	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0012	0.0000	0.0000		
ATV on Unpaved Road						0.0015	0.0001				0.0009	0.0001
		0.0001	**0.0000**	**0.0000**	**0.0000**	**0.0015**	**0.0001**	**0.0012**	**0.0000**	**0.0000**		

Vehicle Type	Unit miles/day	Emissions (tons/day) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
ATV	0.85	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000	0.0000
ATV on Paved Road						0.0000	0.0000			
		0.0000	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0002**	**0.0000**	**0.0000**

Equipment Type	Horsepower	Unit hours/day	Emissions (tons/day) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Chainsaw	10.45	2.42	0.0031	0.0000	0.0001	0.0000	0.0000	0.0000	0.0093	0.0000	0.0000
			0.0031	**0.0000**	**0.0001**	**0.0000**	**0.0000**	**0.0000**	**0.0093**	**0.0000**	**0.0000**

Equipment Type	Horsepower	Unit hours/day	Emissions (tons/day) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Chipper	67.00	4.00	0.0016	0.0000	0.0003	0.0000	0.0000	0.0000	0.1274	0.0000	0.0000
			0.0016	**0.0000**	**0.0003**	**0.0000**	**0.0000**	**0.0000**	**0.1274**	**0.0000**	**0.0000**

Equipment Type	Horsepower	Unit hours/day	Emissions (tons/year) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Skid Steer Loader	70.56	2.45	0.0001	0.0000	0.0002	0.0000	0.0000	0.0000	0.0370	0.0000	0.0000
			0.0001	**0.0000**	**0.0002**	**0.0000**	**0.0000**	**0.0000**	**0.0370**	**0.0000**	**0.0000**

Equipment Type	Horsepower	Unit hours/day	Emissions (tons/day) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Tractor	18.07	0.08	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0007	0.0000	0.0000
			0.0000	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0007**	**0.0000**	**0.0000**

Equipment Type	Horsepower	Unit hours/day	Emissions (tons/day) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Excavator	146.03	2.81	0.0003	0.0000	0.0003	0.0000	0.0000	0.0000	0.0913	0.0000	0.0000
			0.0003	**0.0000**	**0.0003**	**0.0000**	**0.0000**	**0.0000**	**0.0913**	**0.0000**	**0.0000**

Annual Emissions

Vehicle Type	Unit miles/year	CO2	N2O	CH4
Light Duty Automobile	896.00	0.2719	0.0000	0.0000
	0.2719	**0.0000**	**0.0000**	

Vehicle Type	Unit miles/year	CO2	N2O	CH4
Van/Medium Truck	57.40	0.0204	0.0000	0.0000
	0.0204	**0.0000**	**0.0000**	

Vehicle Type	Unit miles/year	CO2	N2O	CH4
Van/Medium Truck	229.95	0.0818	0.0000	0.0000
	0.0818	**0.0000**	**0.0000**	

Vehicle Type	Unit miles/year	CO2	N2O	CH4
ATV	5.20	0.0012	0.0000	0.0000
	0.0012	**0.0000**	**0.0000**	

Vehicle Type	Unit miles/year	CO2	N2O	CH4
ATV	0.85	0.0002	0.0000	0.0000
	0.0002	**0.0000**	**0.0000**	

Equipment Type	Horsepower	Unit hours/year	CO2	N2O	CH4
Chainsaw	10.45	32.03	0.1236	0.0000	0.0000
		0.1236	**0.0000**	**0.0000**	

Equipment Type	Horsepower	Unit hours/year	CO2	N2O	CH4
Chipper	67.00	5.20	0.1657	0.0000	0.0000
		0.1657	**0.0000**	**0.0000**	

Equipment Type	Horsepower	Unit hours/year	CO2	N2O	CH4
Skid Steer Loader	70.56	13.08	0.1979	0.0000	0.0000
		0.1979	**0.0000**	**0.0000**	

Equipment Type	Horsepower	Unit hours/year	CO2	N2O	CH4
Tractor	18.07	0.50	0.0040	0.0000	0.0000
		0.0040	**0.0000**	**0.0000**	

Equipment Type	Horsepower	Unit hours/year	CO2	N2O	CH4
Excavator	146.03	2.81	0.0913	0.0000	0.0000
		0.0913	**0.0000**	**0.0000**	

Equipment Type	Emission Factor (g/hp-hr) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Backhoe	0.6710	0.0300	1.0309	0.0018	0.0261	0.0240	195.2141	0.0000	0.0000

Horsepower	Unit hours/day	Emissions (tons/day) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
83.17	2.81	0.0002	0.0000	0.0003	0.0000	0.0000	0.0000	0.0503	0.0000	0.0000
		0.0002	**0.0000**	**0.0003**	**0.0000**	**0.0000**	**0.0000**	**0.0503**	**0.0000**	**0.0000**

Horsepower	Unit hours/year	CO2	N2O	CH4
83.17	2.81	0.0503	0.0000	0.0000
		0.0503	**0.0000**	**0.0000**

Equipment Type	Emission Factor (g/hp-hr) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Crane	9.1355	0.1356	1.2963	0.0035	0.0135	0.0102	364.4179	0.0000	0.0000

Horsepower	Unit hours/day	Emissions (tons/day) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
74.00	0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
		0.0000	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Horsepower	Unit hours/year	CO2	N2O	CH4
74.00	0.00	0.0000	0.0000	0.0000
		0.0000	**0.0000**	**0.0000**

Equipment Type	Emission Factor (g/hp-hr) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
String Trimmer	5.3797	0.0798	0.8650	0.0042	0.0159	0.0120	431.3772	0.0000	0.0000

Horsepower	Unit hours/day	Emissions (tons/day) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
67.00	0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
		0.0000	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Horsepower	Unit hours/year	CO2	N2O	CH4
67.00	0.00	0.0000	0.0000	0.0000
		0.0000	**0.0000**	**0.0000**

Equipment Type	Emission Factor (g/hp-hr) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Power pole saw	110.4151	1.5355	4.1945	0.0092	1.3066	0.9872	334.9362	0.0000	0.0000

Horsepower	Unit hours/day	Emissions (tons/day) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
10.45	3.41	0.0043	0.0001	0.0002	0.0000	0.0001	0.0000	0.0132	0.0000	0.0000
		0.0043	**0.0001**	**0.0002**	**0.0000**	**0.0001**	**0.0000**	**0.0132**	**0.0000**	**0.0000**

Horsepower	Unit hours/year	CO2	N2O	CH4
10.45	16.43	0.0634	0.0000	0.0000
		0.0634	**0.0000**	**0.0000**

Equipment Type	Emission Factor (g/hp-hr) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Leaf blower	68.5165	1.1224	2.5378	0.0059	0.6918	0.5227	214.7015	0.0000	0.0000

Horsepower	Unit hours/day	Emissions (tons/day) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
9.39	0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
		0.0000	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Horsepower	Unit hours/year	CO2	N2O	CH4
9.39	0.00	0.0000	0.0000	0.0000
		0.0000	**0.0000**	**0.0000**

Activity	Emission Factor (lb/10^3 gal) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Drip Torch (Prescribed Burn) 70/30	123.8836	107.1878	469.8935	30.0776	32.5139	32.5139	20786.6246	0.0000	0.0000

Unit gal/day	Emissions (tons/day) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Unit gal/year	CO2	N2O	CH4
0.00	0.0000	0.0000	0.0000
	0.0000	**0.0000**	**0.0000**

Activity	Emission Factor (lb/10^3 gal) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Drip Torch (Pile Burn) 70/30	123.8836	107.1878	469.8935	30.0776	32.5139	32.5139	20786.6246	0.0000	0.0000

Unit gal/day	Emissions (tons/day) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Unit gal/year	CO2	N2O	CH4
0.00	0.0000	0.0000	0.0000
	0.0000	**0.0000**	**0.0000**

Activity	Emission Factor (lb/10^3 gal) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Propane Torch	7.5000	1.0000	13.0000	0.0160	0.7000	0.7000	12500.0000	0.9000	0.2000

Unit gal/day	Emissions (tons/day) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Unit gal/year	CO2	N2O	CH4
0.78	0.0049	0.0000	0.0000
	0.0049	**0.0000**	**0.0000**

Percent PM2.5 and PM10 assumed to be 100%

Drip Torch (Prescribed Burn) 70/30	0.30	gal/ac
Drip Torch (Pile Burn) 70/30	0.04	gal/ton
Propane Torch	2.36	gal/hr
Generator 143 hp	10.39	gal/hr

Total Unit Calculations
miles/year: total vrehicles * (one-way miles * 2)
days/year: total vehicles * total days
hours/year: total equipment * hours per day * days

	Emissions (tons/day) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4	Controlled PM10	PM2.5
Total	**0.01**	**0.00**	**0.00**	**0.00**	**0.03**	**0.00**	**0.92**	**0.00**	**0.00**		
Exhaust	**0.01**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.92**	**0.00**	**0.00**		
Fugitive (Paved)					**0.00**	**0.00**					
Fugitive (Unpaved)					**0.02**	**0.00**				**0.01**	**0.00**

	CO2	N2O	CH4
Total	**1.08**	**0.00**	**0.00**

Maximum Annual Treatments

Emission Factors

Vehicle Type	Emission Factors (g/mile for exhaust or lb/mile for fugitive)								
	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Light Duty Automobile	0.8243	0.0278	0.0586	0.0027	0.0461	0.0191	275.2545	0.0057	0.0052
Light Duty Auto on Paved Road					0.0029	0.0007			

Vehicle Type	Emission Factors (g/mile for exhaust or lb/mile for fugitive)								
	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Van/Medium Truck	0.8620	0.0159	0.0772	0.0032	0.0463	0.0192	322.7684	0.0067	0.0038
Van/Medium Truck on Unpaved Road					0.4695	0.0466			

Vehicle Type	Emission Factors (g/mile for exhaust or lb/mile for fugitive)								
	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Van/Medium Truck	0.8620	0.0159	0.0772	0.0032	0.0463	0.0192	322.7684	0.0067	0.0038
Van/Medium Truck on Paved Road					0.0082	0.0020			

Vehicle Type	Emission Factors (g/mile for exhaust or lb/mile for fugitive)								
	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Heavy Truck	0.4225	0.1568	3.3402	0.0115	0.1866	0.1012	1220.9057	0.1919	0.0073
Heavy Truck on Unpaved Road					0.4695	0.0466			

Vehicle Type	Emission Factors (g/mile for exhaust or lb/mile for fugitive)								
	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Heavy Truck	0.4225	0.1568	3.3402	0.0115	0.1866	0.1012	1220.9057	0.1919	0.0073
Heavy Truck on Paved Road					0.0082	0.0020			

Vehicle Type	Emission Factors (g/mile for exhaust or lb/mile for fugitive)								
	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Water Truck	0.5724	0.1931	2.9264	0.0115	0.2037	0.1175	1217.7201	0.1914	0.0090
Water Truck on Unpaved Road					0.3696	0.0367			

Vehicle Type	Emission Factors (g/mile for exhaust or lb/mile for fugitive)								
	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Water Truck	0.5724	0.1931	2.9264	0.0115	0.2037	0.1175	1217.7201	0.1914	0.0090
Water Truck on Paved Road					0.0278	0.0068			

Vehicle Type	Emission Factors (g/mile for exhaust or lb/mile for fugitive)								
	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Type III Fire Engine Truck	0.8393	0.1060	0.9804	0.0078	0.1020	0.0488	806.3828	0.0510	0.0092
Type III Fire Engine on Unpaved Road					0.3696	0.0367			

Vehicle Type	Emission Factors (g/mile for exhaust or lb/mile for fugitive)								
	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Type III Fire Engine Truck	0.8393	0.1060	0.9804	0.0078	0.1020	0.0488	806.3828	0.0510	0.0092
Type III Fire Engine on Paved Road					0.0278	0.0068			

Vehicle Type	Emission Factors (g/mile for exhaust or lb/mile for fugitive)								
	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Type VI Fire Truck	0.8393	0.1060	0.9804	0.0078	0.1020	0.0488	806.3828	0.0510	0.0092

Annual Emissions

Unit	Emissions (tons/year)								
miles/year	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
207360.00	0.1884	0.0063	0.0134	0.0006	0.0105	0.0044	62.9163	0.0013	0.0012
					0.3003	0.0737			
	0.1884	**0.0063**	**0.0134**	**0.0006**	**0.3108**	**0.0781**	**62.9163**	**0.0013**	**0.0012**

Unit	Emissions (tons/year)									Controlled	
miles/year	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4	PM10	PM2.5
25942.40	0.0246	0.0005	0.0022	0.0001	0.0013	0.0005	9.2301	0.0002	0.0001		
					6.0894	0.6049				3.7266	0.3686
	0.0246	**0.0005**	**0.0022**	**0.0001**	**6.0907**	**0.6054**	**9.2301**	**0.0002**	**0.0001**		

Note: Removed personnel who would arrive by fire engine or water tender (pile and prescribed burning)

Unit	Emissions (tons/year)								
miles/year	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
48420.90	0.0460	0.0008	0.0041	0.0002	0.0025	0.0010	17.2277	0.0004	0.0002
					0.1988	0.0488			
	0.0460	**0.0008**	**0.0041**	**0.0002**	**0.2013**	**0.0498**	**17.2277**	**0.0004**	**0.0002**

Note: Removed personnel who would arrive by fire engine or water tender (pile and prescribed burning)

Unit	Emissions (tons/year)									Controlled	
miles/year	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4	PM10	PM2.5
0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
					0.0000	0.0000				0.0000	0.0000
	0.0000	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		

Unit	Emissions (tons/year)								
miles/year	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
896.00	0.0004	0.0002	0.0033	0.0000	0.0002	0.0001	1.2059	0.0002	0.0000
					0.0037	0.0009			
	0.0004	**0.0002**	**0.0033**	**0.0000**	**0.0039**	**0.0010**	**1.2059**	**0.0002**	**0.0000**

Unit	Emissions (tons/year)									Controlled	
miles/year	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4	PM10	PM2.5
614.40	0.0004	0.0001	0.0020	0.0000	0.0001	0.0001	0.8247	0.0001	0.0000		
					0.1136	0.0113				0.0695	0.0069
	0.0004	**0.0001**	**0.0020**	**0.0000**	**0.1137**	**0.0113**	**0.8247**	**0.0001**	**0.0000**		

Unit	Emissions (tons/year)								
miles/year	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
2472.80	0.0016	0.0005	0.0080	0.0000	0.0006	0.0003	3.3193	0.0005	0.0000
					0.0343	0.0084			
	0.0016	**0.0005**	**0.0080**	**0.0000**	**0.0349**	**0.0087**	**3.3193**	**0.0005**	**0.0000**

Unit	Emissions (tons/year)									Controlled	
miles/year	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4	PM10	PM2.5
537.60	0.0005	0.0001	0.0006	0.0000	0.0001	0.0000	0.4779	0.0000	0.0000		
					0.0994	0.0099				0.0608	0.0060
	0.0005	**0.0001**	**0.0006**	**0.0000**	**0.0994**	**0.0099**	**0.4779**	**0.0000**	**0.0000**		

Unit	Emissions (tons/year)								
miles/year	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
1379.70	0.0013	0.0002	0.0015	0.0000	0.0002	0.0001	1.2264	0.0001	0.0000
					0.0191	0.0047			
	0.0013	**0.0002**	**0.0015**	**0.0000**	**0.0193**	**0.0048**	**1.2264**	**0.0001**	**0.0000**

Unit	Emissions (tons/year)									Controlled	
miles/year	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4	PM10	PM2.5
716.80	0.0007	0.0001	0.0008	0.0000	0.0001	0.0000	0.6372	0.0000	0.0000		

Vehicle Type	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Type VI Fire Truck on Unpaved Road					0.3696	0.0367			

Unit	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4	Controlled PM10	Controlled PM2.5
					0.1325	0.0131				0.0811	0.0080
	0.0007	**0.0001**	**0.0008**	**0.0000**	**0.1326**	**0.0132**	**0.6372**	**0.0000**	**0.0000**		

	Emission Factors (g/mile for exhaust or lb/mile for fugitive)								
Vehicle Type	*CO*	*ROG*	*NOx*	*SOx*	*PM10*	*PM2.5*	*CO2*	*N2O*	*CH4*
Type VI Fire Truck	0.8393	0.1060	0.9804	0.0078	0.1020	0.0488	806.3828	0.0510	0.0092
Type VI Fire Truck on Paved Road					0.0278	0.0068			

Unit	Emissions (tons/year)								
miles/year	*CO*	*ROG*	*NOx*	*SOx*	*PM10*	*PM2.5*	*CO2*	*N2O*	*CH4*
1839.60	0.0017	0.0002	0.0020	0.0000	0.0002	0.0001	1.6352	0.0001	0.0000
					0.0255	0.0063			
	0.0017	**0.0002**	**0.0020**	**0.0000**	**0.0257**	**0.0064**	**1.6352**	**0.0001**	**0.0000**

	Emission Factors (g/vehicle/day)								
Vehicle Type	*CO*	*ROG*	*NOx*	*SOx*	*PM10*	*PM2.5*	*CO2*	*N2O*	*CH4*
Heavy Truck	1.9106	0.0576	3.8065	0.0061	0.0035	0.0034	641.9214	0.1009	0.0027

Unit	Emissions (tons/year)								
days/year	*CO*	*ROG*	*NOx*	*SOx*	*PM10*	*PM2.5*	*CO2*	*N2O*	*CH4*
28.00	0.0001	0.0000	0.0001	0.0000	0.0000	0.0000	0.0198	0.0000	0.0000
	0.0001	**0.0000**	**0.0001**	**0.0000**	**0.0000**	**0.0000**	**0.0198**	**0.0000**	**0.0000**

	Emission Factors (g/vehicle/day)								
Vehicle Type	*CO*	*ROG*	*NOx*	*SOx*	*PM10*	*PM2.5*	*CO2*	*N2O*	*CH4*
Water Truck	2.0424	0.0796	5.0303	0.0061	0.0145	0.0138	646.4472	0.1016	0.0037

Unit	Emissions (tons/year)								
days/year	*CO*	*ROG*	*NOx*	*SOx*	*PM10*	*PM2.5*	*CO2*	*N2O*	*CH4*
76.00	0.0002	0.0000	0.0004	0.0000	0.0000	0.0000	0.0542	0.0000	0.0000
	0.0002	**0.0000**	**0.0004**	**0.0000**	**0.0000**	**0.0000**	**0.0542**	**0.0000**	**0.0000**

	Emission Factors (g/vehicle/day)								
Vehicle Type	*CO*	*ROG*	*NOx*	*SOx*	*PM10*	*PM2.5*	*CO2*	*N2O*	*CH4*
Type III Fire Engine Truck	2.4272	0.2872	1.0018	0.0013	0.0131	0.0126	139.0304	0.0131	0.0675

Unit	Emissions (tons/year)								
days/year	*CO*	*ROG*	*NOx*	*SOx*	*PM10*	*PM2.5*	*CO2*	*N2O*	*CH4*
42.00	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0064	0.0000	0.0000
	0.0001	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0064**	**0.0000**	**0.0000**

	Emission Factors (g/vehicle/day)								
Vehicle Type	*CO*	*ROG*	*NOx*	*SOx*	*PM10*	*PM2.5*	*CO2*	*N2O*	*CH4*
Type VI Fire Truck	2.4272	0.2872	1.0018	0.0013	0.0131	0.0126	139.0304	0.0131	0.0675

Unit	Emissions (tons/year)								
days/year	*CO*	*ROG*	*NOx*	*SOx*	*PM10*	*PM2.5*	*CO2*	*N2O*	*CH4*
56.00	0.0001	0.0000	0.0001	0.0000	0.0000	0.0000	0.0086	0.0000	0.0000
	0.0001	**0.0000**	**0.0001**	**0.0000**	**0.0000**	**0.0000**	**0.0086**	**0.0000**	**0.0000**

	Emission Factors (g/mile for exhaust or lb/mile for fugitive)								
Vehicle Type	*CO*	*ROG*	*NOx*	*SOx*	*PM10*	*PM2.5*	*CO2*	*N2O*	*CH4*
ATV	20.3222	2.3442	1.1694	0.0021	0.0178	0.0079	216.1491	0.0670	0.3430
ATV on Unpaved Road					0.5760	0.0573			

Unit	Emissions (tons/year)									Controlled	
miles/year	*CO*	*ROG*	*NOx*	*SOx*	*PM10*	*PM2.5*	*CO2*	*N2O*	*CH4*	*PM10*	*PM2.5*
3955.20	0.0886	0.0102	0.0051	0.0000	0.0001	0.0000	0.9424	0.0003	0.0015		
					1.1391	0.1133				0.6972	0.0691
	0.0886	**0.0102**	**0.0051**	**0.0000**	**1.1392**	**0.1133**	**0.9424**	**0.0003**	**0.0015**		

	Emission Factors (g/mile for exhaust or lb/mile for fugitive)								
Vehicle Type	*CO*	*ROG*	*NOx*	*SOx*	*PM10*	*PM2.5*	*CO2*	*N2O*	*CH4*
ATV	20.3222	2.3442	1.1694	0.0021	0.0178	0.0079	216.1491	0.0670	0.3430
ATV on Paved Road					0.0029	0.0007			

Unit	Emissions (tons/year)								
miles/year	*CO*	*ROG*	*NOx*	*SOx*	*PM10*	*PM2.5*	*CO2*	*N2O*	*CH4*
262.65	0.0059	0.0007	0.0003	0.0000	0.0000	0.0000	0.0626	0.0000	0.0001
					0.0004	0.0001			
	0.0059	**0.0007**	**0.0003**	**0.0000**	**0.0004**	**0.0001**	**0.0626**	**0.0000**	**0.0001**

	Emission Factor (g/hp-hr)								
Equipment Type	*CO*	*ROG*	*NOx*	*SOx*	*PM10*	*PM2.5*	*CO2*	*N2O*	*CH4*
Generator	0.5247	0.0191	0.4421	0.0015	0.0101	0.0093	157.9734	0.0000	0.0000

	Unit	Emissions (tons/year)								
Horsepower	*hours/year*	*CO*	*ROG*	*NOx*	*SOx*	*PM10*	*PM2.5*	*CO2*	*N2O*	*CH4*
143.18	608.00	0.0504	0.0018	0.0424	0.0001	0.0010	0.0009	15.1592	0.0000	0.0000
		0.0504	**0.0018**	**0.0424**	**0.0001**	**0.0010**	**0.0009**	**15.1592**	**0.0000**	**0.0000**

	Emission Factor (g/hp-hr)								
Equipment Type	*CO*	*ROG*	*NOx*	*SOx*	*PM10*	*PM2.5*	*CO2*	*N2O*	*CH4*
Chainsaw	110.4151	1.5355	4.1945	0.0092	1.3066	0.9872	334.9362	0.0000	0.0000

		Unit	Emissions (tons/year)								
Type	*Horsepower*	*hours/year*	*CO*	*ROG*	*NOx*	*SOx*	*PM10*	*PM2.5*	*CO2*	*N2O*	*CH4*
New	10.45	3635.86	4.6239	0.0643	0.1757	0.0004	0.0547	0.0413	14.0264	0.0000	0.0000
Maintain		2014.58	2.5621	0.0356	0.0973	0.0002	0.0303	0.0229	7.7718	0.0000	0.0000
New (FRA)		2553.55	3.2475	0.0452	0.1234	0.0003	0.0384	0.0290	9.8511	0.0000	0.0000
Maintain (FRA)		1276.78	1.6238	0.0226	0.0617	0.0001	0.0192	0.0145	4.9255	0.0000	0.0000
Total		**9480.77**	**12.0573**	**0.1677**	**0.4580**	**0.0010**	**0.1427**	**0.1078**	**36.5748**	**0.0000**	**0.0000**

	Emission Factor (g/hp-hr)								
Equipment Type	*CO*	*ROG*	*NOx*	*SOx*	*PM10*	*PM2.5*	*CO2*	*N2O*	*CH4*
Chipper	5.3797	0.0798	0.8650	0.0042	0.0159	0.0120	431.3772	0.0000	0.0000

		Unit	Emissions (tons/year)								
Type	*Horsepower*	*hours/year*	*CO*	*ROG*	*NOx*	*SOx*	*PM10*	*PM2.5*	*CO2*	*N2O*	*CH4*
50 % Cutting	67.00	1327.29	0.5274	0.0078	0.0848	0.0004	0.0016	0.0012	42.2866	0.0000	0.0000
Total		**1327.29**	**0.5274**	**0.0078**	**0.0848**	**0.0004**	**0.0016**	**0.0012**	**42.2866**	**0.0000**	**0.0000**

	Emission Factor (g/hp-hr)								
Equipment Type	*CO*	*ROG*	*NOx*	*SOx*	*PM10*	*PM2.5*	*CO2*	*N2O*	*CH4*
Skid Steer Loader	0.6255	0.0198	0.8807	0.0018	0.0155	0.0143	194.5350	0.0000	0.0000

		Unit	Emissions (tons/year)								
Type	*Horsepower*	*hours/year*	*CO*	*ROG*	*NOx*	*SOx*	*PM10*	*PM2.5*	*CO2*	*N2O*	*CH4*
New	70.56	2426.62	0.1181	0.0037	0.1662	0.0003	0.0029	0.0027	36.7175	0.0000	0.0000
Maintain		1011.57	0.0492	0.0016	0.0693	0.0001	0.0012	0.0011	15.3061	0.0000	0.0000
New (FRA)		810.65	0.0394	0.0013	0.0555	0.0001	0.0010	0.0009	12.2661	0.0000	0.0000
Maintain (FRA)		426.94	0.0208	0.0007	0.0292	0.0001	0.0005	0.0005	6.4601	0.0000	0.0000
Total		**4675.79**	**0.2275**	**0.0072**	**0.3203**	**0.0007**	**0.0056**	**0.0052**	**70.7497**	**0.0000**	**0.0000**

	Emission Factor (g/hp-hr)								
Equipment Type	*CO*	*ROG*	*NOx*	*SOx*	*PM10*	*PM2.5*	*CO2*	*N2O*	*CH4*
Tractor	0.9740	0.1295	3.2925	0.0054	0.0601	0.0553	397.8031	0.0000	0.0000

		Unit	Emissions (tons/year)								
Type	*Horsepower*	*hours/year*	*CO*	*ROG*	*NOx*	*SOx*	*PM10*	*PM2.5*	*CO2*	*N2O*	*CH4*
New	18.07	390.66	0.0076	0.0010	0.0256	0.0000	0.0005	0.0004	3.0962	0.0000	0.0000
Maintain		337.19	0.0065	0.0009	0.0221	0.0000	0.0004	0.0004	2.6725	0.0000	0.0000
New (FRA)		48.64	0.0009	0.0001	0.0032	0.0000	0.0001	0.0001	0.3855	0.0000	0.0000
Maintain (FRA)		24.32	0.0005	0.0001	0.0016	0.0000	0.0000	0.0000	0.1927	0.0000	0.0000
Total		**800.81**	**0.0155**	**0.0010**	**0.0253**	**0.0000**	**0.0005**	**0.0004**	**3.0580**	**0.0000**	**0.0000**

	Emission Factor (g/hp-hr)								
Equipment Type	*CO*	*ROG*	*NOx*	*SOx*	*PM10*	*PM2.5*	*CO2*	*N2O*	*CH4*
Excavator	0.6109	0.0243	0.7104	0.0019	0.0166	0.0153	201.6426	0.0000	0.0000

		Unit	Emissions (tons/year)								
Type	*Horsepower*	*hours/year*	*CO*	*ROG*	*NOx*	*SOx*	*PM10*	*PM2.5*	*CO2*	*N2O*	*CH4*
New	146.03	252.00	0.0248	0.0010	0.0288	0.0001	0.0007	0.0006	8.1796	0.0000	0.0000
Maintain		42.66	0.0042	0.0002	0.0049	0.0000	0.0001	0.0001	1.3847	0.0000	0.0000
New (FRA)		0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maintain (FRA)		0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**294.66**	**0.0290**	**0.0012**	**0.0337**	**0.0001**	**0.0008**	**0.0007**	**9.5643**	**0.0000**	**0.0000**

	Emission Factor (g/hp-hr)								
Equipment Type	*CO*	*ROG*	*NOx*	*SOx*	*PM10*	*PM2.5*	*CO2*	*N2O*	*CH4*
Backhoe	0.6710	0.0300	1.0309	0.0018	0.0261	0.0240	195.2141	0.0000	0.0000

		Unit	Emissions (tons/year)								
Type	*Horsepower*	*hours/year*	*CO*	*ROG*	*NOx*	*SOx*	*PM10*	*PM2.5*	*CO2*	*N2O*	*CH4*
New	83.17	280.00	0.0172	0.0008	0.0265	0.0000	0.0007	0.0006	5.0109	0.0000	0.0000
Maintain		42.66	0.0026	0.0001	0.0040	0.0000	0.0001	0.0001	0.7635	0.0000	0.0000
New (FRA)		0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maintain (FRA)		0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**322.66**	**0.0198**	**0.0009**	**0.0305**	**0.0001**	**0.0008**	**0.0007**	**5.7744**	**0.0000**	**0.0000**

	Emission Factor (g/hp-hr)								
Equipment Type	*CO*	*ROG*	*NOx*	*SOx*	*PM10*	*PM2.5*	*CO2*	*N2O*	*CH4*
Crane	9.1355	0.1356	1.2963	0.0035	0.0135	0.0102	364.4179	0.0000	0.0000

		Unit	Emissions (tons/year)								
Type	*Horsepower*	*hours/year*	*CO*	*ROG*	*NOx*	*SOx*	*PM10*	*PM2.5*	*CO2*	*N2O*	*CH4*
New	74.00	112.00	0.0835	0.0012	0.0118	0.0000	0.0001	0.0001	3.3293	0.0000	0.0000
Maintain		0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
New (FRA)		0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maintain (FRA)		0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**112.00**	**0.0835**	**0.0012**	**0.0118**	**0.0000**	**0.0001**	**0.0001**	**3.3293**	**0.0000**	**0.0000**

	Emission Factor (g/hp-hr)								
Equipment Type	*CO*	*ROG*	*NOx*	*SOx*	*PM10*	*PM2.5*	*CO2*	*N2O*	*CH4*
String Trimmer	5.3797	0.0798	0.8650	0.0042	0.0159	0.0120	431.3772	0.0000	0.0000

		Unit	Emissions (tons/year)								
Type	*Horsepower*	*hours/year*	*CO*	*ROG*	*NOx*	*SOx*	*PM10*	*PM2.5*	*CO2*	*N2O*	*CH4*
New	67.00	0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maintain		0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
New (FRA)		64.85	0.0258	0.0004	0.0041	0.0000	0.0001	0.0001	2.0661	0.0000	0.0000
Maintain (FRA)		32.43	0.0129	0.0002	0.0021	0.0000	0.0000	0.0000	1.0331	0.0000	0.0000
Total		**97.28**	**0.0387**	**0.0006**	**0.0062**	**0.0000**	**0.0001**	**0.0001**	**3.0992**	**0.0000**	**0.0000**

	Emission Factor (g/hp-hr)								
Equipment Type	*CO*	*ROG*	*NOx*	*SOx*	*PM10*	*PM2.5*	*CO2*	*N2O*	*CH4*
Power pole saw	110.4151	1.5355	4.1945	0.0092	1.3066	0.9872	334.9362	0.0000	0.0000

		Unit	Emissions (tons/year)								
Type	*Horsepower*	*hours/year*	*CO*	*ROG*	*NOx*	*SOx*	*PM10*	*PM2.5*	*CO2*	*N2O*	*CH4*
New	10.45	39837.98	50.6643	0.7046	1.9247	0.0042	0.5996	0.4530	153.6865	0.0000	0.0000
Maintain		1075.57	1.3679	0.0190	0.0520	0.0001	0.0162	0.0122	4.1493	0.0000	0.0000
New (FRA)		510.71	0.6495	0.0090	0.0247	0.0001	0.0077	0.0058	1.9702	0.0000	0.0000
Maintain (FRA)		255.36	0.3248	0.0045	0.0123	0.0000	0.0038	0.0029	0.9851	0.0000	0.0000
Total		**41679.62**	**53.0064**	**0.7372**	**2.0136**	**0.0044**	**0.6273**	**0.4739**	**160.7912**	**0.0000**	**0.0000**

	Emission Factor (g/hp-hr)								
Equipment Type	*CO*	*ROG*	*NOx*	*SOx*	*PM10*	*PM2.5*	*CO2*	*N2O*	*CH4*
Leaf blower	68.5165	1.1224	2.5378	0.0059	0.6918	0.5227	214.7015	0.0000	0.0000

		Unit	Emissions (tons/year)								
Type	*Horsepower*	*hours/year*	*CO*	*ROG*	*NOx*	*SOx*	*PM10*	*PM2.5*	*CO2*	*N2O*	*CH4*
New	9.39	339.29	0.2405	0.0039	0.0089	0.0000	0.0024	0.0018	0.7537	0.0000	0.0000
Maintain		0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
New (FRA)		0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maintain (FRA)		0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**339.29**	**0.2405**	**0.0039**	**0.0089**	**0.0000**	**0.0024**	**0.0018**	**0.7537**	**0.0000**	**0.0000**

	Emission Factor ($lb/10^3$ gal)								
Activity	*CO*	*ROG*	*NOx*	*SOx*	*PM10*	*PM2.5*	*CO2*	*N2O*	*CH4*
Drip Torch (Prescribed Burn) 70/30	123.8836	107.1878	469.8935	30.0776	32.5139	32.5139	20786.6246	0.0000	0.0000

Unit	Emissions (tons/year)								
gal/year	*CO*	*ROG*	*NOx*	*SOx*	*PM10*	*PM2.5*	*CO2*	*N2O*	*CH4*
135.00	0.0084	0.0072	0.0317	0.0020	0.0022	0.0022	1.4031	0.0000	0.0000
	0.0084	**0.0072**	**0.0317**	**0.0020**	**0.0022**	**0.0022**	**1.4031**	**0.0000**	**0.0000**

Activity	Emission Factor ($lb/10^3$ gal)								
	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Drip Torch (Pile Burn) 70/30	123.8836	107.1878	469.8935	30.0776	32.5139	32.5139	20786.6246	0.0000	0.0000

Activity	Emission Factor ($lb/10^3$ gal)								
	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Propane Torch	7.5000	1.0000	13.0000	0.0160	0.7000	0.7000	12500.0000	0.9000	0.2000

Percent PM2.5 and PM10 assumed to be 100%

Drip Torch (Prescribed Burn) 70/30	0.30	gal/ac
Drip Torch (Pile Burn) 70/30	0.04	gal/ton
Propane Torch	2.36	gal/hr
Generator 143 hp	10.39	gal/hr

Unit	Emissions (tons/year)								
gal/year	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
17.81	0.0011	0.0010	0.0042	0.0003	0.0003	0.0003	0.1851	0.0000	0.0000
	0.0011	**0.0010**	**0.0042**	**0.0003**	**0.0003**	**0.0003**	**0.1851**	**0.0000**	**0.0000**

Unit	Emissions (tons/year)								
gal/year	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
241.66	0.0009	0.0001	0.0016	0.0000	0.0001	0.0001	1.5104	0.0001	0.0000
	0.0009	**0.0001**	**0.0016**	**0.0000**	**0.0001**	**0.0001**	**1.5104**	**0.0001**	**0.0000**

	Emissions (tons/year)									Controlled	
	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4	PM10	PM2.5
Total	**66.66**	**0.96**	**3.12**	**0.01**	**8.96**	**1.50**	**453.97**	**0.00**	**0.00**		
Exhaust	**66.66**	**0.96**	**3.12**	**0.01**	**0.80**	**0.60**	**453.97**	**0.00**	**0.00**		
Fugitive (Paved)					**0.58**	**0.14**					
Fugitive (Unpaved)					**7.57**	**0.75**				**4.64**	**0.46**

Maximum Annual Treatments

Emission Factors

Vehicle Type	Emission Factors (g/mile for exhaust or lb/mile for fugitive) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Light Duty Automobile Light Duty Auto on Paved Road	0.8243	0.0278	0.0586	0.0027	0.0461 0.0029	0.0191 0.0007	275.2545	0.0057	0.0052

Vehicle Type	Emission Factors (g/mile for exhaust or lb/mile for fugitive) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Van/Medium Truck Van/Medium Truck on Unpaved Road	0.8620	0.0159	0.0772	0.0032	0.0463 0.4695	0.0192 0.0466	322.7684	0.0067	0.0038

Vehicle Type	Emission Factors (g/mile for exhaust or lb/mile for fugitive) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Van/Medium Truck Van/Medium Truck on Paved Road	0.8620	0.0159	0.0772	0.0032	0.0463 0.0082	0.0192 0.0020	322.7684	0.0067	0.0038

Vehicle Type	Emission Factors (lb/mile) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Heavy Truck Heavy Truck on Unpaved Road	0.4225	0.1568	3.3402	0.0115	0.1866 0.4695	0.1012 0.0466	1220.9057	0.1919	0.0073

Vehicle Type	Emission Factors (lb/mile) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Heavy Truck Heavy Truck on Paved Road	0.4225	0.1568	3.3402	0.0115	0.1866 0.0082	0.1012 0.0020	1220.9057	0.1919	0.0073

Vehicle Type	Emission Factors (g/mile for exhaust or lb/mile for fugitive) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Water Truck Water Truck on Unpaved Road	0.5724	0.1931	2.9264	0.0115	0.2037 0.3696	0.1175 0.0367	1217.7201	0.1914	0.0090

Vehicle Type	Emission Factors (g/mile for exhaust or lb/mile for fugitive) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Water Truck Water Truck on Paved Road	0.5724	0.1931	2.9264	0.0115	0.2037 0.0278	0.1175 0.0068	1217.7201	0.1914	0.0090

Vehicle Type	Emission Factors (g/mile for exhaust or lb/mile for fugitive) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Type III Fire Engine Truck Type III Fire Engine on Unpaved Road	0.8393	0.1060	0.9804	0.0078	0.1020 0.3696	0.0488 0.0367	806.3828	0.0510	0.0092

Vehicle Type	Emission Factors (g/mile for exhaust or lb/mile for fugitive) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Type III Fire Engine Truck Type III Fire Engine on Paved Road	0.8393	0.1060	0.9804	0.0078	0.1020 0.0278	0.0488 0.0068	806.3828	0.0510	0.0092

Vehicle Type	Emission Factors (g/mile for exhaust or lb/mile for fugitive) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Type VI Fire Truck Type VI Fire Truck on Unpaved Road	0.8393	0.1060	0.9804	0.0078	0.1020 0.3696	0.0488 0.0367	806.3828	0.0510	0.0092

Vehicle Type	Emission Factors (g/mile for exhaust or lb/mile for fugitive) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Type VI Fire Truck Type VI Fire Truck on Paved Road	0.8393	0.1060	0.9804	0.0078	0.1020 0.0278	0.0488 0.0068	806.3828	0.0510	0.0092

Vehicle Type	Emission Factors (g/vehicle/day) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Heavy Truck	1.9106	0.0576	3.8065	0.0061	0.0035	0.0034	641.9214	0.1009	0.0027

Vehicle Type	Emission Factors (g/vehicle/day) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Water Truck	2.0424	0.0796	5.0303	0.0061	0.0145	0.0138	646.4472	0.1016	0.0037

Maximum Daily Emissions

Unit miles/day	Emissions (tons/day) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
2560.00	0.0023	0.0001	0.0002	0.0000	0.0001 0.0037	0.0001 0.0009	0.7767	0.0000	0.0000
	0.0023	**0.0001**	**0.0002**	**0.0000**	**0.0038**	**0.0010**	**0.7767**	**0.0000**	**0.0000**

Unit miles/day	Emissions (tons/day) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4	Controlled PM10	PM2.5
114.80	0.0001	0.0000	0.0000	0.0000	0.0000 0.0269	0.0000 0.0027	0.0408	0.0000	0.0000	0.0165	0.0016
	0.0001	**0.0000**	**0.0000**	**0.0000**	**0.0270**	**0.0027**	**0.0408**	**0.0000**	**0.0000**		

Note: Removed personnel who would arrive by fire engine or water tender

Unit miles/day	Emissions (tons/day) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
459.90	0.0004	0.0000	0.0000	0.0000	0.0000 0.0019	0.0000 0.0005	0.1636	0.0000	0.0000
	0.0004	**0.0000**	**0.0000**	**0.0000**	**0.0019**	**0.0005**	**0.1636**	**0.0000**	**0.0000**

Note: Removed personnel who would arrive by fire engine or water tender

Unit miles/day	Emissions (tons/day) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
0.00	0.0000	0.0000	0.0000	0.0000	0.0000 0.0000	0.0000 0.0000	0.0000	0.0000	0.0000
	0.0000	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Unit miles/day	Emissions (tons/day) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
0.00	0.0000	0.0000	0.0000	0.0000	0.0000 0.0000	0.0000 0.0000	0.0000	0.0000	0.0000
	0.0000	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Unit miles/day	Emissions (tons/day) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4	Controlled PM10	PM2.5
5.20	0.0000	0.0000	0.0000	0.0000	0.0000 0.0010	0.0000 0.0001	0.0070	0.0000	0.0000	0.0006	0.0001
	0.0000	**0.0000**	**0.0000**	**0.0000**	**0.0010**	**0.0001**	**0.0070**	**0.0000**	**0.0000**		

Unit miles/day	Emissions (tons/day) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
32.85	0.0000	0.0000	0.0001	0.0000	0.0000 0.0005	0.0000 0.0001	0.0441	0.0000	0.0000
	0.0000	**0.0000**	**0.0001**	**0.0000**	**0.0005**	**0.0001**	**0.0441**	**0.0000**	**0.0000**

Unit miles/day	Emissions (tons/day) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4	Controlled PM10	PM2.5
15.60	0.0000	0.0000	0.0000	0.0000	0.0000 0.0029	0.0000 0.0003	0.0139	0.0000	0.0000	0.0018	0.0002
	0.0000	**0.0000**	**0.0000**	**0.0000**	**0.0029**	**0.0003**	**0.0139**	**0.0000**	**0.0000**		

Unit miles/day	Emissions (tons/day) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
98.55	0.0001	0.0000	0.0001	0.0000	0.0000 0.0014	0.0000 0.0003	0.0876	0.0000	0.0000
	0.0001	**0.0000**	**0.0001**	**0.0000**	**0.0014**	**0.0003**	**0.0876**	**0.0000**	**0.0000**

Unit miles/day	Emissions (tons/day) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4	Controlled PM10	PM2.5
15.60	0.0000	0.0000	0.0000	0.0000	0.0000 0.0029	0.0000 0.0003	0.0139	0.0000	0.0000	0.0018	0.0002
	0.0000	**0.0000**	**0.0000**	**0.0000**	**0.0029**	**0.0003**	**0.0139**	**0.0000**	**0.0000**		

Unit miles/day	Emissions (tons/day) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
65.70	0.0001	0.0000	0.0001	0.0000	0.0000 0.0009	0.0000 0.0002	0.0584	0.0000	0.0000
	0.0001	**0.0000**	**0.0001**	**0.0000**	**0.0009**	**0.0002**	**0.0584**	**0.0000**	**0.0000**

Unit # of Equipment	Emissions (tons/day) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Unit # of Equipment	Emissions (tons/day) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
1.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0007	0.0000	0.0000
	0.0000	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0007**	**0.0000**	**0.0000**

Total Annual Emissions (Prescribed, Pile, and New)

Unit miles/year	Emissions (tons/year) CO2	N2O	CH4
7577.60	2.2992	0.0000	0.0000
	2.2992	**0.0000**	**0.0000**

Unit miles/year	Emissions (tons/year) CO2	N2O	CH4
403.44	0.1435	0.0000	0.0000
	0.1435	**0.0000**	**0.0000**

Note: Removed personnel who would arrive by fire engine or water tender (pile and prescribed burning)

Unit miles/year	Emissions (tons/year) CO2	N2O	CH4
1616.22	0.5750	0.0000	0.0000
	0.5750	**0.0000**	**0.0000**

Note: Removed personnel who would arrive by fire engine or water tender (pile and prescribed burning)

Unit miles/year	Emissions (tons/year) CO2	N2O	CH4
0.00	0.0000	0.0000	0.0000
	0.0000	**0.0000**	**0.0000**

Unit miles/year	Emissions (tons/year) CO2	N2O	CH4
0.00	0.0000	0.0000	0.0000
	0.0000	**0.0000**	**0.0000**

Unit miles/year	Emissions (tons/year) CO2	N2O	CH4
15.60	0.0209	0.0000	0.0000
	0.0209	**0.0000**	**0.0000**

Unit miles/year	Emissions (tons/year) CO2	N2O	CH4
98.55	0.1323	0.0000	0.0000
	0.1323	**0.0000**	**0.0000**

Unit miles/year	Emissions (tons/year) CO2	N2O	CH4
15.60	0.0139	0.0000	0.0000
	0.0139	**0.0000**	**0.0000**

Unit miles/year	Emissions (tons/year) CO2	N2O	CH4
98.55	0.0876	0.0000	0.0000
	0.0876	**0.0000**	**0.0000**

Unit miles/year	Emissions (tons/year) CO2	N2O	CH4
20.80	0.0185	0.0000	0.0000
	0.0185	**0.0000**	**0.0000**

Unit miles/year	Emissions (tons/year) CO2	N2O	CH4
131.40	0.1168	0.0000	0.0000
	0.1168	**0.0000**	**0.0000**

Unit days/year	Emissions (tons/year) CO2	N2O	CH4
0.00	0.0000	0.0000	0.0000
	0.0000	**0.0000**	**0.0000**

Unit days/year	Emissions (tons/year) CO2	N2O	CH4
3.00	0.0021	0.0000	0.0000
	0.0021	**0.0000**	**0.0000**

Vehicle Type	Emission Factors (g/vehicle/day) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Type III Fire Engine Truck	2.4272	0.2872	1.0018	0.0013	0.0131	0.0126	139.0304	0.0131	0.0675

# of Equipment	Emissions (tons/day) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
3.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0005	0.0000	0.0000
	0.0000	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0005**	**0.0000**	**0.0000**

days/year	Emissions (tons/year) CO2	N2O	CH4
3.00	0.0005	0.0000	0.0000
	0.0005	**0.0000**	**0.0000**

Vehicle Type	Emission Factors (g/vehicle/day) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Type VI Fire Truck	2.4272	0.2872	1.0018	0.0013	0.0131	0.0126	139.0304	0.0131	0.0675

# of Equipment	Emissions (tons/day) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
2.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0003	0.0000	0.0000
	0.0000	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0003**	**0.0000**	**0.0000**

days/year	Emissions (tons/year) CO2	N2O	CH4
4.00	0.0006	0.0000	0.0000
	0.0006	**0.0000**	**0.0000**

Vehicle Type	Emission Factors (lb/mile) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
ATV ATV on Unpaved Road	20.3222	2.3442	1.1694	0.0021	0.0178 0.5760	0.0079 0.0573	216.1491	0.0670	0.3430

miles/day	Emissions (tons/day) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
0.00	0.0000	0.0000	0.0000	0.0000	0.0000 0.0000	0.0000 0.0000	0.0000	0.0000	0.0000
	0.0000	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

miles/year	Emissions (tons/year) CO2	N2O	CH4
46.80	0.0112	0.0000	0.0000
	0.0112	**0.0000**	**0.0000**

Vehicle Type	Emission Factors (lb/mile) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
ATV ATV on Paved Road	20.3222	2.3442	1.1694	0.0021	0.0178 0.0029	0.0079 0.0007	216.1491	0.0670	0.3430

miles/day	Emissions (tons/day) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
0.00	0.0000	0.0000	0.0000	0.0000	0.0000 0.0000	0.0000 0.0000	0.0000	0.0000	0.0000
	0.0000	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

miles/year	Emissions (tons/year) CO2	N2O	CH4
7.65	0.8268	0.0003	0.0013
	0.8268	**0.0003**	**0.0013**

Equipment Type	Emission Factor (g/hp-hr) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Generator	0.5247	0.0191	0.4421	0.0015	0.0101	0.0093	157.9734	0.0000	0.0000

Horsepower	hours/day	Emissions (tons/day) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
143.18	0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
		0.0000	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Horsepower	hours/year	Emissions (tons/year) CO2	N2O	CH4
143.18	24.00	0.5984	0.0000	0.0000
		0.5984	**0.0000**	**0.0000**

Equipment Type	Emission Factor (g/hp-hr) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Chainsaw	110.4151	1.5355	4.1945	0.0092	1.3066	0.9872	334.9362	0.0000	0.0000

Type	Horsepower	hours/day	Emissions (tons/day) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
New	10.45	0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maintain		0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
New (FRA)		0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maintain (FRA)		0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.00**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Type	Horsepower	hours/year	Emissions (tons/year) CO2	N2O	CH4
New	10.45	48.61	0.1914	0.0000	0.0000
Maintain		48.42	0.1868	0.0000	0.0000
New (FRA)		71.45	0.2756	0.0000	0.0000
Maintain (FRA)		35.72	0.1378	0.0000	0.0000
Total		**205.20**	**0.7916**	**0.0000**	**0.0000**

Equipment Type	Emission Factor (g/hp-hr) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Chipper	5.3797	0.0798	0.8650	0.0042	0.0159	0.0120	431.3772	0.0000	0.0000

Type	Horsepower	hours/day	Emissions (tons/day) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
New	67.00	0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maintain		0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
New (FRA)		0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maintain (FRA)		0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.00**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Type	Horsepower	hours/year	Emissions (tons/year) CO2	N2O	CH4
50 % Cutting	67.00	33.21	1.0580	0.0000	0.0000
Total		**33.21**	**1.0580**	**0.0000**	**0.0000**

Equipment Type	Emission Factor (g/hp-hr) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Skid Steer Loader	0.6255	0.0198	0.8807	0.0018	0.0155	0.0143	194.5350	0.0000	0.0000

Type	Horsepower	hours/day	Emissions (tons/day) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
New	70.56	0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maintain		0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
New (FRA)		0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maintain (FRA)		0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.00**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Type	Horsepower	hours/year	Emissions (tons/year) CO2	N2O	CH4
New	70.56	90.04	1.3624	0.0000	0.0000
Maintain		27.43	0.4151	0.0000	0.0000
New (FRA)		22.68	0.3432	0.0000	0.0000
Maintain (FRA)		11.95	0.1807	0.0000	0.0000
Total		**152.10**	**2.3015**	**0.0000**	**0.0000**

Equipment Type	Emission Factor (g/hp-hr) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Tractor	0.9740	0.1295	3.2925	0.0054	0.0601	0.0553	397.8031	0.0000	0.0000

Type	Horsepower	hours/day	Emissions (tons/day) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
New	18.07	0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maintain		0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
New (FRA)		0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maintain (FRA)		0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.00**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Type	Horsepower	hours/year	Emissions (tons/year) CO2	N2O	CH4
New	18.07	27.20	0.2156	0.0000	0.0000
Maintain		4.81	0.0381	0.0000	0.0000
New (FRA)		1.36	0.0108	0.0000	0.0000
Maintain (FRA)		0.68	0.0054	0.0000	0.0000
Total		**34.05**	**0.0489**	**0.0000**	**0.0000**

Equipment Type	Emission Factor (g/hp-hr) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Excavator	0.6109	0.0243	0.7104	0.0019	0.0166	0.0153	201.6426	0.0000	0.0000

Type	Horsepower	hours/day	Emissions (tons/day) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
New	146.03	0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maintain		0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
New (FRA)		0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maintain (FRA)		0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.00**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Type	Horsepower	hours/year	Emissions (tons/year) CO2	N2O	CH4
New	146.03	0.00	0.0000	0.0000	0.0000
Maintain		1.34	0.0435	0.0000	0.0000
New (FRA)		0.00	0.0000	0.0000	0.0000
Maintain (FRA)		0.00	0.0000	0.0000	0.0000
Total		**1.34**	**0.0435**	**0.0000**	**0.0000**

Equipment Type	Emission Factor (g/hp-hr) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Backhoe	0.6710	0.0300	1.0309	0.0018	0.0261	0.0240	195.2141	0.0000	0.0000

Type	Horsepower	hours/day	Emissions (tons/day) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
New	83.17	0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maintain		0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
New (FRA)		0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maintain (FRA)		0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.00**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Type	Horsepower	hours/year	Emissions (tons/year) CO2	N2O	CH4
New	83.17	0.00	0.0000	0.0000	0.0000
Maintain		1.34	0.0240	0.0000	0.0000
New (FRA)		0.00	0.0000	0.0000	0.0000
Maintain (FRA)		0.00	0.0000	0.0000	0.0000
Total		**1.34**	**0.0240**	**0.0000**	**0.0000**

Equipment Type	Emission Factor (g/hp-hr) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Crane	9.1355	0.1356	1.2963	0.0035	0.0135	0.0102	364.4179	0.0000	0.0000

Type	Horsepower	hours/day	Emissions (tons/day) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
New	74.00	0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maintain		0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
New (FRA)		0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maintain (FRA)		0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.00**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Type	Horsepower	hours/year	Emissions (tons/year) CO2	N2O	CH4
New	74.00	0.00	0.0000	0.0000	0.0000
Maintain		0.00	0.0000	0.0000	0.0000
New (FRA)		0.00	0.0000	0.0000	0.0000
Maintain (FRA)		0.00	0.0000	0.0000	0.0000
Total		**0.00**	**0.0000**	**0.0000**	**0.0000**

Equipment Type	Emission Factor (g/hp-hr) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
String Trimmer	5.3797	0.0798	0.8650	0.0042	0.0159	0.0120	431.3772	0.0000	0.0000

Type	Horsepower	hours/day	Emissions (tons/day) CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
New	67.00	0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maintain		0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
New (FRA)		0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maintain (FRA)		0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.00**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Type	Horsepower	hours/year	Emissions (tons/year) CO2	N2O	CH4
New	67.00	0.00	0.0000	0.0000	0.0000
Maintain		0.00	0.0000	0.0000	0.0000
New (FRA)		1.81	0.0578	0.0000	0.0000
Maintain (FRA)		0.91	0.0289	0.0000	0.0000
Total		**2.72**	**0.0867**	**0.0000**	**0.0000**

	Emission Factor (g/hp-hr)								
Equipment Type	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Power pole saw	110.4151	1.5355	4.1945	0.0092	1.3066	0.9872	334.9362	0.0000	0.0000

		Unit	Emissions (tons/day)								
Type	Horsepower	hours/day	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
New	10.45	0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maintain		0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
New (FRA)		0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maintain (FRA)		0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.00**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

		Unit	Emissions (tons/year)		
Type	Horsepower	hours/year	CO2	N2O	CH4
New	10.45	180.36	0.6958	0.0000	0.0000
Maintain		25.93	0.1000	0.0000	0.0000
New (FRA)		14.29	0.0551	0.0000	0.0000
Maintain (FRA)		7.14	0.0276	0.0000	0.0000
Total		**227.72**	**0.8785**	**0.0000**	**0.0000**

	Emission Factor (g/hp-hr)								
Equipment Type	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Leaf blower	68.5165	1.1224	2.5378	0.0059	0.6918	0.5227	214.7015	0.0000	0.0000

		Unit	Emissions (tons/day)								
Type	Horsepower	hours/day	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
New	9.39	0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maintain		0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
New (FRA)		0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maintain (FRA)		0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.00**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

		Unit	Emissions (tons/year)		
Type	Horsepower	hours/year	CO2	N2O	CH4
New	9.39	17.86	0.0397	0.0000	0.0000
Maintain		0.00	0.0000	0.0000	0.0000
New (FRA)		0.00	0.0000	0.0000	0.0000
Maintain (FRA)		0.00	0.0000	0.0000	0.0000
Total		**17.86**	**0.0397**	**0.0000**	**0.0000**

	Emission Factor ($lb/10^3$ gal)								
Activity	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Drip Torch (Prescribed Burn) 70/30	123.8836	107.1878	469.8935	30.0776	32.5139	32.5139	20786.6246	0.0000	0.0000

	Unit	Emissions (tons/day)								
	gal/day	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
	15.00	0.0009	0.0008	0.0035	0.0002	0.0002	0.0002	0.1559	0.0000	0.0000
		0.0009	**0.0008**	**0.0035**	**0.0002**	**0.0002**	**0.0002**	**0.1559**	**0.0000**	**0.0000**

	Unit	Emissions (tons/year)		
	gal/year	CO2	N2O	CH4
	15.00	0.0000	0.0000	0.0000
		0.0000	**0.0000**	**0.0000**

	Emission Factor ($lb/10^3$ gal)								
Activity	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Drip Torch (Pile Burn) 70/30	123.8836	107.1878	469.8935	30.0776	32.5139	0.0000	20786.6246	0.0000	0.0000

	Unit	Emissions (tons/day)								
	gal/day	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
	0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
		0.0000	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

	Unit	Emissions (tons/year)		
	gal/year	CO2	N2O	CH4
	0.94	0.0000	0.0000	0.0000
		0.0000	**0.0000**	**0.0000**

	Emission Factor ($lb/10^3$ gal)								
Activity	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Propane Torch	7.5000	1.0000	13.0000	0.0160	0.7000	0.7000	12500.0000	0.9000	0.2000

	Unit	Emissions (tons/day)								
	gal/day	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
	0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
		0.0000	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

	Unit	Emissions (tons/year)		
	gal/year	CO2	N2O	CH4
	6.45	0.0000	0.0000	0.0000
		0.0000	**0.0000**	**0.0000**

Percent PM2.5 and PM10 assumed to be 100%

Drip Torch (Prescribed Burn) 70/30	0.30	gal/ac
Drip Torch (Pile Burn) 70/30	0.04	gal/ton
Propane Torch	2.36	gal/hr
Generator 143 hp	10.39	gal/hr

	Emissions (tons/day)									Controlled	
	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4	PM10	PM2.5
Total	**0.00**	**0.00**	**0.00**	**0.00**	**0.04**	**0.01**	**1.36**	**0.00**	**0.00**		
Exhaust	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**1.36**	**0.00**	**0.00**		
Fugitive (Paved)					**0.01**	**0.00**					
Fugitive (Unpaved)					**0.03**	**0.00**				**0.02**	**0.00**

	Emissions (tons/day)		
	CO2	N2O	CH4
Total	**10.12**	**0.00**	**0.00**

Maximum Annual Treatments

Emission Factors

Vehicle Type	Emission Factors (g/mile for exhaust or lb/mile for fugitive)								
	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Light Duty Automobile	0.8243	0.0278	0.0586	0.0027	0.0461	0.0191	275.2545	0.0057	0.0052
Light Duty Auto on Paved Road					0.0029	0.0007			

Vehicle Type	Emission Factors (g/mile for exhaust or lb/mile for fugitive)								
	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Van/Medium Truck	0.8620	0.0159	0.0772	0.0032	0.0463	0.0192	322.7684	0.0067	0.0038
Van/Medium Truck on Unpaved Road					0.4695	0.0466			

Vehicle Type	Emission Factors (g/mile for exhaust or lb/mile for fugitive)								
	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Van/Medium Truck	0.8620	0.0159	0.0772	0.0032	0.0463	0.0192	322.7684	0.0067	0.0038
Van/Medium Truck on Paved Road					0.0082	0.0020			

Vehicle Type	Emission Factors (g/mile for exhaust or lb/mile for fugitive)								
	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Water Truck	0.5724	0.1931	2.9264	0.0115	0.2037	0.1175	1217.7201	0.1914	0.0090
Water Truck on Unpaved Road					0.3696	0.0367			

Vehicle Type	Emission Factors (g/mile for exhaust or lb/mile for fugitive)								
	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Water Truck	0.5724	0.1931	2.9264	0.0115	0.2037	0.1175	1217.7201	0.1914	0.0090
Water Truck on Paved Road					0.0278	0.0068			

Equipment Type	Emission Factor (g/hp-hr)								
	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Leaf blower	68.5165	1.1224	2.5378	0.0059	0.6918	0.5227	214.7015	0.0000	0.0000

Activity	Emission Factor ($lb/10^3$ gal)								
	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Drip Torch (Pile Burn) 70/30	123.8836	107.1878	469.8935	30.0776	32.5139	32.5139	20786.6246	0.0000	0.0000

Drip Torch (Pile Burn) 70/30	0.04	gal/ton
Propane Torch	2.36	gal/hr
Generator 143 hp	10.39	gal/hr

Maximum Daily Emissions

Unit	Emissions (tons/day)								
miles/day	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
1280.00	0.0012	0.0000	0.0001	0.0000	0.0001	0.0000	0.3884	0.0000	0.0000
					0.0019	0.0005			
	0.0012	**0.0000**	**0.0001**	**0.0000**	**0.0019**	**0.0005**	**0.3884**	**0.0000**	**0.0000**

Unit	Emissions (tons/day)									Controlled	
miles/day	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4	PM10	PM2.5
73.80	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0263	0.0000	0.0000		
					0.0173	0.0017				0.0106	0.0010
	0.0001	**0.0000**	**0.0000**	**0.0000**	**0.0173**	**0.0017**	**0.0263**	**0.0000**	**0.0000**		

Note: Removed personnel who would arrive by water truck

Unit	Emissions (tons/day)								
miles/day	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
295.65	0.0003	0.0000	0.0000	0.0000	0.0000	0.0000	0.1052	0.0000	0.0000
					0.0012	0.0003			
	0.0003	**0.0000**	**0.0000**	**0.0000**	**0.0012**	**0.0003**	**0.1052**	**0.0000**	**0.0000**

Note: Removed personnel who would arrive by water truck

Unit	Emissions (tons/day)									Controlled	
miles/day	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4	PM10	PM2.5
5.20	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0070	0.0000	0.0000		
					0.0010	0.0001				0.0006	0.0001
	0.0000	**0.0000**	**0.0000**	**0.0000**	**0.0010**	**0.0001**	**0.0070**	**0.0000**	**0.0000**		

Unit	Emissions (tons/day)								
miles/day	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
32.85	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	0.0441	0.0000	0.0000
					0.0005	0.0001			
	0.0000	**0.0000**	**0.0001**	**0.0000**	**0.0005**	**0.0001**	**0.0441**	**0.0000**	**0.0000**

Type	Horsepower	Unit	Emissions (tons/day)								
		hours/day	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
New	9.39	10.00	0.0071	0.0001	0.0003	0.0000	0.0001	0.0001	0.0222	0.0000	0.0000
Maintain			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
New (FRA)			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maintain (FRA)			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**10.00**	**0.0071**	**0.0001**	**0.0003**	**0.0000**	**0.0001**	**0.0001**	**0.0222**	**0.0000**	**0.0000**

Unit	Emissions (tons/day)								
gal/day	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
0.53	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	0.0055	0.0000	0.0000
	0.0000	**0.0000**	**0.0001**	**0.0000**	**0.0000**	**0.0000**	**0.0055**	**0.0000**	**0.0000**

	Emissions (tons/day)									Controlled	
	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4	PM10	PM2.5
Total	**0.01**	**0.00**	**0.00**	**0.00**	**0.02**	**0.00**	**0.60**	**0.00**	**0.00**		

Exhaust	**0.01**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.60**	**0.00**	**0.00**		
Fugitive (Paved)					**0.00**	**0.00**					
Fugitive (Unpaved)					**0.02**	**0.00**				**0.01**	**0.00**

Maximum Annual Treatments

Emission Factors

Vehicle Type	Emission Factors (g/mile for exhaust or lb/mile for fugitive)								
	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Light Duty Automobile	0.8243	0.0278	0.0586	0.0027	0.0461	0.0191	275.2545	0.0057	0.0052
Light Duty Auto on Paved Road					0.0029	0.0007			

Vehicle Type	Emission Factors (g/mile for exhaust or lb/mile for fugitive)								
	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Van/Medium Truck	0.8620	0.0159	0.0772	0.0032	0.0463	0.0192	322.7684	0.0067	0.0038
Van/Medium Truck on Unpaved Road					0.4695	0.0466			

Vehicle Type	Emission Factors (g/mile for exhaust or lb/mile for fugitive)								
	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Van/Medium Truck	0.8620	0.0159	0.0772	0.0032	0.0463	0.0192	322.7684	0.0067	0.0038
Van/Medium Truck on Paved Road					0.0082	0.0020			

Vehicle Type	Emission Factors (g/mile for exhaust or lb/mile for fugitive)								
	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
ATV	20.3222	2.3442	1.1694	0.0021	0.0178	0.0079	216.1491	0.0670	0.3430
ATV on Unpaved Road					0.5760	0.0573			

Vehicle Type	Emission Factors (g/mile for exhaust or lb/mile for fugitive)								
	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
ATV	20.3222	2.3442	1.1694	0.0021	0.0178	0.0079	216.1491	0.0670	0.3430
ATV on Paved Road					0.0029	0.0007			

Equipment Type	Emission Factor (g/hp-hr)								
	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Generator	0.5247	0.0191	0.4421	0.0015	0.0101	0.0093	157.9734	0.0000	0.0000

Equipment Type	Emission Factor (g/hp-hr)								
	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Chainsaw	110.4151	1.5355	4.1945	0.0092	1.3066	0.9872	334.9362	0.0000	0.0000

Equipment Type	Emission Factor (g/hp-hr)								
	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Chipper	5.3797	0.0798	0.8650	0.0042	0.0159	0.0120	431.3772	0.0000	0.0000

Equipment Type	Emission Factor (g/hp-hr)								
	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
Skid Steer Loader	0.6255	0.0198	0.8807	0.0018	0.0155	0.0143	194.5350	0.0000	0.0000

Equipment Type	Emission Factor (g/hp-hr)								
	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4

Maximum Daily Emissions

Unit	Emissions (tons/day)								
miles/day	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
1408.00	0.0013	0.0000	0.0001	0.0000	0.0001	0.0000	0.4272	0.0000	0.0000
					0.0020	0.0005			
	0.0013	**0.0000**	**0.0001**	**0.0000**	**0.0021**	**0.0005**	**0.4272**	**0.0000**	**0.0000**

Unit	Emissions (tons/day)									Controlled	
miles/day	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4	PM10	PM2.5
90.20	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0321	0.0000	0.0000		
					0.0212	0.0021				0.0130	0.0013
	0.0001	**0.0000**	**0.0000**	**0.0000**	**0.0212**	**0.0021**	**0.0321**	**0.0000**	**0.0000**		

Unit	Emissions (tons/day)								
miles/day	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
361.35	0.0003	0.0000	0.0000	0.0000	0.0000	0.0000	0.1286	0.0000	0.0000
					0.0015	0.0004			
	0.0003	**0.0000**	**0.0000**	**0.0000**	**0.0015**	**0.0004**	**0.1286**	**0.0000**	**0.0000**

Unit	Emissions (tons/day)									Controlled	
miles/day	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4	PM10	PM2.5
5.20	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0012	0.0000	0.0000		
					0.0015	0.0001				0.0009	0.0001
	0.0001	**0.0000**	**0.0000**	**0.0000**	**0.0015**	**0.0001**	**0.0012**	**0.0000**	**0.0000**		

Unit	Emissions (tons/day)								
miles/day	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
32.85	0.0007	0.0001	0.0000	0.0000	0.0000	0.0000	0.0078	0.0000	0.0000
					0.0000	0.0000			
	0.0007	**0.0001**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0078**	**0.0000**	**0.0000**

Horsepower	Unit	Emissions (tons/day)								
	hours/day	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
143.18	0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
		0.0000	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Type	Horsepower	Unit	Emissions (tons/day)								
		hours/day	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
New	10.45	26.00	0.0331	0.0005	0.0013	0.0000	0.0004	0.0003	0.1003	0.0000	0.0000
Maintain		0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
New (FRA)		0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maintain (FRA)		0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**26.00**	**0.0331**	**0.0005**	**0.0013**	**0.0000**	**0.0004**	**0.0003**	**0.1003**	**0.0000**	**0.0000**

Type	Horsepower	Unit	Emissions (tons/day)								
		hours/day	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
New	67.00	8.00	0.0032	0.0000	0.0005	0.0000	0.0000	0.0000	0.2549	0.0000	0.0000
Maintain		0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
New (FRA)		0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maintain (FRA)		0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**8.00**	**0.0032**	**0.0000**	**0.0005**	**0.0000**	**0.0000**	**0.0000**	**0.2549**	**0.0000**	**0.0000**

Type	Horsepower	Unit	Emissions (tons/day)								
		hours/day	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
New	70.56	16.00	0.0008	0.0000	0.0011	0.0000	0.0000	0.0000	0.2421	0.0000	0.0000
Maintain		0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
New (FRA)		0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maintain (FRA)		0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**16.00**	**0.0008**	**0.0000**	**0.0011**	**0.0000**	**0.0000**	**0.0000**	**0.2421**	**0.0000**	**0.0000**

Type	Horsepower	Unit	Emissions (tons/day)								
		hours/day	CO	ROG	NOx	SOx	PM10	PM2.5	CO2	N2O	CH4
New	18.07	8.00	0.0002	0.0000	0.0005	0.0000	0.0000	0.0000	0.0634	0.0000	0.0000
Maintain		0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

	Emission Factor (g/hp-hr)								
Equipment Type	*CO*	*ROG*	*NOx*	*SOx*	*PM10*	*PM2.5*	*CO2*	*N2O*	*CH4*
Tractor	0.9740	0.1295	3.2925	0.0054	0.0601	0.0553	397.8031	0.0000	0.0000

	Emission Factor (g/hp-hr)								
Equipment Type	*CO*	*ROG*	*NOx*	*SOx*	*PM10*	*PM2.5*	*CO2*	*N2O*	*CH4*
Excavator	0.6109	0.0243	0.7104	0.0019	0.0166	0.0153	201.6426	0.0000	0.0000

	Emission Factor (g/hp-hr)								
Equipment Type	*CO*	*ROG*	*NOx*	*SOx*	*PM10*	*PM2.5*	*CO2*	*N2O*	*CH4*
Backhoe	0.6710	0.0300	1.0309	0.0018	0.0261	0.0240	195.2141	0.0000	0.0000

	Emission Factor (g/hp-hr)								
Equipment Type	*CO*	*ROG*	*NOx*	*SOx*	*PM10*	*PM2.5*	*CO2*	*N2O*	*CH4*
Power pole saw	110.4151	1.5355	4.1945	0.0092	1.3066	0.9872	334.9362	0.0000	0.0000

Percent PM2.5 and PM10 assumed to be 100%

Drip Torch (Prescribed Burn) 70/30	0.30	gal/ac
Drip Torch (Pile Burn) 70/30	0.04	gal/ton
Propane Torch	2.36	gal/hr
Generator 143 hp	10.39	gal/hr

			Emissions (tons/day)								
Type	*Horsepower*	*Unit hours/day*	*CO*	*ROG*	*NOx*	*SOx*	*PM10*	*PM2.5*	*CO2*	*N2O*	*CH4*
New (FRA)		0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maintain (FRA)		0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**8.00**	**0.0002**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

			Emissions (tons/day)								
Type	*Horsepower*	*Unit hours/day*	*CO*	*ROG*	*NOx*	*SOx*	*PM10*	*PM2.5*	*CO2*	*N2O*	*CH4*
New	146.03	0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maintain		0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
New (FRA)		0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maintain (FRA)		0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.00**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

			Emissions (tons/day)								
Type	*Horsepower*	*Unit hours/day*	*CO*	*ROG*	*NOx*	*SOx*	*PM10*	*PM2.5*	*CO2*	*N2O*	*CH4*
New	83.17	0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maintain		0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
New (FRA)		0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maintain (FRA)		0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.00**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

			Emissions (tons/day)								
Type	*Horsepower*	*Unit hours/day*	*CO*	*ROG*	*NOx*	*SOx*	*PM10*	*PM2.5*	*CO2*	*N2O*	*CH4*
New	10.45	14.00	0.0178	0.0002	0.0007	0.0000	0.0002	0.0002	0.0540	0.0000	0.0000
Maintain		0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
New (FRA)		0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maintain (FRA)		0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**14.00**	**0.0178**	**0.0002**	**0.0007**	**0.0000**	**0.0002**	**0.0002**	**0.0540**	**0.0000**	**0.0000**

										Controlled	
	Emissions (tons/day)										
	CO	*ROG*	*NOx*	*SOx*	*PM10*	*PM2.5*	*CO2*	*N2O*	*CH4*	*PM10*	*PM2.5*
Total	**0.06**	**0.00**	**0.00**	**0.00**	**0.03**	**0.00**	**1.24**	**0.00**	**0.00**		
Exhaust	**0.06**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**1.24**	**0.00**	**0.00**		
Fugitive (Paved)					**0.00**	**0.00**					
Fugitive (Unpaved)					**0.02**	**0.00**				**0.01**	**0.00**

Prescribed Burn Emissions **Emission in Pounds per Acre**

		PM 10			PM 2.5			CH4			CO			CO2				NOX		SO2			ROG
FOFEM Veg Type	**Consumed Fuel per Acre (Tons)**	**flaming**	**smoldering**	**total**	**flaming**	**smoldering**	**total**	**flaming**	**smoldering**	**total**	**flaming**	**smoldering**	**total**	**flaming**	**smoldering**	**total**	**flaming**	**smoldering**	**total**	**flaming**	**smoldering**	**total**	**total**
Woodlands (Broadleaf Forest)	17	19	729	748	16	618	634	5	375	380	41	8,236	827	11,053	33,522	44,575	20	0	20	6	27	33	214
Shrublands (Chamise Chaparral)	11	66	0	66	56	0	56	17	0	17	141	0	141	38,414	0	38,414	69	0	69	22	0	22	270
Grasslands (Valley Grassland)	2	11	0	11	9	0	9	3	0	3	23	0	23	6,402	0	6,402	12	0	12	4	0	4	19
		PM 10			**PM 2.5**			**CH4**			**CO**			**CO2**				**NOX**		**SO2**			**ROG**
FOFEM Veg Type		*flaming*	*smoldering*	*total*	*flaming*	*smoldering*	*total*	*flaming*	*smoldering*	*total*	*flaming*	*smoldering*	*total*	*flaming*	*smoldering*	*total*	*flaming*	*smoldering*	*total*	*flaming*	*smoldering*	*total*	*total*
Woodlands (60 percent)	17	11.4	437.4	448.8	9.6	370.8	380.4	3.0	225.0	228.0	24.6	4,941.6	496.2	6,631.8	20,113.2	26,745.0	12.0	0.0	12.0	3.6	16.2	19.8	128.6
Shrublands (30 percent)	11	19.8	0.0	19.8	16.8	0.0	16.8	5.1	0.0	5.1	42.3	0.0	42.3	11,524.2	0.0	11,524.2	20.7	0.0	20.7	6.6	0.0	6.6	81.0
Grasslands (10 percent)	2	1.1	0.0	1.1	0.9	0.0	0.9	0.3	0.0	0.3	2.3	0.0	2.3	640.2	0.0	640.2	1.2	0.0	1.2	0.4	0.0	0.4	1.9
Total Emissions of 1 acre		**32.3**	**437.4**	**469.7**	**27.3**	**370.8**	**398.1**	**8.4**	**225.0**	**233.4**	**69.2**	**4,941.6**	**540.8**	**18,796.2**	**20,113.2**	**38,909.4**	**33.9**	**0.0**	**33.9**	**10.6**	**16.2**	**26.8**	**211.6**

Note: FOFEM does not model ROG emissions. ROG emission factors from forest wildfires are used as a proxy using the weighted average of flaming and smoldering.

ROG/NMHC Factor (lbs/ton)

Vegetation	Total
Grass	10.7
Chaparral shrub	25.0
Hardwood	12.8

Source: USEPA 1996, CARB August 2000

Pile Burn Emissions

Pile		Gross	Adjusted*	Pile	Consumed	Emissions by pollutant (tons)								
Group	**Fuel**	**Volume**	**Volume**	**Biomass**	**Fuel**									
Name	**(tons)**	**(cubic ft)**	**(cubic ft)**	**(tons)**	**(tons)**	**PM**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**CO_2**	**CH_4**	**NMHC**	**NOx**	**SOx**
Total 1250 piles	500	294,524	234,565	258	232	2.54	1.80	1.57	8.82	386	0.65	0.53	0.46	0.25
Average Daily=35	14	8,247	6,568	7.22	6.50	0.071	0.050	0.044	0.25	10.8	0.018	0.015	0.01	0.01
2.5 piles	1	589	469	0.52	0.46	0.0051	0.0036	0.0031	0.018	0.77	0.0013	0.0011	0.00	0.00

Note: Assumes hand piles, in a parabolic shape of 6 ft height and 10 ft width, composed of mixed shrub/hardwood vegetation with 90% consumption.
Consume does not model NOx or SOx emissions; emission factor per ton consumed fuel from Source: Urbanski 2013
ROG is likely less than NMHC so it is conservative to assume it is equal

Annual SFBAAB Existing Activities

	Emissions (tons/year)								
	CO	*ROG*	*NOx*	*SOx*	*PM10*	*PM2.5*	*CO2*	*N2O*	*CH4*
Pile Burn	0.02	0.00	0.00	0.00	0.00	0.00	0.77	0.00	0.00
Exhaust	2.84	0.04	0.19	0.00	0.03	0.03	39.1	0.00	0.00
Fugitive (Paved)					0.05	0.01			
Fugitive (Unpaved)					0.76	0.08			
Total	2.86	0.04	0.19	0.00	0.85	0.12	39.8	0.00	0.00
Significance Threshold		10	10		15	10			

NCCAB Existing Activities

	Maximum Daily Emissions (lb/day)						Emissions (tons/year)		
	CO	*ROG*	*NOx*	*SOx*	*PM10*	*PM2.5*	*CO2*	*N2O*	*CH4*
Pile Burn									
Exhaust	22.8	0.43	2.87	0.02	0.41	0.25	1.08	0.00	0.00
Fugitive (Paved)					7.05	1.73			
Fugitive (Unpaved)					45.3	4.50			
Total	22.82	0.43	2.87	0.02	52.79	6.48	1.08	0.00	0.00
Significance Threshold	550	137	137	150	82	55			

Annual Total GHG Emissions Existing

	Emissions (tons/year)			
	CO2	*N2O*	*CH4*	*CO2e (MT)*
Pile Burn	0.77	0.00	0.00	0.73
Exhaust	40.15	0.00	0.00	36.49
Total	40.93	0.00	0.00	37.23

Annual SFBAAB Potential Activities

	Emissions (tons/year)								
	CO	*ROG*	*NOx*	*SOx*	*PM10*	*PM2.5*	*CO2*	*N2O*	*CH4*
Prescribed Burn	121.68	47.60	7.63	6.03	105.68	89.57	8754.62	0.00	52.52
Pile Burn	8.38	0.50	0.44	0.23	1.71	1.49	366.93	0.00	0.62
Exhaust	66.66	0.96	3.12	0.01	0.80	0.60	453.97	0.00	0.00
Fugitive (Paved)					0.58	0.14			
Fugitive (Unpaved)					7.57	0.75			
Total	196.72	49.06	11.19	6.27	116.35	92.56	9575.52	0.00	53.14
Significance Threshold		10	10		15	10			

Maximum Daily NCCAB Potential Activities (Prescribed Burn)

	Emissions (lbs/day)						Controlled	
	CO	*ROG*	*NOx*	*SOx*	*PM10*	*PM2.5*	*PM10*	*PM2.5*
Prescribed Burn	1150.00	963.00	600.00	200.00	550.00	550.00	550.00	550.00
Pile Burn								
Exhaust	8.04	1.85	8.17	0.47	0.87	0.65	0.87	0.65
Fugitive (Paved)					16.66	4.09	16.66	4.09
Fugitive (Unpaved)					67.35	6.69	41.21	4.07
Total	1158.04	964.85	608.17	200.47	634.88	561.43	608.74	558.81
Significance Threshold	550	137	137	150	82	55	82	55

Maximum Daily NCCAB Potential Activities (Pile Burn)

	Emissions (lbs/day)						Controlled	
	CO	*ROG*	*NOx*	*SOx*	*PM10*	*PM2.5*	*PM10*	*PM2.5*
Prescribed Burn								
Pile Burn	493.86	29.42	26.00	13.78	100.76	87.76	100.76	87.76
Exhaust	17.32	0.40	1.26	0.03	0.35	0.20	0.35	0.20
Fugitive (Paved)					7.05	1.73	7.05	1.73
Fugitive (Unpaved)					36.6	3.63	22.4	2.21
Total	511.18	29.82	27.26	13.81	144.71	93.32	130.53	91.90
Significance Threshold	550	137	137	150	82	55	82	55

Maximum Daily NCCAB Potential Activities (New Treatment)

	Emissions (lbs/day)						Controlled	
	CO	*ROG*	*NOx*	*SOx*	*PM10*	*PM2.5*	*PM10*	*PM2.5*
Prescribed Burn								
Pile Burn								
Exhaust	113.61	1.69	7.35	0.03	1.45	1.04	1.45	1.04
Fugitive (Paved)					7.05	1.73	7.05	1.73
Fugitive (Unpaved)					45.34	4.50	27.75	2.74
Total	113.61	1.69	7.35	0.03	53.84	7.27	36.24	5.51
Significance Threshold	550	137	137	150	82	55	82	55

Annual NCCAB GHG Emissions Potential

	Emissions (tons/year)			
	CO2	*N2O*	*CH4*	*CO2e (MT)*
Prescribed Burn	160.05	0.00	0.08	147.10
Pile Burn	19.31	0.00	0.03	18.35
Exhaust	10.12	0.00	0.00	9.30
Total	189.48	0.00	0.11	174.75

Annual Total GHG Emissions

	Emissions (tons/year)			
	CO2	*N2O*	*CH4*	*CO2e (MT)*
Prescribed Burn	8914.67	0.00	52.59	9423.10
Pile Burn	386.24	0.00	0.65	366.92
Exhaust	464.09	0.00	0.00	422.03
Total	9765.00	0.00	53.25	10212.04

Net Annual Average SFBAAB									
	Emissions (tons/year)								
	CO	*ROG*	*NOx*	*SOx*	*PM10*	*PM2.5*	*CO2*	*N2O*	*CH4*
Prescribed Burn	121.68	47.60	7.63	6.03	105.68	89.57	8754.62	0.00	52.52
Pile Burn	8.36	0.50	0.44	0.23	1.71	1.49	366.16	0.00	0.62
Exhaust	63.82	0.92	2.93	0.01	0.77	0.58	414.89	0.00	0.00
Fugitive (Paved)					0.53	0.13			
Fugitive (Unpaved)					6.81	0.68			
Total	193.86	49.02	11.00	6.27	115.50	92.44	9535.67	0.00	53.13
Significance Threshold		10	10		15	10			

Net Maximum Daily NCCAB (Prescribed Burn)

	Emissions (lbs/day)						Controlled	
	CO	*ROG*	*NOx*	*SOx*	*PM10*	*PM2.5*	*PM10*	*PM2.5*
Prescribed Burn	1150.00	963.00	600.00	200.00	550.00	550.00	550.00	550.00
Pile Burn	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exhaust	-14.77	1.42	5.30	0.46	0.46	0.40	0.46	0.40
Fugitive (Paved)					9.62	2.36	9.62	2.36
Fugitive (Unpaved)					22.01	2.18	13.47	1.33
Total	1135.23	964.42	605.30	200.46	582.08	554.94	573.54	554.09
Significance Threshold	550	137	137	150	82	55	82	55

Net Maximum Daily NCCAB (Pile Burn)

	Emissions (lbs/day)						Controlled	
	CO	*ROG*	*NOx*	*SOx*	*PM10*	*PM2.5*	*PM10*	*PM2.5*
Prescribed Burn	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile Burn	494	29.4	26.0	13.78	101	87.8	101	87.8
Exhaust	-5.49	-0.03	-1.61	0.01	-0.06	-0.05	-0.06	-0.05
Fugitive (Paved)					0.00	0.00	0.00	0.00
Fugitive (Unpaved)					-8.8	-0.87	-5.37	-0.53
Total	488.37	29.39	24.39	13.79	91.92	86.84	95.32	87.18
Significance Threshold	550	137	137	150	82	55	82	55

Net Maximum Daily NCCAB (New Treatment)

	Emissions (lbs/day)						Controlled	
	CO	*ROG*	*NOx*	*SOx*	*PM10*	*PM2.5*	*PM10*	*PM2.5*
Prescribed Burn	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile Burn	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exhaust	90.8	1.26	4.48	0.01	1.04	0.79	1.04	0.79
Fugitive (Paved)					0.00	0.00	0.00	0.00
Fugitive (Unpaved)					0.00	0.00	0.00	0.00
Total	90.8	1.26	4.48	0.01	1.04	0.79	1.04	0.79
Significance Threshold	550	137	137	150	82	55	82	55

APPENDIX 4.4 BIOLOGICAL RESOURCES SUPPORTING INFORMATION

Appendix 4.4a Vegetation Communities

Vegetation Communities

General descriptions of vegetation types mapped within the Midpen lands are collapsed into generalized "Midpen Types." These vegetation categories are based on geographic distribution, structure, fire behavior, and special-status plant species preferences. This is an effort to relate vegetation community names to these commonly used classification systems for regional context and regulatory continuity. Table 1 provides the detailed vegetation crosswalks for upland and aquatic communities that compare general Program vegetation types to those in the Midpen dataset, as well as other commonly used vegetation classification systems, notably the *Terrestrial Natural Communities of California* (Holland, 1986) or *California Vegetation* (Holland & Keil, 1995); *A Manual of California Vegetation* (Sawyer *et al*. 2009); and habitat types from the *CNPS Inventory of Rare and Endangered Plants of California* (CNPS, 2020). It is also intended to connect Midpen vegetation types to currently accepted types of sensitive natural communities and rare plant habitat descriptors. The codes used in the Tables are associated with specific vegetation types that indicate various levels of organization sensitivity. The numeric codes following vegetation types in the Terrestrial Communities and California Vegetation columns align these vegetation types with the California Natural Communities List (CDFW, 2019). It is from this list that sensitive natural communities, those with State Ranks (S1-S3), are identified. In these cases, vegetation types in the California Vegetation column will be noted with their appropriate State Rank.

The crosswalks presented in this table relate vegetation community names to these commonly used classification systems for regional context and regulatory continuity. Midpen vegetation types are also linked to currently accepted types of sensitive natural communities and rare plant habitat descriptors. The codes used in these tables are associated with specific vegetation types that indicate various levels of organization sensitivity. The numeric codes following vegetation types in the Terrestrial Communities and California Vegetation columns align these vegetation types with the *California Natural Communities List* (CDFW, 2019). It is from this list that sensitive natural communities, those with State Ranks (S1-S3), are identified. Vegetation types in the California Vegetation column will be noted with their appropriate State Rank.

Table 1 Upland Vegetation Communities Found on Midpen Lands and Potential for Sensitive Communities to Occur

Midpen Types [a,b]	Area (Acres)	Terrestrial Communities [c]	California Vegetation		CNPS Inventory [e]
			Name	Designation [d]	
Non-Native / Ornamental					
Acacia Series	9.25	Ruderal (Not Described)	Not Described	--	Not Described
Broom Series	46.45	Ruderal (Not Described)	Broom (*Cytisus scoparius* and Others) Shrubland Semi-Natural Alliance	--	Not Described
Eucalyptus Series	186.5	Eucalyptus Plantation (Not Described)	*Eucalyptus* spp. – *Ailanthus altissima* – *Robinia pseudoacacia* Woodland Semi-Natural Alliance	--	Not Described
Harding Grass Series	77.26	Freshwater Seep (45400) Non-Native Grassland (42200) Ruderal (Not Described)	*Phalaris aquatica* – *Phalaris arundinacea* Herbaceous Semi-Natural Alliance (Harding Grass – Reed Canary Grass Swards) (42.051.00)	--	Valley and Foothill Grassland
Planted Stands of Pine (Monterey Pine - Monterey Cypress - other spp.)	91.25	Pine Plantation (Not Described)	*Pinus radiata* Semi-Natural Alliance (Monterey Pine Plantations) (87.240.04)	--	Not Described
Poison Hemlock (mapped based on plot data only)	4.40	Non-Native Grassland (42200) Ruderal (Not Described)	*Conium maculatum - Foeniculum vulgare* Herbaceous Semi-Natural Stand (Poison Hemlock or Fennel Patches) (45.556.00)	--	Valley and Foothill Grassland

Midpen Types [a,b]	Area (Acres)	Terrestrial Communities [c]	California Vegetation		CNPS Inventory [e]
			Name	Designation [d]	
Weedy Ruderal (Harding Grass - Velvet Grass - Thistle spp.)	304.01	Non-Native Grassland (42200) Freshwater Seep (45400) Ruderal (Not Described)	*Holcus lanatus – Anthoxanthum odoratum* Herbaceous Semi-Natural Alliance (Common Velvet Grass -Sweet Vernal Grass Meadows) (42.050.00)	--	Valley and Foothill Grassland
Yellow Star-thistle Series	163.27	Non-Native Grassland (42200) Ruderal (Not Described)	*Centaurea (solstitialis, melitensis*) Herbaceous Semi-Natural Alliance (Yellow Star-Thistle Fields) (42.042.00)	--	Valley and Foothill Grassland
Grassland					
California Annual Grasslands Series	6,150.00 (+35.68 on serpentine)	Non-Native Grassland (42200)	*Avena* spp. – *Bromus* spp. Herbaceous Semi-Natural Alliance (Wild Oats and Annual Brome Grasslands) (42.027.00)	--	Valley and Foothill Grassland
California Annual Grasslands with a Native Component Mapping Unit	35.13 (+1.63 on serpentine)	Non-Native Grassland (42200) Valley Needlegrass Grassland (42110) Wildflower Fields (42300)	*Avena* spp. – *Bromus* spp. Herbaceous Semi-Natural Alliance (Wild Oats and Annual Brome Grasslands) (42.027.00)	--	Valley and Foothill Grassland
			Bromus carinatus – Elymus glaucus Herbaceous Alliance (California Brome – Blue Wildrye Prairie) (41.131.00)	S3 / BHS	
			Danthonia californica Herbaceous Alliance (California Oatgrass Prairie) (41.050.00)	S3 / BHS	

Midpen Types [a,b]	Area (Acres)	Terrestrial Communities [c]	California Vegetation		CNPS Inventory [e]
			Name	Designation [d]	
			Elymus triticoides Herbaceous Association (Creeping Ryegrass Turfs) (41.080.01)	S3 / BHS	
			Grindelia camporum Herbaceous Alliance (Gumplant Patches) (52.206.00)	S3 / BHS	
			Festuca idahoensis Herbaceous Alliance (Idaho Fescue Grassland) (41.250.00)	S3? / BHS	
			Nasella spp. – *Melica* spp. Herbaceous Alliance (Needlegrass – Melic Grass Grassland) (41.151.00)	S3 / BHS	
Mixed California Annual Grassland - Purple Needlegrass Association	23.00	Non-Native Grassland (42200) Serpentine Bunchgrass (42130) Valley Needlegrass Grassland (42110) Wildflower Fields (42300)	*Avena* spp. – *Bromus* spp. Herbaceous Semi-Natural Alliance (Wild Oats and Annual Brome Grasslands) (42.027.00)	--	Valley and Foothill Grassland
			Nassella spp. – *Melica* spp. Herbaceous Alliance (Needlegrass – Melic Grass Grassland) (41.151.00)	S3 / BHS	
Purple Needlegrass Association	1.85	Serpentine Bunchgrass (42130) Valley Needlegrass Grassland (42110) Wildflower Fields (42300)	*Nasella* spp. – *Melica* spp. Herbaceous Alliance (Needlegrass – Melic Grass Grassland) (41.151.00)	S3	Valley and Foothill Grassland

Midpen Types [a,b]	Area (Acres)	Terrestrial Communities [c]	California Vegetation Name	California Vegetation Designation [d]	CNPS Inventory [e]
Coastal Scrub					
California Sagebrush Series	132.02 (+4.17 on serpentine)	Central (Lucian) Coastal Scrub (32200)	*Artemisia californica* Sagesbrush Scrub Alliance (California Sagebrush Scrub) (32.010.00)	BHS when on serpentine	Coastal Scrub
Coyote Brush Series	460.15 (+0.95 on serpentine)	Northern Coyote Brush Scrub (32110)	*Baccharis pilularis* Shrubland Alliance (Coyote Brush Scrub) (32.060.00)	BHS when on serpentine	Coastal Scrub
Coyote Brush – California Sagebrush Series	5.41	Northern Coyote Brush Scrub (32110)	*Artemisia californica* Sagebrush Scrub Alliance (California Sagebrush Scrub) (32.010.00)	BHS when on serpentine	Coastal Scrub
			Baccharis pilularis Shrubland Alliance (Coyote Brush Scrub) (32.060.00)	BHS when on serpentine	
Coyote Brush - Sticky Monkeyflower Series	10.27	Central (Lucian) coastal scrub (32200)	*Baccharis pilularis* Shrubland Alliance (Coyote Brush Scrub) (32.060.00)	BHS when on serpentine	Coastal Scrub
		Northern Coyote Brush Scrub (32110)	*Diplacus aurantiacus* Shrubland Alliance (Bush Monkeyflower Scrub) (32.082.00)	S3?	
Coyote Brush, Successional Stage	10.26	Northern Coyote Brush Scrub (32110)	*Baccharis pilularis* Shrubland Alliance (Coyote Brush Scrub) (32.060.00)	BHS when on serpentine	Coastal Scrub
Coyote Brush Mesic Stands (Coyote Brush - Ocean Spray - *Rubus* spp.)	2,485.08	Mesic North Slope Chaparral (37E00)	*Baccharis pilularis* Shrubland Alliance (Coyote Brush Scrub) (32.060.00)	BHS when on serpentine	Coastal Scrub

Midpen Types [a,b]	Area (Acres)	Terrestrial Communities [c]	California Vegetation		CNPS Inventory [e]
			Name	Designation [d]	
		Northern Coyote Brush Scrub (32110)	*Baccharis pilularis – Holodiscus discolor* Shrubland Association (Coyote Brush – Oceanspray Scrub) (32.060.12)	S3	
			Rubus (*parviflorus, spectablis, ursinus*) Shrubland Alliance (Coastal Brambles) (63.910.00)	S3	
Coyote Brush Open Stands (Coyote Brush / California Annual Grasslands)	1,541.54	Non-Native Grassland (42200) Northern Coyote Brush Scrub (32110)	*Avena* spp. – *Bromus* spp. Herbaceous Semi-Natural Alliance (Wild Oats and Annual Brome Grasslands) (42.027.00)	--	Coastal Scrub
			Baccharis pilularis Shrubland Alliance (Coyote Brush Scrub) (32.060.00)	BHS when on serpentine	
Coyote Brush Xeric Stands (Coyote Brush - California Sagebrush – Mimulus aurantiacus)	566.28	Northern Coyote Brush Scrub (32110)	*Artemisia californica* Shrubland Alliance (California Sagebrush Scrub) (32.010.00)	BHS when on serpentine	Coastal Scrub
			Baccharis pilularis Shrubland Alliance (Coyote Brush Scrub) (32.060.00)	BHS when on serpentine	
			Diplacus aurantiacus Shrubland Alliance (Bush Monkeyflower Scrub) (32.082.00)	S3?	
Mesic Deciduous Shrubs (Hazelnut - Dogwood - Holodiscus - Poison Oak)	255.92	Mesic North Slope Chaparral (37E00)	*Corylus cornuta* var. *californica* Shrubland Alliance (Hazelnut Scrub) (37.950.00)	S2?	Coastal Scrub

Midpen Types [a,b]	Area (Acres)	Terrestrial Communities [c]	California Vegetation		CNPS Inventory [e]
			Name	Designation [d]	
		Northern (Franciscan) Coastal Scrub (32100)	*Holodiscus discolor* Shrubland Alliance (Oceanspray Scrub) (39.100.00)	S3	
Poison Oak Series	459.88 (+0.60 on serpentine)	Poison Oak Chaparral (37F00) Serpentine Chaparral (37600)	*Toxicodendron diversilobum* Shrubland Alliance (Poison Oak Scrub) (37.940.00)	BHS when on serpentine	Coastal Scrub
Chaparral					
Big Berry Manzanita Series	439.48 (+94.97 on serpentine)	Northern Mixed Chaparral (37110) Serpentine Chaparral (37600)	*Arctostaphylos glauca* Shrubland Alliance (Bigberry Manzanita Chaparral) (37.301.00)	BHS when on serpentine	Chaparral
Birch-leafed Mountain Mahogany - Mesic Chaparral Mapping Unit	1,944.83 (+45.82 on serpentine)	Mesic North Slope Chaparral (37E00)	*Cercocarpus montanus* Shrubland Alliance (Birch Leaf Mountain Mahogany Chaparral) (76.100.00)	BHS when on serpentine	Chaparral
Bitter Cherry series (field verification only)	0.73	Mixed Montane Chaparral (37510) Mesic North Slope Chaparral (37E00)	*Prunus emarginata* Provisional Shrubland Alliance (Bitter Cherry Thickets) (37.900.00)	--	Chaparral
Blue Blossom – Jimbrush Mapping Unit	42.23	Blue Blossom Chaparral (37820) Mesic North Slope Chaparral (37E00)	*Ceanothus* (*oliganthus, tomentosus*) Shrubland Alliance (Hairy Leaf – Woolly Leaf Ceanothus Chaparral) (37.207.00)	S3	Chaparral
			Ceanothus thyrsiflorus Shrubland Alliance (Blue Blossom Chaparral) (37.204.00)	--	

Midpen Types [a,b]	Area (Acres)	Terrestrial Communities [c]	California Vegetation		CNPS Inventory [e]
			Name	Designation [d]	
Brittleleaf Manzanita Mapping Unit	2.93	Northern Maritime Chaparral (37C10)	*Arctostaphylos crustacea* Shrubland Alliance (Brittle Leaf Manzanita Chaparral) (37.308.00)	S3	Chaparral
Chamise - California Sagebrush Series	6.76	Chamise Chaparral (37200)	*Adenostoma fasciculatum* Shrubland Alliance (Chamise Chaparral) (37.101.00)	--	Chaparral
			Artemisia californica Sagebrush Scrub Alliance (California Sagebrush Scrub) (32.010.00)	BHS when on serpentine	
Chamise - Leather Oak - (Garrya) - Serpentine Mapping Unit	9.92 (all on serpentine)	Chamise Chaparral (37200) Serpentine Chaparral (37600)	*Adenostoma fasciculatum* Serpentine Shrubland Association (Serpentine Chamise Chaparral) (37.101.15)	S3	Chaparral
		Leather Oak Chaparral (37620)	*Quercus durata* Shrubland Alliance (Leather Oak Chaparral) (37.405.00)	--	
Chamise - Mixed Manzanita Multiple Series Mapping Unit	2,815.41 (+49.81 on serpentine)	Chamise Chaparral (37200) Northern Maritime Chaparral (37C10)	*Adenostoma fasciculatum* Shrubland Alliance (Chamise Chaparral) (37.101.00)	BHS when on serpentine	Chaparral
			Arctostaphylos crustacea Shrubland Alliance (Brittle Leaf Manzanita Chaparral) (37.308.00)	S3 / BHS when on serpentine	
Chamise - Mixed Oak Multiple Series Mapping Unit	241.40 (+8.27 on serpentine)	Chamise Chaparral (37200) Northern Mixed Chaparral (37110)	*Adenostoma fasciculatum* Shrubland Alliance (Chamise Chaparral) (37.101.00)	BHS when on serpentine	Chaparral
			Quercus spp. Forest & Woodland Alliance (Mixed Oak Forest and Woodland) (71.100.00)	BHS when on serpentine	

Midpen Types [a,b]	Area (Acres)	Terrestrial Communities [c]	California Vegetation		CNPS Inventory [e]
			Name	Designation [d]	
Chamise - Wedge-leaf Ceanothus Series	182.83 (+0.28 on serpentine)	Chamise Chaparral (37200) Northern Mixed Chaparral (37110)	*Adenostoma fasciculatum* Shrubland Alliance (Chamise Chaparral) (37.101.00)	BHS when on serpentine	Chaparral
			Ceanothus cuneatus Shrubland Alliance (Wedge Leaf Ceanothus Chaparral) (37.211.00)	BHS when on serpentine	
Chamise – Woolly leaf Manzanita Series	75.86	Chamise Chaparral (37200) Northern Maritime Chaparral (37C10)	*Adenostoma fasciculatum* Shrubland Alliance (Chamise Chaparral) (37.101.00)	BHS when on serpentine	Chaparral
			Arctostaphylos (*crustacea, tomentosa*) Shrubland Alliance (Brittle Leaf – Woolly Leaf Manzanita Chaparral)	S3	
Chamise Chaparral Series	1,847.00 (+26.41 on serpentine)	Chamise Chaparral (37200)	*Adenostoma fasciculatum* Shrubland Alliance (Chamise Chaparral) (37.101.00)	BHS when on serpentine	Chaparral
Chaparral - Coastal Scrub Transition (Manzanita spp. - Blue-blossom)	827.92	Blue Brush Chaparral (37820) Northern Maritime Chaparral (37C10) Northern Mixed Chaparral (37110)	*Arctostaphylos* (*crustacea, tomentosa*) Shrubland Alliance (Brittle Leaf – Woolly Leaf Manzanita Chaparral)	S3	Chaparral Coastal Scrub
			Ceanothus thyrsiflorus Shrubland Alliance (Blue Blossom Chaparral) (37.204.00)	--	
Giant Chinquapin	3.92	Bush Chinquapin Chaparral (37550)	*Chrysolepis chrysophylla* Shrubland Alliance (Golden Chinquapin Thickets) (37.417.00)	S2	Chaparral Coastal Scrub

Midpen Types [a,b]	Area (Acres)	Terrestrial Communities [c]	California Vegetation		CNPS Inventory [e]
			Name	Designation [d]	
Interior Live Oak - Manzanita spp. (Kings Mountain Manzanita) Mapping	0.65	Interior Live Oak Woodland (71150) Northern Maritime Chaparral (37C10)	*Quercus wislizenii* Forest & Woodland Alliance (Interior Live Oak Woodland and Forest) (71.080.00)	--	Cismontane Woodland
Manzanita - Mixed Oak Multiple Series Mapping Unit	336.78 (+1.32 on serpentine)	Northern Maritime Chaparral (37C10)	*Arctostaphylos* (*crustacea*, *tomentosa*) Shrubland Alliance (Brittle Leaf – Woolly Leaf Manzanita Chaparral)	S3	Chaparral
			Quercus spp. Forest & Woodland Alliance (Mixed Oak Forest and Woodland) (71.100.00)	BHS when on serpentine	
Mixed Xeric Chaparral (Chamise - Sticky Monkey flower - Toyon – Sagebrush)	431.12	Chamise Chaparral (37200) Northern Mixed Chaparral (37110)	*Adenostoma fasciculatum* Shrubland Alliance (Chamise Chaparral) (37.101.00)	--	Chaparral
			Artemisia californica Sagebrush Scrub Alliance (California Sagebrush Scrub) (32.010.00	BHS when on serpentine	
			Diplacus aurantiacus Shrubland Alliance (Bush Monkeyflower Scrub) (32.082.00)	S3?	
			Prunus ilicifolia Heteromeles arbutifolia – *Ceanothus spinosus* Shrubland Alliance (Holly Leaf Cherry – Toyon – Greenbark Ceanothus Chaparral) (37.912.00)	--	
Scrub Oak - (Manzanita - Wedge-leaf Ceanothus - Chamise - Scrub Interior	508.65	Scrub Oak Chaparral (37900)	*Quercus berberidifolia* Shrubland Alliance (Scrub oak Chaparral) (37.407.00)	S3	Chaparral

Midpen Types [a,b]	Area (Acres)	Terrestrial Communities [c]	California Vegetation		CNPS Inventory [e]
			Name	Designation [d]	
			Quercus berberidifolia – Adenostoma fasciculatum Shrubland Alliance (Scrub oak – Chamise Chaparral) (37.409.00)	--	
Oak Savannah Woodland					
Blue Oak / California Annual Grasslands Association	12.32 (+0.39 on serpentine)	Blue Oak Woodland (71140) Non-Native Grassland (42200)	*Avena* spp. – *Bromus* spp. Herbaceous Semi-Natural Alliance (Wild Oats and Annual Brome Grasslands) (42.027.00)	--	Cismontane Woodland
			Quercus douglasii Forest & Woodland Alliance (Blue Oak Woodland and Forest) (71.020.00)	BHS	
Blue Oak Series	4.07	Blue Oak Woodland (71140)	*Quercus douglasii* Forest & Woodland Alliance (Blue Oak Woodland and Forest) (71.020.00)	BHS	Cismontane Woodland
Blue Oak Woodland Mapping Unit	38.93 (0.53 on serpentine)	Blue Oak Woodland (71140)	*Quercus douglasii* Forest & Woodland Alliance (Blue Oak Woodland and Forest) (71.020.00)	BHS	Cismontane Woodland
Valley Oak Woodland Series	68.98 (+1.20 on serpentine)	Valley Oak Woodland (71130)	*Quercus lobata* Forest & Woodland Alliance (Valley Oak Woodland and Forest) (71.040.00)	S3 / BHS when on serpentine	Cismontane Woodland
Hardwood Forest					
Black Oak / Madrone (Coast Live Oak) Mapping Unit	40.85	Black Oak Woodland (71120)	*Arbutus menziesii* Forest Alliance (Madrone Forest) (73.200.00)	S3.2 / BHS	Cismontane Woodland

Midpen Types [a,b]	Area (Acres)	Terrestrial Communities [c]	California Vegetation		CNPS Inventory [e]
			Name	Designation [d]	
		Coast Live Oak Woodland (71160)	*Quercus agrifolia* – *Quercus kelloggii* Forest & Woodland Association (Coast Live Oak – Black Oak Woodland and Forest) (71.060.18)	--	
			Quercus kelloggii Forest & Woodland Alliance (Black Oak Woodland and Forest) (71.010.00)	BHS	
Black Oak Mapping Unit	83.22 (+0.39 on serpentine)	Black Oak Woodland (71120)	*Quercus kelloggii* Forest & Woodland Alliance (Black Oak Woodland and Forest) (71.010.00)	BHS	Cismontane Woodland
California Bay - Canyon Live Oak Multiple Series Mapping Unit	4,610.32 (+64.86 on serpentine)	California Bay Forest (81200) Canyon Live Oak Forest (81320)	*Umbellularia californica* – *Quercus chrysolepis* Forest Association (California Bay and Canyon Live Oak Forest) (74.100.20)	S3? / BHS when on serpentine	Broadleaved Upland Forest
California Bay - Coast Live Oak Multiple Series Mapping Unit	2,340.98 (+68.46 on serpentine)	Coast Live Oak Woodland (71160) California Bay Forest (81200)	*Umbellularia californica* – *Quercus agrifolia* Forest Association (California Bay Forest) (74.100.00)	S3 / BHS when on serpentine	Broadleaved Upland Forest
California Bay Association	1,071.11 (+9.75 on serpentine)	California Bay Forest (81200)	*Umbellularia californica* Forest Alliance (California Bay Forest) (74.100.00)	S3 / BHS when on serpentine	Broadleaved Upland Forest
California Bay Forest Series	14.59	California Bay Forest (81200)	*Umbellularia californica* Forest Alliance (California Bay Forest) (74.100.00)	S3	Broadleaved Upland Forest
California Buckeye Series	323.78	Interior Live Oak Woodland (71150)	*Aesculus californica* Forest & Woodland Alliance (California Buckeye Groves) (75.100.00)	S3	Cismontane Woodland

Midpen Types [a,b]	Area (Acres)	Terrestrial Communities [c]	California Vegetation		CNPS Inventory [e]
			Name	Designation [d]	
Coast Live Oak Series	2,716.89 (+22.35 on serpentine)	Coast Live Oak Woodland (71160)	*Quercus agrifolia* Woodland Alliance (Coast Live Oak Woodland) (71.060.00)	BHS when on serpentine	Cismontane Woodland
Higher Elevation Mixed Broadleaf Hardwoods	2,271.38	California Bay Forest (81200) Tanoak Forest (81400)	*Notholithocarpus densiflorus* Forest Alliance (Tanoak Forest) (73.100.00)	S3.2	Broadleaved Upland Forest
			Umbellularia californica Forest (California Bay Forest) (74.100.00)	S3	
Lower Elevation Mixed Broadleaf Hardwoods	3,864.78	California Bay Forest (81200) Tanoak Forest (81400)	*Notholithocarpus densiflorus* Forest Alliance (Tanoak Forest) (73.100.00)	S3.2	Broadleaved Upland Forest
			Umbellularia californica Forest Alliance (California Bay Forest) (74.100.00)	S3	
Mixed Oak Mapping Unit	231.58	California Bay Forest (81200) Coast Live Oak Forest (81310)	*Quercus* sp. Forest & Woodland Alliance (Mixed Oak Woodland and Forest) (71.100.00)	BHS	Cismontane Woodland
Tanoak - (California Bay) Multiple Series Mapping Unit	834.68	Tanoak Forest (81400)	*Notholithocarpus densiflorus – Umbellularia californica* Forest Association (Tanoak - California Bay Forest) (73.100.19)	S3	Broadleaved Upland Forest Cismontane Woodland
Temperate Broadleaf Sclerophyll Evergreen Forests	2.93	California Bay Forest (81200)	*Umbellularia californica* Forest Alliance (California Bay Forest) (74.100.00)	S3	Broadleaved Upland Forest

Midpen Types [a,b]	Area (Acres)	Terrestrial Communities [c]	California Vegetation Name	California Vegetation Designation [d]	CNPS Inventory [e]
Conifer Forest					
Douglas-fir - / Mixed Hardwoods Mapping Unit	5,455.03	Mixed Evergreen (81100) Upland Douglas Fir Forest (82420)	*Pseudotsuga menziesii – Notholithocarpus densiflorus* Forest & Woodland Association (Douglas Fir – Tanoak Forest and Woodland) (82.500.00)	S3 / BHS when on serpentine	North Coast Coniferous Forest
			Pseudotsuga menziesii – Quercus agrifolia Forest & Woodland Association (Douglas Fir – Coast Live Oak Forest and Woodland) (82.200.71)	S3? / BHS when on serpentine	
			Pseudotsuga menziesii – Umbellularia californica Forest & Woodland Association (Douglas Fir – California Bay Forest and Woodland) (82.200.66)	--	
Douglas-fir - California Bay Association	829.68 (+37.43 on serpentine)	Mixed Evergreen (81100) Upland Douglas Fir Forest (82420)	*Pseudotsuga menziesii – Umbellularia californica* Forest & Woodland Association (Douglas Fir – California Bay Forest and Woodland) (82.200.66)	BHS when on serpentine	North Coast Coniferous Forest
Douglas-fir - Coast Redwood Association	2,017.79	Mixed Evergreen (81100)	*Sequoia sempervirens – Pseudotsuga menziesii – Notholithocarpus densiflorus* Forest & Woodland Association (Redwood – Douglas Fir – Tanoak Forest and Woodland) (86.100.31)	S?	North Coast Coniferous Forest

Midpen Types [a,b]	Area (Acres)	Terrestrial Communities [c]	California Vegetation		CNPS Inventory [e]
			Name	Designation [d]	
			Sequoia sempervirens – *Pseudotsuga menziesii* – *Umbellularia californica* Forest & Woodland Alliance (Redwood – Douglas Fir – California Bay Forest and Woodland) (86.100.20)	S?	
Douglas-fir - Chinquapin Association	43.75	Mixed Evergreen (81100)	*Pseudotsuga menziesii / Chrysolepis chrysophylla* – *Notholithocarpus densiflorus* Forest Association (Douglas Fir and Giant Chinquapin) (82.200.12)	S3	North Coast Coniferous Forest
Douglas-fir Forest Series	166.93	Upland Douglas Fir Forest (82420)	*Pseudotsuga menziesii* Forest & Woodland Alliance (Douglas Fir Forest and Woodland) (82.200.00)	--	North Coast Coniferous Forest
Foothill Pine / Big Berry Manzanita Association	76.89 (+15.98 on serpentine)	Non-serpentine Gray Pine Chaparral Woodland (71322) Open Gray Pine Woodland (71310) Serpentine Gray Pine-Chaparral Woodland (71321)	*Arctostaphylos glauca* Shrubland Alliance (Bigberry Manzanita Chaparral) (37.301.00)	BHS when on serpentine	Cismontane Woodland
			Pinus sabiniana Woodland Alliance (Foothill Pine Woodland) (87.130.00)	BHS when on serpentine	
Foothill Pine - Canyon Live Oak Association	49.85 (+0.11 on serpentine)	Canyon Live Oak Forest (81320) Open Gray Pine Woodland (71310)	*Pinus sabiniana* Woodland Alliance (Foothill Pine Woodland) (87.130.00)	BHS when on serpentine	Cismontane Woodland
			Quercus chrysolepis Forest & Woodland Alliance (Canyon Live Oak Forest and Woodland) (71.050.00)	BHS when on serpentine	

Midpen Types [a,b]	Area (Acres)	Terrestrial Communities [c]	California Vegetation		CNPS Inventory [e]
			Name	Designation [d]	
Foothill Pine Series	22.70	Open Gray Pine Woodland (71310) Serpentine Digger Pine-Chaparral Woodland (71321)	*Pinus sabiniana* Woodland Alliance (Foothill Pine Woodland) (87.130.00)	BHS when on serpentine	Cismontane Woodland
Knobcone Pine Series	422.33 (+18.13 on serpentine)	Knobcone Pine Forest (83210)	*Pinus attenuata* Forest Alliance (Knobcone Pine Forest) (87.100.00)	BHS when on serpentine	Closed Cone Coniferous Forest
Redwood / Tanoak Association	4,188.72	Upland Redwood Forest (82320)	*Sequoia sempervirens* – *Notholithocarpus densiflorus* – *Vaccinium ovatum* Forest Association (Redwood – Tanoak – Huckleberry Forest) (86.100.16)	S3	North Coast Coniferous Forest
Redwood Forest Series	659.71	North Coast Alluvial Redwood Forest (61120) Upland Redwood Forest (82320)	*Sequoia sempervirens* Forest Alliance (Redwood Forest) (86.100.00)	S3	North Coast Coniferous Forest
Riparian					
Arroyo Willow (Arroyo willow identified as dominant component	318.49	Central Coast Riparian Scrub (63200)	*Salix lasiolepis* Thickets Alliance (Arroyo Willow Thickets) (61.2010.00)	S?	Riparian Scrub
Big-leaf Maple Series	218.75 (+2.49 on serpentine)	North Coast Riparian Forests (61100)	*Acer macrophyllum* Forest Alliance (Bigleaf Maple Forest) (61.450.00)	S3 / BHS	Riparian Forest
Box Elder Series	0.85	North Coast Riparian forests (61100)	*Acer negundo* Forest Alliance (Box-elder Forest) (61.440.00)	S2 / BHS	Riparian Forest

Midpen Types [a,b]	Area (Acres)	Terrestrial Communities [c]	California Vegetation		CNPS Inventory [e]
			Name	Designation [d]	
California Sycamore Series	7.70	Sycamore Alluvial Woodland (62100)	*Platanus racemosa* Woodland Alliance (California Sycamore Woodland) (61.310.00)	S3 / BHS	Riparian Forest
Mixed Willow Series Mapping Unit (contains Arroyo Willow, Red Willow)	83.07	Central Coast Riparian Scrub (63200)	*Salix laevigata – Salix lasiolepis* Riparian Woodland Association (Arroyo Willow – Red Willow Riparian Woodland) (61.205.02)	S3	Riparian Scrub
Red Alder Series (mixed willow)	279.49	Red Alder Riparian Forest (61130)	*Alnus rubra* Forest Alliance (Red Alder Forest) (61.410.00)	Potentially jurisdictional	Riparian Forest
White Alder Series	422.22 (+5.93 on serpentine)	White Alder Riparian Forest (61510)	*Alnus rhombifolia* Forest & Woodland Alliance (White Alder Groves) (61.420.00)	Potentially jurisdictional / BHS when on serpentine	Riparian Forest
Barren or Rock					
Landslides, Cliffs, Rock Outcrops	119.49 (+0.88 on serpentine)	Unvegetated (Not Described)	Not Described	BHS	Not Described
Degraded / Converted					
Agriculture	81.84	Agriculture (Not Described)	Not Described	--	Not Described
Christmas Tree Farm	23.26	Agriculture (Not Described)	Not Described	--	Not Described
Olive Groves	2.19	Agriculture (Not Described)	Not Described	--	Not Described

Midpen Types [a,b]	Area (Acres)	Terrestrial Communities [c]	California Vegetation		CNPS Inventory [e]
			Name	Designation [d]	
Plantation Pines	1.48	Pine Plantation (Not Described)	*Pinus radiata* Semi-Natural Alliance (Monterey Pine Plantations) (87.240.04)	--	Not Described
Built-up / Urban Disturbance	244.76	Urban (Not Described)	Not Described	--	Not Described
Government Related Facilities	24.24	Urban (Not Described)	N/A	--	N/A
Land Use / Unvegetated	35.32	Unvegetated (Not Described)	Not Described	--	Not Described
Sparsely Vegetated or Unvegetated Areas	0.66	Unvegetated (Not Described)	Not Described	--	Not Described
Vegetation Restoration Sites	6.71 (+2.27 on serpentine)	Not Described	Not Described	--	Not Described

Notes:

It should be noted that Midpen's vegetation data set may be outdated, has not been entirely field verified, and may be inaccurate in some locations which is an inherent result when mapping at large scales.

[a] Midpen Vegetation Classifications (Midpen, 2018)

[b] Terrestrial Natural Communities of California (Holland, 1986).

[c] A Manual of California Vegetation (Sawyer et al. 2009) or List of Terrestrial Natural Communities (CDFW 2020).

[d] BHS: Biologically Highly Significant Community which are derived from Midpen's Conservation Atlas and current vegetation spatial dataset (Midpen, 2018; Midpen, 2014)
S-Ranks 1-3 are included and appear at the end of the California Vegetation name. These ranks indicate Sensitive Natural Community status (CDFW, 2019). A rank of S1 indicates a vegetation alliance or association as "Critically Imperiled" because of rarity due to very restricted range, very few populations, steep declines, or other factors making it very vulnerable to extirpation from jurisdiction (NatureServe 2020). A rank of S2 indicates a vegetation alliance or association as "Imperiled" because of rarity due to very restricted range, few populations, steep declines, or other factors making it very vulnerable to extirpation from jurisdiction (NatureServe 2020). A rank of S3 indicates a vegetation alliance or association is "Vulnerable," meaning it is at moderate risk of extinction or elimination due to a restricted range, relatively few populations, recent and widespread declines, or other factors (NatureServe 2020). A rank of S? denotes that although insufficient samples exist for the full expected range of a community.

[e] CNPS Inventory of Rare and Endangered Plants of California Habitat Types (CNPS 2020).

Table 2 Aquatic Vegetation Communities Found on Midpen Lands and Potential for Sensitive Communities to Occur

Midpen Types [a,b]	Area (Acres)	Terrestrial Communities [c]	California Vegetation		CNPS Inventory [e]
			Name	Designation [d]	
Wetland					
Bulrush Series	0.35	Coastal and Valley Freshwater Marsh (52410)	*Schoenoplectus* (*acutus, californicus*) Herbaceous Alliance (Hardstem and California Bulrush Marshes) (52.128.00)	S3	Marshes and Swamps
Cattail Series	7.23	Coastal and Valley Freshwater Marsh (52410)	*Typha* (*angustifolia, domingensis, latifolia*) Herbaceous Alliance (Cattail Marshes) (52.050.00)	--	Marshes and Swamps
Meadow Barley Series	4.27	Coastal and Valley Freshwater Marsh (52410)	*Hordeum brachyantherum* Herbaceous Alliance (Meadow Barley Patches) (42.052.00)	S2 / BHS	Meadows and Seeps
Sedge - Juncus Meadow Mapping Unit	9.03	Coastal and Valley Freshwater Marsh (52410)	*Carex nudata* Herbaceous Alliance (Torrent Sedge Patches) (45.182.00)	S2? / BHS	Marshes and Swamps
			Juncus arcticus (var. *balticus, mexicanus*) Herbaceous Alliance (Baltic and Mexican Rush Marshes) (45.562.00)	BHS	
			Juncus patens Herbaceous Alliance (Western Rush Marshes) (45.564.00)	BHS	
			Juncus (*oxymeris, xiphioides*) Provisional Herabceous Alliance (Iris-Leaf Rush Seeps) (45.568.00)	S2? / BHS	

Midpen Types [a,b]	Area (Acres)	Terrestrial Communities [c]	California Vegetation		CNPS Inventory [e]
			Name	Designation [d]	
Undifferentiated Marsh (cattail, bulrush), Permanent Freshwater Marsh, & Wetland	182.00	Coastal and Valley Freshwater Marsh (52410)	*Schoenoplectus* (*acutus, californicus*) Herbaceous Alliance (Hardstem and California Bulrush Marshes) (52.128.00)	S3	Marshes and Swamps
			Typha (*angustifolia, domingensis, latifolia*) Herbaceous Alliance (Cattail Marshes) (52.050.00)	--	
			Water		
Reservoirs	4.57	Not Described	*Azolla* (*filiculoides, microphylla*) Herbaceous Alliance (Mosquito Fern Mats) (52.106.00)	BHS	Not Described
			Hydrilla verticillata – Myriophyllum spicata Herbaceous Alliance (Ruderal Water-Thyme – Eurasian Water Milfoil Aquatic) (52.127.00)	BHS	
			Lemna (minor) and Relatives Provisional Herbaceous Alliance (Duckweed Blooms) (52.105.00)	BHS	
			Ludwigia (*hexapetala, peploides*) Provisional Herbaceous Semi-Natural Alliance (Water Primrose Wetlands) (52.118.00)	BHS	

Midpen Types [a,b]	Area (Acres)	Terrestrial Communities [c]	California Vegetation		CNPS Inventory [e]
			Name	Designation [d]	
Small Ephemeral Ponds	23.44	Not Described	*Lemna* (minor) and Relatives Provisional Herbaceous Alliance (Duckweed Blooms) (52.105.00)	BHS	Not Described
			Azolla (*filiculoides, microphylla*) Herbaceous Alliance (Mosquito Fern Mats) (52.106.00)	BHS	
Water	89.26	Not Described	*Azolla* (*filiculoides, microphylla*) Herbaceous Alliance (Mosquito Fern Mats) (52.106.00)	BHS	Not Described
			Hydrilla verticillata – Myriophyllum spicata Herbaceous Alliance (Ruderal Water-Thyme – Eurasian Water Milfoil Aquatic) (52.127.00)	BHS	
			Lemna (minor) and Relatives Provisional Herbaceous Alliance (Duckweed Blooms) (52.105.00)	BHS	
			Ludwigia (*hexapetala, peploides*) Provisional Herbaceous Semi-Natural Alliance (Water Primrose Wetlands) (52.118.00)	BHS	

Midpen Types [a,b]	Area (Acres)	Terrestrial Communities [c]	California Vegetation		CNPS Inventory [e]
			Name	Designation [d]	

Notes:

It should be noted that Midpen's vegetation data set may be outdated, has not been entirely field verified, and may be inaccurate in some locations which is an inherent result when mapping at large scales.

[a] Midpen Vegetation Classifications (Midpen, 2018).

[b] Terrestrial Natural Communities of California (Holland, 1986).

[c] A Manual of California Vegetation (Sawyer et al. 2009) or California Natural Communities List (CDFW, 2019).

[d] BHS: Biologically Highly Significant Community which are derived from Midpen's Conservation Atlas and current vegetation spatial dataset (Midpen 2014; Midpen 2020).
S-Ranks 1-3 are included and appear at the end of the California Vegetation name. These ranks indicate Sensitive Natural Community status (CDFW, 2019). A rank of S1 indicates a vegetation alliance or association as "Critically Imperiled" because of rarity due to very restricted range, very few populations, steep declines, or other factors making it very vulnerable to extirpation from jurisdiction (NatureServe 2020). A rank of S2 indicates a vegetation alliance or association as "Imperiled" because of rarity due to very restricted range, few populations, steep declines, or other factors making it very vulnerable to extirpation from jurisdiction (NatureServe 2020). A rank of S3 indicates a vegetation alliance or association is "Vulnerable," meaning it is at moderate risk of extinction or elimination due to a restricted range, relatively few populations, recent and widespread declines, or other factors (NatureServe 2020). A rank of S? denotes that although insufficient samples exist for the full expected range of a community.

[e] CNPS Inventory of Rare and Endangered Plants of California Habitat Types (CNPS 2020).

Appendix 4.4b Special-Status Species Tables

Special Status Species Tables

The tables below have local distribution references using the CNDDB Element Occurrence Index (EONDX) number (CNDDB 2020). The EONDX is an integer (unique for each record) used within the CNDDB for its GIS relational databases. Factors influencing which determination category are applied to target species are detailed below.

- None denotes a complete lack of habitat suitability, local range restrictions, and/or regional extirpations.
- Not Expected denotes situations where partial habitat elements may be present but are of poor quality or is isolated from the nearest extant occurrences. Incomplete habitat elements refer to a lack of one or more of the following: appropriate elevation, preferred geology, preferred soil chemistry and type, suitable vegetation communities, or necessary microhabitats. The site conditions may also be degraded or significantly altered. These factors create unsuitable ecological conditions for the consideration of even a low occurrence potential within the Program area, therefore they are not considered to have a potential to occur.
- Possible indicates the presence of suitable habitat or key habitat elements that potentially support a specific species or taxa.
- Present indicates the target species occurs within Potential or Existing Treatment areas based on GIS analysis.

Table 3 Special-Status Plant Species Known to Occur or Potentially Occurring on Midpen Lands

Species Name Common Name	Listing Status [a]	Habitat Preferences, Distribution Information, and Notes	Flowering Phenology/Life Form	Habitat Suitability and Local Distribution	Occurrence Potential
Federal/State Endangered or Threatened and California Rare Species					
Acanthomintha duttonii San Mateo thorn-mint	Fed: FE CA: SE CEQA:1B.1	Occurs on serpentine in chaparral and valley and foothill grassland. Known only from SMT County between 50-300 meters from only five occurrences.	April-June annual herb	Although suitable vegetation associations and substrates are present this species is highly restricted to the serpentine around Crystal Springs Reservoir. There is one CNDDB occurrence recorded nearby the Program Area. CNDDB occurrence EONDX #18110 is a specific location in Edgewood County Park.	Not Expected

Species Name Common Name	Listing Status [a]	Habitat Preferences, Distribution Information, and Notes	Flowering Phenology/Life Form	Habitat Suitability and Local Distribution	Occurrence Potential
Ceanothus ferrisiae Coyote ceanothus	Fed: FE CA: CEQA CEQA: 1B.1 Other: SCVHP	Occurs on serpentine in chaparral, coastal scrub, and valley and foothill grassland. Known only from SCL County between 120-460 meters from only four occurrences.	January-May perennial shrub (evergreen)	Although suitable vegetation associations and substrates are present this species is highly restricted to the serpentine east of Sierra Azul. The nearest recorded CNDDB occurrence (EONDX #1378) is a non-specific location in Croy Canyon approximately 3 miles east of Sierra Azul OSP. This record is based on a historic collection that could have been erroneously identified.	Not Expected
Chorizanthe pungens var. hartwegiana Ben Lomond spineflower	Fed: FE CA: CEQA CEQA: 1B.1	Occurs in maritime ponderosa pine sandhills of lower montane coniferous forest. Known only from SCR County between 90-610 meters.	April-July annual herb	No suitable vegetation associations or sandy substrate present. This species is also restricted to the locations west of the Santa Cruz Mountains crest. The nearest recorded CNDDB occurrence (EONDX #8011) is a non-specific location in the vicinity of Glenwood approximately 2 miles southwest of Sierra Azul OSP. This record is possibly extirpated.	None
Chorizanthe pungens var. pungens Monterey spineflower	Fed: FT CA: None CEQA: 1B.2	Occurs on sandy soils in maritime chaparral, cismontane woodland, coastal dunes, coastal scrub, and valley and foothill grassland. Known from MNT and SCR counties between 3-450 meters. Presumed extirpated from SLO County.	April-June annual herb	No suitable vegetation associations or sandy substrate present. This species is also restricted to the locations west of the Santa Cruz Mountains crest. The nearest recorded CNDDB occurrence (EONDX #29626) is a specific location at the northwest end of Pleasant Valley, 5 miles south of Sierra Azul OSP.	None
Chorizanthe robusta var. hartwegii Scotts Valley spineflower	Fed: FE CA: None CEQA: 1B.1	Occurs in sandy meadows and seeps and on mudstone and Purisima outcrops of valley and foothill grassland. Known only from SCR county between 230-245 meters from only four occurrences.	April-July annual herb	No suitable vegetation associations or sandy substrate present. This species is also restricted to the locations west of the Santa Cruz Mountains crest. The nearest recorded CNDDB occurrence (EONDX #7271) is a specific location in Scotts Valley 5.6 miles southwest of Sierra Azul OSP.	None

Species Name Common Name	Listing Status [a]	Habitat Preferences, Distribution Information, and Notes	Flowering Phenology/Life Form	Habitat Suitability and Local Distribution	Occurrence Potential
Chorizanthe robusta var. robusta robust spineflower	Fed: FE CA: None CEQA: 1B.1	Occurs in sandy or gravelly soils in maritime chaparral, openings of cismontane woodland, coastal dunes, and coastal scrub. Known from MNT, SCR, and SFO counties between 3-300 meters. Potentially found in MRN county. Presumed extirpated from ALA, SCL, and SMT counties.	April-September annual herb	Although suitable vegetation associations are present within the Program Area this species prefers sandy soils closer to the coast, bayside, or riverine environments. There is one CNDDB occurrence recorded nearby the Program Area at El Sereno OSP and St. Joseph's Hill OSP. CNDDB occurrence EONDX #22582 is a non-specific location in the general vicinity of Los Gatos that is based on a historical collection and is likely extirpated.	Not Expected
Cirsium fontinale var. fontinale Crystal Springs fountain thistle	Fed: FE CA: SE CEQA: 1B.1	Occurs on serpentine seeps in openings of chaparral, cismontane woodland, meadows and seeps, and valley and foothill grassland. Known only from SMT County between 45-175 meters. Known from only five occurrences in the vicinity of Crystal Springs Reservoir.	May-October perennial herb	Although suitable vegetation associations and substrates are present this species is highly restricted to the serpentine around Crystal Springs Reservoir. One CNDDB occurrence is recorded nearby the Program Area. CNDDB occurrence EONDX #4492 is a specific location at the south end of Edgewood County Park that is possibly extirpated. Pulgas Ridge OSP is not mapped as including serpentine.	Not Expected
Dudleya abramsii subsp. setchellii Santa Clara Valley dudleya	Fed: FE CA: None CEQA: 1B.1 Other: SCVHP	Occurs on serpentine, rocky soils in cismontane woodland and valley and foothill grassland. Known only from SCL County between 60-455 meters.	April-October perennial herb	Suitable vegetation associations and serpentine habitat are present within the Program Area. There are two CNDDB occurrences recorded within Sierra Azul OSP. CNDDB occurrences EONDX #94251 and 94250 are specific locations approximately 0.6 mile south and 0.6 mile WSW of Guadalupe Dam. This taxon possibly occurs in treatment areas within Sierra Azul OSP. on serpentine grassland. It occupies rock outcrops and serpentine barrens that do not carry fire well.	Possible

Species Name Common Name	Listing Status [a]	Habitat Preferences, Distribution Information, and Notes	Flowering Phenology/Life Form	Habitat Suitability and Local Distribution	Occurrence Potential
Eriophyllum latilobum San Mateo woolly sunflower	Fed: FE CA: SE CEQA: 1B.1	Occurs in cismontane woodland on road cuts and often serpentine, coastal scrub, and lower montane coniferous forest. Known only from SMT County between 45-330 meters. Specimens from NAP county need verification.	May-June perennial herb	Suitable vegetation associations and substrates present within the Program Area. It is suspected that this species is a pyrophyte. There is one CNDDB occurrence recorded within the Program Area at Russian Ridge and Coal Creek OSPs. CNDDB occurrence EONDX #63072 is a non-specific area along Highway 35, 9 miles north of Saratoga Summit. The occurrence noted above is from the 1960s and has not been reported since. It is likely this occurrence extirpated however, it possibly occurs in treatment areas that support oak woodland habitat providing partial shade in the vicinity of Coal Creek OSP and Russian Ridge OSP. This species is presumed to be of hybrid origin between two fire adapted Eriophyllum species, therefore this species could benefit from burning or opening closed canopy woodlands.	Possible
Erysimum teretifolium Santa Cruz wallflower	Fed: FE CA: SE CEQA: 1B.1	Occurs on inland marine sands in chaparral and lower montane coniferous forest. Known only from SCR County between 120-610 meters.	March-July perennial herb	No suitable vegetation associations or sandy substrate present. This species is also restricted to the locations west of the Santa Cruz Mountains crest. The nearest recorded CNDDB occurrence (EONDX #8009) is a non-specific location in the vicinity of Glenwood approximately 2.1 miles southwest of Sierra Azul OSP. This occurrence is possibly extirpated.	None
Hesperocyparis abramsiana var. abramsiana Santa Cruz cypress	Fed: FT CA: SE CEQA: 1B.2	Occurs on sandstone or granitic soils in closed-cone coniferous forest, chaparral, and lower montane coniferous forest. Known only from SCR County between 280-	perennial tree (evergreen)	Although suitable vegetation associations and substrate are present this species is restricted to areas of northwestern Santa Cruz County. The nearest CNDDB occurrence (EONDX #14440) is a	Not expected

Species Name Common Name	Listing Status [a]	Habitat Preferences, Distribution Information, and Notes	Flowering Phenology/Life Form	Habitat Suitability and Local Distribution	Occurrence Potential
		800 meters from only seven occurrences.		specific location in Bracken Brae Grove 6.6 miles west of Bear Creek Redwoods OSP.	
Hesperocyparis abramsiana var. butanoensis Butano Ridge cypress	Fed: FT CA: SE CEQA: 1B.2	Occurs on sandstone soils in closed-cone coniferous forest, chaparral, and lower montane coniferous forest. Known only from one occurrence on Butano Ridge of the Santa Cruz Mountains between 400-490 meters.	perennial tree (evergreen)	Although suitable vegetation associations and substrate are present this species is restricted to a small area in southern San Mateo County The nearest CNDDB occurrence (EONDX #86559) is a specific location on the southwest-facing slope of Butano Ridge, 4.1 miles south of Russian Ridge OSP.	Not Expected
Hesperolinon congestum Marin western flax	Fed: FT CA: ST CEQA: 1B.1	Occurs on serpentine in chaparral and valley and foothill grassland. Protected in part at Ring Mountain Preserve in Marin County. Known from MRN, SFO, and SMT counties between 5-370 meters.	April-July annual herb	Although suitable vegetation associations and substrates are present this species is highly restricted to the serpentine around Crystal Springs Reservoir and Edgewood. Two CNDDB occurrences are recorded near the Program Area. CNDDB occurrences EONDX #7809 and 20708 are specific locations at Edgewood County Park. Pulgas Ridge OSP is not mapped as including serpentine.	Not Expected
Holocarpha macradenia Santa Cruz tarplant	Fed: FT CA: SE CEQA: 1B.1	Occurs on sandy, often clay soils in coastal prairie, coastal scrub, and valley and foothill grassland. Known from MNT, SCR, and SOL counties between 10-220 meters. Presumed extirpated from ALA, CCA, and MRN counties.	June-October annual herb	Although suitable vegetation associations and substrates are present within the Program Area, locally this species is restricted to the immediate Santa Cruz coast. The nearest CNDDB occurrence (EONDX #7435) is a specific location adjacent to the former Monterey Bay Heights golf course 7.1 miles south of Sierra Azul OSP.	Not Expected
Pedicularis dudleyi Dudley's lousewort	Fed: None CA: SR CEQA: 1B.2	Occurs in maritime chaparral, cismontane woodland, North Coast coniferous forest, and valley and foothill grassland. Known from MNT, SLO, and SMT counties	April-June perennial herb	Suitable vegetation associations present. The nearest recorded CNDDB occurrence (EONDX #748) is a specific location 1.2 miles southwest of the Program Area, in Portola Redwoods State Park. This taxon possibly occurs in Treatment areas that support redwood forests on the west slope of the	Possible

Species Name Common Name	Listing Status [a]	Habitat Preferences, Distribution Information, and Notes	Flowering Phenology/Life Form	Habitat Suitability and Local Distribution	Occurrence Potential
		between 60-900 meters. Presumed extirpated from SCR County.		Santa Cruz Mountains crest between Long Ridge OSP and La Honda Creek OSP. This species germinates on bare mineral soil but prefers full shade of a closed canopy. Therefore, vegetation management or prescribed fire activities could benefit this species.	
Pentachaeta bellidiflora white-rayed pentachaeta	Fed: FE CA: SE CEQA: 1B.1	Occurs in cismontane woodland and valley and foothill grassland often on serpentine. Currently only known from SMT County between 35-620 meters. Presumed extirpated from MRN and SCR counties.	March-May annual herb	Although suitable vegetation associations and substrates are present this species is highly restricted to the serpentine around Crystal Springs Reservoir and Edgewood. One CNDDB occurrence is recorded near the Program Area. CNDDB occurrence #27386 is a specific location in Edgewood Triangle and Edgewood County Park.	Not Expected
Plagiobothrys diffusus San Francisco popcornflower	Fed: None CA: SE CEQA: 1B.1	Occurs in coastal prairie and valley and foothill grassland. Known from ALA, SBT, SCR, and SMT counties between 60-360 meters. Presumed extirpated from SFO County.	March-June annual herb	Although suitable vegetation associations and substrates are present within the Program Area, however locally this species is restricted to the immediate Santa Cruz coast. The nearest recorded CNDDB occurrence (EONDX #7437) is a specific location in northern Scotts Valley at "Santa's Village", 5.6 miles southwest of Sierra Azul OSP.	Not Expected
Polygonum hickmanii Scotts Valley polygonum	Fed: FE CA: SE 1B.1	Occurs in valley and foothill grassland on mudstone and sandstone soils. Known only from Scotts Valley in SCR County between 210-250 meters from only two occurrences. Not in TJM.	May-August annual herb	No suitable vegetation associations or sandy substrate present within the Program Area. This species is also restricted to the locations west of the Santa Cruz Mountains crest. The nearest recorded CNDDB occurrence (EONDX #31214) is a specific location in northern Scotts Valley at "Santa's Village" 5.6 miles southwest of Sierra Azul OSP.	None
Sanicula saxatilis rock sanicle	Fed: None CA: SR CEQA: 1B.2	Occurs on rocky, scree, and talus substrates in broadleafed upland forest, chaparral, and valley and	April-May perennial herb	Suitable vegetation associations and substrate present. There is one CNDDB occurrence within the Program Area at Sierra Azul OSP. CNDDB	Possible

Species Name Common Name	Listing Status [a]	Habitat Preferences, Distribution Information, and Notes	Flowering Phenology/Life Form	Habitat Suitability and Local Distribution	Occurrence Potential
		foothill grassland. Known from CCA and SCL counties between 620-1,175 meters from only nine occurrences.		occurrence EONDX #114463 is a specific location on the east slope of Mount Umunhum and upper Guadalupe Canyon. This taxon possibly occurs in Treatment areas that are dominated by scree and talus on ridgetops and peaks of Sierra Azul OSP. These scree and talus habitats do not carry fire.	
Streptanthus albidus subsp. albidus Metcalf Canyon jewelflower	Fed: FE CA: None CEQA: 1B.1 Other: SCVHP	Occurs in valley and foothill grassland on serpentine soils. Known only from SCL County between 45-800 meters.	April-July annual herb	Although suitable vegetation associations and substrates are present in the Program Area this taxon has a narrow distribution that ends near New Almaden. The nearest recorded CNDDB occurrence (EONDX #25391) is a specific location on the ridge north of Danna Rock Park in San Jose 6 miles northeast of Sierra Azul OSP.	Not Expected
Suaeda californica California seablite	Fed: FE CA: None CEQA: 1B.1	Occurs in coastal salt marshes and swamps. Known from ALA, SCL, SFO, and SLO counties between 0-15 meters. Presumed extirpated from CCA county.	July-October shrub (evergreen)	Although suitable vegetation associations are present within the Program Area, Treatments are not anticipated in these habitats. The nearest recorded CNDDB occurrence (EONDX #6725) is a non-specific location on the salt flats of Palo Alto Yacht Harbor approximately 1.3 miles south of Stevens Creek Shoreline Nature Study Area. This occurrence is based on a historical collection and is likely extirpated.	Not Expected
Trifolium amoenum two-fork clover	Fed: FE CA: None CEQA: 1B.1	Occurs in coastal bluff scrub and valley and foothill grassland that can be serpentinitic. Rediscovered in 1993. Currently known from MRN and SMT counties. Presumed extirpated from NAP, SCL, SOL, and SON counties. Has been recorded from 5-415 meters.	April-June annual herb	Although suitable vegetation associations and substrates are present this taxon is known from lower elevations in the northern part of San Mateo County. The nearest recorded CNDDB occurrence (EONDX #84558) is a non-specific location at San Francisquito Creek near Searsville Lake 1 mile east of Thornewood. This occurrence is based on a historic collection.	Not Expected

Species Name Common Name	Listing Status [a]	Habitat Preferences, Distribution Information, and Notes	Flowering Phenology/Life Form	Habitat Suitability and Local Distribution	Occurrence Potential
Trifolium polyodon Pacific Grove clover	Fed: None CA: SR CEQA: 1B.1	Occurs on mesic, sometimes granitic substrates in closed-cone coniferous forest, coastal prairie, meadows and seeps, and valley and foothill grassland. Known from MNT, MRN, SCR, and SON counties between 5-425 meters.	April-June annual herb	Although suitable vegetation associations and substrates are present this taxon is known from lower elevations in the western part of Santa Cruz County. The nearest recorded CNDDB occurrence (EONDX #113542) is a specific location on Glenwood Preserve 5.7 miles southwest of Sierra Azul OSP.	Not Expected
California Native Plant Society Listed and Locally Rare Species					
Allium peninsulare var. franciscanum Franciscan onion	Fed: None CA: None CEQA: 1B.2	Occurs on clay, volcanic, and most often serpentine sites in cismontane woodland and valley and foothill grassland. Known from MEN, NAP, SCL, SMT and SON counties between 52-305 meters.	May-June perennial herb (bulbiferous)	Vegetation associations and preferred substrates present with in the Program Area. There are four CNDDB occurrences recorded within the Program Area. CNDDB occurrences EONDX #94479 and #94481 are specific locations on Pulgas Ridge OSP near the Dusky-Footed Woodrat trail and along the Polly Geraci trail, respectively. CNDDB occurrences EONDX #94483 and 110308 are specific locations in Edgewood Park. The occurrence in Pulgas Ridge OSP is located within a Potential Treatment area and possibly occurs in other treatment areas that primarily supports intermittent canopy woodlands near grasslands east of Highway 35 and north of Portola Valley. This species prefers partial shade habitats but may not persist when canopies close.	Present and Possible
Amsinckia lunaris bent-flowered fiddleneck	Fed: None CA: None CEQA: 1B.2	Occurs in coastal bluff scrub, cismontane woodland and valley and foothill grassland. Many collections are old. Known from ALA, CCA, COL, LAK, MRN, NAP, SBT, SCL, SCR, SMT SON, SUT, and	March-June annual herb	Suitable vegetation associations are present within the Program Area. The nearest recorded CNDDB occurrence (EONDX #109708) is a specific location on Limekiln trail just south of St. Joseph's Hill OSP. This taxon possibly occurs in Treatment areas that provide grassland ecotones with the other vegetation types listed on the west slope of the	Possible

Species Name Common Name	Listing Status [a]	Habitat Preferences, Distribution Information, and Notes	Flowering Phenology/Life Form	Habitat Suitability and Local Distribution	Occurrence Potential
		YOL counties between 3-500 meters.		Santa Cruz Mountains from St. Joseph's Hill OSP north. This species prefers to be on the margin of grassland and scrub or woodland. Changes in vegetation structure, such as scrub encroachment or removal, could be detrimental.	
Androsace elongata subsp. acuta California androsace	Fed: None CA: None CEQA: 4.2	Occurs in chaparral, cismontane woodland, coastal scrub, meadows and seeps, pinyon and juniper woodland, and valley and foothill grassland. Known from ALA, CCA, COL, FRE, GLE, KRN, LAX, MER, RIV, SBD, SBT, SCL, SDG, SIS, SJQ, SLO, SMT, STA, and TEH counties between 150-1,305 meters.	March-June annual herb	Suitable vegetation associations are present within the Program Area. The nearest herbarium record is a McMurphy collection (Accession #CAS-BOT-BC-46952) from Page Mill Rd. about 3 miles east of Windy Hill OSP. This taxon possibly occurs in Treatment areas that support a variety of habitats but typically occur in areas with very little vegetative cover nearby rock outcrops in the vicinity of Windy Hill OSP. These are habitats that do not carry fire well.	Possible
Anomobryum julaceum slender silver moss	Fed: None CA: None CEQA: 4.2	Occurs on damp rock and soil on outcrops, usually on roadcuts in broadleafed upland forest, lower montane coniferous forest, and North Coast coniferous forest. Known from BUT, CCA, HUM, LAX, MPA, SBA, SCR, SHA, and SON counties between 100-1,000 meters.	moss	Although suitable vegetation associations are present this species is locally distributed to the western part of Santa Cruz County. The nearest recorded CNDDB occurrence (EONDX #45371) is a non-specific location in Big Basin Redwoods State Park approximately 3.8 miles southwest of Long Ridge OSP.	Not Expected
Arabis blepharophylla coast rockcress	Fed: None CA: None CEQA: 4.3	Occurs on rocky substrates in broadleafed upland forest, coastal bluff scrub, coastal prairie, and coastal scrub. Known from CCA, LAK, MNT, MRN, SFO, SMT, and SON counties between 3-1,100 meters. Uncertain about distribution in SCR County.	February-May perennial herb	Suitable vegetation associations are present within the Program Area. The nearest herbarium record is a V. Mayer collection (Accession #9992) from above Guadalupe Reservoir on the eastern edge of Sierra Azul OSP. However, this collection seems suspect as it is too far south and inland for the known range of this species.	Possible

Species Name Common Name	Listing Status [a]	Habitat Preferences, Distribution Information, and Notes	Flowering Phenology/Life Form	Habitat Suitability and Local Distribution	Occurrence Potential
				This species possibly occurs in Treatment areas that support rocky grassland habitat in the vicinity of Teague Hill OSP. This species does not do well in understory conditions.	
Arctostaphylos andersonii Anderson's manzanita	Fed: None CA: None CEQA: 1B.2	Occurs in broadleafed upland forest, chaparral, and North Coast coniferous forest in openings and edges. Known from SCL, SCR, and SMT counties between 60-760 meters. Confused with other species merged with it as varieties.	November-May shrub (evergreen)	Suitable vegetation associations and structure present within the Program Area. Two CNDDB occurrences are recorded within the Program Area at La Honda Creek OSP and Sierra Azul OSP. CNDDB occurrence EONDX #64138 is a non-specific location on Highway 35 southwest of Wunderlich County Park from historical collections. CNDDB occurrence EONDX #96082 is a specific location on the southwest side of Soquel Creek, just south of the Sierra Azul OSP boundary. The occurrence in La Honda Creek OSP is in a Potential Treatment area and possibly occurs in other Treatment areas in forest and woodland habitat with intermittent canopies throughout the Program Area. As a manzanita this species is fire adapted and an obligate seeder. It could benefit from creating openings in canopy structure and members of the same species complex have been known to germinate from fuels reduction projects.	Present and Possible
Arctostaphylos glutinosa Schreiber's manzanita	Fed: None CA: None CEQA: 1B.2	Occurs on diatomaceous shale substrate in closed-cone coniferous forest and chaparral. Known only from SCR county from seven occurrences between 170-685 meters.	March-April perennial shrub (evergreen)	No suitable vegetation associations are present on the necessary substrate. This species is also restricted to the Big Basin area of Santa Cruz County. The nearest recorded CNDDB occurrence (EONDX #20237) is a specific location within a mile of Eagle Rock approximately 8 miles southwest of Long Ridge OSP.	None

Species Name Common Name	Listing Status [a]	Habitat Preferences, Distribution Information, and Notes	Flowering Phenology/Life Form	Habitat Suitability and Local Distribution	Occurrence Potential
Arctostaphylos ohloneana Ohlone manzanita	Fed: None CA: None CEQA: 1B.1	Occurs on siliceous shale substrate in closed-cone coniferous forest and coastal scrub. Known only from SCR county from four occurrences between 450-530 meters.	February-March perennial shrub (evergreen)	No suitable vegetation associations are present on the necessary substrate. This species is also restricted to the Big Basin area of Santa Cruz County. The nearest recorded CNDDB occurrence (EONDX #75420) is a specific location just north of Big Basin Redwoods State Park and 9.2 miles southwest of Long Ridge OSP.	None
Arctostaphylos regismontana Kings Mountain manzanita	Fed: None CA: None CEQA: 1B.2	Occurs in granitic or sandstone sites in broadleafed upland forest, chaparral, and North Coast coniferous forest. Known from SCL and SMT counties between 305-730 meters. May be found in SCR County.	December-April shrub (evergreen)	Suitable vegetation associations and substrates present within the Program Area. There are 12 CNDDB occurrences recorded within the Program Area at Long Ridge, Purisima Creek, El Corte de Madera Creek, Teague Hill, La Honda Creek, Thornewood, and Edgewood OSPs. CNDDB occurrences EONDX #56344, 56351, 56346, and 56345 are non-specific locations at the head of Peters Creek in Long Ridge OSP, WNW of Sierra Moreno, on Skyline Blvd. north of the junction with Kings Mountain Rd., and in the vicinity of Kings Mountain Road between Woodside and Skyline Blvd, respectively. CNDDB occurrences EONDX #56352 and #56355 are specific locations in El Corte de Madera OSP in the vicinity of Skeggs Point and at the south end of the preserve. CNDDB occurrences EONDX #94283 and #94284 are specific locations at the north end of La Honda Creek OSP. CNDDB occurrences EONDX #56349 and #94288 are specific locations in Teague Hill OSP. CNDDB occurrence EONDX #94293 is a specific location at Edgewood County Park. The occurrences in Teague Hill, El Corte de Madera Creek, Thornewood, and La Honda Creek OSPs are within Potential and Existing Treatment	Present and Possible

Species Name Common Name	Listing Status [a]	Habitat Preferences, Distribution Information, and Notes	Flowering Phenology/Life Form	Habitat Suitability and Local Distribution	Occurrence Potential
				areas. The species possibly occurs in other Treatment areas that support forest and woodland habitat on Butano sandstone primarily from El Corte de Madera Creek OSP and north. As a manzanita this species is fire adapted and an obligate seeder. It could benefit from creating openings in canopy structure.	
Arctostaphylos silvicola Bonny Doon manzanita	Fed: None CA: None CEQA: 1B.2	Occurs on inland marine sands in closed-cone coniferous forest, chaparral, and lower montane coniferous forest. Known only from SCR County between 120-600 meters.	January-March perennial shrub (evergreen)	No suitable vegetation associations are present on the necessary substrate. This species also restricted to the area surrounding Santa Cruz, west of the Santa Cruz Mountain crest. The nearest recorded CNDDB occurrence (EONDX #98610) is a non-specific location around the town of Glenwood approximately 2 miles west of Sierra Azul OSP.	None
Astragalus nuttallii var. nuttallii ocean bluff milk-vetch	Fed: None CA: None CEQAL: 4.2	Occurs in coastal bluff scrub and coastal dunes. Known from MNT, MRN, SBA, SLO, and SMT counties between 3-120 meters. Presumed extirpated from ALA and SFO counties.	January-November perennial herb	No suitable vegetation associations are present on the necessary substrate. The nearest herbarium record is a G. E. Sindel collection (Accession #UC1128883) from NNW of Pescadero approximately 4 miles south of Tunitas Creek OSP.	None
Astragalus pycnostachyus var. pycnostachyus coastal marsh milk-vetch	Fed: None CA: None CEQA: 1B.2	Occurs in mesic coastal dunes, coastal scrub, and coastal salt marshes and swamps in streamside sites. Known from HUM, MRN, SLO, and SMT counties between 0-30 meters.	June-October perennial herb	No suitable vegetation associations are present on the necessary substrate or wetland conditions. This species is also restricted to lower elevations on the west side of the Santa Cruz Mountain crest than present within the Program Area. The nearest recorded CNDDB occurrence (EONDX #49630) is a specific location at the mouth of Tunitas Creek, 0.1 mile west of Tunitas Creek OSP.	None
Astragalus tener var. tener alkali milk-vetch	Fed: None CA: None CEQA: 1B.2	Occurs on alkaline substrates in playas, valley and foothill grassland on adobe clay, and vernal pools	March-June annual herb	Although suitable vegetation associations are present the preferred alkaline substrate is absent from the Program Area. The nearest recorded	Not Expected

Species Name Common Name	Listing Status [a]	Habitat Preferences, Distribution Information, and Notes	Flowering Phenology/Life Form	Habitat Suitability and Local Distribution	Occurrence Potential
		between 1-60 meters. Known from ALA, MER, NAP, SOL and YOL counties. Presumed extirpated from CCA, MNT, SBT, SCL, SFO, SJQ, SON, and STA counties.		CNDDB occurrence (EONDX #8259) is a non-specific location near Mayfield Slough approximately 0.9 mile west of Stevens Creek Shoreline Nature Study Area. This occurrence is based on a historical collection and is possibly extirpated.	
Calandrinia breweri Brewer's calandrinia	Fed: None CA: None CEQA: 4.2	Occurs on sandy or loamy soils at disturbed sites and burns in chaparral and coastal scrub. Known from CCA, LAX, MEN, MNT, MPA, MRN, NAP, ORA, RIV, SBA, SBD, SCL, SCR, SCZ, SDG, SHA, SLO, SMT, SON, SRO, and VEN counties between 10-1,220 meters.	March-June annual herb	Suitable vegetation associations present. This species is a pyrophyte but has also known to germinate from mastication. Two herbarium records were collected from within the Program Area. A Rawlings and Hickman collection (Accession #15876) is from the Mt. Umunhum Summit Trail in Sierra Azul OSP. A Thomas collection (Accession #233941) is from the Stevens Creek Reservoir, near Picchetti Ranch and Fremont Older OSPs. This species possibly occurs in chaparral dominated Treatment areas that have been disturbed anywhere in the Program Area.	Possible
Calochortus umbellatus Oakland star-tulip	Fed: None CA: None CEQA: 4.2	Occurs often on serpentine substrate in broadleafed upland forest, chaparral, cismontane woodland, lower montane coniferous forest, and valley and foothill grassland. Known from ALA, CCA, LAK, MRN, SCL, SMT, and STA counties between 100-700 meters. Presumed extirpated from SCR county.	March-May perennial herb (bulbiferous)	Suitable vegetation associations and substrate present within the Program Area. The nearest herbarium record is a Davy collection (Accession #UC423011) from Belmont, approximately 2 miles north of Pulgas Ridge OSP. This species possibly occurs in Treatment areas that primarily support intermittent canopy woodlands near grasslands in the vicinity of Kings Mountain such as Miramontes Ridge, Purisima Creek Redwoods, and Teague Hill OSPs. This species prefers partial shade habitats but may not persist when canopies close.	Possible

Species Name Common Name	Listing Status [a]	Habitat Preferences, Distribution Information, and Notes	Flowering Phenology/Life Form	Habitat Suitability and Local Distribution	Occurrence Potential
Calyptridium parryi var. hesseae Santa Cruz Mountains pussypaws	Fed: None CA: None CEQA: 1B.1	Occurs on sandy or gravelly substrates in openings of chaparral and cismontane woodland. Known from MNT, SCL, SCR, SLO, and STA counties between 305-1,530 meters.	May-August annual herb	Suitable vegetation associations and substrates are present within the Program Area. However, it is suspected that this species is a pyrophyte. One CNDDB occurrence is recorded within the Program Area at Sierra Azul OSP. CNDDB occurrence EONDX #73273 is a non-specific location near Loma Prieta based on historic collections. This taxon possibly occurs in Treatment areas in the vicinity of Sierra Azul OSP. Little is known about this seldom seen species in the Bay Area is suspected to be a narrowly distributed fire follower.	Possible
Carex comosa bristly sedge	Fed: None CA: None CEQA: 2B.1	Occurs in coastal prairie, marshes and swamps on lake margins, and valley and foothill grassland. Known from CCA, LAK, MEN, SAC, SCR, SHA, SJQ, and SON counties between 0-625 meters. Presumed extirpated from SBD and SFO counties.	May-September perennial herb (rhizomatous)	Although suitable vegetation associations are present within the Program Area this taxon occurs west of the Santa Cruz Mountains crest and occurs in habitat where Treatments are not targeted. The nearest recorded CNDDB occurrence (EONDX #28970) is a specific location at Whites Lagoon 2.9 miles south of Sierra Azul OSP.	Not Expected
Centromadia parryi subsp. congdonii Congdon's tarplant	Fed: None CA: None CEQA: 1B.1	Occurs in alkaline sites in valley and foothill grassland. Known from ALA, CCA, MNT, SCL, SLO, and SMT counties between 0-230 meters. Presumed extirpated from SCR and SOL counties.	May-October annual herb	Although suitable vegetation associations are present the preferred alkaline substrate is absent from the Program Area. This species is also restricted to bay shore habitats in this part of its range and occurs in habitat where Treatments are not targeted. One CNDDB occurrence is recorded within the Program Area at Stevens Creek Shoreline Nature Study Area. CNDDB occurrence #42359 is a specific location at Shoreline Mountain View Park.	Not Expected

Species Name Common Name	Listing Status [a]	Habitat Preferences, Distribution Information, and Notes	Flowering Phenology/Life Form	Habitat Suitability and Local Distribution	Occurrence Potential
Chlorogalum pomeridianum var. minus dwarf soaproot	Fed: None CA: None CEQA: 1B.2	Occurs in chaparral on serpentine soils. Known from ALA, COL, GLE, LAK, SCL, SLO, SON, and TEH counties between 305-1,000 meters.	May-August perennial herb (bulbiferous)	Although suitable vegetation associations and substrate are present this taxon occurs on the east side of Santa Clara County east of Coyote Creek. The nearest recorded CNDDB occurrence (EONDX #105965) is a non-specific location near Coyote Creek approximately 6 miles east of Sierra Azul OSP. This occurrence is based on a historic collection.	Not Expected
Chloropyron maritimum subsp. palustre Point Reyes bird's-beak	Fed: None CA: None CEQA: 1B.2	Occurs in coastal salt marshes and swamps. Known from HUM, MRN, SFO, and SON counties and Oregon from 0-10 meters. Presumed extirpated from ALA, SCL, and SMT counties.	June-October annual herb (hemiparasitic)	Although suitable vegetation associations are present within the Program Area, Program Treatments are not anticipated in these habitats. One CNDDB occurrence is recorded within the Program Area at Ravenswood OSP. CNDDB occurrence #17541 is a non-specific location near Palo Alto based on historic collections and is possibly extirpated.	Not Expected
Cirsium fontinale subsp. campylon Mt. Hamilton thistle	Fed: None CA: None CEQA: 1B.2 Other: SCVHP	Occurs on serpentinite seeps in chaparral, cismontane woodland, and valley and foothill grassland. Known from ALA, SCL, and STA counties between 100-890 meters.	April-October perennial herb	Suitable vegetation associations, substrates, and hydrology are present in the Program Area. Four CNDDB occurrences are recorded within the Program Area at Sierra Azul OSP. CNDDB occurrences #94012, #17132, and #80406 are specific locations south of Guadalulpe Reservoir Dam. CNDDB occurrence #60197 is a specific location on the southeast slope of Mount Umunhum in Sierra Azul OSP. The occurrence in Sierra Azul OSP is in a Potential Treatment area and this taxon possibly occurs in other Treatment areas that include serpentine seep habitat with suitable habitat in Sierra Azul OSP. This species occupies habitat that does not typically burn.	Present and Possible

Species Name Common Name	Listing Status [a]	Habitat Preferences, Distribution Information, and Notes	Flowering Phenology/Life Form	Habitat Suitability and Local Distribution	Occurrence Potential
Cirsium praeteriens lost thistle	Fed: None CA: None CEQA: 1A	Known from only two collections from Palo Alto, the most recent in 1901. Presumed extirpated from SCL County. Not in TJM.	June-July perennial herb	Although suitable vegetation and substrate is present this species is endemic to the flatlands around Palo Alto and considered extinct due to urbanization. The nearest recorded CNDDB occurrence (EONDX #27370) is a non-specific location in Palo Alto approximately 1.6 miles west of Ravenswood OSP. This occurrence is based on historic collections and is possibly extirpated.	Not Expected
Clarkia breweri Brewer's clarkia	Fed: None CA: None CEQA: 4.2	Occurs often on serpentine soils in chaparral, cismontane woodland, and coastal scrub. Known from ALA, FRE, MER, MNT, SBT, SCL, and STA counties between 215-1,115 meters.	April-June annual herb	Suitable vegetation associations and substrates present. One herbarium record, a Rawlings and Hickman collection (Accession #15600), is recorded within the Program Area at Sierra Azul OSP. This species possibly occurs in serpentine chaparral Treatment areas of Sierra Azul OSP. It prefers rocky serpentine barren habitat with very little cover that does not carry fire well. Although the genus Clarkia is a well-known pyrophyte.	Possible
Clarkia concinna subsp. automixa Santa Clara red ribbons	Fed: None CA: None CEQA: 4.3	Occurs in chaparral and cismontane woodland. Known from ALA, SCL and SCR counties between 90-1,500 meters.	May-July annual herb	Suitable vegetation associations are present within the Program Area. Seven CNDDB occurrences are recorded within the Program Area at Monte Bello, Fremont Older, Skyline Ridge, Saratoga Gap, Long Ridge, Sierra Azul, and Bear Creek Redwoods OSPs. CNDDB occurrences #996, 29056, 30292, and 28954 are non-specific locations based on historic collections in the vicinity of Gold Mine Creek south of Palo Alto, near Saratoga Summit, in the vicinity of Loma Prieta, and near Lexington, respectively. CNDDB occurrence #832 is a non-specific location west of Saratoga at the junction of Stevens Creek Road and Redwood Gulch Road. CNDDB occurrences #319 and #320 are specific locations	Possible

Species Name Common Name	Listing Status [a]	Habitat Preferences, Distribution Information, and Notes	Flowering Phenology/Life Form	Habitat Suitability and Local Distribution	Occurrence Potential
				along the road to Mt. Umunhum and along the road to El Sombroso in Sierra Azul OSP. All of these occurrences above are non-specific but nearby Potential and Existing Treatment areas. This taxon possiblly occurs in woodland habitat primarily in preserves located in Santa Clara County, from Monte Bello OSP south. The genus Clarkia is a well-known pyrophyte.	
Collinsia corymbosa round-headed Chinese-houses	Fed: None CA: None CEQA: 1B.2	Occurs in coastal dunes. Known from HUM, MEN, SCL, and SON counties from 0-20 meters. May be present in MRN County. Presumed extirpated from SFO County. May intergrade with C. bartsiifolia var. bartsiifolia.	April-June annual herb	No suitable vegetation associations or sand dune habitat present. The nearest recorded CNDDB occurrence (EONDX #104429) is a non-specific location in Palo Alto approximately 1.7 miles from Ravenswood OSP. This occurrence is based on a historic collection and is presumed extirpated by development.	None
Collinsia multicolor San Francisco collinsia	Fed: None CA: None CEQA: 1B.2	Occurs in closed-cone coniferous forest and coastal scrub, sometimes on serpentine. Known from MNT, MRN, SCL, SCR, SFO, and SMT counties between 30-250 meters.	March-May annual herb	Suitable vegetation associations and substrates present within the Program Area. This species also occurs in cismontane locally. Two CNDDB occurrences are recorded within the Program Area. CNDDB occurrence #81186 is a non-specific location in Almaden Quicksilver County Park. CNDDB occurrence #56870 is a specific location at Edgewood County Park. The occurrence at Almaden Quicksilver is in a Potential Treatment area and this species possibly occurs in other Treatment areas within openings of forest and scrub canopies with suitable habitat in Sierra Azul OSP. This species prefers partial shade conditions of given habitats.	Present and Possible

Species Name Common Name	Listing Status [a]	Habitat Preferences, Distribution Information, and Notes	Flowering Phenology/Life Form	Habitat Suitability and Local Distribution	Occurrence Potential
Cypripedium fasciculatum clustered lady's-slipper	Fed: None CA: None CEQA: 4.2	Occurs in lower montane coniferous forest and North Coast coniferous forest usually in serpentine seeps and streambanks. Known from BUT, DNT, GLE, HUM, MEN, NEV, PLU, SCL, SHA, SIE, SIS, SMT, THE, TRI and YUB counties between 100-2,435 meters. Presumed extirpated from SCR county.	March-August perennial herb (rhizomatous)	Suitable vegetation associations, hydrology, and substrates present with in the Program Area. The nearest herbarium record is a Deitrich collection (Accession#UC673588) from Lake Pilarcitos, about 5 miles north of Miramontes OSP. This species possibly occurs in Treatment areas that support coniferous forest and are located on serpentine wetlands.	Possible
Cypripedium montanum mountain lady's-slipper	Fed: None CA: None CEQA: 4.2	Occurs is broadleafed upland forest, cismontane woodland, lower montane coniferous forest and North Coast coniferous forest. Known from DNT, GLE, HUM, MAD, MOD, MPA, PLU, SHA, SIE, SIS, SON, THE, and TUO counties between 185-2,225 meters. Presumed extirpated in SCR and SMT counties.	March-August perennial herb (rhizomatous)	Suitable vegetation associations and hydrology are present with in the Program Area. The nearest herbarium record is a Davis collection (Accession#UC429115) from the Lexington Hills about 1 mile east of Bear Creek Redwoods OSP. This species possibly occurs in Treatment areas that support moist forest and woodland habitats located on the west side of the Santa Cruz Mountain crest north of Saratoga Gap OSP. The habitat this species occurs in does not carry fire well.	Possible
Dirca occidentalis western leatherwood	Fed: None CA: None CEQA: 1B.2	Occurs on mesic sites in broadleafed upland forest, closed-cone coniferous forest, chaparral, cismontane woodland, North Coast coniferous forest, riparian forest, and riparian woodland. Populations declining not reproducing well. Known from ALA, CCA, MRN, SCL, SMT, and SON counties between 25-425 meters.	January-April shrub (deciduous)	Suitable vegetation associations and site conditions present within the Program Area. There are 17 CNDDB occurrences recorded within the Program Area. CNDDB occurrences EONDX #64045, 56206, 94408, 94412, and 94410 are specific locations in La Honda Creek OSP. CNDDB occurrences EONDX #29967, 29966, and 29965 are specific locations in Edgewood County Park. CNDDB occurrences #29985, 29986, and 94390 are non-specific locations near Langley Hill, at St. Joseph's Seminary in Rancho San Antonio County	Present and Possible

Species Name Common Name	Listing Status [a]	Habitat Preferences, Distribution Information, and Notes	Flowering Phenology/Life Form	Habitat Suitability and Local Distribution	Occurrence Potential
				Park, and at Picchetti Ranch OSP, respectively. CNDDB occurrences #81046, 81050, 94397, 94392, 94414, and 94402 are specific locations in Rancho San Antonio County Park, Windy Hill OSP, Coal Creek OSP, Fremont Older OSP, Pulgas Ridge OSP, and Los Trancos OSP, respectively. The occurrences in La Honda Creek, Windy Hill, Coal Creek, Los Trancos, Rancho San Antonio, and Picchetti Ranch OSPs are within Potential and Existing Treatment areas. This species possibly occurs in other Treatment areas, primarily in these preserves and further north. It almost always occupies openings of woodlands, roadsides, or low canopy shrubland were it has access to filtered light or partial shade. These conditions may be a result of disturbance, such as fire, creating an opening in woodland canopies.	
Elymus californicus California bottle-brush grass	Fed: None CA: None CEQA: 4.3	Occurs in broadleafed upland forest, cismontane woodland, North Coast coniferous forest and riparian woodland. Known from MRN, SCR, SMT and SON counties between 15-470 meters.	May-August perennial herb	Suitable vegetation associations are present in the Program Area. The nearest herbarium record is a Kellogg collection (Accession #UC50673) from San Gregorio's Redwoods, less than 0.1 mile north of Tunitas Creek OSP. This species possibly occurs in Treatment areas with woodland and forest habitat from La Honda OSP north. Perennial native grasses typically benefit from fire. This species could be harmed from creating openings in the canopy.	Possible
Eriogonum nudum var. decurrens Ben Lomond buckwheat	Fed: None CA: None CEQA: 1B.1	Occurs on sandy substrates in chaparral, cismontane woodland, and maritime ponderosa pine sandhills. Known from SCR county	June-October perennial herb	No suitable vegetation associations on the necessary sandy substrate are present. This species is also restricted to the locations west of the Santa Cruz Mountains crest. The nearest recorded CNDDB occurrence (EONDX #109953) is a	Not Expected

Species Name Common Name	Listing Status [a]	Habitat Preferences, Distribution Information, and Notes	Flowering Phenology/Life Form	Habitat Suitability and Local Distribution	Occurrence Potential
		counties between 50-800 meters. Possibly occurs in SCL county.		non-specific location south of Glenwood approximately 4 miles west of Sierra Azul OSP. This occurrence is based on a historic collection.	
Eryngium aristulatum var. *hooveri* Hoover's button-celery	Fed: None CA: None CEQA: 1B.1	Occurs in vernal pools. Known from ALA, SBT, SDG, and SLO counties between 3-45 meters. Presumed extirpated from SCL County. Almost all collections old.	July annual/perennial herb	No suitable vegetation associations or vernal hydrology present. This species is also restricted to bay shore habitats in this part of its range and occurs in habitat where Treatments are not targeted. The nearest recorded CNDDB occurrence (EONDX #56045) is a non-specific location near Stanford University, approximately 3 miles east of Windy Hill OSP. This occurrence is based on historic collections and is possibly extirpated.	None
Eryngium jepsonii Jepson's coyote thistle	Fed: None CA: None CEQA: 1B.2	Occurs in clay sites in valley and foothill grassland and vernal pools. Known from ALA, AMA, CAL, CCA, FRE, NAP, SMT, SOL, STA, TUO, and YOL counties between 3-300 meters. Previously misapplied in part to E. aristulatum var. aristulatum.	April-August perennial herb	Suitable vegetation associations and substrate present. The nearest recorded CNDDB occurrence (EONDX #103656) is a non-specific location approximately 1.5 miles east of the Program Area, at Jasper Ridge Biological Preserve. This species possible occurs in Treatment areas that support grassland habitat in lower elevation OSPs nearby Jasper Ridge. This perennial species is not likely to be negatively impacted by fire.	Possible
Erysimum franciscanum San Francisco wallflower	Fed: None CA: None CEQA: 4.2	Often occurs on serpentine or granitic soils in chaparral, coastal dunes, coastal scrub, and valley and foothill grassland. Rare and declining in SCR County. Includes E. f. var. crassifolium. Known from MRN, SCL, SCR, SFO, SMT, and SON counties between 0-550 meters.	March-June perennial herb	Although suitable vegetation associations are present in the Program Area, its preferred serpentine or granitic substrates are absent from the northern portion of the study are where it would be possible. The nearest herbarium record is a Yadon collection (Accession #H-0186) from Pigeon Point Lighthouse about 11.5 miles southwest of Russian Ridge OSP.	Not Expected

Species Name Common Name	Listing Status [a]	Habitat Preferences, Distribution Information, and Notes	Flowering Phenology/Life Form	Habitat Suitability and Local Distribution	Occurrence Potential
Fissidens pauperculus minute pocket moss	Fed: None CA: None CEQA: 1B.2	Occurs in North Coast coniferous forest. Known from ALA, BUT, DNT, HUM, MEN, MRN, SCR, SMT, SON and YUB counties between 10-1,024 meters.	Moss	Suitable vegetation associations are present within the Program Area. The nearest CNDDB occurrence is recorded immediately adjacent to the Program Area, abutting Long Ridge and Skyline Ridge OSPs. CNDDB occurrence #94043 is a non-specific location at Portola State Park based on a historic collection. This taxon possible occurs in Treatment areas with suitable habitat preferably road cuts and bare mineral soil at Long Ridge, Skyline Ridge, and Tunitas Creek OSPs. The type of preferred habitat this species occupies is not expected to carry fire well. Openings in the forest canopy may harm this species.	Possible
Fritillaria liliacea Fragrant fritillary	Fed: None CA: None CEQA: 1B.2 Other: SCVHP	Occurs in cismontane woodland, coastal prairie, coastal scrub, and valley and foothill grassland near the coast, on clay or serpentinite. Known from ALA, CCA, MNT, MRN, SBT, SCL, SFO, SMT, SOL and SON counties between 3-410 meters.	February-April perennial herb (bulbiferous)	Suitable vegetation associations and substrate are present within the Program Area. Three CNDDB occurrences are recorded within the Program Area. CNDDB occurrence EONDX #94640 is a specific area northwest of Guadalupe Reservoir at Sierra Azul OSP. CNDDB occurrences EONDX #17657 and 22375 are specific locations in Edgewood County Park. This species possibly occurs in Treatment areas that support serpentine grassland habitat between Sierra Azul OSP and Rancho San Antonio OSP. This bulbiferous species is not likely to be negatively impacted by fire. Fire can be a benefit to some bulbiferous taxa.	Possible
Galium andrewsii subsp. gatense	Fed: None CA: None CEQA: 4.2	Occurs on serpentine, rocky substrates in chaparral, cismontane woodland, and lower montane	April-July perennial herb	Suitable vegetation associations and substrates are present in the Program Area. There is one herbarium record within the Program Area. A	Possible

Species Name Common Name	Listing Status [a]	Habitat Preferences, Distribution Information, and Notes	Flowering Phenology/Life Form	Habitat Suitability and Local Distribution	Occurrence Potential
phlox-leaf serpentine bedstraw		coniferous forest. Known from ALA, CCA, COL, FRE, LAX, MNT, SBT, SCL, and SLO counties between 150-1,450 meters.		Rawlings and Hickman collection (Accession #CAS-BOT-BC-626460) is recorded on Mt. Umunhum in Sierra Azul OSP. This species possibly occurs in Treatment areas with rocky substrates at higher elevations of Sierra Azul OSP. The preferred habitat of this species does not carry fire well.	
Grimmia torenii Toren's grimmia	Fed: None CA: None CEQA: 1B.3	Occurs in openings, on boulder and rock walls, and on rocky, carbonate, and volcanic substrates in chaparral, cismontane woodland, and lower montane coniferous forest. Known from CCA, COL, LAK, MEN, MNT, SCR, and SMT counties between 325-1,160 meters.	moss	Although suitable vegetation associations and substates are present within the Program Area this species is locally restricted to the area around Big Basin. The nearest recorded CNDDB occurrence (EONDX #93670) is a specific location 3.7 miles west of Long Ridge OSP, in Big Basin Redwoods State Park.	Not Expected
Grimmia vaginulata vaginulate grimmia	Fed: None CA: None CEQA: 1B.1	Occurs on rocky, carbonate substrate and on boulder and rock walls in openings of chaparral. Known from SBD and SCR counties.	moss	Although suitable vegetation associations and substates are present within the Program Area this species is locally restricted to the area around Big Basin. The nearest recorded CNDDB occurrence (EONDX #93658) is a specific location in Big Basin Redwoods State Park 3.7 miles west of Long Ridge OSP. This is the type locality for this species.	Not Expected
Grindelia hirsutula var. maritima San Francisco gumplant	Fed: None CA: None CEQA: 3.2	Occurs on serpentine or sandy substrates in coastal bluff scrub, coastal scrub, and valley and foothill grassland. Can be difficult to identify. Known from MRN, SFO, SLO, and SMT counties between 15-400 meters. Possibly occurs in MNT and SCR counties.	August-September perennial herb	Although suitable vegetation associations and substrates are present in the Program Area, this taxon prefers more immediate coastal habitats. The nearest recorded CNDDB occurrence (EONDX 16946) is about 7 miles northwest of Miramontes Ridge OSP in McNee Ranch State Park.	Not Expected

Species Name Common Name	Listing Status [a]	Habitat Preferences, Distribution Information, and Notes	Flowering Phenology/Life Form	Habitat Suitability and Local Distribution	Occurrence Potential
Hesperevax sparsiflora var. brevifolia short-leaved evax	Fed: None CA: None CEQA: 1B.2	Occurs in sandy coastal bluff scrub, coastal dunes, and coastal prairie. Known from DNT, HUM, MEN, MRN, SCR, SMT, and SON counties between 0-215 meters. Also known from Oregon. Presumed extirpated from SFO County. May intergrade with var. sparsiflora in the San Francisco Bay area.	March-June annual herb	No suitable vegetation associations are present within the Program Area. The nearest recorded CNDDB occurrence (EONDX #72673) is a non-specific location on Black Mountain, near Skyline Blvd, 2.9 miles north of Miramontes Ridge OSP. This occurrence is based on a historic collection.	None
Hoita strobilina Loma Prieta hoita	Fed: None CA: None CEQA: 1B.1 Other: SCVHP	Occurs usually on serpentinitic and mesic sites in chaparral, cismontane woodland, and riparian woodland. Known from CCA, SCL, and SCR counties between 30-860 meters. Presumed extirpated from ALA County	May-October perennial herb	Suitable vegetation associations, substrates and site conditions are present in the Program Area. Ten CNDDB occurrences are recorded within the Program Area. CNDDB occurrences #63301 and #50137 are specific locations NNW and northeast of Lexington Dam in El Sereno and Saint Joseph's Hill OSPs. CNDDB occurrence #63302 is a non-specific location east of Lexington Dam in Sierra Azul OSP. CNDDB occurrences #63303, 80507, 80510, 50134, 60439, 60447, and 63296 are all specific locations in Sierra Azul OSP east of Lexington Dam, southwest of Guadalupe Reservoir Dam, south of Guadalupe Reservoir Dam, on Loma Prieta Ave, west of Jacques Ridge, on the southeast slope of Mt. Umunhum, and south of the mouth of Rincon Creek, respectively. The occurrences in St. Joseph's Hill OSP and Sierra Azul OSP are within Potential and Existing Treatment areas. This species possibly occurs in other Treatment areas primarily on serpentine in chaparral and woodland ecotones in Santa Clara County preserves south of El Sereno OSP. As as perennial herb this species fire response is likely	Present and Possible

Species Name Common Name	Listing Status [a]	Habitat Preferences, Distribution Information, and Notes	Flowering Phenology/Life Form	Habitat Suitability and Local Distribution	Occurrence Potential
				neutral. However, Changes in vegetation structure, could be detrimental.	
Horkelia cuneata var. sericea Kellogg's horkelia	Fed: None CA: None CEQA: 1B.1	Occurs in sandy or gravelly openings in closed-cone coniferous forest, maritime chaparral, coastal dunes, and coastal scrub. Known from MNT, SBA, SCR, SLO, and SMT counties between 10-200 meters. Presumed extirpated from ALA, MRN, and SFO counties. Occurrence from the Crocker Hills probably the last remaining location in S.F. Bay.	April-September perennial herb	Suitable vegetation associations and substrates present within the Program Area. The nearest recorded CNDDB occurrence (EONDX #64647) is a specific location just east of Half Moon Bay approximately 1 mile north of Miramontes Ridge OSP. This taxon possibly occurs in Treatment areas on the margins of coastal scrub and maritime chaparral between La Honda Creek OSP and Miramontes Ridge OSP. Due to its preference for edge habitat on scrub and chaparral this species is considered fire adapted. Changes in vegetation structure, such as scrub encroachment or removal, could be detrimental.	Possible
Iris longipetala coast iris	Fed: None CA: None CEQA: 4.2	Occurs in coastal prairie, lower montane coniferous forest, and mesic meadows and seeps. Known from ALA, CCA, HUM, MEN, MNT, MRN, NAP, SBT, SCL, SFO, SMT, SOL, and SON between 0-600 meters.	March-May perennial herb (rhizomatous)	Suitable vegetation associations and hydrology present within the Program Area. The nearest herbarium record is a Haller collection (Accession #UCSB003161) from the road to Skyline Drive about 0.1 mile north of Thornewood OSP. This species possibly occurs in Treatment areas with suitable habitat that are mesic or include seeps in the north of Windy Hill OSP and La Honda OSP. The mesic habitat this species prefers does not carry fire well.	Possible
Lasthenia californica subsp. *macrantha* perennial goldfields	Fed: None CA: None CEQA: 1B.2	Occurs in coastal bluff scrub, coastal dunes, and coastal scrub. Known from DNT, HUM, MEN, MRN, SCR, SLO, SMT, and SON counties between 5-520 meters.	January-November perennial herb	No suitable vegetation associations are present within the Program Area in the immediate vicinity of the coastal habitats. The nearest CNDDB occurrence (EONDX #103074) is a specific location	None

Species Name Common Name	Listing Status [a]	Habitat Preferences, Distribution Information, and Notes	Flowering Phenology/Life Form	Habitat Suitability and Local Distribution	Occurrence Potential
				at Montara State Beach, 1.7 miles west of Miramontes Ridge OSP.	
Legenere limosa legenere	Fed: None CA: None CEQA: 1B.1	Occurs in vernal pools. Known from ALA, LAK, MNT, NAP, PLA, SAC, SCL, SHA, SJQ, SMT, SOL, SON, STA, TEH, and YUB counties between 1-880 meters.	April-June annual herb	No suitable vegetation associations or vernal hydrology are present within the Program Area and occurs in habitat where Treatments are not targeted. The nearest recorded CNDDB occurrence (EONDX #17383) is a non-specific location on Coal Mine Ridge approximately 0.1 mile north of Coal Creek OSP.	None
Leptosiphon acicularis bristly leptosiphon	Fed: None CA: None CEQA: 4.2	Occurs in chaparral, cismontane woodland, coastal prairie, and valley and foothill grassland. Known from ALA, BUT, FRE, HUM, LAK, MEN, MRN, NAP, SCL, SMT, and SON counties between 55-1,500 meters. Uncertain about distribution in CCA County.	April-July annual herb	Suitable vegetation associations are present within the Program Area. The nearest herbarium record is a Barry collection (Accession # CAS-BOT-BC226538) from Coal Mine Ridge near Coal Creek OSP. This species possibly occurs in Treatment areas in habitat with very little vegetative cover in the vicinity of Coal Mine Ridge. Changes in vegetation structure, such as scrub encroachment or removal, could be detrimental.	Possible
Leptosiphon ambiguus serpentine leptosiphon	Fed: None CA: None CEQA: 4.2	Occurs on serpentine in chaparral, cismontane woodland, coastal scrub, and valley and foothill grassland. Known from ALA, CCA, MER, SBT, SCL, SCR, SJQ, SMT and STA counties between 55-1,500 meters.	April-July annual herb	Suitable vegetation associations and substrate are present within the Program Area. There are three herbarium records from within the Program Area. A Thomas collection (Accession #226998) and two Rawlings and Hickman collections (Accession #s 15535 and 15572) are all from the vicinity of Mt. Umunhum in Sierra Azul OSP. This species possibly occurs in Treatment areas with serpentine substrates between El Sereno OSP and Sierra Azul OSP. The fire response of this species is considered neutral.	Possible

Species Name Common Name	Listing Status [a]	Habitat Preferences, Distribution Information, and Notes	Flowering Phenology/Life Form	Habitat Suitability and Local Distribution	Occurrence Potential
Leptosiphon grandiflorus large-flowered leptosiphon	Fed: None CA: None CEQA: 4.2	Occurs on usually sandy substrate in coastal bluff scrub, closed-cone coniferous forest, cismontane woodland, coastal dunes, coastal prairie, coastal scrub, and valley and foothill grassland. Known from ALA, KRN, MAD, MER, MNT, MRN, SCL, SCR, SFO, SLO, SMT, and SON counties between 5-1,220 meters. Presumed extirpated from SBA County.	April-August annual herb	Although suitable vegetation associations are present the preferred sandy substrate is absent. The nearest herbarium record is a Santana collection (Accession #8716) from Uvas Canyon approximately 5.7 miles east of Sierra Azul OSP.	Not Expected
Leptosiphon rosaceus rose leptosiphon	Fed: None CA: None CEQA: 1B.1	Occurs in coastal bluff scrub. Known from MRN and SMT counties between 0-100 meters. Presumed extirpated from SFO and SON counties. Not in TJM.	April-July annual herb	No suitable vegetation associations are present within the Program Area. This species is also restricted to a narrow band of habitat along the San Mateo County coastline. The nearest recorded CNDDB occurrence (EONDX #95234) is a specific location at Pillar Point Bluff, 4.9 miles northwest of Miramontes Ridge OSP.	None
Lessingia arachnoidea Crystal Springs lessingia	Fed: None CA: None CEQA: 1B.2	Occurs on serpentine substrates, often on roadsides in cismontane woodland, coastal scrub, and valley and foothill grassland. Known only from Crystal Springs Reservoir in SMT County between 60-200 meters. Occurrences from SON County need taxonomic verification.	July-October annual herb	Although suitable vegetation associations and substrates are present within the Program Area this species is restricted to the area around Crystal Springs Reservoir. There are two CNDDB occurrences recorded within 0.5 mile of the Program Area. CNDDB occurrence EONDX #95416 and #1262 are specific locations just west of Edgewood County Park.	Not Expected
Lessingia hololeuca woolly-headed lessingia	Fed: None CA: None CEQA: 3	Occurs on clay and serpentine in broadleafed upland forest, coastal scrub, lower montane coniferous forest, and valley and foothill grassland. Known from ALA, MNT,	June-October annual herb	Suitable vegetation associations and substrates are present within the Program Area. The nearest herbarium record is a Hillaire collection (Accession #CHSC098696) from the northwest	Possible

Species Name Common Name	Listing Status [a]	Habitat Preferences, Distribution Information, and Notes	Flowering Phenology/Life Form	Habitat Suitability and Local Distribution	Occurrence Potential
		MRN, NAP, SCL, SMT, SOL, SON and YOL counties between 15-305 meters. Possibly more widespread in the northern San Francisco Bay, southern Sacramento Valley and southern North Coast Ranges.		corner of Edgewood County Park approximately 0.4 mile east of Pulgas Ridge OSP. This species possibly occurs in Treatment areas that support grassland in heavy clay soils (serpentine or non-serpentine) on the east side of the Santa Cruz Mountain crest at lower elevations from Sierra Azul OSP to Pulgas Ridge OSP. The fire response of this species is considered neutral.	
Lessingia micradenia var. *glabrata* smooth lessingia	Fed: None CA: None CEQA: 1B.2 Other: SCVHP	Occurs on serpentine soils, often on roadsides in chaparral, cismontane woodland, and valley and foothill grassland. Known only from SCL County between 120-420 meters.	July-November annual herb	Suitable vegetation associations and substrates present with in the Program Area. There are three CNDDB occurrences recorded within the Program Area. CNDDB occurrences EONDX #64174, 94096, and 94106 are specific locations southwest of Guadalupe Reservoir in Sierra Azul OSP. The occurrence in Sierra Azul OSP is within Potential Treatment areas. This species possibly occurs in other Treatment areas with serpentine grassland in in Santa Clara County preserves south of El Sereno OSP. The fire response of this species is considered neutral.	Present and Possible
Lupinus arboreus var. *eximius* San Mateo tree lupine	Fed: None CA: None CEQA: 3.2	Occurs in chaparral and coastal scrub. Identification is very difficult. SON County occurrences need taxonomic confirmation. Known from SMT and possibly SON counties between 90-550 meters.	April-July shrub (evergreen)	Suitable vegetation associations are present within the Program Area. The nearest herbarium record is a Kennedy collection (Accession #UC1601763) from north of Pilarcitos Lake approximately 6 miles north of Miramontes Ridge OSP. This taxon possibly occurs in Treatment areas that support scrub habitat surrounding Half Moon Bay. Lupinus species are well adapted to fire, especially those that occur in scrub and chaparral habitats. Changes in vegetation structure, such as scrub encroachment or removal, could be detrimental.	Possible

Species Name Common Name	Listing Status [a]	Habitat Preferences, Distribution Information, and Notes	Flowering Phenology/Life Form	Habitat Suitability and Local Distribution	Occurrence Potential
Malacothamnus arcuatus arcuate bush-mallow	Fed: None CA: None CEQA: 1B.2	Occurs in chaparral and cismontane woodland. Known from SCL, SCR, and SMT counties between 15-355 meters. Recognized as M. fasciculatus in TJM.	April-September shrub (evergreen)	Suitable vegetation associations present within the Program Area. This species is suspected to be a pyrophyte. Seven CNDDB occurrences are recorded within the Program Area. CNDDB occurrences EONDX #55918, 55929, 97753, 55910, and 97754 are non-specific locations in the vicinity of La Honda OSP, near Black Mountain on the Rancho San Antonio OSP, near Los Gatos overlapping with El Sereno OSP and St. Joseph's Hill OSP, around Loma Prieta Peak on Sierra Azul OSP, and on the west end of Pulgas Ridge OSP, respectively. CNDDB occurrences EONDX #94349 and 55923 are specific locations on Russian Ridge in Skyline Ridge OSP and on the north side of Edgewood County Park, respectively. All of these occurrences above are non-specific but nearby Potential and Existing Treatment areas. This taxon possible occurs in chaparral and woodland habitat primarily from Pulgas Ridge OSP south. Malacothamnus species are well adapted to fire. This species could benefit from creating openings in canopy structure.	Possible
Malacothamnus hallii Hall's bush mallow	Fed: None CA: None CEQA: 1B.2	Occurs in chaparral and coastal scrub. Known from CCA, MER, SCL, SMT, and STA counties between 10-760 meters. Recognized as M. fascilulatus in TJM.	May-September shrub (evergreen)	Although suitable vegetation associations are present within the Program Area the distribution of this taxon is east of the Program Area in Santa Clara Valley and Coyote Ridge. The nearest recorded CNDDB occurrence (EONDX #44486) is a specific location at Calero Lake Estates, SSW of Coyote Peak and 3.8 miles east of Sierra Azul OSP.	Not Expected

Species Name Common Name	Listing Status [a]	Habitat Preferences, Distribution Information, and Notes	Flowering Phenology/Life Form	Habitat Suitability and Local Distribution	Occurrence Potential
Micropus amphibolus Mt. Diablo cottonweed	Fed: None CA: None CEQA: 3.2	Occurs on rocky substrates in broadleafed upland forest, chaparral, cismontane woodland, and valley and foothill grassland. Known from ALA, CCA, COL, LAK, MNT, MRN, NAP, SBA, SCL, SCR, SJQ, SOL, and SON counties between 45-825 meters. Can be confused with M. californicus.	March-May annual herb	Suitable vegetation associations and substrates are present in the Program Area. The nearest herbarium record is a Ferris collection (Accession#UC429813) from Page Mill Road about 0.9 mile north of Foothills OSP. This species possible occurs in Treatment areas with suitable habitat at Sierra Azul OSP and Foothills OSP. The fire response of this species is considered neutral.	Possible
Microseris paludosa marsh microseris	Fed: None CA: None CEQA: 1B.2	Occurs in closed-cone coniferous forest, cismontane woodland, coastal scrub, and valley and foothill grassland. Known from MEN, MNT, MRN, SBT, SCR, SLO, SOL, and SON counties between 5-355 meters. Presumed extirpated from SFO and SMT counties.	April-June perennial herb	Although suitable vegetation associations are present within the Program Area this species is restricted to more coastal environments of San Mateo and Santa Cruz counties. The nearest recorded CNDDB occurrence (EONDX #53622) is a non-specific location at Pescadero State Beach, approximately 5.8 miles southwest of La Honda Creek OSP. This occurrence has been extirpated.	Not Expected
Monardella sinuata subsp. *nigrescens* northern curly-leaved monardella	Fed: None CA: None CEQA: 1B.2	Occurs in sandy sites in chaparral in SCR County, coastal dunes, coastal scrub, and lower montane coniferous forest in ponderosa pine sandhills in SCR County. Known from MNT, MRN, and SCR counties between 0-300 meters. Presumed extirpated from SFO County. Previously included in M. undulata.	May-July annual herb	No suitable vegetations associations with preferred substrate are present within the Program Area. This species is also restricted to the Scotts Valley area. The nearest recorded CNDDB occurrence (EONDX #92561) is a non-specific location around Scotts Valley, approximately 6.3 miles west of Sierra Azul OSP. This occurrence is based on a historic collection.	None
Monolopia gracilens woodland woollythreads	Fed: None CA: None CEQA: 1B.2	Occurs on serpentine sites in openings of broadleafed upland forest, openings of chaparral, cismontane woodland, openings of North Coast coniferous forest, and	March-July annual herb	Suitable vegetation associations and substrate present within the Program Area. This species can respond well to fire but is not an obligate pyrophyte. Several CNDDB occurrences are recorded within the Program Area. CNDDB	Present and Possible

Species Name Common Name	Listing Status [a]	Habitat Preferences, Distribution Information, and Notes	Flowering Phenology/Life Form	Habitat Suitability and Local Distribution	Occurrence Potential
		valley and foothill grassland. Known from ALA, CCA, MNT, SBT, SCL, SCR, SLO, and SMT counties between 100-1,200 meters.		occurrence EONDX #80183 is a specific location on the south end of Edgewood County Park, #80162 is a specific location from Foothills OSP, #80155 is a specific location from St Joseph's Hill OSP, and #94193 is from Sierra Azul OSP. Other non-specific occurrences are present at Purisima Creek, Monte Bello, and El Sereno OSPs. The occurrences in Foothills, St. Joseph's Hill, and Sierra Azul OSPs are in Potential and Existing Treatment areas. The remaining occurrences are non-specific but nearby Potential and Existing Treatment areas. This taxon possibly occurs in suitable habitat primarily in OSPs where serpentine is present from Pulgas Ridge OSP south. It should be noted that this species has been observed off serpentine in Contra Costa County in burned scrub and chaparral.	
Orthotrichum kellmanii Kellman's bristle moss	Fed: None CA: None CEQA: 1B.2	Occurs on sandstone and carbonate substrates in chaparral and cismontane woodland. Known from MNT, SCR, and SMT counties between 343-685 meters.	January-February moss	Although suitable vegetation associations and substates are present within the Program Area this species is locally restricted to the area around Big Basin. The nearest recorded CNDDB occurrence (EONDX #70922) is a specific occurrence in Big Basin Redwoods State Park, 3.7 miles southwest of Long Ridge OSP.	Not Expected
Penstemon rattanii var. kleei Santa Cruz Mountains beardtongue	Fed: None CA: None CEQA: 1B.2	Occurs in chaparral, lower montane coniferous forest, and North Coast coniferous forest. Known from SCL and SCR counties from only six occurrences between 400-1,100 meters.	May-June perennial herb	Although suitable vegetation associations are present within the Program Area, Santa Clara County occurrences are suspect as this species has not been specifically observed there based on herbarium label information. It is not expected to be present east of the Santa Cruz Mountain Crest. Two CNDDB occurrences are recorded within the Program Area at Sierra Azul OSP. CNDDB	Not Expected

Species Name Common Name	Listing Status [a]	Habitat Preferences, Distribution Information, and Notes	Flowering Phenology/Life Form	Habitat Suitability and Local Distribution	Occurrence Potential
				occurrence EONDX #30801 and #30293 are non-specific occurrences on a ridge at the headwaters of Aptos Creek and in the vicinity of Loma Prieta, both based on historic collections.	
Piperia candida white-flowered rein orchid	Fed: None CA: None CEQA: 1B.2	Occurs in broadleafed upland forest, lower montane coniferous forest, and North Coast coniferous forest. Known from DNT, HUM, MEN, SCL, SCR, SIS, SMT, SON, and TRI counties between 30-1,310 meters.	May-September perennial herb	Suitable vegetation associations present within the Program Area. There is one CNDDB occurrence recorded within the Program Area. CNDDB occurrence EONDX #71132 is a non-specific area in Los Trancos OSP. This species possibly occurs in Treatment areas with suitable habitat in Los Troncos, Long Ridge, Skyline, Russian Ridge, and La Honda OSPs. This species may be enhanced by fire or by creating openings in the overstory.	Possible
Plagiobothrys chorisianus var. *chorisianus* Choris' popcornflower	Fed: None CA: None CEQA: 1B.2	Occurs on mesic sites in chaparral, coastal prairie, and coastal scrub. Known from MNT, SCL, SCR, SFO, and SMT counties between 3-160 meters. Presumed extirpated from ALA County. Intergrades with var. hickmanii and differences may be environmentally induced.	March-June annual herb	Suitable vegetation associations and site conditions are present in the Program Area. Seven CNDDB occurrences are recorded within the Program Area. CNDDB occurrence EONDX #94273 is a non-specific location near El Corte Madera Creek that overlaps with Windy Hill OSP based on a historic collection. CNDDB occurrence EONDX #94274 is a specific location on the southeast end of Russian Ridge OSP. CNDDB occurrences EONDX #94276, 94278, and 94277 are specific locations in La Honda Creek OSP, west of Harrington Creek, and east of Bogess Creek. CNDDB occurrences EONDX #94290 and 94281 are specific locations on Miramontes Ridge OSP. The occurrences in La Honda Creek, Windy Hill, Coal Creek, and Russian Ridge OSPs are in Potential and Existing Treatment areas. The remaining occurrences are non-specific but	Present and Possible

Species Name Common Name	Listing Status [a]	Habitat Preferences, Distribution Information, and Notes	Flowering Phenology/Life Form	Habitat Suitability and Local Distribution	Occurrence Potential
				nearby Potential and Existing Treatment areas. This taxon possibly occurs in mesic grassland habitat north of Skyline Ridge OSP. The fire response of this species is considered neutral.	
Plagiobothrys chorisianus var. *hickmanii* Hickman's popcornflower	Fed: None CA: None CEQA: 4.2	Occurs in closed-cone coniferous forest, chaparral, coastal scrub, marshes and swamps, and vernal pools. Known from MNT, SBT, SCL, SCR, and SLO counties between 15-185 meters. Distribution uncertain in SMT County.	April-June annual herb	Suitable vegetation associations and mesic habitat present within the Program Area. The nearest herbarium record is a Thomas collection (Accession #001411) from Jasper Ridge Biological Preserve about 0.8 mile east of Thornewood OSP. This taxon possible occurs in Treatment areas with mesic grassland habitat in Teague Hill OSP and Thornewood OSP. The fire response of this species is considered neutral.	Possible
Plagiobothrys glaber hairless popcornflower	Fed: None CA: None CEQA: 1A	Occurs in alkaline meadows and seeps and coastal salt marshes and swamps between 15-180 meters. Presumed extirpated from ALA, MRN, SBT, and SCL counties.	March-May annual herb	Although suitable vegetation associations are present within the Program Area the necessary alkaline influence is absent. One CNDDB occurrence is recorded within the Program Area. CNDDB occurrence EONDX #22583 is a non-specific location in the vicinity of Los Gatos that overlaps with El Sereno OSP and St. Joseph's Hill OSP.	Not Expected
Ranunculus lobbii *Lobb's aquatic buttercup*	Fed: None CA: None CEQA: 4.2	Occurs in mesic cismontane woodland, North Coast coniferous forest, valley and foothill grassland, and vernal pools. Known from ALA, CCA, MEN, MRN, NAP, SOL, and SON between 15-470 meters. Presumed extirpated from SCR and SMT counties.	February-May annual aquatic herb	No suitable vegetation associations or vernal hydrology present. This species is also restricted ponds and other still water habitats where Treatments are not targeted. There is one herbarium record from within the Program Area. An Elmer collection (Accession #UC202813) is from the Alpine Schoolhouse in Skyline Ridge OSP.	None

Species Name Common Name	Listing Status [a]	Habitat Preferences, Distribution Information, and Notes	Flowering Phenology/Life Form	Habitat Suitability and Local Distribution	Occurrence Potential
Senecio aphanactis rayless ragwort	Fed: None CA: None CEQA: 2B.2	Occurs on coastal scrub, chaparral, and cismontane woodland on alkaline soils between 15-800 meters. Known from ALA, CCA, FRE, LAX, MER, MNT, ORA, RIV, SBA, SCL, SCT, SCZ, SDG, SLO, SOL, SRO, and VEN counties.	January-April annual herb	Although suitable vegetation associations are present the Program Area lacks preferred alkaline soils. Two CNDDB occurrences are recorded within the Program Area. CNDDB occurrence EONDX #107760 is a non-specific location along Los Trancos Trail that overlaps with Los Trancos and Foothills OSPs and is based on a historical collection. CNDDB occurrence EONDX #107762 is a non-specific location north of Melendy Dr. that overlaps with Pulgas Ridge OSP and is also based on a historical collection.	Not Expected
Sidalcea malachroides maple-leaved checkerbloom	Fed: None CA: None CEQA: 4.2	Occurs often in disturbed areas in broadleafed upland forest, coastal prairie, coastal scrub, North Coast coniferous forest, and riparian woodland. Known from DNT, HUM, MEN, MNT, SCL, SCR, and SON counties between 0-730 meters. Specimen from SCL County needs confirmation.	April-August perennial herb	Although suitable vegetation associations and substrates are present in the Program Area, this taxon also prefers more immediate coastal habitats. The nearest recorded CNDDB occurrence (EONDX #2207) is a non-specific location around Santa Cruz, approximately 11 miles southwest of Sierra Azul OSP. This occurrence is based on a historic collection and may be extirpated.	Not Expected
Silene verecunda subsp. verecunda San Francisco campion	Fed: None CA: None CEQA: 1B.2	Occurs on sandy sites in coastal bluff scrub, chaparral, coastal prairie, coastal scrub, and valley and foothill grassland. Known from SCR, SFO, and SMT counties between 30-645 meters. Not in TJM2.	March-June perennial herb	Although suitable vegetation associations are present the preferred sandy substrate is absent, also this taxon prefers more immediate coastal habitats. There is one CNDDB occurrence is recorded within the Program Area. CNDDB occurrence EONDX #21263 is a specific location at Edgewood County Park that may be extirpated.	Not Expected
Stebbinsoseris decipiens Santa Cruz microseris	Fed: None CA: None CEQA: 1B.2	Occurs in open areas, sometimes on serpentinite, in broadleafed upland forest, closed-cone coniferous forest, chaparral,	April-May annual herb	Although suitable vegetation associations and substrates are present this species is narrowly distributed around the Swanton Pacific area of Santa Cruz County. The nearest recorded CNDDB	Not Expected

Species Name Common Name	Listing Status [a]	Habitat Preferences, Distribution Information, and Notes	Flowering Phenology/Life Form	Habitat Suitability and Local Distribution	Occurrence Potential
		coastal prairie, coastal scrub, and valley and foothill grassland. Known from MNT, MRN, SCR, SFO, and SMT counties between 10-500 meters.		occurrence (EONDX #16903) is a non-specific location between Scott Creek drainage and Mill Creek drainage, approximately 9 miles southwest of Long Ridge OSP. This is the type locality for this species and is based on historic collections.	
Streptanthus albidus subsp. *peramoenus* most beautiful jewelflower	Fed: None CA: None CEQA: 1B.2 Other: SCVHP	Occurs on serpentine sites in chaparral, cismontane woodland, and valley and foothill grassland. Known from ALA, CCA, MNT, SCL, and SLO counties between 95-1,000 meters. No longer recognized in TJM as it has been synonomized with S. glandulosa subsp. glandulosa.	April-September annual herb	Suitable vegetation associations and substrate are present in the Program Area. Four CNDDB occurrences are recorded within the Program Area. CNDDB occurrence EONDX #60341 is a non-specific location on the south side of St. Joseph's Hill OSP. CNDDB occurrence EONDX #80809, #94337, and #94339 are specific locations in Sierra Azul OSP, west of Guadalupe Reservoir, east of the junction of Guadalupe Creek and Hicks Rd., and at the summit of Mt. Umunhum respectively. The occurrences in St. Joseph's Hill OSP and Sierra Azul OSP are in Potential and Existing Treatment areas. This taxon possibly occurs in suitable serpentine habitat south of El Sereno OSP. The rocky or serpentine barren microhabitat this species prefers does not carry fire well.	Present and Possible
Stuckenia filiformis subsp. *alpina* slender-leaved pondweed	Fed: None CA: None CEQA: 2B.2	Occurs in assorted shallow freshwater marshes and swamps. Known from ALA, BUT, CCA, ELD, LAS, MER, MNO, MOD, MPA, NEV, PLA, SHA, SIE, SMT, SOL, and SON counties between 300-2,150 meters. Presumed extirpated from SCL County.	May-July perennial herb (rhizomatous, aquatic)	No suitable vegetation associations or hydrology present in the Program Area. This species is also restricted ponds and other still water habitats where Treatments are not targeted. The nearest recorded CNDDB occurrence (EONDX #838) is a non-specific location in Palo Alto, approximately 1.7 miles west of Ravenswood OSP. This occurrence is based on a historic collection.	None

Species Name Common Name	Listing Status [a]	Habitat Preferences, Distribution Information, and Notes	Flowering Phenology/Life Form	Habitat Suitability and Local Distribution	Occurrence Potential
Trifolium buckwestiorum Santa Cruz clover	Fed: None CA: None CEQA: 1B.1	Occurs in broadleafed upland forest, cismontane woodland, and coastal prairie. Known from MEN, MNT, SCL, SCR, SMT and SON counties between 105-610 meters.	April-October annual herb	Suitable vegetation associations present. One CNDDB occurrence is recorded within the Program Area. CNDDB occurrence #109282 is a non-specific location on Coal Mine Ridge that overlaps with Windy Hill OSP. This non-specific occurrence is the only known location east of the Santa Cruz Mountains in this area. No other populations have been documented east of the Santa Cruz Mountains crest. It is likely a disjunct. This taxon possibly occurs in Coal Creek OSP or Windy Hill OSP. The fire response of this species is considered neutral.	Possible
Trifolium hydrophilum saline clover	Fed: None CA: None CEQA: 1B.2	Occurs in marshes and swamps, on mesic and alkaline sites in valley and foothill grassland, and in vernal pools. Known from ALA, CCA, LAK, MNT, NAP, SAC, SBT, SCL, SCR, SJQ, SLO, SMT, SOL, SON, and YOL counties between 0-300 meters. Possibly occurs in COL County.	April-June annual herb	Although suitable vegetation associations are present the appropriate alkaline habitat is absent from the Program Area. This prefers level ground around the bay shore in this area. The nearest CNDDB occurrence (EONDX #49393) is a non-specific location in Belmont, approximately 3.3 miles east of Pulgas Ridge OSP. This occurrence is the type locality and is based on a historic collection.	Not Expected
Usnea longissima Methuselah's beard lichen	Fed: None CA: None CEQA: 4.2	Occurs on tree branches, usually on old growth hardwoods and conifers in broadleafed upland forest and North Coast coniferous forest. Known from DNT, HUM, MEN, SCR, SMT, and SON counties between 50-1,460 meters.	Fructose lichen (epiphytic)	Suitable vegetation associations are present within the Program Area. Two CNDDB occurrences are recorded within the Program Area. CNDDB occurrence EONDX #45319 is a non-specific location at the headwaters of Oil Creek that overlaps with Long Ridge OSP, although this occurrence was extirpated in 2001. CNDDB occurrence EONDX #45320 is a non-specific location by Purisima Creek in Purisima Creek OSP that may be extirpated.	Possible

Species Name Common Name	Listing Status [a]	Habitat Preferences, Distribution Information, and Notes	Flowering Phenology/Life Form	Habitat Suitability and Local Distribution	Occurrence Potential
				This taxon possibly occurs in Purisima Creek Redwoods OSP or Long Ridge OSP. This species would be harmed by removal of its host or by crown fire.	

Notes:

[f] **Explanation of State and Federal Listing Codes**

Federal listing codes:

- FE: Federally listed as Endangered
- FT: Federally listed as Threatened
- FPE: Federally proposed for listing as Endangered
- FPT: Federally proposed for listing as Threatened
- FPD: Federally proposed for delisting

California listing codes:

- SE: State listed as Endangered
- ST: State listed as Threatened
- SR: State listed as Rare
- SCE: State candidate for listing as Endangered
- SCT: State candidate for listing as Threatened

California Native Plant Society codes:

- 1A: Presumed extinct in California
- 1B: Rare or Endangered in California and elsewhere
- 2A: Rare or Endangered in CA, more common elsewhere
- 2B: Plants presumed extirpated in California, common elsewhere
- 3: Plants for which we need more information - Review list
- 4: Plants of limited distribution - Watch list

California Native Plant Society Threat Codes:

.1: Seriously Endangered in California (over 80% of occurrences threatened / high degree and immediacy of threat)

.2: Moderately Endangered in California (20-80% occurrences threatened / moderate degree and immediacy of threat)

.3: Not very Endangered in California (<20% of occurrences threatened low degree and immediacy of threat or no current threats known

Abbreviations:

AMA Amador
BUT Butte
CAL Calaveras
CCA Contra Costa
CNPS CA Native Plant Society
COL Colusa
DNT Del Norte
ELD El Dorado
FRE Fresno
MER Merced
MNT Monterey
MPA Mariposa
MRN Marin
NAP Napa
NEV Nevada
ORA Orange
OSP Open Space Preserve
PLA Placer
PLU Plumas
SDG San Diego
SFO San Francisco
SHA Shasta
SIE Sierra
SIS Siskiyou
SJQ San Joaquin
SMI San Miguel Island
SMT San Mateo
SNI San Nicolas Island
SOL Solano

Species Name Common Name	Listing Status [a]	Habitat Preferences, Distribution Information, and Notes	Flowering Phenology/Life Form	Habitat Suitability and Local Distribution	Occurrence Potential
GLE Glenn HUM Humboldt KRN Kern LAK Lake LAS Lassen LAX Los Angeles LCP Local Coastal Plan MAD Madera MOD Modoc MEN Mendocino		RIV Riverside SAC Sacramento SBA Santa Barbara SBD San Bernardino SBT San Benito SCL Santa Clara SCR Santa Cruz SCT Santa Catalina Island SCVHP Santa Clara Valley Habitat Plan SCZ Santa Cruz Island		SON Sonoma SRO Santa Rosa Island TEH Tehama TJM The Jepson Manual TRI Trinity TUL Tulare VEN Ventura YOL Yolo YUB Yuba	

Table 4 Special-Status Fish and Wildlife Species Known to Occur or Potentially Occurring on Midpen Lands (Federal/State Listed, Proposed, Candidate and/or Fully Protected Species)

Species Name Common Name	Listing Status [a]	Habitat Requirements and Additional Notes	Habitat Suitability and Local Distribution	Occurrence Potential
Invertebrates				
Bombus crotchii Crotch bumble bee	Fed: None CA: SCE	There is limited life history information available for this species, but it is known to nest primarily underground like most other bumblebee species. It is known from open grassland and scrub habitats. Previously found throughout southern California and the Central Valley, but is now nearly absent from the Central Valley (CDFW, 2019).	May occur in grassland, scrub, and sparse woodland habitats throughout Midpen lands. The nearest CNDDB occurrence (EONDX #98636) was recorded in San Jose approximately 3.5 miles north of Sierra Azul OSP. This record is based on a historic collection in an area that is now highly urbanized. There is one recent verified observation from 2019 in Santa Teresa County Park (Bumblebee Watch 2020), approximately 3.5 miles east of Sierra Azul OSP.	Possible
Bombus occidentalis Western bumble bee	Fed: None CA: SCE	The western bumblebee occurs along the West Coast, and elevations of known sites range from sea level to over 2,000 m. Most reports of western bumblebee nests	May occur in grassland, scrub, and sparse woodland habitats throughout Midpen lands.	Possible

Species Name Common Name	Listing Status [a]	Habitat Requirements and Additional Notes	Habitat Suitability and Local Distribution	Occurrence Potential
		are from underground cavities such as old squirrel or other animal nests and in open west-southwest slopes bordered by trees, although a few nests have been reported from above-ground locations such as in logs among railroad ties. Availability of nests sites for western bumblebee may depend on rodent abundance. Nest tunnels have been reported to be up to 2.1 m long for this species and the nests may be lined with grass or bird feathers. Bumble bees require plants that bloom and provide adequate nectar and pollen throughout the colony's life cycle, which is from early February to late November. Rangewide, example food plants include Ceanothus, Centaurea, Chrysothamnus, Cirsium, Geranium, Grindellia, Lupinus, Melilotus, Monardella, Rubus, Solidago, and Trifolium. (Hatfield et al. 2015). Occupies a diverse range of habitats, including mixed woodlands, farmlands, urban areas, montane meadows and into the western edge of the prairie grasslands. Like many bumble bees, it typically nests underground in abandoned rodent burrows or within hollows in decaying wood (COSEWIC 2014).	The nearest CNDDB occurrence (EONDX #100351) is a historical collection from Half Moon Bay, which partially overlaps Miramontes Ridge OSP. There are no recent verified observations of this species in the greater San Francisco Bay Area (Bumblebee Watch 2020).	
Cicindela ohlone Ohlone tiger beetle	Fed: FE CA: None	Inhabits coastal terraces with remnant native grasslands, and is associated with Watsonville loam or Bonnydoon soil types. Adults are found along trails and other barren areas among low-growing grassland vegetation. Known only from 16 locations in the vicinity of the City of Santa Cruz (USFWS 2019).	Midpen lands are outside of this species' known range. The nearest CNDDB occurrence (EONDX #60021) was recorded in near Scotts Valley approximately 5.6 mile southwest of Sierra Azul OSP.	Not Expected
Euphilotes enoptes smithi Smith's blue butterfly	Fed: FE CA: None	Primarily known from dune habitats along Monterey Bay, but also found in chaparral and grasslands where its hostplants, coast buckwheat (*Eriogonum latifolium*) and seacliff buckwheat (*E. parvifolium*) are present.	This species' status north of Monterey Bay is highly uncertain, and they may be extirpated from the area. If present, they would likely only occur in the southernmost portions of Sierra Azul OSP.	Possible

Species Name Common Name	Listing Status [a]	Habitat Requirements and Additional Notes	Habitat Suitability and Local Distribution	Occurrence Potential
		The adult flight period is approximately from mid-June to September (USFWS 2006).	The nearest CNDDB occurrence (EONDX #110648) was recorded in 2000 along Loma Prieta Road within Sierra Azul OSP.	
Euphydryas editha bayensis Bay checkerspot butterfly	Fed: FT CA: None Other: SCVHCP	A California endemic butterfly restricted to serpentine and similar habitats. Host plant is the dwarf plantain (*Plantago erecta*) (Steiner 1990). Secondary host plants include Indian paintbrush (*Castilleja affinis ssp. affinis*) and purple owl's clover (*Castilleja exserta ssp. exserta*). Restricted to six localities in San Francisco (San Bruno Mountain State & County Park), San Mateo (Edgewood County Park and El Corte de Madera) and Santa Clara (Kirby, Metcalf, San Felipe & Silver Creek Hills) counties (USFWS 1998).	May occur in serpentine grasslands within Midpen lands, most likely in Pulgas Ridge OSP. The nearest CNDDB occurrence (EONDX #1263) is a well-documented population located in Edgewood County Park, immediately south of Pulgas Ridge OSP.	Possible
Speyeria zerene myrtleae Myrtle's silverspot butterfly	Fed: FE CA: None	A medium-sized butterfly endemic to the San Francisco Bay Area. Current populations restricted to four sites in western Marin and southwestern Sonoma counties. Inhabits coastal terrace prairie, coastal bluff scrub and adjacent non-native annual grasslands. The host plant is the western dog violet (*Viola adunca*).	Midpen lands are outside of this species' currently known range. The nearest CNDDB occurrence (EONDX #91025) is a historical record located in Pescadero, approximately 4.2 miles southwest of La Honda Creek OSP. This population, along with all others south of the Golden Gate, is considered to be extirpated.	Not Expected
Trimerotropis infantilis Zayante band-winged grasshopper	Fed: FE CA: None	Known only from the Zayante sandhills in Santa Cruz County. Found in sandy soils, and is closely associated with silver bush lupine (*Lupinus albifrons*). Eggs overwinter in the soil, and nymphs begin to emerge in May. The adult flight period is generally from July until the first significant rains of the season (USFWS 2009).	Midpen lands are outside of this species' currently known range. The nearest CNDDB occurrence (EONDX #58357) is a historical collection from 1928 that partially overlaps Bear Creek Redwoods OSP and Sierra Azul OSP. This record is now considered extirpated as it was taken in the town of Alma, which was inundated by the construction of Lexington Reservoir in the 1950's.	Not Expected

Species Name Common Name	Listing Status [a]	Habitat Requirements and Additional Notes	Habitat Suitability and Local Distribution	Occurrence Potential
		Fish		
Acipenser medirostris Green sturgeon - Southern Distinct Population Segment (DPS)	Fed: FT CA: SSC	Anadromous fish found in marine waters from the Bering Sea to Ensenada, Mexico. The southern DPS includes all spawning populations south of the Eel River (exclusive), principally including the Sacramento River population. Locally, green sturgeon inhabit Suisun, San Pablo, and San Francisco Bays, and coastal bays and estuaries from Monterey Bay north to Puget Sound. Spawning occurs in the Sacramento River.	May occur in tidal sloughs connected to San Francisco Bay within Midpen lands. All of San Francisco Bay and adjoining tidal marshes and sloughs are designated Critical Habitat for this species.	Possible
Eucyclogobius newberryi Tidewater goby	Fed: FE, CH CA: SSC	A California endemic fish that inhabits brackish coastal lagoons, estuaries and marshes. Range extends from the Smith River in Del Norte County to Agua Hedionda Lagoon in San Diego County. Species is typically an annual species. The Greater Bay Area recovery unit extends from north of Bodega Head in Sonoma County to the Salinas River Valley in Monterey County (USFWS 2008).	No tidally influenced lagoons are present within Midpen lands. The nearest CNDDB occurrence (EONDX #28558) is in San Gregorio Creek at San Gregorio State Beach, approximately 1.1 miles south of Tunitas Creek OSP.	Not Expected
Oncorhynchus kisutch pop. 4 Coho salmon – central California coast ESU	Fed: FE CA: SE	An anadromous fish that typically spends 2 years in the ocean before returning to perennial freshwater streams to spawn. ESU includes all naturally spawned populations from Punta Gorda in northern California south to and including the San Lorenzo River in central California, as well as populations in tributaries to San Francisco Bay including Corte Madera and Mill Valley Creeks, excluding the Sacramento-San Joaquin River system, as well four artificial propagation programs: the Don Clausen Fish Hatchery Captive Broodstock Program, Scott Creek/King Fisher Flats Conservation Program, Scott Creek Captive Broodstock Program, and the Noyo River Fish Station egg-take Program coho hatchery programs. Critical habitat includes all river	May occur in coastal streams and streams tributary to San Francisco Bay with no passage barriers throughout Midpen lands. The nearest CNDDB occurrence (EONDX #28241) is a large record that includes the entire San Lorenzo River and all of its tributaries, covering much of northwestern Santa Cruz County. The uppermost reaches of this occurrence are 0.85 mile south of Long Ridge OSP.	Possible

Species Name Common Name	Listing Status [a]	Habitat Requirements and Additional Notes	Habitat Suitability and Local Distribution	Occurrence Potential
		reaches accessible to coho from Punta Gorda south to San Lorenzo River (NOAA Fisheries 1999).		
Oncorhynchus mykiss irideus pop. 8 Steelhead – central California coast DPS	Fed: FT, CH CA: None	This species is an anadromous fish that spend several years in the ocean; returning to freshwater rivers and tributaries to spawn and rear. Listing includes all naturally spawned anadromous steelhead populations below natural and human-made impassable barriers in California streams from the Russian River (inclusive) to Aptos Creek (inclusive), and the drainages of San Francisco, San Pablo, and Suisun Bays eastward to Chipps Island at the confluence of the Sacramento and San Joaquin Rivers (NOAA Fisheries 2005a). Tributary streams to Suisun Marsh including Suisun Creek, Green Valley Creek, and an unnamed tributary to Cordelia Slough (commonly referred to as Red Top Creek), excluding the Sacramento-San Joaquin River Basin, as well as two artificial propagation programs: the Don Clausen Fish Hatchery, and Kingfisher Flat Hatchery/ Scott Creek (Monterey Bay Salmon and Trout Project) steelhead hatchery programs (NOAA Fisheries 2005a).	Several creeks in the northern portion of Midpen lands are designated as Critical Habitat for this species. May occur in coastal streams and streams tributary to San Francisco Bay with no passage barriers throughout Midpen lands. There are three CNNDB occurrences on Midpen lands. The first (EONDX #30107) encompasses all of San Gregorio Creek and its tributaries, which includes a portion of La Honda Creek OSP. The second encompasses all of Pescadero Creek and its tributaries, which includes portions of Skyline Ridge OSP and Long Ridge OSP. The third includes all of the Guadalupe River and its tributaries, which includes a portion of Sierra Azul OSP.	Present
Oncorhynchus mykiss irideus pop. 9 Steelhead – south-central California coast DPS	Fed: FT CA: None	This anadromous fish spends several years in the ocean before returning to freshwater rivers and streams to spawn. This steelhead DPS inhabits coastal stream networks from the Pajaro River south to, but not including the Santa Maria River.	Midpen lands are outside of the species' known range. The nearest CNDDB occurrence (EONDX #30263) is in Coralitos Creek and its tributaries, approximately 2 miles south of Sierra Azul OSP.	Not Expected
Spirinchus thaleichthys Longfin smelt	Fed: FC CA: ST, SSC	An anadromous fish that inhabits coastal bays, estuaries and waters near the coastline from Prince William Sound in Alaska to the Sacramento-San Joaquin Delta. Spawning occurs in freshwater streams from December – February.	May occur in sloughs within tidal marsh habitats and the lower reaches of streams tributary to San Francisco Bay within Ravenswood OSP and Stevens Creek Nature Study Area only. The nearest CNDDB occurrence (EONDX #90725) is an undated historical occurrence in Butano	Possible

Species Name Common Name	Listing Status [a]	Habitat Requirements and Additional Notes	Habitat Suitability and Local Distribution	Occurrence Potential
			Creek near Pescadero, approximately 4.15 miles southwest of La Honda Creek OSP.	
		Amphibians		
Ambystoma californiense California tiger salamander	Fed: FT, CH CA: ST, WL Other: SCVHCP	A large terrestrial salamander that inhabits seasonal/semi-permanent water sources (3-4 months in duration) and adjacent upland habitat with small fossorial mammal activity in lowland grasslands, oak savannah and mixed woodlands. Range includes the Central Valley and Central Coast ranges from Colusa County south to San Luis Obispo and Kern counties from sea level to 3,460 feet (1,054 meters) in elevation with two disjunct populations within Sonoma County and Santa Barbara County. Species have been documented traveling distances up to 1 mile (Austin and Shaffer 1992).	Low probability for this species to occur on the northeastern boundary of Sierra Azul OSP only. There is one historical CNDDB occurrence (EONDX #33386) that partially overlaps Rancho San Antonio OSP, which was recorded in 1893 in Permanente Creek. The next nearest occurrence (EONDX #45839) was recorded in 1983, approximately 0.3 mile north of Sierra Azul OSP.	Possible
Rana boylii Foothill yellow-legged frog (West/Central coast clade)	Fed: None CA: SE, SSC Other: SCVHCP	A medium-sized frog that inhabits rocky, cascading streams in woodland, chaparral and coniferous forests. The current known range of the West/Central Coast clade extends south from the San Francisco Bay through the Diablo Range and down the peninsula through the Santa Cruz and Gabilan Mountains in the Coast Range east of the Salinas Valley.	May occur in rocky/cobbly streams, primarily in the southern part of Midpen lands. Occurrences are distributed throughout large portions of Midpen lands, though many are historic and are now considered extirpated. Occurrences that are now considered to be extirpated or possibly extirpated are present in Windy Hill OSP (EONDX #111878), Monte Bello and Saratoga Gap OSPs (EONDX #111819), Long Ridge OSP (EONDX #111883), Sierra Azul OSP (EONDX #111812). Sierra Azul OSP also contains three occurrences from 2000 that are presumed to be extant (EONDX #75809, #75811, and #111875). There are two historical occurrences that are presumed extant partially overlapping La Honda Creek OSP (EONDX #111879 and #111880), though their current status is unknown.	Present

Species Name Common Name	Listing Status [a]	Habitat Requirements and Additional Notes	Habitat Suitability and Local Distribution	Occurrence Potential
Rana draytonii California red-legged frog	Fed: FT, CH CA: SSC Other: SCVHCP	A medium-sized frog that inhabits lowlands & foothills in or near permanent sources of deep water with dense, shrubby or emergent riparian vegetation up to 4,921 feet (1,500 meters) in elevation (Jennings and Hayes 1994, Bulger et al. 2003, Stebbins 2003). Range extends from Redding to Baja California, Mexico with hybridization occurring with the California red-legged frog from the Oregon border to Marin County. Breeding occurs between November and April in standing or slow moving water with emergent vegetation, such as cattails (*Typha* spp.), tules (*Scirpus* spp.) or overhanging willows (*Salix* spp.) (Hayes and Jennings 1988). Larvae undergo metamorphosis 3 ½ to 7 months following hatching (Jennings and Hayes 1984, 1994).	A substantial portion of the lands in the northern portion of Midpen lands is within designated critical habitat. May breed in streams, ponds, and wetlands throughout Midpen lands. Species is well-distributed throughout Midpen lands. Occurrences are present within many of the individual OSPs, including Purisima Creek Redwoods OSP (EONDX #58556), La Honda Creek OSP (EONDX #104426 and #65052), Russian Ridge OSP (EONDX #76386 and #76389), Coal Creek OSP (EONDX #104881), Picchetti Ranch OSP (EONDX #111147), and Sierra Azul OSP (EONDX #111093, #44889, #111098, #28476). Numerous additional occurrences are present in the immediate vicinity.	Present
Reptiles				
Thamnophis sirtalis tetrantaenia San Francisco garter snake	Fed: FE CA: SE, FP	A colorful aquatic garter snake endemic to the San Francisco Bay Area. Distributed along the peninsula from the southern San Francisco County border south to Waddell Lagoon south of Año Nuevo. Occurs sympatrically with its primary prey, California red-legged frog. Species may hibernate near coast in fossorial mammal burrows and other refuges or remain active year-round weather permitting.	Known populations occur in aquatic habitats on Midpen lands. Specific occurrence details for this species are suppressed, but they are known to be well-distributed in stream, wetland, and pond habitats throughout the northern portion of Midpen lands.	Present
Birds				
Agelaius tricolor Tricolored blackbird (nesting colony)	Fed: BCC CA: ST, SSC Other: SCVHCP	Highly colonial species, most numerous in central valley & vicinity. Largely endemic to California. Nest in emergent vegetation within aquatic and riparian habitats. Breeds from mid-March through early August; double-brooded (Baicich & Harrison 2005, Shuford and Gardali 2008).	May forage in preserves within Midpen lands, but a low probability that nesting colonies would occur. The nearest CNDDB occurrence (EONDX #24670) was recorded in 1989 near Calero Reservoir,	Possible

Species Name Common Name	Listing Status [a]	Habitat Requirements and Additional Notes	Habitat Suitability and Local Distribution	Occurrence Potential
			approximately 3.1 miles northeast of Sierra Azul OSP.	
Aquila chrysaetos Golden eagle	Fed: BGEPA, BCC CA: WL, FP	A large diurnal raptor that nests on cliffs and in large trees in open areas. Forages in open terrain including grasslands, deserts, savannahs and early successional stages of forest and shrub habitats (Kochert et al. 2002). A year-round resident in the greater Bay Area. Breeding begins in February to late May; single-brooded (Baicich & Harrison 2005)	May forage anywhere within Midpen lands. Suitable nesting habitat present in tall trees and cliff faces on Midpen lands. There are two nesting occurrences within Sierra Azul OSP, one recorded in 1984 (EONDX #110488) and the other in 2007 (EONDX #110472).	Possible
Brachyramphus marmoratus Marbled murrelet	Fed: FT, CH CA: SE	A small coastal seabird that nests in coastal trees in mature/old-growth coniferous forests. Also nests on coastal cliffs or on the ground under vegetation. Breeding begins in April (Baicich & Harrison 2005).	May nest in mature redwood forests within Midpen lands. There is one nesting occurrence recorded as recently as 2007 in Purisima Creek Redwoods OSP (EONDX #99411).	Possible
Buteo swainsoni Swainson's hawk	Fed: BCC CA: ST	Breeds in the summer in open grasslands, shrublands, woodlands, and agricultural areas throughout the Central Valley and the valleys of the Sierra Nevada in Inyo and Mono counties (England et al. 1997). Nests are built in a variety of trees and shrubs; breeding occurs from March to August and are single brooded (Baicich & Harrison 2005).	Midpen lands are outside of this species' known range. The nearest CNDDB occurrence was a nest observed in 1889 in an unknown location somewhere within Santa Clara, approximately 5.7 miles northeast of Fremont Older OSP (EONDX #91540). This occurrence is considered extirpated due to urbanization.	Not Expected
Charadrius alexandrinus nivosus Western snowy plover	Fed: FT, BCC, CH CA: SSC	Inhabits beaches, mud flats, estuaries, salt evaporation ponds and inland river channels with banks for foraging. Breeds on sandy beaches, dunes, levees, river banks and dry salt evaporation beds along the California coastline typically in areas with minimal human disturbance. San Francisco Bay is within USFWS Recovery Unit 3 (USFWS 2007). Breeding begins in March; double-brooded (Baicich & Harrison 2005).	May nest and forage in Ravenswood OSP and Stevens Creek Nature Study Area only. The nearest CNDDB occurrence was recorded as recently as 2017 in the Ravenswood Unit of Don Edwards National Wildlife Refuge (EONDX #80151), which is 0.2 mile north of Ravenswood OSP. Evidence of breeding (adults with young) was recently observed within the Stevens Creek Shoreline Nature Study Area (eBird 2020).	Possible

Species Name Common Name	Listing Status [a]	Habitat Requirements and Additional Notes	Habitat Suitability and Local Distribution	Occurrence Potential
Elanus leucurus White-tailed kite	Fed: None CA: FP	Inhabits grasslands, agriculture fields, oak woodlands, savannah and riparian habitats in rural and urban areas. Feeds primarily on California voles. Year-round resident of Central and Coastal California. Breeding begins in February; sometimes double-brooded (Baicich & Harrison 2005).	May nest in trees near open areas such as grasslands and marshes throughout Midpen lands. The nearest CNDDB occurrence (EONDX #63807) was recorded in 2005 along Stevens Creek, approximately 1.25 miles north of Fremont Older OSP.	Possible
Falco peregrinus anatum American peregrine falcon	Fed: Delisted, BCC CA: Delisted FP	Typically a year-round resident in California and most common along the coast. Nests on cliffs, but frequently uses human-made structures such as bridges and buildings. Nests are generally located close to water bodies with abundant avian prey. Breeding begins in March; single-brooded (Baicich & Harrison 2005).	Specific occurrence details for this species are suppressed, but they may nest on tall cliff faces present within Midpen lands.	Possible
Haliaeetus leucocephalus Bald eagle	Fed: Delisted, BCC CA: SE, FP	Winters at lakes, reservoirs, river systems and some rangelands and coastal wetlands. Nests in large conifers near aquatic sources. Breeding begins in May; single-brooded (Baicich & Harrison 2005).	May nest in tall trees near reservoirs and other large bodies of water within Midpen lands. The nearest nesting occurrence was recorded in 2016 in near Felt Reservoir (EONDX #106677), approximately 1.25 miles northeast of Windy Hill OSP.	Possible
Laterallus jamaicensis coturniculus California black rail	Fed: BCC CA: ST, FP	Smallest of the rails; inhabits tidal marshes, freshwater wetlands and marshes. Wintering habitat similar to breeding habitat. Occurs most commonly in tidal emergent wetlands dominated by pickleweed, or in brackish marshes supporting bulrushes in association with pickleweed. In freshwater, usually found in bulrushes, cattails, and saltgrass. A year-round resident of the San Francisco Bay Area. Breeding begins in March; sometimes double-brooded (Eddleman et al. 2020).	May occur in salt marsh habitats on the San Francisco Bay shoreline in Ravenswood OSP and Stevens Creek Shoreline Nature Study Area only. The nearest CNDDB occurrence was recorded as recently as 2005 in Faber-Laumeister Marsh (EONDX #63305), immediately south of Ravenswood OSP.	Possible

Species Name Common Name	Listing Status [a]	Habitat Requirements and Additional Notes	Habitat Suitability and Local Distribution	Occurrence Potential
Rallus obsoletus Ridgway's rail	Fed: FE CA: SE, FP	Restricted to the San Francisco Bay Area. Inhabits coastal wetlands dominated by pickleweed (*Salicornia spp.*) and cordgrass (*Spartina spp.*). Wintering habitat similar to breeding habitat. Breeding begins in March; single-brooded (Baicich & Harrison 2005).	May occur in salt marsh habitats on the San Francisco Bay shoreline in Ravenswood OSP and Stevens Creek Shoreline Nature Study Area only. There is one CNDDB occurrence recorded as recently as 2017 (EONDX #112447) within Ravenswood OSP.	Present
Riparia riparia Bank swallow	Fed: None CA: ST	Nests in colonies in vertical banks with friable soils. Breeds from April to August. Most of California's nesting colonies occur along the upper Sacramento River. Breeding begins in April; double-brooded (Baicich & Harrison 2005).	Not expected to nest, but individuals may occur throughout Midpen lands during migration. The nearest CNDDB occurrence is a historical record from 1896 located near Pescadero (EONDX #85360), approximately 4.5 miles southwest of La Honda Creek OSP.	Not Expected
Sternula antillarum browni California least tern (nesting colony)	Fed: FE CA: SE, FP	Breeds in colonies on bare soil, sand and mudflats along the California coast and the San Francisco Bay Area. Winters south to Mexico. Breeding begins in May; single-brooded (Baicich & Harrison 2005).	Not expected to nest anywhere on Midpen lands. May forage in open water channels on the San Francisco Bay shoreline within Ravenswood OSP and Stevens Creek Shoreline Nature Study Area only. The nearest CNNDB occurrence is a post-breeding foraging area identified in 1987 in a salt pond (EONDX #13020) 0.6 mile northeast of Stevens Creek Shoreline Nature Study Area. There are no documented breeding occurrences anywhere in the vicinity.	Not Expected
Mammals				
Bassariscus astutus Ringtail	Fed: None CA: FP	Small, nocturnal carnivores that feed on arthropods, rodents, lizards, amphibians, small birds, and a variety of fruits and berries. They occur in riparian, montane and coniferous woodlands, chaparral, desert and tropical habitats with rocky outcroppings, canyons, or talus slopes near open water. They make dens in rocky areas in crevices, tree hollows, dens made by other	May occur in riparian, woodland, and forested habitats within Midpen lands. The CNDDB does not track occurrences of ringtail, but Midpen lands are within the species' generally accepted range.	Possible

Species Name Common Name	Listing Status [a]	Habitat Requirements and Additional Notes	Habitat Suitability and Local Distribution	Occurrence Potential
		animals, and occasionally human structures (Poglayen-Neuwall and Toweill 1988).		
Puma concolor Mountain lion (Southern California/Central Coast ESU)	Fed: None CA: SCT	Large, slender cats with large home ranges, requiring relatively undisturbed areas. Inhabit many different habitat types, including conifer forests, oak and riparian woodlands, scrub, chaparral, grasslands, and deserts. The Southern California/Central Coast ESU includes all populations from the San Francisco Bay Area south along the Coast Ranges, and throughout Southern California from Interstate 15 southward to the Mexico border, and eastward to the Nevada and Arizona borders (Center for Biological Diversity and the Mountain Lion Foundation 2019).	May occur anywhere within Midpen lands. The CNDDB does not track occurrences of mountain lions. The Santa Cruz Mountains are a known core habitat area for mountain lions, with the population extending to the limits of urbanization in San Mateo, Santa Clara, Santa Cruz, Contra Costa, and Alameda Counties (Center for Biological Diversity and the Mountain Lion Foundation 2019).	Present
Reithrodontomys raviventris Salt-marsh harvest mouse	Fed: FE CA: SE, FP	A small endemic, pickleweed (*Salicornia* spp.)-obligate species of tidal marshes of the San Francisco Bay Area. Requires adjacent upland tidal zones for escape cover during floods. Two recognized subspecies, *R. r. halicoetes* that inhabits San Pablo and Suisun bays and *R. r. raviventris* that inhabits the South San Francisco Bay including Corte Madera and Richmond marshes.	May occur in salt marsh habitats on the San Francisco Bay shoreline in Ravenswood OSP and Stevens Creek Shoreline Nature Study Area only. There are two CNDDB occurrences within Ravenswood OSP (EONDX #32536 and #32526) and one within Stevens Creek Shoreline Nature Study Area (EONDX #8484).	Present

Notes:

[g] **Explanation of State and Federal Listing Codes**

Federal listing codes:

- FE: Federally listed as Endangered
- FT: Federally listed as Threatened
- FPE: Federally proposed for listing as Endangered
- FPT: Federally proposed for listing as Threatened
- FPD: Federally proposed for delisting
- FC: Federal candidate species (former Category 1 candidates)
- BGEPA: Bald and Golden Eagle Protection Act

California listing codes:

- SE: State listed as Endangered
- ST: State listed as Threatened
- SCE: State candidate for listing as Endangered
- SCT: State candidate for listing as Threatened
- SCD: State candidate for delisting
- SSC: California Species of Special Concern
- FP: Fully Protected Species

Species Name Common Name	Listing Status [a]	Habitat Requirements and Additional Notes	Habitat Suitability and Local Distribution	Occurrence Potential

BCC: USFWS Bird of Conservation Concern
WL: CDFW Watch List
SC: Species of Concern (NMFS regulated species only)
SA: Included on the CDFW Special Animals List
CH: Critical Habitat (Proposed or Final) is designated

Other codes:

SCVHCP: Covered species under the Santa Clara Valley Habitat Conservation Plan

Table 5 Special-Status Fish and Wildlife Species Known to Occur or Potentially Occurring on Midpen Lands (Sensitive and Locally Rare Species)

Species Name Common Name	Listing Status [a]	Habitat Requirements and Additional Notes	Habitat Suitability and Local Distribution	Occurrence Potential
		Invertebrates		
Adela oplerella Opler's longhorn moth	Fed: None CA: SA	Found on serpentine soils where its hostplant, California cream cups (*Platystemon californicus*) occurs. Several isolated populations known from Sonoma County south to Santa Cruz County (USFWS 1998).	Highly range-restricted, may occur on Midpen lands in serpentine grasslands only. The nearest CNDDB occurrence was recorded in 1993 near Calero Reservoir (EONDX #88092), 2 miles northeast of Sierra Azul OSP.	Possible
Anodonta californiensis California floater	Fed: None CA: SA	A freshwater mussel known from watersheds throughout much of western North America. Found in lakes, reservoirs, and slow-moving streams with mud or sand substrates. Also found in rivers and creeks with gravel substrates. Larvae attach to a variety of native and non-native fish species and use the host fish as a means of dispersal. Significant range reductions have been documented in recent years (Cummings and Cordeiro 2011).	May occur in freshwater habitats within Midpen lands. The nearest CNDDB occurrence was recorded in 1960 in Coyote Creek (EONDX #110631), 6.75 miles northeast of Sierra Azul OSP.	Possible
Bombus caliginosus Obscure bumble bee	Fed: None CA: SA	Occurs along the Pacific Coast from southern California to southern British Columbia, with scattered records from the east side of California's Central Valley.	May occur in grassland, scrub, and sparse woodland habitats throughout Midpen lands.	Possible

Species Name Common Name	Listing Status [a]	Habitat Requirements and Additional Notes	Habitat Suitability and Local Distribution	Occurrence Potential
			There are three CNDDB occurrences partially overlapping the following OSPs: La Honda Creek OSP (EONDX #97964), El Sereno OSP and St. Joseph's Hill OSP (EONDX #97968), and Sierra Azul OSP (EONDX #97973). These occurrences are all at least 40 years old, and there have been no verified sightings in the greater San Francisco Bay Area in recent years (Bumblebee Watch 2020).	
Calasellus californicus An isopod	Fed: None CA: SA	A freshwater aquatic isopod, very little specific life history information is available for this species. Known historically from occurrences in Lake, Napa, and Santa Clara Counties.	May occur in freshwater habitats within Midpen lands. The nearest CNDDB occurrence was recorded in 1967 in Black Creek, just west of Lexington Reservoir (EONDX #64217), immediately north of Bear Creek Redwoods OSP.	Possible
Calicina minor Edgewood blind harvestman	Fed: None CA: SA	The Edgewood Blind Harvestman is a minute yellow-orange species with neotenic characters (juvenile characteristics retained in adulthood), such as blindness (usually confined to cave-dwelling species) and reduction in size. This species is among the world's smallest harvestmen, measuring just over 1 millimeter in body length. They are generally found under serpentine rocks, particularly in association with serpentine grassland or woodland vegetation (Ubick and Briggs 1989).	Highly range-restricted, known only from Edgewood County Park. Pulgas Ridge OSP is adjacent, but lacks any of the serpentine habitat required by this species. The nearest CNDDB occurrence was recorded in 1983 in Edgewood Park (EONDX #12858), immediately south of Pulgas Ridge OSP.	Not Expected
Danaus plexippus pop. 1 Monarch butterfly - California overwintering population	Fed: None CA: SA	Along the California Coast, overwintering roosts typically occur in wind-protected groves of eucalyptus, pine, and cypress trees within 1 kilometer of the coast. The winter migratory lifespan reaches >9 months and adults return to northern habitats in spring.	May occur in groves of trees on Midpen lands that are near the Pacific Coast. The nearest CNDDB occurrence was recorded in 1998 in a grove of trees located where Purisima Creek crosses under Highway 1 (EONDX #22934), approximately 0.25 mile west of Purisima Creek Redwoods OSP.	Possible

Species Name Common Name	Listing Status [a]	Habitat Requirements and Additional Notes	Habitat Suitability and Local Distribution	Occurrence Potential
*Hydrochara ricksecker*i Ricksecker's water scavenger beetle	Fed: None CA: SA	Inhabits slow-moving freshwater streams, marshes, ponds, and lakes in Sonoma, Marin, Alameda, Contra Costa, and San Mateo counties. Very little specific life history information is available for this species.	May occur in slow-moving or still freshwater aquatic habitats throughout Midpen lands. The nearest CNDDB occurrence was recorded in 1954 at the Pulgas Water Temple (EONDX #22635), approximately 1 mile west of Pulgas Ridge OSP.	Possible
Microcina edgewoodensis Edgewood Park micro-blind harvestman	Fed: None CA: SA	A nocturnal arachnid with long, thin legs and small oval bodies. Inhabits xeric, open grasslands under serpentine rocks adjacent to scrub oaks. Known from Edgewood County Park.	Highly range-restricted, known only from Edgewood County Park. Pulgas Ridge OSP is adjacent, but lacks any of the serpentine habitat required by this species. There is one CNDDB occurrence recorded in Edgewood Park in 1987 (EONDX #58437) that partially overlaps Pulgas Ridge OSP.	Not Expected
Microcina homi Hom's micro-blind harvestman	Fed: None CA: SA	A small arachnid known only from scattered occurrences in Santa Clara County. Found almost exclusively under rocks in serpentine habitats (Briggs and Ubick 1989).	Midpen lands are outside of this species' known range. The nearest CNDDB occurrence was recorded in 1966 (EONDX #58617), 3.5 miles northeast of Sierra Azul OSP.	Not Expected
Speyeria adiaste adiaste Unsilvered fritillary butterfly	Fed: None CA: SA	The unsilvered fritillary butterfly is a medium-sized butterfly with a wingspan of approximately 2 inches. They occur in grasslands, chaparral, and oak woodlands where their host plant (*Viola* sp.) are present. The species nectars on thistles and California buckeye (*Aesculus californica*). They are uncommon and thought to be declining in numbers.	May occur within Midpen lands in grasslands, chaparral, and woodlands where their host plant is present. There is one CNDDB occurrence recorded in 1992 along Skyline Boulevard (EONDX #49979) that partially overlaps Long Ridge OSP.	Possible
Tryonia imitator Mimic tryonia (=California brackishwater snail)	Fed: None CA: SA	Inhabits perennial brackish water sources including coastal lagoons, estuaries and salt marshes. Ranges from Sonoma County south to San Diego County. Exhibits high salinity tolerance (Kellogg 1985).	May occur in salt marsh habitats at the lowermost reaches of coastal streams and streams tributary to San Francisco Bay on Midpen lands.	Possible

Species Name Common Name	Listing Status [a]	Habitat Requirements and Additional Notes	Habitat Suitability and Local Distribution	Occurrence Potential
			The nearest CNDDB occurrence was recorded in 2004 near Pescadero (EONDX #60250), 5.8 miles southwest of La Honda Creek OSP.	
		Amphibians		
Aneides niger Santa Cruz black salamander	Fed: None CA: SSC	Found in mesic forest habitats, often in or near streams. Known only from woodlands in the Santa Cruz Mountains.	Known populations on Midpen lands. May occur in woodland and forest habitats. CNDDB occurrences of this species are well-distributed throughout Midpen lands, with numerous records present within or partially overlapping the following OSPs: La Honda Creek, Russian Ridge, Monte Bello, Pichetti Ranch, Saratoga Gap, El Sereno, St. Joseph's Hill, Bear Creek Redwoods, and Sierra Azul.	Present
Dicamptodon ensatus California giant salamander	Fed: None CA: SSC	Occur in mesic coastal forests including oak woodland and coniferous forests. May also be found in coastal chaparral. This species breeds in perennial or semi-perennial cold-water streams. They are found from Sonoma County south to Santa Cruz County.	Known populations on Midpen lands. May occur in woodland and forest habitats. CNDDB occurrences of this species are well-distributed throughout Midpen lands, with numerous records present within or partially overlapping the following OSPs: Purisima Creek Redwoods, Tunitas Creek, El Corte de Madera Creek, La Honda Creek, Skyline Ridge, Monte Bello, Long Ridge, Saratoga Gap, El Sereno, St. Joseph's Hill, Bear Creek Redwoods, and Sierra Azul.	Present
Taricha rivularis Red-bellied newt	Fed: None CA: SSC	Found primarily in coastal redwood forests, but may also use Douglas fir, tan oak, and madrone forests. Breed in moderate to fast-flowing mountain streams with rocky substrates. They are known from coastal northern California from Humboldt county south to Sonoma County. One disjunct population in the Stevens	Known population present on Midpen lands. Likely restricted to the Stevens Creek watershed. There is one CNDDB occurrence located within Monte Bello OSP (EONDX #104569), and a second occurrence immediately south of Monte Bello OSP (EONDX #104574). These records represent	Present

Species Name Common Name	Listing Status [a]	Habitat Requirements and Additional Notes	Habitat Suitability and Local Distribution	Occurrence Potential
		Creek watershed in Santa Clara County has also been documented.	the entirety of the recently discovered disjunct population in Stevens Creek.	
		Reptiles		
Anniella pulchra Northern California legless lizard	Fed: None CA: SSC	A small legless lizard measuring up to 7 inches in length with shovel-shaped nose and blunt tail. Displays distinct coloration: a bright silver dorsal surface with a yellowish underbelly and a single black dorsal stripe. Feeds on a variety of insects, beetles, and arachnids. Inhabits sandy or loose loamy soils and leaf litter from Contra Costa County to northwestern Baja. Occurs in moist warm loose soil with plant cover. Occurs in sparsely vegetated areas of beach dunes, chaparral, pine-oak woodlands, desert scrub, sandy washes, and stream terraces with sycamores, cottonwoods, or oaks. Leaf litter under trees and bushes in sunny areas and dunes stabilized with bush lupine and mock heather often indicate suitable habitat (Nafis 2020).	There is no sandy dune habitat present on Midpen lands. The nearest CNDDB occurrence is a historical record from 1949 that was located at an unspecified location in San Jose (EONDX #107112). This occurrence is considered extirpated, as the entire area is now highly urbanized.	Not Expected
Emys marmorata Western pond turtle	Fed: None CA: SSC Other: SCVHCP	A moderate sized freshwater turtle that inhabits permanent or nearly permanent bodies of water and low gradient slow moving streams below 6,000 feet elevation. Range extends from Washington to the northern Bay Area counties along the Pacific slope drainages. Two recognized subspecies: the northwestern pond turtle (*E. m. marmorata*) which ranges north of the American River and the southwestern pond turtle (*E. m. pallida*) which ranges from the coastal areas south of San Francisco. Subspecies interbreed within the gradation zone that defines the two subspecies.	There are known populations present within Midpen lands. May occur in ponds and large streams throughout Midpen lands. CNDDB occurrences of this species are well-distributed throughout Midpen lands, with records present within or partially overlapping La Honda Creek OSP, Bear Creek Redwoods OSP, and Sierra Azul OSP.	Present
Phrynosoma blainvillii Blainville's horned lizard	Fed: None CA: SSC	A dorsoventrally flattened lizard with several spiny dorsal scales and backward projecting spines on the head. Inhabits a variety of habitats including scrub,	May occur in scrub, grassland, and woodland habitats with sandy or gravelly substrates on Midpen lands.	Possible

Species Name Common Name	Listing Status [a]	Habitat Requirements and Additional Notes	Habitat Suitability and Local Distribution	Occurrence Potential
		chaparral, grasslands and woodlands with sandy to gravelly substrate from Shasta County to Los Angeles County within the Sacramento and San Joaquin Valleys and neighboring foothills. Active from April-October, peaking in April/May. Diet consists of native ants and beetles, but may also feed on other insects that are seasonally abundant.	The nearest CNDDB occurrence was recorded in 2009 near Calero Reservoir (EONDX #81581), approximately 3.8 miles northeast of Sierra Azul OSP. There are also recent reliable observations of this species in Rancho San Antonio OSP (iNaturalist 2020).	
		Birds		
Accipiter cooperii Cooper's hawk	Fed: None CA: WL	Inhabits dense stands of oak woodlands, riparian deciduous forests, or other forest habitats often near water and suburban areas. Hunts in broken woodlands and along forest edges. Breeding begins in April; single-brooded (Baicich & Harrison 2005).	May nest in woodland and forest habitats throughout Midpen lands. The nearest CNDDB occurrence was recorded in 2003 along Calabazas Creek in a heavily urbanized area in Cupertino (EONDX #53907), approximately 1.75 miles northeast of Fremont Older OSP.	Possible
Accipiter striatus Sharp-shined hawk	Fed: None CA: WL	Prefers to nest on north-facing slopes in dense stands of deciduous, conifer and mixed hardwood trees, including ponderosa pine, black oak, and Jeffrey pines, preferably in riparian areas; also known to nest in suburban areas. Species attracted to rural and suburban areas especially near bird feeders often during winter months (Bildstein and Meyer 2020). It forages primarily for small birds along woodland edges and openings, hedgerows, brushy pastures, and shorelines. Breeding begins in April; single-brooded (Baicich and Harrison 2005).	May occasionally nest in dense forest and woodland habitats within Midpen lands. There are no CNDDB records of nesting sharp-shinned hawk anywhere within or in the vicinity of Midpen lands. This species is typically only present in the Bay Area during the winter, and very rarely nests in the region.	Possible
Ammodramus savannarum Grasshopper sparrow	Fed: None CA: SSC	Uncommon and local summer resident and breeder in foothills and lowlands west of the Cascade-Sierra Nevada crest from Mendocino and Trinity counties south to San Diego County (Zeiner et al. 1990). Prefer short to medium-height, moderately open grasslands with scattered shrubs (Shuford and Gardali 2008).	May nest in grasslands throughout Midpen lands. There are no CNDDB records of nesting grasshopper sparrow anywhere within or in the vicinity of Midpen lands, though they are likely under-reported. They are considered to breed	Possible

Species Name Common Name	Listing Status [a]	Habitat Requirements and Additional Notes	Habitat Suitability and Local Distribution	Occurrence Potential
		Grasshopper sparrows build nests domed with grasses and with a side entrance, typically well-concealed in depressions at the base of grass clumps with the rim approximately level to the ground (Vickery 1996).	within Santa Clara, San Mateo, and Santa Cruz Counties (Shuford and Gardali 2008).	
Ardea alba Great egret (nesting colony)	Fed: None CA: SA	A large wading bird that inhabits a variety of aquatic habitats including shores, tidal flats, marshes, swamps, ponds, lakes, rivers and streams. Nests colonially in large trees near water bodies. Breeding begins in March; single-brooded (Baicich & Harrison 2005).	May form nesting colonies in tall trees in the vicinity of large water bodies on Midpen lands. The nearest CNDDB occurrence was recorded in 2011 in Almaden Lake Park (EONDX #110547), approximately 2.7 miles north of Sierra Azul OSP.	Possible
Ardea herodias Great blue heron (nesting colony)	Fed: None CA: SA	A large wading bird that inhabits a variety of aquatic habitats including shores, tidal flats, marshes, swamps, ponds, lakes, rivers and streams. Nests colonially in large trees near water bodies. Breeding begins in March; single-brooded (Baicich & Harrison 2005).	May form nesting colonies in tall trees in the vicinity of large water bodies on Midpen lands. The nearest CNDDB occurrence was recorded in 2018 in Almaden Lake Park (EONDX #110525), approximately 2.7 miles north of Sierra Azul OSP.	Possible
Asio flammeus Short-eared owl	Fed: None CA: SSC	Inhabits open grasslands, prairies, marshes and agricultural fields with sufficient vegetative cover and abundant small mammal prey. Nests on the ground in a shallow depression. Breeds in Great Basin, Sacramento-San Joaquin Delta, San Joaquin Valley, and isolated areas along the southern California Coast (Shuford and Gardali 2008). Breeds from March through July; single-brooded (Baicich & Harrison 2005, Shuford and Gardali 2008).	May nest in salt marshes and open grasslands on Midpen lands. The nearest CNDDB occurrence was recorded in 1977 in salt marshes along the bay shore (EONDX #25537), 4.3 miles northwest of Ravenswood OSP.	Possible
Asio otus Long-eared owl	Fed: None CA: SSC	Inhabits riparian and live oak woodlands near meadows and forested habitats. Occurs in dense conifer stands at higher elevations. An uncommon species in the San Francisco Bay Area. Breeds from March to July.	May nest in woodland and forest habitats throughout Midpen lands. There is one CNDDB occurrence recorded in 1987 (EONDX #22494) that covers a large area primarily within Monte Bello OSP, and partially overlapping Skyline Ridge OSP, Coal Creek OSP, Russian Ridge OSP, and Los Trancos OSP.	Possible

Species Name Common Name	Listing Status [a]	Habitat Requirements and Additional Notes	Habitat Suitability and Local Distribution	Occurrence Potential
Athene cunicularia Burrowing owl	Fed: BCC CA: SSC Other: SCVHCP	Valley bottoms and foothills with low vegetation and fossorial mammal activity. Listing includes wintering observations with/without a burrow in San Francisco, Ventura, Sonoma, Marin, Napa and Santa Cruz counties. Breeding begins in March; single-brooded (Baicich & Harrison 2005).	May occur in grasslands and other open habitats throughout Midpen lands. Recent CNDDB occurrences are present in Purisima Creek Redwoods OSP (EONDX #114464), La Honda Creek OSP (EONDX #114466), and Russian Ridge OSP (EONDX #114467). These are all wintering or migratory occurrences, with no breeding documented.	Present
Chaetura vauxi Vaux's swift	Fed: None CA: SSC	In California, this species primarily nests in cavities in large-diameter redwood trees, snags, and stumps. May occasionally nest in chimneys as well (Shuford and Gardali 2008).	May occur in redwood forests within Midpen lands. There are no nearby CNDDB occurrences of nesting Vaux's swift, though this species is likely under-reported. They are considered to breed within Santa Clara, San Mateo, and Santa Cruz Counties (Shuford and Gardali 2008).	Possible
Circus hudsonius Northern harrier	Fed: None CA: SSC	Inhabits both freshwater and saltwater marshes and adjacent upland grasslands. Nests on the ground in tall grasses in grasslands and meadows. Breeding begins in March; single-brooded (Baicich & Harrison 2005).	May nest in salt marshes and open grasslands on Midpen lands. The nearest CNDDB occurrence was recorded in 2004 in salt marsh habitat adjacent to Palo Alto (EONDX #61145), approximately 0.5 mile south of Ravenswood OSP.	Possible
Conotopus cooperi Olive-sided flycatcher	Fed: BCC CA: SSC	Inhabits open canopy late-successional coniferous forests and eucalyptus groves in foothill canyons. Prefers edge habitats and openings often associated with clear-cuts, burned areas, slashings, and fragmented forests. Nests in willows, alders, oaks and eucalyptus trees within lowlands (Shuford and Gardali 2008).	May nest along habitat edges in woodland and forest habitats throughout Midpen lands. There are no CNDDB occurrences of nesting olive-sided flycatchers anywhere in the vicinity of Midpen lands, though this species is likely under-reported. They are considered to breed within Santa Clara, San Mateo, and Santa Cruz Counties (Shuford and Gardali 2008).	Possible

Species Name Common Name	Listing Status [a]	Habitat Requirements and Additional Notes	Habitat Suitability and Local Distribution	Occurrence Potential
Coturnicops noveboracensis Yellow rail	Fed: BCC CA: SSC	Highly secretive, breeds in northeastern California in wet meadows and sedge marshes. Winters in tidal marshes in the greater San Francisco Bay Area.	May occur on Midpen lands in salt marsh habitats on the San Francisco Bay shoreline only. There is one CNDDB occurrence recorded in 1988 partially overlapping Ravenswood OSP (EONDX #107074). Another historical occurrence from 1901 (EONDX #106959) partially overlaps Stevens Creek Nature OSP.	Possible
Cypseloides niger Black swift	Fed: BCC CA: SSC	Breeds in areas with cliff faces, on coasts or inland in canyons. Nests are in sheltered crevices or ledges near seeps and waterfalls. Breeding begins in May. Single brooded (Baicich & Harrison 2005).	The extremely specific nesting habitat for this species, bluffs and steep-walled canyons near waterfalls, may not occur within Midpen lands. The nearest CNDDB occurrence was recorded in 1973 in New Almaden (EONDX #1232), approximately 0.6 mile east of Sierra Azul OSP. The breeding status of this species in the region is uncertain. Known nesting locations along the coast in San Mateo and Santa Cruz Counties appear to be extirpated, and nesting has not been documented in these counties since 1988 (Shuford and Gardali 2008).	Not Expected
Egretta thula Snowy egret (nesting colony)	Fed: None CA: SA	Inhabits shallow estuaries, marshes, ponds, rivers and wetlands. Breeds in rookeries near water in trees often in dense thickets or protected areas. Breeding season varies, typically begins in mid-April in California; single-brooded (Baicich & Harrison 2005).	May form nesting colonies in tall trees in the vicinity of large water bodies on Midpen lands. The nearest CNDDB occurrence was recorded in 2011 in Almaden Lake Park (EONDX #110548), approximately 2.7 miles north of Sierra Azul OSP.	Possible
Geothlypis trichas sinuosa San Francisco common yellowthroat	Fed: BCC CA: SSC	Year-round resident of the San Francisco Bay Area. Inhabits dense vegetation in wetlands, marshes, estuaries, prairies and riparian areas of San Francisco and San Pablo bays, and along the coastal areas of Marin, San Francisco, and San Mateo Counties (Shuford and Gardali 2008). Breeds from mid-March to	May occur in salt marsh habitats within Midpen lands. There is one CNDDB occurrence recorded in salt marsh habitat along the bay shore (EONDX #59820) that partially overlaps Ravenswood OSP.	Possible

Species Name Common Name	Listing Status [a]	Habitat Requirements and Additional Notes	Habitat Suitability and Local Distribution	Occurrence Potential
		late July; double-brooded (Baicich & Harrison 2005, Shuford and Gardali 2008).		
Lanius ludovicianus Loggerhead shrike	Fed: BCC CA: SSC	Common resident and winter visitor in lowlands and foothills throughout California. Loggerhead shrikes breed mainly in shrublands or open woodlands with a fair amount of grass cover and areas of bare ground. They require tall shrubs or trees (but also use fences or power lines) for hunting perches, territorial advertisement, and pair maintenance; open areas of short grasses, forbs, or bare ground for hunting; and large shrubs or trees for nest placement (Shuford and Gardali 2008).	May occur in grassland and shrubland habitats throughout Midpen lands. There are no CNDDB occurrences of nesting loggerhead shrikes anywhere in the vicinity of Midpen lands, though this species is likely under-reported. They are considered to breed throughout Santa Clara, San Mateo, and Santa Cruz Counties (Shuford and Gardali 2008).	Possible
Melospiza melodia pusillula Alameda song sparrow	Fed: BCC CA: SSC	The Alameda song sparrow occurs only in tidal marshes along San Francisco Bay south from El Cerrito through the shorelines of Alameda, Santa Clara, San Mateo, and San Francisco Counties (Shuford and Gardali 2008).	May nest in salt marsh habitats within Midpen lands along the San Francisco Bay shoreline. There is one CNDDB occurrence recorded in salt marsh habitat along the bay shore (EONDX #60617) that partially overlaps Ravenswood OSP.	Possible
Nycticorax nycticorax Black-crowned night heron (nesting colony)	Fed: None CA: SA	Colonial nester in sites near fresh, brackish, or salt water in all types of vegetation; also in marshes in *Phragmites*, cattails, grass tussocks, and *Scirpus*. Breeding begins in winter to April; usually single-brooded (Baicich & Harrison 2005).	May form nesting colonies in tall trees in the vicinity of large water bodies on Midpen lands. The nearest CNDDB occurrence was recorded in 2018 in Almaden Lake Park (EONDX #110533), approximately 2.7 miles north of Sierra Azul OSP.	Possible
Pandion haliaetus Osprey	Fed: None CA: WL	Inhabits rivers, lakes and coastal habitats. Nest in tall trees near water bodies with sufficient prey. Range is almost cosmopolitan throughout California. Breeding begins in March; single-brooded (Baicich & Harrison 2005).	May nest in tall trees or utility towers on Midpen lands near reservoirs or the San Francisco Bay shoreline. There are three nesting occurrences all recorded in 2006 (EONDX #64907, #64908, and #64909) within approximately 0.5 mile south of Sierra Azul OSP. All three are generally associated with large reservoirs.	Possible

Species Name Common Name	Listing Status [a]	Habitat Requirements and Additional Notes	Habitat Suitability and Local Distribution	Occurrence Potential
Phalacrocorax auratus Double-crested cormorant (nesting colony)	Fed: None CA: WL	Rookery sites are located near large water bodies and on small islands, shorelines, and cliff ledges. Nest consists of a structure of twigs and plant material in a tree or tall manmade structures. Breeding begins in early March to mid-June; single-brooded (Baicich & Harrison 2005).	May nest in tall trees and large utility towers on Midpen lands along the San Francisco Bay shoreline only. The nearest CNDDB occurrence was recorded in 2004 in an electrical tower in salt marsh habitat (EONDX #58226) approximately 6 miles northwest of Ravenswood OSP. Nesting has also been documented in the electrical towers along the Dumbarton Bridge, immediately adjacent to Ravenswood OSP, as recently as 2008 (Adkins et al 2010).	Possible
Progne subis Purple martin	Fed: None CA: SSC	Nests in tall, old trees near a body of water in open forests, woodlands, & riparian habitats. Forages in valley foothills, meadows, grasslands, montane hardwood, riparian habitats, closed-cone pine-cypress, ponderosa pine, Douglas fir, & redwood forests. Breeding begins in March; primarily single-brooded (Baicich & Harrison 2005).	Known population present on Midpen landsat Mt. Umunhum. Likely restricted to this area only. There is one occurrence of this species located at the historic radar structure on Mt. Umunhum within Sierra Azul OSP (EONDX #94365). This well-studied population has been documented nesting at this location as recently as 2017 (Airola et al. 2018).	Present
Rynchops niger Black skimmer (nesting colony)	Fed: BCC CA: SSC	Black skimmers nest on levees and islands in salt ponds and marshes of San Francisco Bay. Breeding for this species in San Francisco Bay has been documented only from 1994. Breeding begins early-May. Single brooded (Baicich & Harrison 2005).	No islands suitable for nesting are present on Midpen lands. The nearest CNDDB occurrence was recorded in 2015 on an island in Shoreline Sailing Lake (EONDX #102320), approximately 1.3 miles west of Steven Creek Shoreline Nature Study Area.	Not Expected
Setophaga petechia Yellow warbler	Fed: BCC CA: SSC	Nests in dense, shrubby thickets dominated by willows along water courses and wet meadows. They build nests in a variety of riparian trees, most commonly willows (*Salix* spp.) and cottonwoods (*Populus* spp.). Occasionally yellow warblers breed in mixed-conifer forests with shrubby understories (Shuford and Gardali 2008). Breeds from April to late July and is sometimes	May nest in riparian woodlands throughout Midpen lands. There are no nearby CNDDB occurrences of nesting yellow warbler, though this species is likely under-reported. They are considered to breed locally and in small numbers in San Mateo,	Possible

Species Name Common Name	Listing Status [a]	Habitat Requirements and Additional Notes	Habitat Suitability and Local Distribution	Occurrence Potential
		double-brooded (Baicich & Harrison 2005, Shuford and Gardali 2008).	Santa Clara, and Santa Cruz Counties (Shuford and Gardali 2008).	
Spinus lawrencei Lawrence's goldfinch	Fed: BCC CA: SA	Lawrence's goldfinch breeding range extends along the western foothills of the Sierra Nevada and the Coast Ranges from Shasta County, California south to northern Baja California. Breeds primarily in open woodlands with chaparral, tall annual weed fields, and open water in the vicinity. Nest trees are predominantly live oaks and blue oaks. Less frequently breeds in chaparral, riparian woodland, coastal scrub, open conifer forests, and rural areas. Likely require water within 0.5 kilometers of nesting sites (Watt et al. 2020).	May nest in open woodlands near water throughout Midpen lands. There are no nearby CNDDB occurrences of nesting Lawrence's goldfinch, though this species is likely under-reported.	Possible
Mammals				
Eumops perotis Western mastiff bat	Fed: None CA: SSC	Inhabits various types of open, semi-arid to arid habitats, including coastal and desert scrublands, annual and perennial grasslands, conifer and deciduous woodlands. They primarily roost in crevices in vertical cliffs, usually granite or consolidated sandstone, and in broken terrain with exposed rock faces; they may also be found occasionally in high buildings, trees and tunnels. Roost sites may change from season to season. Due to its large size, this bat needs vertical faces to drop from in order to take flight. Nursery roosts are found in tight rock crevices with mating taking place in the spring. They are active yearlong, limited only when temperatures drop below 41 degrees Fahrenheit.	Suitable habitat consists of extensive open areas with potential roost locations having vertical faces to drop off from and take flight, such as crevices in rock outcroppings and cliff faces, tunnels and tall buildings. The distribution is not completely known; however, this species ranges from San Francisco across to the Sierra Nevada and south, encompassing the southern half of the state. There are no CNDDB occurrences of western mastiff bat in the vicinity of Midpen lands.	Not Expected
Antrozous pallidus Pallid bat	Fed: None CA: SSC	Inhabits rocky terrain in open areas in lowlands, foothills and mountainous areas near water throughout California below 2,000 meters. Roost in caves, rock crevices, mines, hollow trees, buildings and bridges in arid regions in low numbers (<200). Active from March-	Suitable habitat is present in woodland and forest habitats, as well as human-made structures throughout Midpen lands. CNDDB occurrences of this species are well-distributed throughout areas adjacent to the	Possible

Species Name Common Name	Listing Status [a]	Habitat Requirements and Additional Notes	Habitat Suitability and Local Distribution	Occurrence Potential
		November; migrates in some areas, but may hibernate locally.	Midpen lands. The nearest occurrence was recorded in 1960 in Woodside (EONDX #66770), approximately 0.5 mile east of Teague Hill OSP.	
Corynorhinus townsendii Townsend's big-eared bat	Fed: None CA: SSC	An obligate cave rooster and moth specialist. Inhabits caves and mines, but may also use bridges, buildings, rock crevices and tree hollows in coastal lowlands, cultivated valleys and nearby hills characterized by mixed vegetation throughout California below 3,300 meters. Exhibits high site fidelity and is highly sensitive to disturbance. Forages along edge habitats near water; may travel long distances during foraging bouts.	Suitable habitat is present in woodland and forest habitats, as well as human-made structures throughout Midpen lands. CNDDB occurrences are well-distributed throughout Midpen lands, with occurrences located within or partially overlapping La Honda Creek OSP, Skyline Ridge OSP, Pichetti Ranch OSP, Bear Creek Redwoods OSP, and Sierra Azul OSP.	Possible
Dipodomys venustus venustus Santa Cruz kangaroo rat	Fed: None CA: SSC	A burrowing rodent that inhabits open chaparral areas in coastal mountains of west-central California. Historically occurred from San Mateo and Santa Clara Counties south to San Benito County. The only known extant population is in the Mount Hermon region of Santa Cruz County (Brylski 1998).	May occur in open chaparral habitats with friable soils within Midpen lands, though the status of this species in the region is unknown. There are no CNDDB occurrences on Midpen lands, though historical records are present in the region (Brylski 1998).	Possible
Erethizon dorsatum North American porcupine	Fed: None CA: SA	Range throughout the Sierra Nevada Mountains and Coast Ranges, generally in forested habitats.	There are no recent sightings of this species anywhere near Midpen lands, and it is likely extirpated from the region. The nearest occurrence is a historical record from 1937 (EONDX #107893), 3 miles southwest of Bear Creek Redwoods OSP.	Not Expected
Lasiurus blossevillii Western red bat	Fed: None CA: SSC	Primarily associated with intact riparian habitat; species is ubiquitous throughout most of California except the northern Great Basin region. Roosts individually in foliage within trees along riparian areas, orchards and suburban areas. Favors cottonwoods, willows, sycamores, and walnut trees (Western Bat	May roost in trees within riparian areas, woodlands, and forest habitats throughout Midpen lands. There are no CNDDB occurrences of western red bat in the vicinity of Midpen lands, though this species is likely under-reported.	Possible

Species Name Common Name	Listing Status [a]	Habitat Requirements and Additional Notes	Habitat Suitability and Local Distribution	Occurrence Potential
		Working Group 2020). Feeds primarily on moths, but will eat a variety of other insects.		
Lasiurus cinereus Hoary bat	Fed: None CA: SA	Ubiquitous throughout California. Roosts solitarily in foliage. Prefers evergreens, but will use deciduous trees in forested habitats, particularly in edge habitat (Western Bat Working Group 2020). May forage in small to large groups. Feeds primarily on moths, but will eat a variety of other insects. Migrates great distances.	May roost in trees within riparian areas, woodlands, and forest habitats throughout Midpen lands. CNDDB occurrences are well-distributed throughout Midpen lands and the surrounding vicinity, with occurrences located within or partially overlapping La Honda Creek OSP and Windy Hill OSP.	Possible
Myotis evotis Long-eared myotis bat	Fed: None CA: SA	Typically inhabits brushy woodland habitats and coniferous forests up to 2,800 meters throughout California except the Central Valley and deserts. Roosts in a variety of habitats including exfoliating bark, tree hollows, caves, rotten stumps, snags, cliff crevices and bridges. A foliage gleaner that requires nearby water.	Suitable habitat is present in woodland and forest habitats, as well as human-made structures throughout Midpen lands. There are no CNDDB occurrences of long-eared myotis within or in the vicinity of Midpen lands, though this species is likely under-reported.	Possible
Myotis thysanodes Fringed myotis bat	Fed: None CA: SA	Exhibits a strong roosting preference for large trees and snags, but will use buildings, caves, rock crevices, etc., if necessary. Inhabits a variety of woodland, scrub and grassland habitats up to 2,850 meters throughout California except for Central Valley and southern deserts. Forages great distances and is active during winter months. Highly sensitive to human disturbance.	Suitable habitat is present in woodland and forest habitats, as well as human-made structures throughout Midpen lands. There are no CNDDB occurrences of fringed myotis within or in the vicinity of Midpen lands, though this species is likely under-reported.	Possible
Myotis Volans Long-legged myotis bat	Fed: None CA: SA	Primarily occurs in coniferous forests, but also occurs seasonally in riparian and desert habitats. Most common in woodland and forest habitats above 1200 m (4000 ft). Also forages in chaparral, coastal scrub, Great Basin shrub habitats, and in early successional stages of woodlands and forests. Roosts under exfoliating bark in small groups, but may also use rock crevices, cliffs	Suitable habitat is present in woodland and forest habitats, as well as human-made structures throughout Midpen lands. There are no CNDDB occurrences of long-legged myotis within or in the vicinity of Midpen lands, though this species is likely under-reported.	Possible

Species Name Common Name	Listing Status [a]	Habitat Requirements and Additional Notes	Habitat Suitability and Local Distribution	Occurrence Potential
		and human-made structures in absence of old growth trees. Forages aerially around the forest canopy.		
Myotis yumanensis Yuma myotis bat	Fed: None CA: SA	A riparian obligate species. Ubiquitous throughout California. Inhabits riparian areas near permanent water sources. Roosts in a variety of habitats including bridges, buildings, caves, mines, cliff crevices and trees. Forages above water and in riparian areas.	Suitable habitat is present in woodland and forest habitats, as well as human-made structures throughout Midpen lands. The nearest CNDDB occurrence was recorded in 2001 along Stevens Creek (EONDX #62396), 1.4 miles east of Rancho San Antonio OSP.	Possible
Neotoma fuscipes annectens San Francisco dusky-footed woodrat	Fed: None CA: SSC	Inhabits chaparral, coastal scrub, oak woodland, and riparian woodland in the San Francisco Bay Area. They exhibit high site fidelity and may live in the same nest community for generations. Nest structures are key indicator of their presence and are easily identified by their large, conical appearance. Species is typically not associated with urban areas due to lack of suitable native woodland plants used for foraging, and increased predation pressure from feral and domestic cats.	This species is ubiquitous in oak and riparian woodlands and may occur in those habitats throughout Midpen lands. The nearest CNDDB occurrence was recorded in 2007 along Highway 92 (EONDX #70792), approximately 0.1 mile north of Miramontes Ridge OSP.	Present
Sorex vagrans halicoetes Salt-marsh wandering shrew	Fed: None CA: SSC	Species is restricted to salt marshes in San Francisco Bay. Feeds mainly on invertebrates and some plant material within a low, dense cover of pickleweed (*Salicornia* spp.). Most young are born March to May. Maximum lifespan is about 16 months.	May occur in salt marsh habitat on Midpen lands along the San Francisco Bay shoreline. The nearest CNDDB occurrence was recorded in 1961 immediately north of the western landing of the Dumbarton Bridge (EONDX #24355), and immediately north of Ravenswood OSP.	Possible
Taxidea taxus American badger	Fed: None CA: SSC	A large mustelid that inhabits open areas with friable soils within woodland, grassland, savannah and desert habitats. A fossorial mammal that preys predominately on ground squirrels (*Ammospermophilus* and *Spermophilus* spp.) and pocket gophers (*Thomomys* spp.). Mating occurs in late summer; young are born in March and April (Jameson and Peeters 2004).	This species ranges widely and may occur throughout Midpen lands. There are numerous CNDDB occurrences well-distributed within and adjacent to Midpen lands. Occurrences are present within or partially overlapping Purisima Creek, La Honda Creek,	Present

Species Name Common Name	Listing Status [a]	Habitat Requirements and Additional Notes	Habitat Suitability and Local Distribution	Occurrence Potential
			Windy Hill, Russian Ridge, Skyline Ridge, Monte Bello, and Los Trancos OSPs.	

Notes:

[h] **Explanation of State and Federal Listing Codes**

Federal listing codes:

- FE: Federally listed as Endangered
- FT: Federally listed as Threatened
- FPE: Federally proposed for listing as Endangered
- FPT: Federally proposed for listing as Threatened
- FPD: Federally proposed for delisting
- FC: Federal candidate species (former Category 1 candidates)
- BGEPA: Bald and Golden Eagle Protection Act
- BCC: USFWS Bird of Conservation Concern
- SC: Species of Concern (NMFS regulated species only)
- CH: Critical Habitat (Proposed or Final) is designated

California listing codes:

- SE: State listed as Endangered
- ST: State listed as Threatened
- SCE: State candidate for listing as Endangered
- SCT: State candidate for listing as Threatened
- SCD: State candidate for delisting
- SSC: California Species of Special Concern
- FP: Fully Protected Species
- WL: CDFW Watch List
- SA: Included on the CDFW Special Animals List

Other codes:

- SCVHCP: Covered species under the Santa Clara Valley Habitat Conservation Plan

Appendix 4.4c Special-Status Wildlife Species Descriptions

Special-Status Wildlife Species Descriptions

Invertebrates

Bumble Bee Species

There are three special-status bumble bee species whose ranges include Midpen lands. Two of them, the western bumble bee (*Bombus occidentalis*) and the Crotch bumble bee (*Bombus crotchii*), are candidates for listing as endangered under the California Endangered Species Act. The third, the obscure bumble bee (*Bombus caliginosus*), is included on CDFW's Special Animals List. Specific habitat requirements for each of these species are not fully understood, but they are generally thought to nest underground or in decaying wood (CDFW, 2019). All three of these bumble bee species may occur in grassland, scrub, or open woodland on Midpen lands.

Smith's Blue Butterfly (*Euphilotes enoptes smithi*)

The Smith's blue butterfly is a federally listed endangered species. It is primarily known from dune habitats along Monterey Bay, but has also been found in chaparral and grasslands where its hostplants, coast buckwheat *(Eriogonum latifolium*) and seacliff buckwheat (*E. parvifolium*) are present. The adult flight period is approximately from mid-June to September (USFWS 2006).

A population of Smith's blue butterflies was reported along Loma Prieta Road in the southern portion of Sierra Azul OSP as recently as 2000, though its current status is unknown. They may occur in this area, but are not expected to occur anywhere else on Midpen lands.

Bay Checkerspot Butterfly (*Euphydryas editha bayensis*)

The bay checkerspot butterfly is a federally listed threatened species. They are medium-sized butterflies, with an approximately 2-inch wingspan, with a brown base color and distinct red, yellow and white checkered pattern forming rows separated by black bands. They are restricted to open grasslands with serpentine and similar soils supporting larval and adult host plants. Larval host plants include the dwarf plantain (*Plantago erecta*), owl's clover (*Castilleja densiflora*), purple owl's clover (*Castilleja exserta*), and Indian paintbrush (*Castilleja affinis*). They also require variability in slope and aspect to accommodate favorable feeding conditions and larval development due to variations in weather conditions and plant senescence. The adult flight season generally occurs from late February to early May, lasting approximately 10 days. Eggs are laid in small masses numbering up to 250, which are deposited at the base *P. erecta* or *C. affinis*. Eggs hatch in approximately ten days and feed on the host plant for a few weeks prior to entering diapause in nearby soil cracks or under rocks until the following spring (Black and Vaughan 2005). The Bay checkerspot is restricted to six localities in San Francisco (San Bruno Mountain State and County Park), San Mateo (Edgewood County Park and El Corte de Madera) and Santa Clara (Kirby, Metcalf, San Felipe, and Silver Creek Hills) counties (USFWS 1998).

A documented population of bay checkerspot butterflies and designated Critical Habitat (USFWS 2008) are present in Edgewood County Park, which is located immediately adjacent to Pulgas Ridge OSP. Pulgas Ridge OSP does not have any mapped serpentine grasslands, but due to its proximity to a known population, bay checkerspot butterflies may occur there occasionally. Serpentine grasslands are also mapped in Sierra Azul OSP and St. Joseph's Hill OSP, though the species has not been documented at either of these locations.

Monarch Butterfly (*Danaus plexippus*)

The monarch butterfly is included on CDFW's Special Animals List, and is under review by USFWS for listing under the Federal Endangered Species Act (though it is not yet formally a candidate for listing). Successive generations of monarchs make long-distance migrations to the same overwintering sites year after year. The western population of monarchs breeds in areas with its host plants, milkweeds (*Asclepias* spp.), throughout the United States west of the Rockies (Brower 1995), but virtually all of the overwintering sites used by the western population are located along the California coast, from northern Mendocino County south to San Diego County. The majority of overwintering sites are located within 1.5 miles of the Pacific Coast or San Francisco Bay, in areas of dense tree cover where the butterflies are protected from the wind (Xerces Society 2017). Typical overwintering sites are found near natural watercourses, and include areas at or near sea level in shallow canyons, gullies, or the leeward side of hills, where a combination of dense tree canopy, vegetation cover, and local topography provide strong wind protection (Lane 1993). Dense canopy cover also provides insulation from cold temperatures and protection from winter rains, both of which can cause lethal freezing in monarchs (Anderson and Brower 1996).

Ravenswood OSP and Stevens Creek Nature Study Area are both located on the San Francisco Bay shoreline, but lack any wind-protected tree groves and are therefore do not contain suitable habitat for overwintering monarch butterflies. The westernmost portions of Miramontes Ridge OSP, Purisima Creek Redwoods OSP, and Tunitas Creek OSP are the only areas on Midpen lands that are in close enough proximity to the Pacific Coast to be suitable for overwintering monarchs. Wintering aggregations may occur in wind-protected groves of trees within these areas, but are not expected elsewhere on Midpen lands.

Unsilvered Fritillary Butterfly (*Speyeria adiaste adiaste*)

The unsilvered fritillary butterfly is included on CDFW Special Animal's List. They are medium-sized butterflies with a wingspan of approximately 2 inches. They occur in grasslands, chaparral, and oak woodlands where their host plants (*Viola* sp.) are present. They have been observed nectaring on California buckeye *(Aesculus californica*) and various species of thistle (Asteraceae) (USFWS 2011a). A population of unsilvered fritillary butterflies was previously known from an area along Skyline Boulevard immediately adjacent to Long Ridge OSP, though its current status is unknown. Unsilvered fritillary butterflies may occur on Midpen lands in grasslands, chaparral, and woodland habitats, but only in locations where their host plants are present.

Opler's Longhorn Moth (*Adela oplerella*)

The Opler's longhorn moth is included on CDFW's Special Animals List. They are small, dark-colored moths with an approximately half-inch wingspan and notably long antennae. Nearly all

known populations are restricted to serpentine grassland habitats where their host plant, California cream cups (*Platystemon californicus*), occurs (USFWS 1998). Opler's longhorn moth may occur in serpentine grassland habitats on Midpen lands, but only in association with populations of its host plant.

Freshwater Aquatic Invertebrates

There are three freshwater invertebrate species included on CDFW's Special Animals List that may occur on Midpen lands: the California floater mussel (*Anodonta californiensis*), the freshwater isopod (*Calasellus californicus*), and the Ricksecker's water scavenger beetle (*Hydrochara rickseckeri*). These species are all relatively under-studied, but are understood to inhabit lakes, ponds, and slow-moving streams.

These species have all been observed previously in the region, though the current status of their populations is unknown. Lacking any further specific information, it is assumed that these species may occur in freshwater habitats such as lakes, ponds, and streams throughout Midpen lands.

Fish

Anadromous Salmonids

Two special-status salmonid fish species may occur in creeks within Midpen lands: California central coast Distinct Population Segment (DPS) steelhead (*Oncorhynchus mykiss irideus*), a federally listed threatened species, and central coast Evolutionarily Significant Unit (ESU) coho salmon (*Oncorhynchus kisutch*), a federally and state-listed endangered species. Adults of both species are oceanic, returning to rivers and large streams to spawn. Critical Habitat for steelhead and coho salmon has been designated in streams that are within or immediately adjacent to several OSPs (NOAA Fisheries 1999, 2005b). Both of these species may occur in streams with no downstream passage barriers throughout Midpen lands.

Amphibians

California Tiger Salamander (*Ambystoma californiense*)

The Central California DPS of California tiger salamander is a federally and state-listed threatened species. They are large terrestrial salamanders that inhabit seasonal/semi-permanent water sources (3-4 months in duration) and adjacent upland habitat with small fossorial mammal activity in lowland grasslands, oak savannah, and mixed woodlands. Larvae develop in vernal pools and ponds, then metamorphose and move into uplands. They enter burrows, typically those made by small mammals, and then spend the vast majority of their lives underground (Trenham et al. 2001, USFWS 2017). Adult Central California tiger salamanders engage in mass migrations during a few rainy nights per year, typically from November through April, although migrating adults have been observed as early as October and as late as May. During these rain events, adults leave their underground burrows and return to breeding ponds to mate and will then return to their underground burrows. Upland habitats surrounding known Central California tiger salamander breeding pools are usually dominated

by grassland, oak savanna, or oak woodland (USFWS 2017). Suitable habitat for California tiger salamander is present in grassland, scrub, and sparse woodlands throughout Midpen lands, although based on the locations of known populations in the region the only area where they have any probability of occurring is along the northeastern edge of Sierra Azul OSP.

Foothill Yellow-legged Frog (*Rana boylii*) (West/Central Coast Clade)

The west/central coast clade is one of six recognized genetically distinct populations of the foothill yellow-legged frog, and is a state-listed Endangered species. This clade ranges south from the San Francisco Bay through the Diablo Range and down the peninsula through the Santa Cruz and Gabilan Mountains in the Coast Range east of the Salinas Valley (CDFW, 2019). They inhabit small to moderately-sized, perennial streams characterized by cobble-rocky substrate and shallow, flowing water in valley-foothill riparian, hardwood-conifer, mixed conifer, coastal scrub, mixed chaparral, and wet meadow communities (Hayes and Jennings 1988, Jennings 1988). Foothill yellow-legged frog populations may require both mainstem and tributary habitats for long-term persistence. Streams too small to provide breeding habitat may be critical as seasonal habitats, such as in winter or during the hottest part of the summer (VanWagner 1996). They are infrequent in habitats where introduced fish and bullfrogs are present (Jennings and Hayes 1994). Foothill yellow-legged frogs may occur in rocky or cobbly streams on Midpen lands, and are most likely to occur in Sierra Azul OSP and the surrounding area based the locations of known extant populations.

There are several historical occurrences of foothill yellow-legged frog within Midpen lands, ranging from the 1930's through the early 1970's, though most are considered extirpated or possibly extirpated. There are occurrences recorded in 2000 in the eastern part of Sierra Azul OSP (EONDX ##75809, #75811, and #111875), and there are additional occurrences recorded in 2015 (EONDX #105942) and 2019 (EONDX #6177) immediately southwest of Sierra Azul OSP in Soquel Creek. Foothill yellow-legged frogs may occur in rocky or cobbly streams within Midpen lands, and are most likely to occur in Sierra Azul OSP and the surrounding area based the locations of known populations.

California Red-Legged Frog (*Rana draytonii*)

The California red-legged frog is a federally listed threatened species and a California Species of Special Concern. California red-legged frogs predominately inhabit permanent water sources such as streams, lakes, marshes, natural and man-made ponds, and ephemeral drainages in valley bottoms and foothills up to 1,500 meters (4,921 feet) in elevation (Jennings and Hayes 1994, Bulger et al. 2003). Adults breed in a variety of aquatic habitats, while larvae and metamorphs use streams, deep pools, backwaters of streams and creeks, ponds, marshes, sag ponds, dune ponds, and lagoons. In a study of upland movements, California red-legged frogs moved from 1 to 71 meters from aquatic habitats, averaging 24 meters. Individuals were found within a variety of refugia including ground squirrel burrows at the bases of trees or rocks, logs, grass thatch, crevices, cow hoof prints, and a downed barn door, while others were associated with upland sites lacking refugia. Uplands closer to aquatic sites were more often used and were more commonly associated with areas having abundant sources of cover (e.g., small woody debris, rocks, and vegetation) (Tatarian 2008). The California red-legged frog is well-distributed throughout Midpen lands and adjacent areas. Furthermore, much of northern portion of Midpen lands falls within designated Critical Habitat for the species (USFWS 2010).

They may breed in aquatic habitats including ponds, wetlands, and slow-moving streams, and move into upland areas of any habitat type for refuge and dispersal.

California Giant Salamander (*Dicamptodon ensatus*), Santa Cruz Black Salamander (*Aneides niger*), and Red-Bellied Newt (*Taricha rivularis*)

The California giant salamander, Santa Cruz black salamander, and red-bellied newt are all California Species of Special Concern. They have similar habitat requirements, occupying wet forest habitats in or near perennial or semi-perennial streams (Thomson et al. 2016).

Records of California giant salamander and Santa Cruz black salamander are well-distributed in the region, and these two species may occur in streams and adjacent riparian, woodland, and forest habitats throughout Midpen lands.

Red-bellied newts are known to occur from Humboldt County south to Sonoma County, with the exception of a single, disjunct population in the upper reaches of Stevens Creek along the southern edge of Monte Bello OSP. Red-bellied newts may occur in the vicinity of this isolated population, but are not expected anywhere else on Midpen lands.

Reptiles

San Francisco Garter Snake (*Thamnophis sirtalis tetrataenia*)

The San Francisco garter snake is a federally and state-listed endangered species, and a California Fully Protected Species. They are a highly aquatic subspecies restricted to the San Francisco Peninsula, ranging from the southern San Francisco County border south to Waddell Lagoon south of Año Nuevo, and as far east as Crystal Springs Reservoir. They occur sympatrically with their primary prey, California red-legged frogs. San Francisco garter snakes prefer densely vegetated habitats close to water where they can retreat when disturbed (Stebbins 2003). The species often occurs near ponds, marshes, streams, and other wetlands associated with cattails (*Typha* spp.), bulrushes (*Amphiscirpus*, *Bolboschoenus*, *Isolepis*, *Schoenoplectus*, and *Trichophorum* spp.) and rushes (*Juncus* and *Eleocharis* spp.). They may hibernate near the coast in fossorial mammal burrows and other refuges, or remain active year-round weather permitting. San Francisco garter snakes are generally known to occur in the northwestern portion of Midpen lands, within the San Mateo County line. They may occur in ponds, streams, and wetlands throughout this are

Western Pond Turtle (*Actinemys marmorata*)

The western pond turtle is a California Species of Special Concern. They are habitat generalists, occurring in slow-moving rivers and streams, lakes, reservoirs, permanent and ephemeral wetlands, stock ponds, and sewage treatment ponds. They prefer aquatic habitat with refugia, such as undercut banks and submerged vegetation, and they require exposed basking sites such as mud banks, rocks, logs, root wads, and mats of vegetation to thermoregulate their body temperature (Holland 1994, Thomson et al. 2016). They move into uplands to dig nests and disperse to other aquatic habitats. Nest sites are most often situated on south or west-facing slopes, are sparsely vegetated with short grasses or forbs, and are scraped in sands or hard-packed, dry, silt, or clay soils. Nests may be dug very close to the water's edge, but have also

been reported as far as 500 meters from the nearest water (Rathbun et al. 1992, Holland 1994, Reese and Welsh 1997). Western pond turtles may occur in ponds, lakes, large streams, and wetlands throughout Midpen lands.

Blainville's Horned Lizard (*Phrynosoma blainvillii*)

Blainville's horned lizard is a California Species of Special Concern. They occur in open areas with sandy soil and low vegetation in valleys, foothills, and semiarid mountains. The species is associated with a variety of habitat types, including grasslands, coniferous forests, woodlands, and chaparral. Key habitat elements are loose, fine soils with a high sand fraction, an abundance of native ants, open areas for basking, and areas with low shrubs for refuge (Thomson et al. 2016). Blainville's horned lizards may occur in woodlands, shrublands, and grasslands with loose soils on Midpen lands.

Birds

Overview

Several other special-status birds, including raptors, passerines, waterfowl, and wading birds could occur within the Midpen lands. Due to the diversity of species, special-status birds could occur in any of the habitats present within the Midpen lands. Bird species that are listed under the federal or California Endangered Species Acts, or are California Fully Protected Species, are described in detail below.

Tricolored Blackbird (*Agelaius tricolor*)

The tricolored blackbird is a state-listed threatened species. Tricolored blackbirds are highly colonial and have been reported to breed in groups exceeding 100,000 nests. In most years, the Central Valley supports greater than 90% of all breeding individuals, with smaller colonies present in the Coast Ranges, Southern California, and northeastern California (Shuford and Gardali 2008). They nest in dense vegetation near open water, suitable foraging areas providing adequate insect prey within a few kilometers of the colony (Beedy and Hamilton 2020). No breeding colonies are known from within Midpen lands, though they could occur in thick vegetation within or near open water throughout the area.

Golden Eagle (*Aquila chrysaetos*)

The golden eagle is a California Fully Protected Species, a USFWS Bird of Conservation Concern, and receives protection under the federal Bald and Golden Eagle Protection Act. They use nearly all terrestrial habitat types in the western U.S. (Kochert et al. 2002). However, in central California, they prefer open grasslands and oak savanna, with lesser numbers in oak woodland and open shrublands (Hunt et al. 1998). Hilly or mountainous country where takeoff and soaring are supported by updrafts is generally preferred to flat habitats (Johnsgard 1990). Golden eagles require large patches of unfragmented natural landscapes as habitat. In addition, they are relatively intolerant of human activity and other sources of anthropogenic disturbance (Kochert et al. 2002). Golden eagles may nest nearly anywhere that suitable nesting substrates (tall trees, cliff faces, large utility towers) are present on Midpen lands.

Marbled Murrelet (*Brachyramphus marmoratus*)

The marbled murrelet is a federally threatened and state-listed endangered species. They are small coastal seabirds that nest in coastal trees in mature/old-growth coniferous forests. In California, they are most often found nesting in old-growth redwood trees (Baicich & Harrison 2005).

Marbled murrelets have been observed nesting in Purisima Creek Redwoods OSP, and a very small sliver of land in this OSP falls within designated marbled murrelet Critical Habitat Unit CA-13 (USFWS 2011b). Marbled murrelets may occur in mature redwood and conifer forests on Midpen lands.

White-Tailed Kite (*Elanus leucurus*)

The white-tailed kite is a California Fully Protected Species. They typically occur in grassland, wetland, oak woodland, and savannah habitats, as well as in riparian habitats adjacent to open areas. They may nest in single isolated trees or in trees that are part of larger stands. They require open areas for foraging, and often hunt in agricultural areas (Dunk 2020). White-tailed kites may nest in woodland and riparian areas near open habitats throughout Midpen lands.

American Peregrine Falcon (*Falco peregrinus anatum*)

The American peregrine falcon is a California Fully Protected Species and a USFWS Bird of Conservation Concern. They typically nest on cliffs, rocky outcrops, or human-made structures such as bridges, buildings and other tall, prominent structures, and feed primarily on birds captured in flight (Baicich and Harrison 2005). Peregrine falcons may nest on cliff faces on Midpen lands.

Bald Eagle (*Haliaeetus leucocephalus*)

The bald eagle is a state-listed endangered species, a California Fully Protected Species, a USFWS Bird of Conservation Concern, and receives protection under the federal Bald and Golden Eagle Protection Act. Bald eagles inhabit forested areas adjacent to large bodies of water including lakes, reservoirs, rivers, estuaries and the coastline. They are opportunistic and will feed on carrion, but actively prey on a variety of fish, mammals, and birds (Buehler 2020). Nests are built from sticks and branches in a large tree or a rocky outcrop, usually near water bodies (Baicich and Harrison 2005). Although there are no large reservoirs on Midpen lands, water bodies including Lexington Reservoir, Lake Elsman, Guadalupe Reservoir, Almaden Reservoir, and Stevens Creek Reservoir are all located immediately adjacent to OSPs. Bald eagles may nest in large trees on Midpen lands that are in the vicinity of large water bodies such as these.

Mammals

Special-Status Bats

Bats are widespread within California and may be found in any habitat. They are nocturnal, aerial predators of insects and other arthropods, and often forage over open water, marshes, and other moist, open areas where flying insects tend to congregate. Different bat species have different roosting requirements and roosts can be found in a variety of habitats and locations. Day roosts, used from sunrise to sunset, provide a protected and sheltered location for bats to

rest and sleep within a short flight to foraging areas and a site to raise their young (Erickson 2002). During the day, bats may use three types of roosts: crevices, cavities, and foliage. Crevice and cavity roosts may be found in natural and human-made features such as caves, cliffs, rock outcrops, trees, mines, buildings, bridges, and tunnels. During the breeding season (April through September), crevice and cavity roosting species typically gather in groups of mothers and young (maternity colonies) that may number in the thousands or even tens of thousands of individuals. In contrast, foliage-roosting bats may be entirely solitary or occur in groups of only a few individuals while breeding. Roosts used during the day and as maternity roosts tend to be well-hidden and require precise temperature and humidity conditions. Night roosts, which are used from approximately sunset to sunrise, are primarily sites where bats congregate to rest and digest their food between foraging bouts (Erickson 2002). Night roosts are often located in more open but protected areas such as overhangs on buildings and recessed areas on the undersides of bridges.

Several special-status bat species have the potential to occur on Midpen lands based on range, habitat, and recorded occurrences in the region, including:

- Western mastiff bat (*Eumops perotis)* – California Species of Special Concern
- Pallid bat (*Antrozous pallidus*) – California Species of Special Concern
- Townsend's big-eared bat (*Corynorhinus townsendii*) – California Species of Special Concern
- Western red bat (*Lasiurus blossevillii*) – California Species of Special Concern
- Hoary bat (*Lasiurus cinereus*) – Included on CDFW's Special Animals List
- Long-eared myotis bat (*Myotis evotis*) – Included on CDFW's Special Animals List
- Fringed myotis bat (*Myotis thysanodes*) – Included on CDFW's Special Animals List
- Long-legged myotis bat (*Myotis volans*) – Included on CDFW's Special Animals List
- Yuma myotis bat (*Myotis yumanensis*) – Included on CDFW's Special Animals List

These bat species may occur in any habitat, although riparian corridors, large trees and snags, and relatively undisturbed parts of human-made structures are generally the most suitable roost locations.

Ringtail (*Bassariscus astutus*)

The ringtail is a California Fully Protected Species. They are small, nocturnal carnivores that feed on arthropods, rodents, lizards, amphibians, small birds, and a variety of fruits and berries. They occur in riparian, montane and coniferous woodlands, chaparral, desert and tropical habitats with rocky outcroppings, canyons, or talus slopes near open water. They make dens in rocky areas in crevices, tree hollows, dens made by other animals, and occasionally human structures (Poglayen-Neuwall and Toweill 1988). Ringtail may occur in riparian, woodland, and forested habitats on Midpen lands.

Santa Cruz Kangaroo Rat (*Dipodomys venustus venustus*)

The Santa Cruz kangaroo rat is a California Species of Special Concern. They are burrowing rodents that occur in open chaparral habitats in mountainous areas of west-central California. Historically, they were known from San Mateo County south to San Benito County, with additional observations in the Mount Hamilton area of Santa Clara County. There was a notable density of observations in the sand hills of the Mount Hermon region in Santa Cruz County

(Brylski 1998). The species is thought to still be extant in the Mount Hermon area, though there are no recent observations anywhere else in its former range. Although their status in the region is unknown, Santa Cruz kangaroo rats may occur in open chaparral habitats with friable soils on Midpen lands.

San Francisco Dusky-Footed Woodrat (*Neotoma fuscipes annectens*)

The San Francisco dusky-footed woodrat is a California Species of Special Concern. The San Francisco subspecies appears to be limited to Alameda, Contra Costa, San Mateo, Santa Clara, and Santa Cruz counties (Matocq 2002). Dusky-footed woodrats are frequently found in forest habitats with moderate canopy cover and a moderate to dense understory, including riparian forests, but may also be found in chaparral habitats. They build relatively large stick nests (2-5 feet in height and 4-8 feet in basal diameter) in protected spots, such as rock outcrops, dense brush, hollow logs, or in the crotches and cavities of trees. Nests are used for cover, food storage, and rearing of young. Nests may be used by multiple generations of woodrats for 20 years or more. Woodrat nests provide cover for many other animal species, including small mammals, reptiles, amphibians, and arthropods, thereby increasing local biodiversity. Woodrats are generalist herbivores, consuming a variety of nuts, fruits, fungi, foliage and some forbs (Carraway and Verts 1991). San Francisco dusky-footed woodrats are ubiquitous in oak and riparian woodlands in the region, and may occur in those habitats as well as chaparral and other shrublands throughout Midpen lands.

Mountain Lion (Southern California/Central Coast ESU) (*Puma concolor*)

The Southern California/Central Coast ESU mountain lion is a candidate for listing as threatened under the California Endangered Species Act. They are large cats with very large home ranges that may cover many different habitat types, including conifer forests, oak and riparian woodlands, scrub, chaparral, grasslands, and deserts. They typically require areas that are relatively undisturbed by human activity. The Southern California/Central Coast ESU includes all populations from the San Francisco Bay Area south along the Coast Ranges, and in Southern California from Interstate 15 southward to the border with Mexico, and eastward to the Nevada and Arizona borders. The Santa Cruz Mountains are understood to be a core habitat area for the species, and populations extend to the limits of urbanization in San Mateo, Santa Cruz, and Santa Clara Counties (Center for Biological Diversity and Mountain Lion Foundation 2019). Although individuals occasionally wander into urban areas, they are not able to establish territories and persist in highly developed environments. Mountain lions may naturally occur in any non-urban habitats on Midpen lands.

American Badger (*Taxidea taxus*)

The American badger is a California Species of Special Concern. They occur throughout California in open habitats where their prey species are present. Characterized by a stout, muscular, compressed body adapted to digging, badgers forage on other fossorial species, such as ground squirrels and pocket gophers (Jameson and Peeters 2004). American badgers are well-distributed throughout Midpen lands and the surrounding region. They range widely and may occur in any non-urban habitat type, though they are most prevalent in grasslands and other open areas.

Tidal Marsh Species – Ravenswood OSP and Stevens Creek Shoreline Study Area

Ravenswood OSP and the Stevens Creek Shoreline Nature Study Area are both located on the San Francisco Bay shoreline, and contain tidal marsh and slough habitats that are not present on any other Midpen lands. There are several special-status species that occur only in these habitat types that are not expected to occur anywhere else on Midpen lands, and for this reason they are discussed here separately.

Salt Marsh Harvest Mouse (*Reithrodontomys raviventris*)

The salt marsh harvest mouse is a federally and state-listed endangered species and a California Fully Protected species. It is a small rodent endemic to the salt and brackish marshes of San Francisco Bay and adjacent tidally influenced areas. They depend mainly on dense pickleweed (*Salicornia* sp.) as their primary cover and food source and may utilize a broader source of food and cover that includes saltgrass and other vegetation typically found in the salt and brackish marshes of this region. In natural systems, harvest mice can be found in the middle tidal marsh and upland transition zones. Upland refugia are an essential habitat component during high tide events (USFWS 1984). The salt marsh harvest mouse is known to be present in both Ravenswood OSP and Stevens Creek Shoreline Nature Study Area Preserve. The species may occur in tidal marshes and adjacent upland areas within both of these OSPs.

Ridgway's Rail (*Rallus obseletus*)

The Ridgway's rail is a federally and state-listed endangered species and a California Fully Protected species. They occur within tidal salt marshes dominated by pickleweed and cordgrass (*Spartina sp.*) along San Pablo Bay, Suisun Marsh, and the south and central San Francisco Bay. Nests are built on the ground and concealed by vegetation. Breeding begins in late February and continues through late August. The species is typically single-brooded, but will replace lost clutches (Baicich and Harrison 2005). Young are precocial, leaving the nest quickly after hatching and are attended by both parents. Ridgway's rail are known to be present in Ravenswood OSP. Ridgway's rail may occur in tidal marshes and adjacent upland areas within both Ravenswood OSP and Stevens Creek Shoreline Nature Study Area.

California Black Rail (*Laterallus jamaicensis coturniculus*)

The California black rail is a State-listed threatened species and a California Fully Protected species. They are year-round residents that occur throughout the San Francisco Bay, Bodega Bay, Tomales Bay, Morro Bay, and Bolinas Lagoon (Eddleman et al. 1994). Nests are built on the ground in tufts of grass or pickleweed beginning in mid-March. The breeding season lasts through mid-July and are typically single-brooded. Precocial young leave the nest within 24 hours of hatching (Eddelman et al. 2020). California black rail may occur in tidal marshes and adjacent upland areas within both Ravenswood OSP and Stevens Creek Shoreline Nature Study Area.

Western Snowy Plover (*Charadrius alexandrinus nivosus*)

The western snowy plover is a federally-listed threatened species and a California Species of Special Concern. They inhabit beaches, mud flats, estuaries, salt evaporation ponds, and inland river channels with banks for foraging. This species breeds on sandy beaches, dunes, levees, river banks and dry salt evaporation beds along the California coastline typically in areas with minimal human disturbance. San Francisco Bay is within USFWS Recovery Unit 3 (USFWS 2007). There is minimal nesting habitat for snowy plover in Ravenswood OSP, though they may

forage in mud flats at low tide. They may nest in open areas within Stevens Creek Shoreline Nature Study Area.

Green Sturgeon (*Acipenser medirostris*) – Southern Distinct Population Segment (DPS)
Southern DPS green sturgeon is a federally listed threatened species and a California Species of Special Concern. They are anadromous fish that are found in marine waters from the Bering Sea to Ensenada, Mexico. The southern DPS includes all spawning populations south of the Eel River (exclusive), principally including the Sacramento River population. Locally, green sturgeon inhabit Suisun, San Pablo, and San Francisco Bays, and coastal bays and estuaries from Monterey Bay north to Puget Sound. Spawning occurs in the Sacramento River (NOAA Fisheries 2009). The entirety of San Francisco Bay has been designated Critical Habitat for this species, including all of the tidal marsh and slough habitat in Ravenswood OSP and the portion of Stevens Creek adjacent to Stevens Creek Shoreline Nature Study Area (NOAA Fisheries 2009). Tidal sloughs in both of these OSPs may be used by green sturgeon during migration or as juvenile rearing habitat.

Longfin Smelt (*Spirinchus thaleichthys*)
Longfin smelt is a candidate for federal listing, a state-listed threatened species, and a California Species of Special Concern. They generally spawn in freshwater and then move downstream to brackish water to rear. Juvenile and adult longfin smelt have been found throughout the year in salinities ranging from pure freshwater to pure seawater, although once past the juvenile stage, they are typically collected in waters with salinities ranging from 14 to 28 parts per thousand (Baxter 1999). The known range of the longfin smelt extends from the San Francisco Bay-Delta in California northward to the Cook Inlet in Alaska. Longfin smelt may occur in tidal sloughs connected to San Francisco Bay within both Ravenswood OSP and Stevens Creek Shoreline Nature Study Area.

Alameda Song Sparrow (*Melospiza melodia pusilulla*)
The Alameda song sparrow is a California Species of Special Concern and a USFWS Bird of Conservation Concern. They are one of four subspecies endemic to the Bay Area. It is a year-round resident of tidal salt and brackish marshes from El Cerrito southward through the shorelines of Alameda, Santa Clara, San Mateo, and San Francisco Counties. The Alameda song sparrow primarily inhabits tidal channels with dense, short vegetation such as pickleweed, cordgrass, gumplant (*Grindelia stricta*), and rushes (*Juncus* spp.) Their diet consists mostly of grains with some invertebrates; therefore, exposed ground is a habitat requirement. They prefer to nest in dense vegetation, which also provides cover from predators (Shuford and Gardali 2008). Alameda song sparrows may nest in thick vegetation anywhere within Ravenswood OSP or the Stevens Creek Shoreline Study Area.

Salt Marsh Wandering Shrew (*Sorex vagrans halicoetes*)
The salt marsh wandering shrew is a California Species of Special Concern. They are small, dark-colored shrews that inhabit tidal marshes along the shoreline of San Francisco Bay from San Pablo southward. They have been found most often in middle marsh areas, 6 to 8 feet above sea level (Collins 1998). Salt marsh wandering shrews may occur in tidal marshes in both Ravenswood OSP and the Stevens Creek Shoreline Study Area.

Mimic Tryonia (*Tryonia imitator*)

Mimic tryonia is included on CDFW's Special Animals List. They are small snails, typically less than 5 millimeters in length, that occur in salt water or brackish water in coastal lagoons, creeks, sloughs, and salt marshes from Sonoma County south to San Diego County. They are found in permanent water, often associated with mats of algae (*Ulva* sp.) (Kellogg 1985). The current status of mimic tryonia in San Francisco Bay is unknown, but they have potential to occur in tidal sloughs within both Ravenswood OSP and Stevens Creek Shoreline Nature Study Area.

References

Anderson, J. B. and Brower L. P. (1996). Freeze Protection of Overwintering Monarch Butterflies in Mexico: Critical Role of the Forest as a Blanket and an Umbrella. Ecological Entomology. 21, 107-116.

Austin C.C. and Shaffer H.B. (1992). Short-, Medium- and Long-Term Repeatability of Locomotor Performance in the Tiger Salamander *Ambystoma californiense*. Functional Ecology 6(2): 145-153.

Baicich, P.J. and Harrison, C.J.O. 2005. Nests, Eggs, and Nestlings of North American Birds. Second Edition. Princeton University Press. Princeton, New Jersey. 347 pp.

Baxter, R. D. (1999). Osmeridae. In: J. Orsi (ed). Report on the 1980-1995 fish, shrimp and crab sampling in the San Francisco estuary. Interagency Ecological Program for the Sacramento-San Joaquin Estuary Technical Report 63.

Beedy, E. C., Hamilton W. J., III, Meese, R. J., Airola, D. A., and Pyle, P. (2020). Tricolored Blackbird (*Agelaius tricolor*). In A. F. Poole and F. B. Gill (Eds). Birds of the World. Cornell Lab of Ornithology, Ithaca, NY, USA. Accessed April 2020. https://birdsoftheworld.org

Bildstein, K. L., Meyer, K. D., White, C. M., Marks, J. S., and Kirwan, G. M. (2020). Sharp-shinned hawk (*Accipiter striatus*), Version 1.0. In A. F. Poole and F. B. Gill (Eds). Birds of the World. Cornell Lab of Ornithology, Ithaca, NY, USA. Accessed April 2020. https://birdsoftheworld.org

Black, S. H., and Vaughan, D. M. (2005). Species Profile: *Euphydryas editha bayensis*. In Shepherd, M. D., D. M. Vaughan, and S. H. Black (Eds). Red List of Pollinator Insects of North America. Portland, OR: The Xerces Society for Invertebrate Conservation.

Briggs, T. S. and Ubick, D. (1989). The harvestman family Phalangodidae. 2. The new genus, *Microcina* (*Opiliones, Laniatores*). Journal Arachnology. 17:207-220.

Brower, L. P. (1995). Understanding and Misunderstanding the Migration of the Monarch Butterfly (Nymphalidae) in North America: 1857-1995. Journal of the Lepidopterists' Society. 49(4), 304-385.

Brylski, P. V. (1998, May). Santa Cruz Kangaroo Rat, *Dipodomys venustus venustus*. In: Bolster, B. C. (Ed.) Terrestrial Mammal Species of Special Concern in California. Prepared for the California Department of Fish and Game. May 1998.

Buehler, D. A. (2020). Bald Eagle (*Haliaeetus leucocephalus*), version 1.0. In A. F. Poole and F. B. Gill (Eds). Birds of the World. Cornell Lab of Ornithology, Ithaca, NY, USA. Accessed April 2020. https://birdsoftheworld.org

Bulger, J.B., Scott N.J., and Seymour R. (2003). Terrestrial Activity and Conservation of Adult California Red-Legged Frogs *Rana aurora draytonii* in Coastal Forests and Grasslands. Biological Conservation. Vol. 110: pp. 85-95.

Bumble Bee Watch. (2020). Bumble Bee Sightings Map. https://www.bumblebeewatch.org

Carraway, L.N., and B.J. Verts. (1991). *Neotoma fuscipes*. Mammalian Species, No. 386, pp. 1-10.

CDFW and CNPS. (2019). CDFW-CNPS Protocol for the Combined Vegetation Rapid Assessment and Relevé Field Form. Available at: <https://www.cnps.org/wp-content/uploads/2019/03/veg-releve-field-protocol.pdf>. (Accessed June 29, 2020).

CDFW. (2019, November 8). California Natural Community List. Retrieved from https://www.wildlife.ca.gov/Data/VegCAMP/Natural-Communities

CDFW. (2019). California Natural Community List, the Vegetation Classification and Mapping Program. California Natural Diversity Database. Biogeographic Data Branch.

Center for Biological Diversity and Mountain Lion Foundation. (2019). A Petition to List the Southern California/Central Coast Evolutionarily Significant Unit (ESU) of Mountain Lions as Threatened under the California Endangered Species Act (CESA). June 25, 2019.

CNDDB. (2020, May 31). RareFind 5 [Internet]. California Department of Fish and Wildlife [May 31, 2020].

CNPS. (2020). Inventory of Rare and Endangered Plants (online edition). Sacramento, CA. Available from http://rareplants.cnps.org

Collins, P. W. (1998). Salt Marsh Wandering Shrew. In: Bolster, B. C. (Ed). (1998). Terrestrial Mammal Species of Special Concern in California.

Committee on the Status of Endangered Wildlife in Canada (COSEWIC). (2014). COSEWIC assessment and status report on the Western Bumble Bee *Bombus occidentalis*, occidentalis subspecies (*Bombus occidentalis occidentalis*) and the mckayi subspecies (*Bombus occidentalis mckayi*) in Canada. Ottawa. xii + 52 pp.

Cummings, K. & Cordeiro, J. (2011). *Anodonta californiensis*. The IUCN Red List of Threatened Species 2011: e.T1311A3409492.

Dunk, J. R. (2020). White-tailed Kite (*Elanus leucurus*), version 1.0. In A. F. Poole and F. B. Gill (Eds). Birds of the World. Cornell Lab of Ornithology, Ithaca, NY, USA. Accessed April 2020. https://birdsoftheworld.org

eBird. (2020). eBird: An online database of bird distribution and abundance. Ithaca, New York. Accessed April 2020. https://www.ebird.org

Eddleman, W. R., Flores R. E., and Legare, M. (1994). Black Rail (*Laterallus jamaicensis*). In: The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online.

Eddleman, W. R., Flores, R. E., and Legare, M. (2020). Black Rail (*Laterallus jamaicensis*), version 1.0. In A. F. Poole and F. B. Gill (Eds). Birds of the World. Cornell Lab of Ornithology, Ithaca, NY, USA. Accessed April 2020. https://birdsoftheworld.org

England, S.A., Bechard, M.J., and Houston, S.C. (1997). Swainson's Hawk (*Buteo swainsoni*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/265. doi:10.2173/bna.265.

Erickson, G. A. (2002). Bat and Bridges Technical Bulletin (Hitchhiker's Guide to Bat Roosts). California Department of Transportation, Sacramento CA.

Hatfield, R., Jepsen, S., Thorp, R., Richardson, L., Colla, S., and Foltz Jordan, S. (2015). *Bombus occidentalis*. The IUCN Red List of Threatened Species 2015: e.T44937492A46440201.

Holland, D.C. (1994). The Western Pond Turtle: Habitat and History. Final Report. Portland, OR: U.S. Department of Energy, Bonneville Power Administration.

Holland, R. F. (1986). Preliminary Descriptions of the Terrestrial Natural Communities of California. Sacramento, California: Department of Fish and Game.

Hunt, W.G., Jackman, R.E., Hunt, T.L., Driscoll, D.E., and Culp, L. (1998). A population study of golden eagles in the Altamont Pass Wind Resource Area: population trend analysis 1997. Report to National Renewable Energy laboratory, Subcontract XAT-6-16459-01. Predatory Bird Research Group, University of California, Santa Cruz.

iNaturalist.org. (2020, April). Online species occurrence and identification platform. Accessed April 2020. https://www.inaturalist.org

Jameson, E.W. Jr. and Peeters, H.J. (2004). Mammals of California. Revised Edition. University of California Press. Berkeley, California. 429 pp.

Jennings, M.R., and Hayes, M.P. (1984). Pre-1900 Overharvest of the California Red-Legged Frog (*Rana aurora draytonii*): The Inducement for Bullfrog (*Rana catesbeiana*) Introduction. Herpetologica 41(1):94-103.

Jennings, M.R., and Hayes, M.P. (1994). Amphibian and Reptile Species of Special Concern in California. Final Report to the California Department of Fish and Game.

Johnsgard, P. A. (1990). Hawks, Eagles, and Falcons of North America: Biology and Natural History. Washington, D.C.: Smithsonian Institution Press.

Kellogg, M. G. (1985). Contributions to our knowledge of *Tryonia imitator* (Pilsbry 1899). Master's Thesis. San Francisco State University.

Kochert, M. N., Steenhof, K., McIntyre, C. L., and Craig, E. H. (2002). Golden Eagle (*Aquila chrysaetos*). In: The Birds of North America, No. 684 (A. Poole and F. Gill, eds.). The Birds of North America, Inc., Philadelphia, PA.

Lane, J. (1993). Overwintering Monarch Butterflies in California: Past and Present. In: Malcolm, S. and M. Zalucki (Eds.) Biology and Conservation of the Monarch Butterfly. Natural History Museum of Los Angeles County. 335-344.

Matocq, M. D. (2002). Phylogeographical structure and regional history of the dusky-footed woodrat, *Neotoma fuscipes*. Molecular Ecology 11, 229-242.

Midpen. (2014). 2014 Vision Plan Conservation Atlas.

Midpen. (2018). Vegetation Classification GIS dataset.

Nature Serve. (2020). Interpreting Nature Serve Conservation Stats Ranks. NatureServe Explorer [Online] and NatureServe Central Databases, Arlington, VA. Available http:www.natureserve.org/explorer/

NOAA Fisheries. (1999). Designated Critical Habitat; Central California Coast and Southern Oregon/Northern California Coasts Coho Salmon; Final Rule and Correction. FR Doc. 99-11187. 50 CFR. Part 226. Vol. 64. No. 86: pp. 24049-24062. May 5, 1999.

NOAA Fisheries. (2005a). Endangered and Threatened Species: Final Listing Determinations for 16 ESUs of West Coast Salmon, and Final 4(d) Protective Regulations for Threatened Salmonid ESUs: Final Rule. Federal Register Vol. 70. No. 123: pp. 37160-37204. June 28, 2005.

NOAA Fisheries. (2005b). Endangered and Threatened Species: Designation of Critical Habitat for Seven Evolutionarily Significant Units of Pacific Salmon and Steelhead in California; Final Rule. FR Doc. 05-16389. Part II. 50 CFR. Part 226. Vol. 70. No. 170: pp. 52488-52627. September 2, 2005.

NOAA Fisheries. (2009, October 9). Endangered and Threatened Wildlife and Plants: Final Rulemaking to Designate Critical Habitat for the Threatened Southern Distinct Population Segment of North American Green Sturgeon; Final Rule. FR Doc. E9-24067. 50 CFR. Part 226. Vol. 74. No. 195: pp. 52300-52351. October 9, 2009.

Poglayen-Neuwall, I., and Toweill, D.E. (1988). *Bassariscus astutus*. The American Society of Mammalogists. Mammalian Species No. 327. 8pp.

Rathbun, G. B., Seipel, N. R., Holland, D. C. (1992). Nesting Behavior and Movements of Western Pond Turtles *Clemmys marmorata*. The Southwestern Naturalist. 37(3):319-324.

Reese, D.A., and Welsh Jr, H. H. (1997). Use of Terrestrial Habitat by Western Pond Turtles, *Clemmys marmorata*: Implications for Management. Pp. 352-357. In J. Van Abbema (Ed.). Conservation, Restoration, and Management of Tortoises and Turtles, An International Conference, WCS Turtle Recovery Program and the New York Turtle and Tortoise Society, New York.

Sawyer JO, Keeler-Wolf, T., Evens, J.M. (2009). A Manual of California Vegetation, Second Edition. California Native Plant Society, Sacramento, California. 1300 pp.

Shuford, W.D. and T.G. Gardali. Eds. (2008). California Bird Species of Special Concern. A Ranked Assessment of Species, Subspecies, and Distinct Populations of Birds of Immediate Conservation Concern in California. Studies of Western Birds No. 1. Western Field Ornithologists and California Department of Fish and Game. 450 pp.

Stebbins, R. C. (2003). A Field Guide to Western Reptiles and Amphibians. 3rd Edition. Houghton Mifflin Company. New York, New York. 533 pp.

Steiner, J. (1990, April). Thesis: Bay Area Butterflies; The Distribution and Natural History of San Francisco Region Rhopalocera. California State University, Hayward. April. 307 pp.

The Xerces Society. (2017). Protecting California's Butterfly Groves: Management Guidelines for Monarch Butterfly Overwintering Habitat. 32+vi pp. Portland, OR: The Xerces Society for Invertebrate Conservation.

Thomson, R. C., Wright, A. N., and Shaffer, H. B. (2016). California Amphibian and Reptile Species of Special Concern. California Department of Fish and Wildlife. University of California Press, Oakland, California.

Trenham, P.C., Koenig, W.D., and Shaffer, H.B. (2001). Spatially autocorrelated demography and interpond dispersal in the salamander *Ambystoma californiense*. Ecology 82(12): 3519-3530.

Ubick, D. and T.S. Briggs. (1989). The harvestmen family Phalangodidae. 1. The new genus *Calicina*, with notes on *Sitalcina* (Opiliones: Laniatores). Proceedings of the California Academy Sciences, 46: 95-136.

USFWS. (1984, November). Salt Marsh Harvest Mouse and California Clapper Rail Recovery Plan. November 1984.

USFWS. (1998, September 30). Recovery Plan for Serpentine Soil Species of the San Francisco Bay Area. Sacramento Fish and Wildlife Office. September 30, 1998.

USFWS. (2006, September). Smith's blue butterfly (*Euphilotes enoptes smithi*) Five-Year Review: Summary and Evaluation. September 2006.

USFWS. (2007). Recovery Plan for the Pacific Coast Population of the Western Snowy Plover (*Charadrius alexandrinus nivosus*). In 2 volumes. Sacramento, California. xiv + 751 pages.

USFWS. (2008, January 31). Endangered and Threatened Wildlife and Plants; Revised Designation of Critical Habitat for the Tidewater Goby (*Eucyclogobius newberryi*); Final Rule. FR Doc. 08-264. 50 CFR. Part 17. Vol. 73. No. 21: pp. 5920-6006. January 31, 2008.

USFWS. (2009). Zayante Band-Winged Grasshopper (*Trimerotropis infantilis*) and Mount Hermon June Beetle (*Polyphylla barbata*) Five-Year Review: Summary and Evaluation. USFWS Ventura Fish and Wildlife Office, Ventura, CA.

USFWS. (2010, March 17). Endangered and Threatened Wildlife and Plants; Revised Designation of Critical Habitat for California Red-Legged Frog. FR Doc. 2010-4656. 50 CFR. Part 17. Vol. 75. No. 51: pp. 12816-12959. March 17, 2010.

USFWS. (2011a, February 24). Endangered and Threatened Wildlife and Plants; 90-Day Finding on a Petition to List the Unsilvered Fritillary Butterfly as Threatened or Endangered. FR Doc. 2011-4037. Part II. 50 CFR. Part 17. Vol. 76. No. 37: pp. 10310-10319. February 24, 2011.

USFWS. (2011b, October 5). Endangered and Threatened Wildlife and Plants; Revised Critical Habitat for the Marbled Murrelet. FR Doc. 2011-25583. 50 CFR. Part 17. Vol. 76. No. 193: pp. 61559-61621. October 5, 2011.

USFWS. (2017). Recovery Plan for the Central California Distinct Population Segment of the California Tiger Salamander (*Ambystoma californiense*). U.S. Fish and Wildlife Service, Pacific Southwest Region, Sacramento, California. v + 69pp.

USFWS. (2019). Ohlone Tiger Beetle (*Cicindela ohlone*) Five-Year Review: Summary and Evaluation. USFWS. Ventura Field Office. Ventura, CA.

Van Wagner, T.J. (1996). Selected Life-History and Ecological Aspects of A Population of Foothill Yellow-legged Frogs (*Rana boylii*) from Clear Creek, Nevada County, California. Master's Thesis, Department of Biological Sciences, California State University, Chico. 143 pp.

Vickery, P. D. (1996). Grasshopper Sparrow (*Ammodramus savannarum*), Version 2.0. In: The Birds of North America (A. F. Poole, Editor) Online. Cornell Lab of Ornithology, Ithaca, NY, USA. https://birdsna.org/Species-Account/bna/species/graspa

Western Bat Working Group. (2020, April). Western Bat Species Accounts. http://wbwg.org/western-bat-species. Accessed April 2020.

Zeiner, D. C., Laudenslayer W. F., White K. E., White M. (1990). California's Wildlife: Volume 2: Birds. California Department of Fish and Game. Sacramento, CA.

Appendix 4.4d Streambed Alteration Agreement

REVISED AS OF MAY 16, 2018. INCLUDES AMENDMENTS 1 THOUGH 5.

CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE
BAY DELTA REGION
7329 SILVERADO TRAIL
NAPA, CALIFORNIA 94558
(707) 944-5500
WWW.WILDLIFE.CA.GOV

STREAMBED ALTERATION AGREEMENT
NOTIFICATION NO. 1600-2012-0444-R3
Various Creeks in San Mateo, Santa Clara and Santa Cruz Counties

Midpeninsula Regional Open Space District
SYSTEM WIDE ROUTINE MAINTENANCE AGREEMENT

This Streambed Alteration Agreement (Agreement) is entered into between the California Department of Fish and Wildlife (CDFW) and Midpeninsula Regional Open Space District as represented by Kirk Lenington (Permittee).

RECITALS

WHEREAS, pursuant to Fish and Game Code (FGC) section 1602, Permittee notified CDFW on December 21, 2012 that Permittee intends to complete the project described herein.

WHEREAS, pursuant to FGC section 1603, CDFW has determined that the project could substantially adversely affect existing fish or wildlife resources and has included measures in the Agreement necessary to protect those resources.

WHEREAS, Permittee has reviewed the Agreement and accepts its terms and conditions, including the measures to protect fish and wildlife resources.

NOW THEREFORE, Permittee agrees to complete the project in accordance with the Agreement

PROJECT LOCATION

The project sites are located in Open Space Preserves managed and/or owned by the Permittee in Santa Clara, San Mateo and Santa Cruz Counties, State of California. Project activities will be conducted in watersheds within San Mateo and Santa Clara counties including, Pilarcitos, , Purisima, Lobitos, Tunitas, Pescadero, San Gregorio and Uvas (Pajaro) which all drain into the Pacific Ocean and in watersheds that drain into San Francisco Bay including Adobe, Cordilleras, Matadero, Permanente, Saratoga, Calabazas, San Francisquito, Stevens Creek, and Guadalupe Creek (including Alamitos, San Tomas Aquinas, Ross and Los Gatos). Routine maintenance activities will occur in the following units listed below with their associated creeks, tributaries,

REVISED AS OF MAY 16, 2018. INCLUDES AMENDMENTS 1 THOUGH 5.

springs, ponds, lakes and other waterways (not all ponds and drainages have names therefore, not all will be listed):

Santa Clara County

1. Bear Creek Redwoods- Santa Clara and Santa Cruz Counties: Dyer Creek; Webb Creek; Collins Creek; Briggs Creek; Aldercroft Creek
2. El Soreno-Santa Clara County: San Tomas Aquinas Creek; Trout Creek; Los Gatos Creek
3. Foothills-Santa Clara County: Adobe Creek
4. Fremont Older-Santa Clara County: Regnart Creek; Stevens Creek; Prospect Creek
5. Los Trancos-San Mateo County: Los Trancos Creek
6. Monte Bello-Santa Clara County: Stevens Creek; Indian Creek; Bay Creek; Goldmine Creek; Adobe Creek
7. Pichetti Ranch- Santa Clara County: Swiss Creek
8. Rancho San Antonio-Santa Clara County: Permanente Creek
9. Saratoga Gap-Santa Clara and Santa Cruz Counties: Saratoga Creek; Stevens Creek
10. Sierra Azul- Santa Clara County and Santa Cruz: Guadalupe Creek; Rincon Creek; Jacques Gulch; Austrian Gulch; Los Gatos Creek; Uvas Creek; Alamitos Creek; Hendry's creek; Pheasant Creek; Soquel Creek
11. St. Josephs Hill-Santa Clara County: Los Gatos Creek

San Mateo County

12. Coal Creek-San Mateo County: Coal Creek; Corte Madera Creek
13. El Corte de Madera-San Mateo County: El Corte de Madera; Lawrence Creek
14. La Honda Creek-San Mateo County: La Honda Creek; Harrington Creek; Bogess Creek; San Gregorio Creek
15. Long Ridge-San Mateo Counties: Peters Creek; Oil Creek; Slate Creek
16. Miramontes Ridge-San Mateo County: Madonna Creek; Mills Creek

REVISED AS OF MAY 16, 2018. INCLUDES AMENDMENTS 1 THOUGH 5.

17. Purissima Creek Redwoods-San Mateo County: Purissima Creek; Whitemore Gulch; Soda Gulch; Lobitos Creek; Grabtown Gulch; Arroyo Leon; Walker Gulch; Rodgers Gulch
18. Pulgas Ridge-San Mateo County: Cordilleras Creek
19. Ravenswood-San Mateo County: San Francisco Bay
20. Russian Ridge- San Mateo County: Mindego Creek; Rapley Creek; Woddruff Creek
21. Skyline Ridge-San Mateo County: Alpine Lake; Lambert Creek; Peters Creek
22. Stevens Creek Shoreline Nature Study Area-San Mateo County: Stevens Creek, San Francisco Bay
23. Teague Hill-San Mateo County: Tripp Gulch; Squealer Gulch; Applettree Gulch
24. Thornewood-San Mateo County: Schilling Lake; Dennis Martin Creek
25. Tunitas Creek-San Mateo County: Kings Gulch; Tunitas Creek
26. Windy Hill-San Mateo County: Sausal Creek; Hamms Gulch; Damiani Creek; Jones Gulch; Bozzo Gulch

Santa Cruz County

Portions of Sierra Azul, Long Ridge and Bear Creek Redwoods

It is anticipated that Permittee may acquire or manage new Preserve Units during the term of this Agreement. Any new units may be added to this Agreement through the Amendment process (see Measure 1.8).

PROJECT DESCRIPTION

Under this Agreement, Permittee will conduct “routine maintenance activities”, as described below, on all of the Midpeninsula District Open Space Preserve properties. Coverage under this Agreement is extended to those activities that meet one or more of the following criteria:

a. Do not directly affect State or Federally listed species. ‘Directly affect’ means that an activity which can reasonably be expected to require an Incidental Take Permit from CDFW or take authorization from the United States Fish and Wildlife Service (USFWS) or National Marine Fisheries Service (NMFS) cannot be covered under this Agreement except as allowed under Measure 1.10.

REVISED AS OF MAY 16, 2018. INCLUDES AMENDMENTS 1 THOUGH 5.

b. Are subject to the Agreement process contained in FGC Sections 1600 et seq. For the terms of this Agreement, this potentially includes any activities that occur in any drainage whether natural or man-made which carries flow and supports aquatic life or which is a lake or pond that has an outlet or inlet of any size or nature. Vegetation that originates within any of the areas defined here is also considered subject to Sections 1600 et.seq.

c. Is not an *emergency activity* as defined in FGC Section 1610 or a timber harvest as defined in FGC Section 1611.

d. An activity that can reasonably be considered routine maintenance. 'Maintenance' refers to generally limited tasks that occur repeatedly over time and are necessary to maintain in good condition, Preserve facilities and amenities. This includes, but is not necessarily limited to the following: repairs, replacement, and cleaning of existing facilities and infrastructure (such as roads, trails and culverts); installation of minor new structures or infrastructure undertaken to improve an existing road, trail or facility; activities such as minor grading, sediment removal or vegetation control to correct conditions that threaten or degrade natural environments (such as non-native species control, removal of trash from channels or drainage and erosion repairs and habitat enhancement). These activities are specifically defined in 'Project Description', below.

e. Will not have disproportionate impacts on fish or wildlife resources or the habitats that sustain them as a result of something specific to the project, such as location or type or length of activity. Examples of this would be projects that disturbed stream segments that supported salmonid spawning or foothill yellow-legged frog habitat or an unusually dense concentration of woodrat nests. Work shall not be conducted at locations that are considered 'sensitive' according to CEQA Guidelines, Section 15300.2(a) unless a corresponding CEQA document and associated mitigation and monitoring plan, and all other required regulatory agency permits are in place for the proposed work.

Any other activity which is subject to Fish and Game Code Sections 1600 et seq, but not coverable under this Agreement, must obtain a project specific Streambed Alteration Agreement from CDFW.

Routine maintenance activities authorized under this Agreement are limited to the following:

1. Culverts

1.1 Replacement

Replacement of any existing concrete, wood, plastic (ABS, HDPE etc.) or metal pipe

REVISED AS OF MAY 16, 2018. INCLUDES AMENDMENTS 1 THOUGH 5.

culvert up to 48 inches inner diameter (unless authorized to be a larger diameter by CDFW) with the following restrictions:

- Work shall be done only when the channel is dry, except in perennial streams or during wet weather years in which the channel does not dry. In these instances, work will be scheduled during periods of low flow and must adhere to the dewatering BMPs in Exhibit B and the associated Regional Water Quality Control Board Waste Discharge Requirements and Water Quality Certification covering the proposed work. When working within wet channels there will be a designated water quality monitor to monitor and document turbidity entering and exiting the work site.
- The new culvert shall typically be as large as or larger than the existing culvert unless the original culvert was oversized or a natural obstruction such as bedrock is encountered. For anything other than an ephemeral drainage, the culvert shall be sized where feasible to convey a 100-year flow or cover the entire channel width.
- Total earthwork shall not exceed 8025 ~~25~~ cubic yards per culvert, not including any energy dissipater.
- The new culvert shall be installed at or below grade.

This category includes replacement or installation of a rock or other natural material energy dissipater for the culvert.

Authorized via Amendment 4: adding a 24-foot retaining wall to replace a section of failed perched fill and a failing culvert. The culvert replacement included approximately 28 cy of earthmoving, plus 15 cy for retaining wall construction to stabilize the banks.

1.2 Repair/Maintenance

Standard practice is to clean culverts of obstructions once they are 10-20% blocked. Culverts with recurring blockages are cleaned annually, regardless of the amount of blockage. Sediment, vegetation or debris shall be removed using handtools in creeks supporting salmonids, unless other methodology is ~~otherwise approved by CDFW in writing~~ submitted to CDFW in writing during annual project notifications. Sediment, vegetation or debris may be removed with mechanized equipment in creeks that do not provide habitat for salmonids. Removal of up to a maximum amount of five (5) cubic yards per culvert ~~when the channel is dry~~ is covered under this Agreement.

Culverts that are more than 1/3 blocked may be cleaned at any time, even during periods when the channel is wet, with the following restrictions:

REVISED AS OF MAY 16, 2018. INCLUDES AMENDMENTS 1 THOUGH 5.

- Up to 32 ~~2~~ cubic yards of material may be removed, using hand tools only, under any conditions.
- Removal of amounts greater than 32 ~~2~~ cubic yards requires that the channel be dewatered first and heavy equipment may be used with written approval from CDFW.
- The total cumulative area of disturbance shall not exceed 150 feet of channel or 2,000 square feet of area, whichever is less.
- After completion of the work, the disturbed area shall immediately be treated with erosion control ~~materials~~ Best Management Practices (BMPs) sufficient to control turbidity and sediment loss.
- Nearby perched or otherwise unstable fill may be removed as well, up to 10 cubic yards.
- No coho salmon are present.

This category includes repairs to headwalls and energy dissipaters, assuming no mortar, concrete or chemicals will be used. This Agreement does not cover the use or installation of culvert coatings or linings.

1.3 Minor Relocation Where the Road or Trail Is Not Also Being Relocated

Relocation or replacement of a culvert with a rolling dip within 25 feet of the original location to correct poor drainage conditions or improve sediment control with the following restrictions:

- The total amount of earthwork may not exceed 8025 ~~25~~ cubic yards.
- Work shall be done only when the channel is dry, except in perennial streams or during wet weather years in which the channel does not dry. In these instances, work will be scheduled during periods of low flow and must adhere to the dewatering BMPs in Exhibit B and the associated Regional Water Quality Control Board Waste Discharge Requirements and Water Quality Certification covering the proposed work. When working within wet channels there will be a designated water quality monitor to monitor and document turbidity entering and exiting the work site.
- The new culvert shall be installed at or below grade and shall include an energy dissipater or downdrain as appropriate.
- Where feasible, the new culvert shall accommodate a 100-year flow or the entire channel width, whichever is greater or more feasible.
- Vegetation removal is limited to no more than a five-foot buffer around the culvert and to trimming of no more than 20% of any individual tree canopy within that five-foot buffer.

1.4 Removal of Existing Culverts Or Replacement with Rolling Dips Or Fords.

REVISED AS OF MAY 16, 2018. INCLUDES AMENDMENTS 1 THOUGH 5.

Removal of culverts and filling in of the associated cross drain or replacement with a rolling dip or ford, with the following restrictions:

- No more than one culvert may be removed for every hundred yards of trail or road length if the culvert is in a natural channel.
- If the channel was created by the original emplacement of the culvert, any number may be removed under this Agreement.

Culvert relocation associated with trail or road relocation is covered under those categories.

1.5 New Culvert installation (Non Stream-Crossing Culverts)

New culverts may be installed to maintain existing roads and trails with the following restrictions:

- New culverts shall not be installed in streams but shall be limited to engineered drainage ditches associated with roads and trails.
- If an existing road or trail has an inadequately drained inboard ditch (excessive length between existing ditch relief culverts or dips), ~~1~~ new ditch relief culverts (where rolling dips would be insufficient) may be placed as directed by Best Management Practices and/or by the project engineer to adequately convey stormwater and reduce sediment to downstream watercourses. ~~per 200 feet of ditch not to exceed more than 1 total mile of road or trail treated per field office each year.~~
- ~~In addition, no more than eight culverts may be installed each year to be split between the two field offices varying in number per field office each year to provide drainage of a seep, spring, or redirected drainage impacting an existing road or trail in order to reduce sediment.~~

2. Bridges (includes puncheons)

2.1 Replacement and Removal

Replacement is defined as any activity that results in the removal of the entire bridge or culvert structure and then replacement with a ~~of the~~ bridge structure.

The following are covered under this Agreement:

Removal, or replacement of any size bridge in the same location, on any trail or road, where no channel entry is necessary, no work is proposed to in-channel abutments or supports and vegetation removal is limited to no more than a six-foot

REVISED AS OF MAY 16, 2018. INCLUDES AMENDMENTS 1 THOUGH 5.

(6) buffer around the existing bridge structure and to trimming of no more than 20% of any individual tree canopy within that six-foot buffer.

Bridge replacement (not in the same location, such as higher on the bank or upstream/downstream) shall only be allowable if it reduces overall habitat impacts and/or removes the bridge completely from the stream bed, bank or channel (for example, a bridge for which the current bridge or footings are located below the ordinary high water mark) made longer to be placed above the OHWM.

Removal, or replacement of any size bridge in the same location, with limited channel entry to place fabric or other devices to catch debris or place falsework, with the following restrictions:

- Work may only occur when the channel is dry, except in perennial streams or during wet weather years in which the channel does not dry. In these instances, work will be scheduled during periods of low flow and must adhere to the dewatering BMPs in Exhibit B and the associated Regional Water Quality Control Board Waste Discharge Requirements and Water Quality Certification covering the proposed work. When working within wet channels there will be a designated water quality monitor to monitor and document turbidity entering and exiting the work site.
- Only very limited modifications to the channel surfaces are proposed. 'Very limited' means movement of rocks less than 8" in size, less than two hand shovels of earth, footprints and indentations caused by equipment and structures. Any modifications to correctly place falsework shall occur to the falsework rather than the channel.
- Vegetation removal is limited to no more than a six (6) foot buffer around the existing bridge structure and to trimming of no more than 20% of any individual tree canopy within that buffer.

Removal, or replacement of smaller bridges (up to six feet (6) width) on trails, as long as work is completed when the channel is dry or during periods of low flow (for perennial streams) and must adhere to the dewatering BMPs in Exhibit B and the associated Regional Water Quality Control Board Waste Discharge Requirements and Water Quality Certification covering the proposed work. ~~and~~ ~~t~~The bridge shall be ~~is~~ supported on mudsills or abutments placed outside of the channel.

2.2 Repair/Maintenance

Repair/Maintenance is replacement of bridge parts and grading for drainage correction on the approaches with the following restrictions:

REVISED AS OF MAY 16, 2018. INCLUDES AMENDMENTS 1 THOUGH 5.

- All work shall be done from the bridge or by workers standing in the channel or on a ladder in the channel.
- A net or other device (diaper) shall be attached to the underside of the bridge to catch any debris falling from bridge.
- Pressure treated lumber shall be sealed and coated off-site. ~~Sealants shall be approved by CDFW in writing.~~ Tread material shall not be pressure treated to prevent leaching and breakdown of pressure treated materials into the waterway.
- Only minor saw work and drilling shall occur; the primary work shall occur off site.
- Grading on the approaches is limited to a maximum of 5 cubic yards per bridge. This amount is not cumulative with the culvert replacement standard of 5 cubic yards.

Relocation associated with trail or road relocation is covered under those categories.

3. Fords and Swales (Includes drain lenses and causeways)

3.1 Replacement, Repair or Maintenance

This task entails either full replacement of existing fords or repair/maintenance by replacing rock and removing sediment and woody debris with the following restrictions:

- No use of chemicals, concrete, mortar or other sealants or adhesives.
- This category applies only to narrow width trails and emergency vehicle/multi-use trails where the drainage does not support salmonids.
- The ford is not on an intermittent or perennial drainage or, if it is, the ford has been confirmed by CDFW to not be considered a barrier to the movement of aquatic organisms.
- Vegetation removal is limited to no more than a five-foot buffer around the existing ford and to trimming of no more than 20% of any individual tree canopy within the five-foot buffer only.

- All work shall be done when the channel is dry<u>, except in perennial streams or during wet weather years in which the channel does not dry. In these instances, work will be scheduled during periods of low flow and must adhere to the dewatering BMPs in Exhibit B and the associated Regional Water Quality Control Board Waste Discharge Requirements and Water Quality Certification covering the proposed work.</u>
- <u>When working within wet channels there will be a designated water quality monitor to monitor and document turbidity entering and exiting the work site</u>.

REVISED AS OF MAY 16, 2018. INCLUDES AMENDMENTS 1 THOUGH 5.

Relocation of fords associated with trail or road relocation is covered under those categories. Ford or swale replacement with culverts, bridges or small puncheons, shall be submitted to CDFW in writing through annual project notifications~~first approved by CDFW~~. If approved, Permittee shall comply with Section 1.5 and 2.1.

4. Bank Stabilization

4.1 Replacement, Repair, Maintenance

This task includes small bank and streambed erosion control projects to minimize water quality and erosion impacts. The following specific tasks are covered under this agreement:

Replacement or repair of damaged or failed sections of perched fill, rock riprap, timber pile walls, geogrid embankment and retaining walls, wooden or log cribwall bank revetments and retaining walls.

Placement of rip-rap above or below failed sections of structures to aid in integrity of those structures. Riprap of proper size and weight to withstand high water flows will be set below grade and keyed into the bank.

This activity does not include any new project sites which may need structural repair (for e.g. placement of new riprap or a new retaining wall where these structures have not been installed). Work will be confined to the damaged or failed sections and immediate adjacent bank area affected by the damage failure. No more than 40% of bank repairs in a given year will use “hard” or impervious structure design without prior consultation with DFW.

The following restrictions apply:

- Streambank areas receiving rock slope protection shall be back-filled with appropriate native or clean imported topsoil. The topsoil will fill some portions of the voids in the rock slope protection above the normal high water mark and provide a substrate for revegetation efforts. This work will be done manually using hand tools and power tools such as a toter or mule for single-track trail environments or an excavator or dump truck when needed for multi-use trails or roads.
- Other bank stabilization measures that may be employed include broadcast and hydro-seeding, riparian vegetation planting, slopes armored with rocks or sandbags staked with live willow and other bioengineering techniques such as willow staking, live willow pole drains, vegetated crib walls, log or rock weirs.
- Riparian trees shall be protected from damage to the greatest extent possible during repair and replacement.

REVISED AS OF MAY 16, 2018. INCLUDES AMENDMENTS 1 THOUGH 5.

5. Roads and Trails

5.1 Drainage and erosion control

This task includes removal of sediment from roads and trails to improve drainage and prevent or repair erosion. The following specific tasks are covered under this Agreement:

Cleaning roadside/trailside ditches. Limited to no more than 10 cubic yards of soil per 100 yard length of road/trail. Also allows associated vegetation removal.

Slough and berm removal. Over time, use of trails and roads tends to compact and lower the road or trail surface, trapping drainage on the travel surface. This task allows for occasional removal (every 3-5 years) of that material, not to exceed 5 cubic yards per 100 yard length of ~~road/~~trail and not to exceed 10 cubic yards per 100 yard length of road.

Cleaning sediment accumulation in rolling dips. Rolling dips are only jurisdictional if they are constructed in a drainage. When this occurs, this Agreement covers removal of up to 2 cubic yards of sediment per 100 yard length of road/trail.

Landslide removal. Up to 5 cubic yards per event may be removed or up to 2 cubic yards under any conditions with the following restrictions:

- Up to 2 cubic yards of material may be removed, using hand tools only, under any conditions.
- Removal of amounts greater than 2 cubic yards requires that the channel be dewatered first and heavy equipment may be used if submitted to CDFW in writing through annual notification process ~~with written approval from CDFW~~ and where no coho salmon are present.
- The total area of disturbance shall not exceed 150 feet of channel or 2,000 square feet of area, whichever is less.
- The disturbed area shall immediately be treated with erosion control materials sufficient to control turbidity.
- Nearby perched or otherwise unstable fill shall be removed as well, up to 5 cubic yards.

5.2 Minor relocation

Minor relocation of trails and roads to improve drainage, remove paths from environmentally sensitive areas or achieve better stability.

The following restrictions apply to narrow width trails:

REVISED AS OF MAY 16, 2018. INCLUDES AMENDMENTS 1 THOUGH 5.

- The new location shall be no more than 400' upslope or downslope of the existing location.
- New crossings shall be freespan bridges in creeks providing salmonid habitat or freespan bridges or mortar or concrete free fords in creek without salmonid habitat. New culvert installation shall not be covered under this Agreement and Permittee shall submit a separate Agreement Notification for any new stream crossing culvert installation.
- Vegetation removal is limited to no more than a six (6) foot buffer around the new crossing and to trimming of no more than 20% of any individual tree canopy in that six-foot buffer.
- All work is to be done when the work area is dry and the work period is outside the rainy season.
- Work must be completed during the allowable work periods identified in Measures 2.1 and 2.2.
- ~~Work started before October 15 shall be at least 50% complete by October 15 of any year and shall be completed by October 31 or until the immediate project area receives the first significant rainfall (defined as 0.5 inch of rain in a 24-hour period).~~

The following restrictions apply to relocation of other trails and roads.

- The new location must be no more than 400' upslope or downslope of the existing location
- The total amount of earthwork may not exceed 75~~25~~ cubic yards.
- New crossings shall be freespan bridges in creeks providing salmonid habitat or freespan bridges or mortar or concrete free fords in creeks without salmonid habitat.
- If a new culvert will be used for stream crossings, Permittee shall submit a separate Agreement Notification for installation activities. Culvert installation activities will not be covered under this Agreement.
- All work is to be done when the work area is dry, except in perennial streams or during wet weather years in which the channel does not dry. In these instances, work will be scheduled during periods of low flow and must adhere to the dewatering BMPs in Exhibit B and the associated Regional Water Quality Control Board Waste Discharge Requirements and Water Quality Certification covering the proposed work. When working within wet channels there will be a designated water quality monitor to monitor and document turbidity entering and exiting the work site. ~~and the work period is outside the rainy season (see work windows in Measures 2.1 and 2.2).~~
- ~~Work started before October 15 shall be at least 50% complete by October 15 of any year and shall be completed by October 31 or until the immediate project area receives the first significant rainfall (defined as 0.5 inch of rain in a 24-hour period).~~

REVISED AS OF MAY 16, 2018. INCLUDES AMENDMENTS 1 THOUGH 5.

- Vegetation removal is limited to no more than a five-foot buffer around the new crossing and to trimming of no more than 20% of any individual tree canopy with the five-foot buffer.

6. Ponds and Lakes

6.1 Berm Repairs/Maintenance

Berm Repairs/Maintenance are defined as any activity that results in the repair or maintenance of an existing earthen berm structure either through vegetation clearing or minor earthwork. This task includes filling in low spots on the berm surface and removal of woody vegetation on berm faces.

The following are covered under this Agreement:

Repair of smaller scale earthen berms that are not regulated by the Division of Dam Safety and on five ~~four~~ berms meeting the Division of Dam Safety criteria for regulated facilities including berms at: Alpine Pond and Horseshoe Lake in Skyline Ridge Open Space Preserve, Lower and Upper Turtle ponds, ~~and at four unnamed ponds at~~La Honda Creek Open Space Preserve, and at Mindego Lake in Russian Ridge Open Space Preserve. Berm repairs may only be completed with the following restrictions:

- Berm repairs are confined to existing berm structures and may not involve relocation or upsizing of any existing berms.
- Berm repairs shall adhere to the terms and conditions of the USFWS Recovery Permit Number: TE225974-2, dated 12/22/16, and CDFW Memorandum of Understanding "Research and Recovery of San Francisco Garter Snake and California Tiger Salamander" dated April 6, 2017. ~~may only occur where no entry into the wetted channel shall occur.~~
- Vegetation removal is limited to existing berm top, face, and no more than a six (6) foot buffer around the existing berm or any additional areas requested by the Division of Dam safety (outside of the above parameters).

6.2 Outlet Repairs/Maintenance

Repair of existing human made outlet channels and pipes associated with small scale earthen berms in order to remove blockages, replace failing or undersized outlet channels or pipes, to remove accumulated vegetation or sediment, or to place erosion control with the following restrictions:

- Work may only occur when ~~the channel is dry~~ adhering to the terms and conditions of the USFWS Recovery Permit Number: TE225974-2, dated 12/22/16, and CDFW Memorandum of Understanding "Research and

REVISED AS OF MAY 16, 2018. INCLUDES AMENDMENTS 1 THOUGH 5.

Recovery of San Francisco Garter Snake and California Tiger Salamander" dated April 6, 2017.

- Vegetation removal is limited to no more than a six (6) foot buffer around the existing channel and may not extend into nearby natural drainages. Limited vegetation removal may occur on the pond access road to provide safe equipment access to the pond site.
- No more than 200 feet of channel or 60 feet of pipe can be repaired in each location using this provision. The 200 feet at each location includes the sum of both banks.
- A secondary outlet pipe may be installed to provide an emergency overflow in the event of blockage of the primary pond outlet/spillway.

6.3 Pond Basins Repairs/Maintenance

Repair of pond basins to remove accumulated sediment, invasive vegetation or to improve aquatic habitat conditions. Basin repairs may only be completed with the following restrictions:

- Basin repairs involving earthwork or re-contouring may only occur when the pond is dry or when following the terms and conditions of the USFWS Recovery Permit Number: TE225974-2, dated 12/22/16, and CDFW Memorandum of Understanding "Research and Recovery of San Francisco Garter Snake and California Tiger Salamander" dated April 6, 2017.
- Basin repairs are confined to existing pond footprint and may not involve relocation or upsizing of any existing ponds.
- Vegetation removal is limited to ~~invasive~~ vegetation (including native species) having a detrimental impact to aquatic habitat conditions within the existing pond basin and banks.
- Wetland vegetation removal is limited to that caused by direct removal of built up ~~targeted invasive~~ vegetation or sediment removal or to allow access to the pond basin for re-countouring.

6.4 Trash cleanup

This task includes removal of non-natural materials from jurisdictional lakes, ponds and channels under the following restrictions:

- ~~No h~~Hazardous materials may only be removed under ~~this Agreement.~~the professional guidance of a hazardous materials consultant with notification to both CDFW and the Regional Water Quality Control Board.
- All work is to be done with hand tools, including come-along cable pullers, except that vehicle mounted winches may be used to remove collected or very heavy materials from the channel.

REVISED AS OF MAY 16, 2018. INCLUDES AMENDMENTS 1 THOUGH 5.

- Vegetation removal is limited to that caused by direct removal or minor trimming to allow access to the channel or material to be removed.
- Access points may be opened no more than every 50 yards to remove materials. No grading and only limited vegetation removal shall take place to open an access point.

7. Water supply facilities and structures

Removal of vegetation around water intakes, tanks and other water supply infrastructure (including springs), is limited to a 30-100 foot buffer based on local fire agency defensible space requirement around each structure and/or to perform routine maintenance on these facilities.

8. Vegetation removal to maintain trails, roads or staging areas, picnic or rest areas that are subject to the requirements of this permit.

This task includes removal of vegetation for the following:

Removal of vegetation, including root masses and trimming, where a road or trail or other surface or structure is being damaged; where plant growth blocks channels or reduces water flow; to protect water supply facilities; to allow adequate site distance for safety and aesthetic reasons; to provide emergency, maintenance, and recreational access to facilities; and to meet local fire codes; Control of invasive and non-native plants; managed livestock grazing; Mowing, mastication, and manual control; native vegetation plantings to enhance riparian and aquatic habitats and to treat disturbed area.

The following restrictions apply:

- Non-native Vegetation Removal. These activities include management of nonnative species through mowing, mastication, manual removal, bio-control (i.e. livestock or natural predator insects), shading, removal of trees that may impact facilities next to streams, ponds or bed and banks of streams, natural resources and/or water quality, and the replanting of native vegetation. Vegetation removal will not exceed 2,000 square feet at each location unless identified in the District's Integrated Pest Management Work Plan submitted annual to CDFW.

- Native vegetation plantings in habitat enhancement and restoration areas. These activities include installation of temporary irrigation, planting of locally collected native vegetation, weed control, and the installation of vegetation protective structures; and the installation of native vegetation and use of bioengineering techniques. Straw wattles, coir rolls, certified weed-free straw, erosion mats, etc. will be used to prevent erosion, minimize bank impacts,

REVISED AS OF MAY 16, 2018. INCLUDES AMENDMENTS 1 THOUGH 5.

and prevent soil loss. If installed in an area where impacts to listed species could occur, wildlife friendly netting shall be utilized.

- There shall be no vegetation removal in excess of what is necessary to allow the level of access needed and to accommodate routine maintenance activities, passage of emergency vehicles where appropriate, and for defensible space or public safety. No vegetation shall be removed by excavation or cutting off below the soil unless approved in writing by CDFW.

- Invasive plant material removed during work activities shall be appropriately handled in order to prevent spread of invasive species including the following:

  Suitable onsite disposal areas shall be identified to prevent the spread of weed seeds.

  Invasive plant material shall be rendered nonviable when being retained onsite. Permittee shall desiccate or decompose plant material until it is nonviable. Depending on type of plant, disposed plant material can be left out in the open as long as roots are not in contact with moist soil, or can be covered with a tarp to prevent material from blowing or washing away.

  Permittee shall monitor all sites where invasive plant material is disposed on-site and treat any newly emerged invasive plants.

  When transporting invasive plant material off-site for disposal, the plant material shall be contained in enclosed bins, heavy duty bags, or a securely covered truck bed. All vehicles used to transport invasive plant material shall be cleaned after each use.

- ~~Wetland or standing water areas shall not be cleared under this category.~~

9. Fire control

This task includes maintenance of defensible space buffers in jurisdictional areas around buildings, staging areas, roads, trails, and use areas.

10. Habitat enhancement activities not specifically covered above.

10.1 Exotic plant removal

This task includes removal of exotic plants using methods approved in the District's Integrated Pest Management Program, including but not limited to: grazing, hand

REVISED AS OF MAY 16, 2018. INCLUDES AMENDMENTS 1 THOUGH 5.

tools, equipment (mechanized mowers, tractor drawn mowers). ~~No chemical removal is proposed.~~

- ~~This task does not include exotic plant removal by fire.~~

10.2 Infill Planting

This task includes any amount of native plant or habitat restoration using ~~hand tools~~ those methods identified in the District's Integrated Pest Management Program and local plant materials.
11. Instream large woody debris installation following the BMPs in Exhibit B is permissible for the following purposes:

- To provide habitat for salmonids or other aquatic species
- To control streambank incision
- To restore floodplain
- To store sediment
- To mitigate for LWD removal elsewhere in the stream to protect infrastructure

PROJECT IMPACTS

Because of the broad geographic area covered by the Midpeninsula Open Space District, it is possible that a very wide range of sensitive species and/or habitats could be encountered while undertaking the routine maintenance activities. The California Natural Diversity Database lists 109 separate elements for Santa Clara County, 131 for San Mateo County, and 113 for Santa Cruz County at the time of the preparation of this Agreement. These include threatened and endangered species as well as Species of Special Concern (SSC) and species considered rare by other organizations, such as the California Native Plant Society (CNPS). Existing fish or wildlife resources the routine maintenance activities could potentially substantially adversely affect include but are not limited to: San Francisco dusky-footed woodrat (SFDW), a species listed as SSC; California red-legged frog (CRLF) a SSC and a species listed as threatened under the Endangered Species Act (ESA); San Francisco garter snake (SFGS), a species listed as endangered under ESA and under the California Endangered Species Act (CESA) and fully protected under Section 5050 of the FGC; Western pond turtle (WPT) a SSC; steelhead, a threatened species under ESA and a SSC; coho salmon, a species listed as endangered under ESA and CESA; marbled murrelet listed as endangered under CESA and threatened under ESA , saltmarsh harvest mouse, listed as fully protected under FGC and endangered under ESA and CESA; Mt. Hamilton fountain thistle a CNPS 1B.2 species; western leatherwood, a CNPS 1B.2 species; Loma Prieta hoita, a CNPS 1B.1 species; popcorn flower; nesting birds; roosting bats; water quality and riparian vegetation.

REVISED AS OF MAY 16, 2018. INCLUDES AMENDMENTS 1 THOUGH 5.

The adverse effects the project could have on the fish or wildlife resources identified above include: potential increase in sediment transport during project activities; increase in turbidity during project activities; disruption to nesting and migratory birds from project activities; temporary impacts to riparian habitat through vegetation removal which could reduce foraging and nesting habitat for birds; temporary loss or impediment of terrestrial animal species travel routes due to temporary structures; temporary loss of riparian habitat; loss of emergent vegetation; and disturbance to wildlife associated with construction noise.

MEASURES TO PROTECT FISH AND WILDLIFE RESOURCES

1. Administrative Measures

Permittee shall meet each administrative requirement described below.

1.1 Documentation at Project Site. Permittee shall make the Agreement, any extensions and amendments to the Agreement, and all related notification materials and California Environmental Quality Act (CEQA) documents, readily available at the project site at all times and shall be presented to CDFW personnel, or personnel from another state, federal, or local agency upon request.

1.2 Providing Agreement to Persons at Project Site. Permittee shall provide copies of the Agreement and any extensions and amendments to the Agreement to all persons who will be working on the project at the project site on behalf of Permittee, including but not limited to contractors, subcontractors, inspectors, and monitors.

1.3 Notification of Conflicting Provisions. Permittee shall notify CDFW if Permittee determines or learns that a provision in the Agreement might conflict with a provision imposed on the project by another local, state, or federal agency. In that event, CDFW shall contact Permittee to resolve any conflict.

1.4 Project Site Entry. Permittee agrees that CDFW personnel may enter the project site at any time to verify compliance with the Agreement.

1.5 Additional Measures. As a result of any field inspection, CDFW may require that additional measures be applied to specific activities to protect sensitive biological resources. Such measures may be amended into this Agreement with the agreement of both parties, or if an exception to authorized activities is identified, Permittee may be

asked to submit separate written notification to CDFW pursuant to Condition 1.7, below.

1.6 Authorized Routine Maintenance Activities. Only those activities specifically described in the Project Description shall be conducted under this Agreement.

1.7 Exceptions to Authorized Activities. Permittee shall submit separate written notification (Forms FG 2023 and FG 2024) pursuant to Section 1602 of the FGC, together with the required fee prescribed in the CDFW Streambed Alteration Agreement fee schedule, and otherwise follow the normal notification process prior to the commencement of work activities in all cases where one or more of the following conditions apply:

- The proposed work does not meet the criteria established for routine maintenance activities in the Project Description of this Agreement;
- The nature of the proposed work is substantially modified from the work described in the Project Description of this Agreement;
- CDFW advises Permittee that conditions affecting fish and wildlife resources have substantially changed at a specified work site or that such resources would be adversely affected by the proposed maintenance activity.

1.8 New Preserves. Permittee may add new Preserves to this Agreement by applying for a formal amendment. The Notification should describe the new unit, provide a map and discuss the likely maintenance needs of the unit. CDFW will review the material to determine if the expected routine maintenance activities associated with the new unit are consistent with the terms of this RMA. If they are, the proposed unit will be added to the RMA.

1.9 Exhibit B. Exhibit B shall be updated as warranted on an annual basis with the annual notification.

1.10 Unauthorized Take. This Agreement does not authorize the take of any State or federally listed threatened species, endangered species, or candidate species. Projects that may cause impacts to or take of one or more listed species may be allowed under this Agreement provided incidental take coverage has been received from all agencies with which the species has/have been listed.

REVISED AS OF MAY 16, 2018. INCLUDES AMENDMENTS 1 THOUGH 5.

Notification of inclusion of a project that could cause a take of a listed species shall take place during the yearly project submittal due by February 1. If take coverage has not been approved but is imminent, the project may be approved by CDFW, but work may not proceed until written authorization has been granted by each approving agency. If CDFW determines, or Permittee finds that there are such species on the work site, Permittee shall notify CDFW, US Fish and Wildlife Service (USFWS), and/or National Oceanic Atmospheric Association, National Marine Fisheries Service (NMFS) as appropriate. Permittee shall immediately cease work until CDFW and other applicable agencies deem that the concern over special status species has been resolved. If take authorization has not been granted or is not imminent, additional analysis under CEQA may be necessary and the project should not be submitted to CDFW for coverage under this Agreement.

1.11 CNDDB Forms. If any sensitive species are observed in project surveys, the Permittee shall submit California Natural Diversity Data Base (CNDDB) forms to the CNDDB for all pre-construction survey data annually ~~within five working days of the sightings~~, and provide CDFW Bay-Delta Region with copies of the GIS data and associated metadata. ~~CNDDB forms and survey maps.~~

2. Avoidance and Minimization Measures

To avoid or minimize adverse impacts to fish and wildlife resources identified above, Permittee shall implement each measure listed below.

2.1 Seasonal Work Period for Salmonids. Work within and around National Oceanic and Atmospheric Administration Fisheries designated critical habitat for steelhead and coho ~~creeks that provide habitat for salmonids~~ shall be limited to June 15 to October 31. Re-vegetation is not confined to this period. See Map in Exhibit B.

2.2 Alternative Seasonal Work Period. Work within and around creeks that do not provide habitat for salmonids and reaches that are 1,000 feet or more upstream of discharge points ~~which do not discharge directly~~ into such drainages shall be limited to April 15 to October 31, or is permissible from November 1 to April 14 under the following conditions:

- Work may not occur until the site has received no rainfall for a period of 10 days and there is no rain in the forecast for a

REVISED AS OF MAY 16, 2018. INCLUDES AMENDMENTS 1 THOUGH 5.

period of 7 or more days, and work requires no greater than 5 days to complete.

- Work started during this period must be at least 50% complete within 2.5 days of beginning work.
- Winterization materials must be on hand and installed if unanticipated rainfall begins (defined as 0.5 inches of rain in a 24-hour period).
- Corrective actions are allowable year-round for the following situations:
    - To correct improperly installed and/or unauthorized work on District lands that occurred during the same calendar year that is resulting in sediment delivery.
    - To correct damage from winter storms that threatens access to homes, ponds, water systems, and other critical infrastructure.

~~Re-vegetation is not confined to this period.~~

2.3 Completion by End of ~~Seasonal~~ Work Period. No project shall be initiated unless there is high confidence it can be completed before the end of the ~~seasonal~~ work windows designated in Measures 2.1 and 2.2. "Completed" includes installation of any erosion and drainage control features. After September 15 of each year, projects that have not been started, ~~or~~ are still underway, or meet the conditions in Section 2.2 shall be evaluated to ensure they can be completed before the end of the applicable ~~seasonal~~ work window. Those projects unlikely to be completed before the end of the ~~seasonal~~ work windows shall not be started or shall be winterized to be completed in the following year.

2.4 Weather Forecast. Permittee shall monitor the seventy-two hour forecast from the National Weather Service (*http://www.nws.noaa.gov* and https://www.accuweather.com). When there is a forecast of more than 40% chance of rain, or at the onset of unanticipated precipitation, the Permittee shall remove all equipment from the creek zone, shall implement erosion and sediment control measures, and all Project activities shall cease.

2.5 Dry Out Period. No work shall occur during a dry out period of 24 hours after there has been ¼ inch or more of precipitation.

2.6 No Equipment in Wetted Areas. No equipment shall be operated within the active creek (i.e. wetted channel) except in perennial streams or during wet weather years in which the channel does not

REVISED AS OF MAY 16, 2018. INCLUDES AMENDMENTS 1 THOUGH 5.

dry. In these instances, work will be scheduled during periods of low flow and must adhere to the dewatering provisions in Exhibit B and the associated Regional Water Quality Control Board Waste Discharge Requirements and Water Quality Certification covering the proposed work. When working within wet channels, there will be a designated water quality monitor to monitor and document turbidity entering and exiting the work site. ~~order to divert water around the project site if necessary. No equipment shall be operated~~ Work in ~~other~~ wetted areas such as ponds or wetlands supporting CRLF or SFGS shall adhere to the terms and conditions of the USFWS Recovery Permit Number: TE225974-2, dated 12/22/16, and CDFW Memorandum of Understanding "Research and Recovery of San Francisco Garter Snake and California Tiger Salamander" dated April 6, 2017. ~~without prior written approval from CDFW.~~

2.7 ~~CDFW-Approved~~ Qualified Biologist(s) and Biological Monitor(s) Definitions. ~~Within a minimum of 30 days prior to initiating species surveys within the Project area, Permittee shall submit to CDFW for approval, the names and resumes of all qualified biologists and biological monitors involved in conducting surveys and/or monitoring work.~~

A qualified biologist is an individual who shall have a minimum of five years of academic training and professional experience in biological sciences and related resource management activities, with a minimum of two survey seasons years (for e.g. two seasons during the blooming season of sensitive plants) conducting surveys for each species that may be present within the Project area.

A biological monitor is an individual who shall have academic and professional experience in biological sciences and related resource management activities as it pertains to this Project, experience with construction-level biological monitoring, be able to recognize species that may be present within the Project area, and be familiar with the habits and behavior of those species.

2.8 Designation of Work Area. Prior to Project activities, a biological monitor or qualified biologist shall clearly mark/flag or erect temporary construction fencing to designate the work area and to delineate the areas that shall be avoided. The boundaries shall be inspected on a regular basis to ensure that work has remained within the marked boundaries. If one or more boundary(ies) has/have been violated, work shall cease until Permittee has taken appropriate action to ensure there is no recurrence of the trespass. Flagging and/

REVISED AS OF MAY 16, 2018. INCLUDES AMENDMENTS 1 THOUGH 5.

or temporary construction fencing shall be removed immediately after the completion of construction work.

2.9 Narrow Width Trail. Where necessary, Permittee may clear a narrow width trail to provide vehicular access to a work site. Vegetation removal shall be limited to the minimum amount necessary to provide access.

2.10 Vegetation Removal. Vegetation shall not be removed or intentionally damaged beyond the construction corridor. Woody debris, trees, or shrubs greater than 6 inches in diameter within the stream channel or on the lower banks of the stream shall not be removed unless submitted to CDFW during annual project notifications ~~approved by CDFW~~. Within tidal marsh habitat, vegetation removal shall be limited to the minimum amount necessary to avoid the loss of salt marsh harvest mice from any work activities in suitable habitat. Sufficient pickleweed habitat shall remain adjacent to the activity area to provide refugia for displaced harvest mice. Exclusion fencing shall be erected adjacent to work areas as described in Section 2.79.

2.11 Vegetation Removal Methods. Hand tools (e.g., trimmer, chain saw, etc.) shall be used to trim vegetation to the extent necessary to gain access to the work sites. No bulldozers, backhoes, or other heavy equipment shall be used to remove vegetation along streambanks or within the stream unless submitted to CDFW during annual project notifications ~~without prior written approval from the CDFW~~.

2.12 Limitations on Bank Stabilization/Bank Repair. This Agreement does not authorize bank or channel fill, such as placement of imported soils, riprap, etc. except those projects covered under Section 4. Bank Stabilization.

2.13 Limitations on Vegetation Removal. The disturbance or removal of vegetation shall not exceed the minimum necessary to complete maintenance activities. Precautions shall be taken to avoid other damage to vegetation by people or equipment. Branches and/or limbs overhanging the trails and channel and impacting trail access and water flows shall be properly pruned. Trees may be removed from natural channels if and only if they are below ordinary high water (OHW) and they are restricting the capacity of the channel and they are causing erosion or flooding. Any trees which must be cut are to be cut at ground level and the root mass left in place to maintain bank stability.

REVISED AS OF MAY 16, 2018. INCLUDES AMENDMENTS 1 THOUGH 5.

2.14 Removal of Vegetation causing Flow Restrictions. Woody and herbaceous plants, fallen trees, or trunks or limbs lodged in the bed or bank causing flow restriction shall be cut off at the bed or bank invert with small tools and removed with winch and cable or other equipment operated from top of bank. Root structures are not to be disturbed.

2.15 Stumps or Large Woody Debris Restrictions. Embedded pieces of large woody debris or stumps that potentially serve as basking sites or that encourage pool formation shall be left in place if it does not obstruct the flow of water and there is adequate flood flow capacity.

2.16 Embedded Objects. Objects embedded/anchored in the bank, such as tree stumps, shall not be removed during periods of heavy flow if removal would result in release of sediment into the channel. However, protruding objects that could capture additional debris and result in obstruction of the channel (e.g. the branches and trunk of a downed tree) may be trimmed. If an embedded object must be removed to prevent a debris jam, Best Management Practices (BMPs) (see Measure 2.33) shall be used to prevent release of sediment into the channel, and the bank shall be reseeded, re-vegetated, mulched and/or covered with erosion-control fabric following removal.

2.17 Disposal of Invasive Plant Material. Suitable onsite disposal areas shall be identified to prevent the spread of weed seeds. Invasive plant material shall be rendered nonviable when being retained onsite. Staff shall desiccate or decompose plant material until it is nonviable (partially decomposed, very slimy or brittle). Depending on the type of plant, disposed plant material can be left out in the open as long as roots are not in contact with moist soil, or can be covered with a tarp to prevent material from blowing or washing away. District staff shall monitor all sites where invasive plant material is disposed onsite and treat any newly emerged invasive plants. ~~Invasive plant material removed during work activities shall be bagged and appropriately incinerated or disposed of in a landfill or permitted composting facility.~~

2.18 Snags. To the maximum amount practicable, individual dead or dying trees shall be retained, with modification if appropriate, as snags. This measure should not be considered to apply in areas where removal is warranted to control spread of a disease or for human safety purposes.

REVISED AS OF MAY 16, 2018. INCLUDES AMENDMENTS 1 THOUGH 5.

2.19 Stream Diversion Approval. Permittee shall make every effort to carry out routine maintenance activities when the creek is dry except in perennial streams or during wet weather years in which the channel does not dry. In these instances, work will be scheduled during periods of low flow and must adhere to the dewatering provisions in Exhibit B and the associated Regional Water Quality Control Board Waste Discharge Requirements and Water Quality Certification covering the proposed work. When working within wet channels, there will be a designated water quality monitor to monitor and document turbidity entering and exiting the work site. ~~If this is not possible, water diversions shall occur with written approval by CDFW. Requests for diversions and diversion methodology shall be submitted with yearly project proposals.~~

2.20 Stream Diversion Methodology. Stream ~~If stream diversion was approved by CDFW, the~~ diversion systems shall maintain as much instream connectivity as possible to allow for movement of aquatic organisms. Diversion shall be conducted such that water at the downstream end does not scour the channel bed or banks. Coffer dams, if used, shall be constructed upstream and downstream of the work area as close as practicable to the work site. Coffer dams shall be constructed of a non-erodible material which does not contain soil or fine sediment and shall be constructed with clean gravel and bags, and may be sealed with sheet plastic. All materials shall be removed from the stream upon project completion. Normal flows shall be restored to the affected stream immediately upon completion of work at that location. Coffer dams and the stream diversion system shall remain in place and functional throughout the construction period. If, the coffer dams or stream diversion fail, they shall be repaired immediately.

2.21 Water Surface Elevation. During dewatering of the channel, the decrease in water surface elevation (WSE) shall be controlled such that WSE does not change at a rate that increases turbidity to the creek that could be deleterious to aquatic life and the likelihood of stranding aquatic life up- and downstream of the creek. Flows shall be provided to downstream reaches during all times the natural flow would have supported aquatic life. Said flows shall be sufficient quality and quantity, and of appropriate temperature to support fish and other aquatic life both above and below the diversion.

2.22 Check for Stranded Aquatic Life. The biological monitor or qualified biologist shall check daily for stranded aquatic life as the water level in the dewatering area drops. All reasonable efforts shall be made to

REVISED AS OF MAY 16, 2018. INCLUDES AMENDMENTS 1 THOUGH 5.

capture and move all stranded aquatic life observed in the dewatered areas. Capture methods may include fish landing nets, dip nets, buckets and by hand. Captured aquatic life shall be released immediately in the closest body of water adjacent to the work site. This measure does not allow for the take or disturbance of any state or federally listed species.

2.23 Nonnative Aquatic Species Removal. Any aquatic nonnative invasive species found shall be disposed of properly and shall not be placed back into the creek where work is being conducted or any other drainages, creeks or streams. Permittee shall send a list to CDFW of species found and the location they were found after completion of project activities.

2.24 Silt Curtains. The Permittee shall deploy silt curtains or other appropriate silt filtering devices, such as straw bales, around the excavation site to prevent heavily silted water from impacting areas around the site. The silt curtain or silt filtering devices shall be maintained throughout all phases of the excavation and construction activities.

2.25 Turbidity Monitoring. During RMA activities in wetted stream channels, Permittee shall monitor turbidity levels up and downstream of the project site before and during project activities and shall keep a log of turbidity data. Maintenance activities shall not result in increases in turbidity of the stream of more than 20 percent of upstream sampling locations, as measured visually or by Nephelometric turbidity units (NTU) as approved by the Regional Water Quality Control Board Waste Discharge Requirements and Water Quality Certification covering the proposed work., ~~of more than 20 percent of upstream sampling locations.~~

2.26 Cease Project for Elevation of Turbidity Levels. Upon CDFW or Permittee's determination that turbidity/siltation levels resulting from project related activities constitute a threat to aquatic life, activities associated with the turbidity/siltation shall be halted until effective CDFW approved control devices are installed or abatement procedures are initiated. The CDFW may take enforcement action if appropriate turbidity and siltation control measures are not deployed.

2.27 Spoils. Spoils shall not be placed where it could enter the stream, riparian or wetland areas. Spoil shall not be placed over riparian or wetland vegetation except as specifically noticed to and accepted by CDFW.

REVISED AS OF MAY 16, 2018. INCLUDES AMENDMENTS 1 THOUGH 5.

2.28 Staging Areas. Staging areas shall be located at least 30 feet from the top of bank or on the outboard side of levees. Vegetation disturbance shall be limited to the immediate construction footprint and a single access pathway, where feasible.

2.29 Check for Wildlife in Pipes/Construction Materials. Permittee shall visually check all construction materials (bridges, pipes, culverts) for the presence of wildlife sheltering within them prior to the materials being moved and placed in their proper locations.

2.30 Escape Ramp in Trench. If there are open trenches or pits, at the end of each work day, Permittee shall place an escape ramp at each end of the open trench to allow any animals that may have become entrapped in the trench to climb out overnight. The ramp may be constructed of either dirt fill or wood planking or other suitable material that is placed at an angle no greater than 30 degrees.

2.31 Removal of Trash and Debris. Except as explicitly described in this Agreement, the removal of native soils, rock, gravel, vegetation, and vegetative debris from the stream bed or stream banks is prohibited.

Permittee shall remove all raw construction materials and wastes from work sites following the completion of maintenance activities. Food-contaminated wastes generated during work shall be removed on a daily basis to avoid attracting predators to work sites. All temporary fences, barriers, and/or flagging shall be completely removed from work sites and properly disposed of upon completion of maintenance activities. Permittee or its contractors shall not dump any litter or construction debris within the riparian/stream zone.

2.32 Erosion Control Best Management Practices (BMPs). All exposed soils within the work area shall be stabilized immediately following the completion of earthmoving activities to prevent erosion into the stream channel. Erosion control BMPs, such as silt fences, straw hay bales, gravel or rock lined ditches, water check bars, wattles, forest duff or mulches, and broadcasted straw shall be used. Erosion control fabrics shall be constructed of biodegradable materials, such as coir or jute, unless otherwise authorized by CDFW. Erosion control BMPs shall be monitored during and after each storm event for effectiveness. Modifications, repairs and improvements to erosion control BMPs shall be made as needed to protect water quality. At no time shall silt laden runoff be allowed to enter the stream or directed to where it may enter the stream.

REVISED AS OF MAY 16, 2018. INCLUDES AMENDMENTS 1 THOUGH 5.

2.33 Erosion Control Methods. Disturbed areas shall be re-vegetated according to the District's BMPs for Revegetation. ~~with propagules (seeds, cuttings, divisions) of locally collected native plants.~~ If locally collected native plants are not available, sterile or short-lived re-vegetation plants shall be used (e.g. cereal barley, Regreen, Trios). Disturbed areas shall be protected with correctly installed erosion control measures (e.g. jute, certified weed free straw, coconut fiber, or coir logs). Materials containing monofilament or plastic shall not be used.

2.34 Erosion Control Measures. Erosion control measures shall be utilized throughout all phases of operation where sediment runoff from exposed slopes threatens to enter Waters of the State. This may require the construction at the toe of the slope below the construction site, of silt catch basins, silt fencing, certified weed free straw bale dikes, or other siltation barriers. At no time shall silt laden runoff be allowed to enter the stream or directed to where it may enter the stream.

2.35 Tidally Influenced Area. Work within any tidally influenced area shall be completed at low tide periods only. All equipment shall be out of the channel prior to the incoming tide.

2.36 Stop Work Authority. The biological monitors or qualified biologist shall have the responsibility and authority of stopping the proposed project if any crews or personnel are not complying with the provisions outlined in this Agreement.

2.37 Construction Equipment Cleanup. Construction equipment shall arrive at the maintenance activity sites clean and free of soil, seed, and plant parts to reduce the likelihood of introducing new weed species. Invasive weed species occurring within locations of construction clearing and grubbing shall be flagged for removal by the biological monitor or qualified biologist. These species, along with associated duff and topsoil, as appropriate, shall be disposed of by the contractor. These materials shall not be allowed to be integrated with other onsite topsoil materials intended for salvage and replacement.

2.38 Staging and Storage Areas. Building materials and/or construction equipment shall not be stockpiled or stored where they could be washed into the water or where they will cover aquatic or riparian vegetation.

REVISED AS OF MAY 16, 2018. INCLUDES AMENDMENTS 1 THOUGH 5.

2.39 Equipment over Drip-pans. Staging and storage areas for equipment, materials, fuels, lubricants and solvents shall be located away from the wetted areas. Stationary equipment such as motors, pumps, generators, compressors and welders, located within or adjacent to the creek shall be positioned over drip-pans.

2.40 Maintenance of Vehicles. Any equipment or vehicles driven and/or operated adjacent to the creek areas shall be checked and maintained daily to prevent leaks of materials that if introduced to water could be deleterious to aquatic life, wildlife or riparian habitat. Vehicles must be moved away from the stream prior to refueling and lubrication.

2.41 Hazardous Materials. Any hazardous or toxic materials that could be deleterious to aquatic life that could be washed into State waters or its tributaries shall be contained in water tight containers or removed from the project site.

2.42 Debris and Waste Disposal. The contractor shall not dump any litter or construction debris within the project area. All such debris and waste shall be picked up daily and properly disposed of at an appropriate site.

2.43 Change of Conditions. If, in the opinion of CDFW, conditions arise, or change, in such a manner as to be considered deleterious to the stream or wildlife, operations shall cease until corrective measures approved by CDFW are taken.

Species Avoidance Measures

Salmonids

2.44 Coho Streams. No routine maintenance activity requiring dewatering shall be permitted under this Agreement in creeks where known occurrences of coho salmon exist. Permittee shall notify the CDFW for a separate Agreement pursuant to FGC Section 1602 for those activities.

2.45 Steelhead. Permittee shall comply with Avoidance and Minimization measures 2.1 through 2.44 in order to avoid and minimize impacts to steelhead and steelhead habitat.

Raptors and Birds

REVISED AS OF MAY 16, 2018. INCLUDES AMENDMENTS 1 THOUGH 5.

2.46 Nesting Bird Survey. If Project activities are scheduled during the nesting season of raptors and migratory birds, a focused survey for active nests of such birds shall be conducted by the qualified biologist within 15 days prior to the beginning of project-related activities. (Note: Additional requirements specific to marbled murrelet are specified under Measure 2.90.) Surveys shall be conducted in all suitable habitat located at Project work sites and in staging and storage areas. The minimum survey radii surrounding the work area shall be the following: i) 250 feet for passerines; ii) 500 feet for other small raptors such as accipiters; iii) 1,000 feet for larger raptors such as buteos. The bird survey methodology and the results of the survey shall be submitted to the CDFW prior to commencement of Project activities.

Nesting seasons shall be defined as followed: i) March 15 to August 30 for smaller bird species such as passerines; ii) February 15 to August 30 for raptors.

2.47 Active Nests. An active nest is defined as a nest having eggs or chicks present, or a nest that adult birds have staked a territory and are displaying, constructing a nest, or are repairing an old nest. If active nests are found <u>and work cannot be postponed</u>, the Permittee <u>shall utilize the buffers and methods identified in Measure 2.48 and notify</u> ~~consult with~~ the CDFW and the USFWS regarding appropriate action to comply with the Migratory Bird Treaty Act of 1918 and the FGC. If a lapse in project-related work of 15 days or longer occurs, another focused survey shall be conducted before project work is reinitiated. If active nests are found, the Permittee shall consult with the CDFW and the USFWS prior to resumption of project activities.

2.48 Active Nest Buffers. Active nest sites shall be designated as "Ecologically Sensitive Areas" and protected (while occupied) during project activities with the establishment of <u>flagging or</u> a fence barrier surrounding the nest site. The minimum distances of the protective buffers surrounding each identified nest site shall be the following: i) 500 feet for large raptors such as buteos; ii) 250 feet for small raptors such as accipiters; iii) 250 feet for passerines. A biological monitor or qualified biologist shall monitor the behavior of the birds (adults and young, when present) at the nest site to ensure that they are not disturbed by project-related activities. Nest monitoring shall continue during project-related construction work until the young have fully fledged, are no longer being fed by the parents and have left the nest site, as determined by a biological monitor.

REVISED AS OF MAY 16, 2018. INCLUDES AMENDMENTS 1 THOUGH 5.

2.49 Nesting Habitat Removal or Modification. No trees or shrubs shall be disturbed that contain active bird nests until all eggs have hatched, and young have fully fledged (are no longer being fed by the adults, and have completely left the nest site). To avoid potential impacts to tree or shrub-nesting birds, any trimming or pruning of trees or shrubs shall be conducted during the time period of September 16 to February 14 unless a preconstruction nesting bird survey has been conducted by a qualified biologist. No habitat removal or modification shall occur within the Ecologically Sensitive Area fenced nest zone even if the nest continues to be active beyond the typical nesting season for the species (refer to Measure 2.47), until the young have fully fledged and will no longer be adversely affected by the project.

California red-legged frog (CRLF)

In Jurisdictional areas within 1 mile of a known occurrence of CRLF:

2.50 CRLF Survey. Prior to and within 48 hours of the planned start of project activities, a focused survey for CRLF using agency approved protocol shall be conducted by a qualified biologist to determine if they are in the area. If CRLF are found, ~~the CDFW shall be notified immediately to determine the correct course of action and routine~~ maintenance activities shall not commence until after May 30~~ and not begin until approved by the CDFW~~. CDFW reserves the right to provide additional measures to this Agreement to protect sensitive species.

2.51 Monitors On-Site for CRLF. If CRLF are found, biological monitor(s) and/or qualified biologists shall be on the project site while routine maintenance activities are being conducted at these sites.

2.52 Vegetation Removal by Mechanized Equipment at CRLF Sensitive Sites. For vegetation removal on berms or other sites with known CRLF observances, vegetation shall be cut down to 3 inches by handtools (weedwhacker, etc). Once the ground is visible, a visual survey for CRLF shall be conducted. If no sensitive species are found in the area, removal of vegetation may continue by mowing or mechanized equipment very slowly with a biological monitor walking in front of the equipment to observe. If a CRLF is observed, all activities shall cease and CDFW shall be notified immediately. CRLF can be relocated only if a person is permitted by the USFWS and approved by CDFW for this specific project to handle CRLF.

REVISED AS OF MAY 16, 2018. INCLUDES AMENDMENTS 1 THOUGH 5.

2.53 Vehicle Restrictions. If CRLF are found, any vehicle parked on site for more than 15 minutes shall be inspected by the biological monitor or qualified biologist before it is moved to ensure that CRLF have not moved under the vehicle. Any parking areas must be checked in advance by the biological monitor or qualified biologist.

2.54 No Stockpiling of Vegetation. If CRLF are found, vegetation removed shall be placed directly into a disposal vehicle and removed from the site. Vegetation shall not be piled on the ground unless it is later transferred, piece by piece, under the direct supervision of the biological monitor or qualified biologist or is going to remain on site for erosion control or slash and not be moved or disturbed.

2.55 No Stockpiling of Soil. Soil shall not be stockpiled on the ground unless it is on a paved surface or staging area where there aren't burrows.

2.56 CRLF Exclusion for Sediment Removal with Large Equipment. If CRLF are found in routine maintenance activity sites using large equipment to remove sediment, CRLF shall be excluded from the project site. CDFW-approved exclusion fencing shall be installed around the sediment removal site, staging areas and any areas where fill may be dumped. After installation of the fence barrier, a biological monitor or qualified biologist shall daily inspect the project work area, staging and stockpiling area prior to the commencement of activities. If the biological monitor or qualified biologist determines that sensitive species are not within the work area, equipment or materials may be moved onto the work site and project activities may commence under the observation of the biological monitor.

CRLF in Ponds

2.57 CRLF Survey in Ponds. Prior to and within 48 hours of the planned start of project activities, a focused survey for CRLF using agency approved protocol shall be conducted by a qualified biologist to determine if they are in the area. If CRLF are found, the CDFW shall be notified immediately to determine the correct course of action and routine maintenance activities shall not commence until after May 30 and not begin until approved by the CDFW. CDFW reserves the right to provide additional measures to this Agreement to protect sensitive species. CDFW may request Permittee to notify the CDFW for a separate Agreement pursuant to FGC Section 1602 for this activity.

REVISED AS OF MAY 16, 2018. INCLUDES AMENDMENTS 1 THOUGH 5.

2.58 Seasonal Work Period in Ponds. If CRLF are found in the pond and water is present in the pond, sediment removal and berm or outfall repair activities shall be performed from August 15 to November 1. Dredging and de-watering operations shall be submitted to ~~approved by~~ CDFW prior to commencement of activities.

2.59 Vegetation Removal at Ponds. If CRLF are found, tule and emergent vegetation shall be removed by hand when feasible. If mechanized equipment is used, one or more ~~a two~~ biological monitors or qualified biologists shall be onsite monitoring the scoop bucket while scooping and watching each load unload. CDFW shall be notified during the annual project notification process when mechanized equipment will be used for vegetation removal at ponds.

2.60 Inspection for Egg Masses. In work areas containing emergent vegetation (e.g., tules, cattails), vegetation shall be inspected for CRLF eggs masses prior to work. If work cannot be postponed, a ~~A~~ buffer of vegetation at least 10 feet in diameter shall be left around any egg masses found. Permittee shall keep a record of any sites where egg masses are found and shall conduct vegetation removal at these sites prior to November 1 in subsequent years.

2.61 Egg Mass Avoidance. Staff shall avoid entering the channel to avoid dislodging egg masses. Trimming activities shall be performed from the banks, if possible.

General CRLF

2.62 Cease Activities for CRLF. If CRLF enters the work area, all work shall stop until the animal leaves on its own. If a person is permitted by the USFWS and approved by CDFW for this specific project to handle CRLF, only they can handle and relocate CRLF. Permittee shall contact notify CDFW of the ~~to develop~~ site appropriate avoidance measures utilized for relocation, which will become part of this Agreement. CDFW may request Permittee to notify the CDFW for a separate Agreement pursuant to FGC Section 1602.

2.63 Stop Work Authority for CRLF. The biological monitor and/or qualified biologist shall have the authority to halt work activities that may affect CRLF adults, tadpoles or egg masses until they can be moved out of harms way.

REVISED AS OF MAY 16, 2018. INCLUDES AMENDMENTS 1 THOUGH 5.

2.64 CRLF and SFGS Sightings. Any project-related, human cause injuries ~~sightings and/or injuries~~ to CRLF or SFGS shall be immediately reported to the CDFW.

If CRLF are not found:

2.65 Monitors On Site. The biological monitor shall remain onsite if sensitive areas are identified during the presurvey. A biological awareness training shall be provided to all persons prior to beginning work. If at any time a CRLF is observed, work shall stop immediately until a biological monitor is contacted. Biological monitor(s) and/or qualified biologists shall then remain ~~be~~ on the project site while routine maintenance activities are being conducted. General CRLF Measures 2.59 through 2.62 shall be followed.

In jurisdictional areas having suitable habitat where CRLF have not yet been documented:

2.66 Cease Activities for CRLF. If CRLF enters the work area, all work shall stop until the animal leaves on its own. Permittee shall contact CDFW to develop site appropriate avoidance measures which will become part of this Agreement. CDFW may request Permittee to notify the CDFW for a separate Agreement pursuant to FGC Section 1602 for this activity.

Yellow-legged Frog (YLF)

2.67 Cease Activities for YLF. If YLF enters the work area, all work shall stop until the animal leaves on its own. Permittee shall contact CDFW to develop site appropriate avoidance measures which will become part of this Agreement.

San Francisco garter snake (SFGS)

In jurisdictional areas within 1 mile of a known occurrence of SFGS:

2.68 ~~No~~ Routine Maintenance Activities Consistent with State and Federal Permits. Maintenance activities permitted under the terms and conditions of the USFWS Recovery Permit Number: TE225974-2, dated 12/22/16, and CDFW Memorandum of Understanding "Research and Recovery of San Francisco Garter Snake and California Tiger Salamander" dated April 6, 2017 may proceed following the terms and conditions of these permits.

REVISED AS OF MAY 16, 2018. INCLUDES AMENDMENTS 1 THOUGH 5.

~~If there are known occurrences of SFGS either through CNDDB and/or USFWS databases or from known studies, or sightings from Permittee and biologists, routine maintenance activities shall not occur. Permittee shall submit a separate Agreement pursuant to FGC Section 1602 for this activity.~~

In jurisdictional areas having suitable habitat where SFGS has not yet been documented:

2.69 Monitors On-Site for SFGS. A biological awareness training shall be provided by a qualified biologist to all persons prior to beginning work. A biological monitor shall remain onsite in sensitive areas identified during the pre-survey. If at any time a SFGS is observed, work shall stop immediately until a biological monitor is contacted. Biological monitor(s) and/or qualified biologist(s) shall remain on the project site while routine maintenance activities are being conducted. Biological monitor(s) and/or qualified biologists shall be on the project site while routine maintenance activities are being conducted at these sites.

2.70 Vegetation Removal by Mechanized Equipment. For vegetation removal on berms or other sites with SFGS habitat, vegetation shall be cut down to 3 inches by handtools (weedwhacker, etc). Once the ground is visible, a visual survey for SFGS shall be conducted. If no sensitive species are found in the area, removal of vegetation may continue by mowing or mechanized equipment very slowly with a biological monitor walking in front of the equipment to observe. If a SFGS is observed, all activities shall cease and CDFW shall be notified immediately.

2.71 No Stockpiling of Vegetation. Vegetation removed shall be placed directly into a disposal vehicle and removed from the site. Vegetation shall not be piled on the ground unless it is later transferred, piece by piece, under the direct supervision of the biological monitor or qualified biologist or is going to remain on site for erosion control or slash and not be moved or disturbed.

Western Pond Turtle (WPT)

In jurisdiction areas within one mile of known WPT occurrences:

2.72 WPT Survey. Prior to and within 48 hours of the planned start of routine maintenance activities, a focused survey for WPT and WPT nests shall be conducted by a qualified biologist to determine if they

REVISED AS OF MAY 16, 2018. INCLUDES AMENDMENTS 1 THOUGH 5.

are in the area. If WPT are found, Measure 2.73 shall be implemented and the CDFW shall be notified ~~immediately to determine the correct course of action and activities shall not begin until approved by the CDFW~~.

2.73 WPT Avoidance. In the event WPT are found in the project area, the Permittee shall exercise measures to avoid direct injury to them as well as avoid areas where they are observed to occur. If a WPT is observed, it shall be left alone to move out of the area on its own. If it does not move on its own, it can be relocated to a safe ~~at least a 100 m~~ distance away from the project location. Relocation areas shall be of suitable habitat, on shallow banks with slow moving water and shall be far enough away so as not to be affected by project activities. If a WPT nest is found, all activities shall cease and Permittee shall contact CDFW to develop site appropriate avoidance and minimization measures.

San Francisco dusky-footed woodrat (SFDW)

2.74 SFDW Protection ~~Preconstruction Survey~~. All routine maintenance work in the proximity of SFDW and/or their nests shall adhere to the BMPs in Exhibit B. ~~A preconstruction survey for SFDW by a qualified biologist shall be conducted within two weeks prior to routine maintenance activities. If SFDW nests are present, the nests shall be flagged and construction fencing that will not impede the movement of the SFDW shall be placed, around the nest to create a 20-foot buffer from the construction area. If the nest is located adjacent to a road or trail, the nest shall be clearly flagged so equipment/truck drivers accessing sites can see the nest. A biological monitor or qualified biologist shall monitor the nest during project activities.~~

2.75 ~~Protection of SFDW. In the event a SFDW nest is found in the Project area, the Permittee shall submit the results of surveys in the immediate work area, in any areas expected to be disturbed by project activities and in a 50-foot buffer around those areas. The locations of any detected nests, sighted individuals or carcasses shall be plotted on a base map or maps. The base map or maps shall consist of an aerial photograph of the work site, predicted disturbed areas and the 50-foot buffer, each of which will be identified on the map or maps. The map or maps will be of such scale as to allow identification of individual nest sites or nest clusters. Once this map is completed, the map shall be submitted to the~~

REVISED AS OF MAY 16, 2018. INCLUDES AMENDMENTS 1 THOUGH 5.

~~CDFW who will confer with the Permittee regarding the development of suitable protective and mitigation measures. Upon determination of those measures, the CDFW shall submit written avoidance and mitigation measures to the Permittee and those measures will be considered part of this Agreement.~~

Salt Marsh Harvest Mouse (SMHM), Salt Marsh Wandering Shrew (SMWS), Ridgeway's Rail (RIRA), ~~and California Clapper (CCR)~~ and California Black Rails (CBR)

In jurisdictional areas in tidal habitats and within 300 feet of pickleweed habitat:

2.75 Biological Awareness Training. For all work activities within or adjacent to tidal marsh or slough habitat, a biological awareness training shall be provided by a qualified biologist to all persons prior to beginning work. Work crews shall be informed of the following:

- A description and status of the species potentially present on the work site
- The importance of their associated habitats
- Their sensitivity to human activities
- The legal protections afforded to each species and penalties for violating them
- The roles and authority of the monitoring biologist(s)

A biological monitor shall remain onsite in sensitive areas identified during the presurvey. If at any time SMHM or RIRA is observed, work shall stop immediately until a biological monitor is onsite.

A fact sheet conveying this information shall be prepared for distribution to the crew and anyone else who enters the project site. A District representative shall be appointed who will be the contact source for any employee or contractor who might encounter a listed species. The representative(s) shall be identified during the environmental education program.

2.76 Seasonal Work Period. Work within or adjacent to ~~in~~ the tidal slough and marsh habitat shall be confined to the period September 1 to October 31 to avoid potential impacts to ~~CCR and~~ RIRA, CBR and SMWS (breeding season spans February 1 to August 31). If maintenance activities cannot be conducted during this seasonal work period, Permittee shall notify CDFW during annual notification. CDFW may either allow work to be conducted with Permittee

REVISED AS OF MAY 16, 2018. INCLUDES AMENDMENTS 1 THOUGH 5.

complying with the following measures, or CDFW may require Permittee to submit a notification for a separate agreement.

Work during the SMHM breeding season (March 1 to November 1) of each year shall be conducted only under the supervision of a qualified onsite biologist and under conditions stated in Measures 2.77 to 2.85.

If breeding rails are determined to be present in the work area, activities will not occur within 700 feet of an identified calling center. If the intervening distance between the rail calling center and an activity area is across a major slough channel (subject to typical boating activities and/or traffic) or other substantial audiovisual barrier and the distance is greater than 200 feet, then work may proceed at that location within the breeding season.

2.77 Work during Low Tide. Any work within the tidally influenced area shall be restricted low tide periods only. All equipment must be out of the channel prior to incoming tide.

2.78 No Work around Extreme High Tide Periods. Permittee shall not conduct routine maintenance activities within or adjacent to clapper rail habitat within two hours before or after extreme high tides (6.5' or above, as measured at the Golden Gate Bridge) when the marsh plain is inundated.

2.79 SMHM Exclusion Fencing. To prevent SMHM from moving through the project site during activities, temporary exclusion fencing shall be placed around a defined work area before excavation activities begin. The fence shall be made of non-woven material that does not allow SMHM to pass through or over, and the bottom should be buried to a depth of 2 inches so that SMHM cannot crawl under the fence. Fence stakes shall face towards the work site, away from the habitat. The biological monitor shall have the ability to make field adjustments to the location of the fencing depending on site-specific habitat conditions.

2.80 CDFW Approval of Fencing. The final design and proposed location of the fencing shall be reviewed and approved by CDFW prior to placement

2.81 Sensitive Species Inspection. Prior to the initiation of work each day during the construction of the exclusion fencing and all work within 300 feet of tidal or pickleweed habitats, the biological monitor shall

REVISED AS OF MAY 16, 2018. INCLUDES AMENDMENTS 1 THOUGH 5.

thoroughly inspect the work area and adjacent habitat areas to determine if SMHM, SMWS, CBR or RIRA~~CCR~~ are present. The biologist shall ensure the exclusion fencing has no holes or rips and the base remains buried. The fenced area will be inspected daily to ensure that no mice are trapped. Any species found along or outside the fence will be closely monitored until they move away from the construction area. The biological monitor shall remain on-site throughout these days while maintenance activities are occurring.

A qualified biologist shall perform a habitat assessment survey for SMHM and SMWS two days before work activity begins, and for RIRA and CBR 90 days before work activity begins, to determine if suitable nesting habitat for each species is present within 100-500 feet of work areas and to look for individuals and/or nests.

If suitable breeding mice or rail habitat or individuals are found within 100 feet of the work area, CDFW shall be consulted regarding the implementation of protective measures such as delaying work until individuals have moved out of the area.

If suitable breeding rail habitat or individuals are found within 100 feet of the work area, biologists shall complete surveys to determine presence-absence of rail species onsite within 15 days of work. Pre-work surveys are not required if work will be conducted outside of the breeding season, or if no rail species are present onsite. If rails are present, "no work" buffer zones shall be established around active nests, which shall be clearly marked in the field and on geotechnical drawings, and shall be monitored and maintained for the duration of work.

2.82 Stop Work for Sensitive Species. If a mouse of any species, a ~~CCR~~ SMWS, RIRA, or CBR is observed within the work area, then work shall be stopped immediately by the biological monitor, and the individual ~~mouse or rail~~ shall be allowed to leave the work area on its own volition. CDFW shall be notified of any such occurrences. If the individual ~~mouse or rail~~ does not leave the area, then no work shall commence until CDFW has made a determination on how to proceed with work activities. In suitable habitats for SMHM, SMWS, RIRA, and CBR, a biological monitor shall remain onsite to inspect work areas, walk in front of vehicles and equipment when accessing the site, and check underneath equipment before moving.

2.83 ~~Rail~~ Nests. If any rail, SMHM or SMWS nests are observed within the work or within 500 feet of the work area, work shall be stopped

REVISED AS OF MAY 16, 2018. INCLUDES AMENDMENTS 1 THOUGH 5.

and CDFW shall be contacted. No work shall commence until CDFW has made a determination on how to proceed with work activities.

2.84 Access Routes. Access, excavation and haul equipment shall be confined to developed access routes (established trails/roads) outside of marsh vegetation. No marsh vegetation shall be removed to gain access to a project site or for staging areas. If it is deemed necessary to remove marsh vegetation, Permittee shall submit a Notification to CDFW for a separate Agreement pursuant to FGC Section 1602 for this activity.

2.85 Designation of Work Area. Prior to maintenance activities, a biological monitor shall clearly mark/flag or erect temporary construction fencing to designate the work area and to delineate the areas that shall be avoided. All saltmarsh vegetation shall be avoided. Flagging and or temporary construction fencing shall be removed immediately after the completion of maintenance activities.

Mount Hamilton Fountain Thistle (MHFT), Western leatherwood (WL), Loma Prieta Hoita (LPH), ~~and~~ Popcorn Flower complex, and Congdon's tarplant (CT)

In jurisdictional areas having suitable habitat characteristics and within ¼ mile of known occurrence:

2.86 Special Status Plant Survey. Prior to the start of project activities, a qualified biologist shall conduct protocol level surveys for sensitive plant species during the peak blooming period. For information on special status plant survey methodology visit: http://www.wildlife.ca.gov/biogeodata/cnddb/pdfs/Protocols_for_Surveying_and_Evaluating_Impacts.pdf

2.87 Rare Plant Exclusion. If at any time MHFT, LW, LPH, popcorn flowers, CT or other rare plant species is found, it shall be flagged for avoidance and site specific avoidance buffers approved by CDFW shall be implemented. All the rare plants and associated buffer zones shall be avoided during maintenance activities.

2.88 Rare Plant Avoidance. If at any time, MHFT, LW, LPH, CT, and popcorn flowers cannot be avoided, routine maintenance activities shall not be conducted under this Agreement. Permittee shall submit a Notification to CDFW for a separate Agreement pursuant to FGC Section 1602 for this activity.

REVISED AS OF MAY 16, 2018. INCLUDES AMENDMENTS 1 THOUGH 5.

In jurisdictional areas having suitable habitat characteristics and no known occurrences of rare plants:

2.89 Rare Plant Protection Measures. Permittee shall comply with Measures 2.86 through 2.88.

Marbled Murrelet (MAMU)

In areas within the range of MAMU habitat as identified in the District 2007 maps, Permittee shall conduct a survey of habitats within ¼-mile of the project area for trees that meet the Pacific Seabird Group definition of potential MAMU nesting trees. If such trees are present within 300 feet of the project area or if a MAMU nest is detected, Permittee shall consult with CDFW before proceeding. If habitat trees are present within ¼-mile of the project site but are greater than 300 feet from the work area, Permittee may proceed with the following conditions:"
:

2.90 Seasonal Work Period. Work within the project area shall be confined to the period of September 15 to November 1. If maintenance activities cannot be conducted during this seasonal work period, Permittee shall notify CDFW during the Feb. 1 notification. CDFW may either allow work to be conducted with Permittee complying with the following Measures 2.90.1 through 2.90.9 or CDFW may require Permittee to submit a Notification to CDFW for a separate Agreement pursuant to FGC Section 1602 for this activity.

2.90.1 Marbled Murrelet Buffers. If construction activities occur during the marbled murrelet breeding season (March 24 to September 15), seasonal disturbance minimization buffers as listed in the table below and in the July 26, 2006 document, *Estimation of the Effects of Auditory and Visual Disturbance to Northern Spotted Owls and Marbled Murrelets in Northwestern California* (Exhibit 1), shall be followed:

REVISED AS OF MAY 16, 2018. INCLUDES AMENDMENTS 1 THOUGH 5.

Table 1. Estimated harassment distance in feet due to elevated action-generated sound levels for proposed actions affecting the marbled murrelet, by sound level.

	Anticipated Action Generated Sound Level (dB)			
Existing Pre-Project (Ambient) Sound Level (dB)	Moderate (71-80)	High (81-90)	Very High (91-100)	Extreme (101-110)
Natural Ambient (<=50)	165	500	1320	1320
Very Low (51-60)	0	330	825	1320
Low (61-70)	0	165	825	1320
Moderate (71-80)	0	165	330	1320
High (81-90)	0	165	165	500

.

2.90.2 Marbled Murrelet Sound Study. Permittee shall conduct a sound level monitoring study to determine level of ambient and construction activity noise anticipated during construction activities to calculate seasonal disturbance minimization buffer widths. Description of methods and results of study shall be submitted to CDFW for approval 30 days prior to commencement of activities.

2.90.3 Marbled Murrelet Seasonal Buffers. In order to alert work crews to their presence, marbled murrelet seasonal disturbance buffers, as determined by the sound study and Table 1 above, shall be flagged in the field where they enter the project area.

2.90.4 Marbled Murrelet Nest Tree Protection. If Permittee chooses not to conduct the sound study, no maintenance activities shall occur within 0.25-mile of potential nest trees during the

marbled murrelet breeding season (March 24 to September 15).

2.90.5 Marbled Murrelet Sunrise/Sunset. If noise generating construction activity takes place during the breeding season (March 24 to September 15) within Redwood and Redwood/Douglas-fir forests, construction activities shall be restricted to 2.0 hours after sunrise to 2.0 hours before sunset to minimize disturbance of potential nesting murrelets using forest habitat as a travel corridor between inland nesting and coastal habitat.

2.90.6 Murrelet Line-of-Sight. Permittee shall not conduct project activities within a visual line-of-sight distance of 40 m or less from a suitable nest tree as designated by a qualified biologist.

2.90.7 Marbled Murrelet Protocol Survey. If marbled murrelet protocol level surveys are conducted and do not indicate that the habitat is occupied by marbled murrelet, the seasonal and distance work restriction as stated above in 2.90.1. and 2.90.4 may be lifted with written approval from CDFW. Protocol level survey procedures and information can be found at: http://www.pacificseabirdgroup.org/publications/PSG_TechPub2_MAMU_ISP.pdf

2.90.8 Murrelet Surveys. If Permittee chooses to conduct marbled murrelet protocol level surveys, CDFW shall be notified and shall approve the survey stations to ensure all contiguous suitable habitat is covered and good visuals of the sky and nearby flyways, if present, are provided.

2.90.9 Marbled Murrelet Surveys Report. If marbled murrelet protocol level surveys are conducted, Permittee shall submit the report as stated in Appendix G in *Methods for Surveying Marbled Murrelets in Forests: A Revised Protocol for Land Management and Research*, which can be accessed at the link in Measure 2.91.7.

<u>Santa Cruz Black Salamander (Aneides flavipunctatus niger) (SCBS) and California Giant Salamander (Dicamptodon ensatus)(CGS)</u>

REVISED AS OF MAY 16, 2018. INCLUDES AMENDMENTS 1 THOUGH 5.

2.91 SCBS and CGS Avoidance. In areas of suitable habitat where SCBS and/or CGS occur:

- A biological awareness training provided by a qualified biologist is required prior to starting work.
- A qualified biologist and biological monitor shall be available on-call for the duration of the project.
- A biological monitor is required when working within or immediately adjacent to wetted areas including stream channels, seeps, and springs.
- For SCBS only, a biological monitor is also required in areas of talus slopes or areas having human stacked rocks and other suitable materials acting as talus.
- The biologist and/or biological monitor has the authority to stop work at any time.
- Dismantling of talus and human-stacked rocks and other suitable materials acting as artificial talus shall be avoided and minimized whenever possible. If removal is required to meet project objectives, these materials shall be dismantled by hand whenever possible.
- Whenever possible individual SCBS and CGS shall be allowed to leave the area on their own.
- Individual SCBS or CGS (not with eggs) that are in harm's way or do not leave the work site on their own may be relocated by a qualified biologist or biological monitor to predetermined sites located outside of the work area but within the same subwatershed.
- Work in wetted areas, talus slopes, or human stacked rocks or other suitable materials acting as artificial talus should be completed prior to July to avoid displacement of SCBS females laying eggs and attending to clutches.
- If heavy equipment is required to remove talus, human stacked rocks or other suitable materials acting as artificial talus, if shall be done in the presence of a qualified biological monitor.
- If at any time, SCBS or CGS eggs are found, the area shall be flagged for avoidance. In the area cannot be avoided to meet project objectives, consultation with CDFW shall occur to determine the best course of action.

In all other areas having suitable habitat:

REVISED AS OF MAY 16, 2018. INCLUDES AMENDMENTS 1 THOUGH 5.

- A pre-survey of the worksite is required prior to starting work. If no SCBS or CGS are observed, work may proceed.
- In individual SCBS or CGS are observed at any time, all work shall stop and the biologist and/or biological monitor shall be notified and the above measures shall be implemented.

Special Status Bat Species

2.92 Special Status Bat Avoidance. In areas of suitable habitat, preconstruction surveys are required for the following bat species:

- Pallid bat
- Townsend's big-eared bat
- Western red bat

Bat surveys and avoidance measures shall adhere to the District's BMPs (Exhibit B) for avoiding impacts to bat species.

3. Compensatory Measures

To compensate for adverse impacts to fish and wildlife resources identified above that cannot be avoided or minimized, Permittee shall implement each measure listed below.

3.1 Restoration Area. Restoration shall take place in the same Preserve Unit preferably on the same waterway or watershed and adhere to the Revegetation Best Management Practices in Exhibit B.

3.2 Tree Replacement. In suitable areas, t~~T~~rees shall be replaced at the following ratios (replacement trees to removed trees) to mitigate for permanent net loss of habitat and canopy cover:

- For non-native trees that provide canopy cover to the creek: 1:1 ratio
- For native trees: 2:1 ratio unless approved otherwise by CDFW. In certain areas where regeneration will occur or overcrowding is an issue, a 1:1 ratio is acceptable ~~may be approved~~.

3.3 Re-vegetation Ratio. In suitable areas, o~~O~~ther vegetation shall be replaced with the following ratios: wetlands, 1:1; general riparian vegetation, 3:1; sycamore alluvial woodland or other rare habitat types: 5:1; other general habitat types, 1:1.

REVISED AS OF MAY 16, 2018. INCLUDES AMENDMENTS 1 THOUGH 5.

3.4 Native Species for Re-vegetation. Replacement trees and vegetation shall be local native species adapted to the lighting, soil and hydrological conditions at the replanting site, except in cases where non-native trees are considered culturally significant. In these areas, non-native trees may be replaced with the same species of non-native tree to preserve the cultural landscape in ongoing maintenance to prevent the spread of the non-native is provided. If replanting within the work area is infeasible due to lack of space, slope steepness or other physical constraints, replacement trees and vegetation may be planted at an alternate location along the stream corridor. Vegetation shall be replaced by December 31 of the year impacts occur in a location that is not subject to future maintenance or construction work.

3.5 Re-vegetation Plan. Where active restoration is warranted, Permittee shall submit a re-vegetation plan with the annual February notification. The plan shall describe the project site and vegetative community, including the conditions warranting active re-vegetation. Proposed restoration measures shall be described, including location, number, size and type of replacement plantings, installation specifications and irrigation specifications if warranted.

3.6 Re-vegetation Survivorship. Any re-vegetation plan shall be accompanied by success criteria specific to the circumstance. The overall intent of the re-vegetation will be to replace or improve on the habitat value of the impacted area in a reasonable amount of time. The term 'Reasonable amount of time' means a return to the pre-project baseline in approximately the same period of time that the pre-existing habitat took to establish naturally. For habitats where this is not feasible (such as oak woodland), success criteria should focus on attributes that will provide a reasonable assurance that the re-vegetation will eventually result in the required replacement value. These attributes could include plant vigor, establishment of minimal species diversity, cover, lack of limiting factors and others.

3.7 Re-vegetation Success Criteria. For every project where habitat is removed, whether active re-vegetation is removed or not, the annual February notification should provide an estimate of the time necessary to re-establish the baseline habitat value lost. Permittee shall monitor the site for that period (as modified by CDFW where warranted). If the site reaches the pre-project habitat baseline prior to the end of the projected monitoring period and keeps that habitat value for two consecutive years, Permittee can request CDFW to waive further monitoring. For sites requiring longer terms to

reasonably reach a pre-project baseline and which are clearly doing well and therefore can reasonably be considered likely to reach the site habitat goals (such as oak woodland or redwood forest), Permittee can request CDFW to consider reducing or ending the monitoring after five years.

3.8 Re-vegetation Remediation. If re-vegetation success criteria requirements do not meet established goals, Permittee is responsible for replacement planting, additional watering, weeding, invasive exotic eradication, or any other practice, to achieve these requirements. All plants that die within the monitoring period shall be replaced during the fall the year the plant was determined to have failed. Replacement plants shall be monitored with the same goal as initial planting until habitat goals are met. If the problem(s) is/are larger in scope, are likely to recur and cannot be corrected, Permittee shall consult with CDFW to develop a modified plan for the site.

3.9 Sedimentation. Primary sedimentation control will be provided by implementation of the best management practices in Exhibit B and following the General Measures in Sections M1-M3 of this RMA. For any project where erosion and sedimentation cannot be completely controlled by these measures (such as clearing a plugged culvert in a live channel), additional measures shall be required. Permittee shall identify any projects where this condition occurred during the preceding calendar year and estimate the amount of sediment that bypassed protective measures. To compensate, as part of the annual February notification, Permittee shall propose sufficient erosion control projects to halt chronic sedimentation from other sources of a similar or greater amount. CDFW shall notify Permittee as to whether the project is acceptable. If both parties agree, the project shall be implemented as described. The base project fee will apply if the project is jurisdictional.

4. Reporting Measures

Permittee shall meet each reporting requirement described below.

4.1 Notification of Proposed Activities. Permittee shall provide CDFW written notification of proposed routine maintenance activities to be performed in the upcoming year by February 1 each year. Notification reports shall describe the project location, general topography, hydrological features, vegetative cover within 50 feet of

the work area, length and width of impact area, and a detailed description of proposed modifications to the banks, trails and/or channel. Each description shall include the specific Preserve map showing the work area, a brief description of the types and quality of habitats in the work area, an evaluation of possible resources present and identification of which programmatic conditions will be applied to the project. Photos of the work site will be provided, if the project involves a relocation, both sites should be included. Additional work may be submitted upon discovery using the conditions above. Reports shall be submitted to CDFW regardless of whether work is proposed.

CDFW shall append annual notification reports of proposed maintenance activities to this Agreement. For streamlined tracking, Permittee shall label annual notification reports according to the following convention: Exhibit D-[year] (e.g. Exhibit D-2013, Exhibit D-2014).

4.2 Additional Sites. Permittee may notify CDFW of work at additional sites (in addition to the sites shown in Project Description) if the proposed work fits the definition of routine maintenance, as specified in the Project Description. Work at additional sites may be submitted as described above.

4.3 Annual Reports for Completed Projects. On an annual basis, Permittee shall provide CDFW written notification of maintenance projects completed. Annual reports shall include the project identification (Preserve name, stream name and location), a brief project description, and the appropriate fee from the current CDFW Streambed Alteration Agreement Fee Schedule for work completed under this Agreement based upon the number of projects completed in the reporting period. The annual report is due on December 15 of each year. A report shall be submitted to CDFW regardless of whether work was completed. CDFW may terminate this Agreement if reports and fees are not submitted by this deadline.

4.4 Bird Survey Results. Permittee shall submit to CDFW prior to commencement of Project Activities, the bird survey methodology and results. Refer to Notification Number 1600-2012-0444-R3 when submitting the report to CDFW.

4.5 Biological Surveys. If other surveys (i.e. CRLF, SFDW, rare plants) are conducted for compliance with this Agreement, the survey methods and results of the survey shall be submitted to CDFW prior

REVISED AS OF MAY 16, 2018. INCLUDES AMENDMENTS 1 THOUGH 5.

to commencement of work. Refer to Notification Number 1600-2012-0444-R3 when submitting the report to the CDFW.

4.6 Annual Status Report. An annual status report on the re-vegetation mitigation shall be provided to the CDFW by December 31 of each year. This report shall include the survival, percent cover, and height of both tree and shrub species. The number by species of plants replaced, an overview of the re-vegetation effort and the method used to assess these parameters shall also be included. Photos from designated photo stations shall be included. All plants that die within the eight-year monitoring period shall be replaced during the fall the year the plant was determined to have failed. Refer to Notification Number 1600-2012-0444-R3 when submitting this plan to CDFW.

4.7 Notification to the California Natural Diversity Database (CNDDB). If any listed, rare, or special status species are detected during project surveys or on or around the project site during covered activities, the Permittee shall submit CNDDB Field Survey Forms to CDFW in the manner described at the CNDDB website (http://www.wildlife.ca.gov/biogeodata/cnddb/submitting_data_to_cnddb.asp) annually ~~within 14 working days of the sightings~~. Copies of such submittals shall also be submitted to the CDFW regional office as specified below.

4.8 List of Nonnative Species. Permittee shall annually submit to CDFW ~~within two weeks of project completion~~, a list of ~~location~~ projects and species treated under the District's Integrated Pest Management Program ~~for any nonnative invasive species found in the Project area~~.

CONTACT INFORMATION

Any communication that Permittee or CDFW submits to the other shall be in writing and any communication or documentation shall be delivered to the address below by U.S. mail, fax, or email, or to such other address as Permittee or CDFW specifies by written notice to the other.

To Permittee:

Natural Resources Department Manager
Midpeninsula Regional Open Space District
330 Distel Circle
Los Altos, CA 94022

REVISED AS OF MAY 16, 2018. INCLUDES AMENDMENTS 1 THOUGH 5.

(650) 691-1200
klenington@openspace.org

To CDFW:

California Department of Fish and Wildlife
Bay Delta Region
7329 Silverado Trail
Napa, California 94558
Attn: Lake and Streambed Alteration Program – Randi Adair or Kristin Garrison
~~Suzanne DeLeon~~
Notification #1600-2012-0444-R3
Fax (707) 944-5553
Randi.Adair@wildlife.ca.gov
Kristin.Garrison@wildlife.ca.gov
~~Suzanne.DeLeon@wildlife.ca.gov~~

LIABILITY

Permittee shall be solely liable for any violations of the Agreement, whether committed by Permittee or any person acting on behalf of Permittee, including its officers, employees, representatives, agents or contractors and subcontractors, to complete the project or any activity related to it that the Agreement authorizes.

This Agreement does not constitute CDFW's endorsement of, or require Permittee to proceed with the project. The decision to proceed with the project is Permittee's alone.

SUSPENSION AND REVOCATION

CDFW may suspend or revoke in its entirety the Agreement if it determines that Permittee or any person acting on behalf of Permittee, including its officers, employees, representatives, agents, or contractors and subcontractors, is not in compliance with the Agreement.

Before CDFW suspends or revokes the Agreement, it shall provide Permittee written notice by certified or registered mail that it intends to suspend or revoke. The notice shall state the reason(s) for the proposed suspension or revocation, provide Permittee an opportunity to correct any deficiency before CDFW suspends or revokes the Agreement, and include instructions to Permittee, if necessary, including but not limited to a directive to immediately cease the specific activity or activities that caused CDFW to issue the notice.

REVISED AS OF MAY 16, 2018. INCLUDES AMENDMENTS 1 THOUGH 5.

ENFORCEMENT

Nothing in the Agreement precludes CDFW from pursuing an enforcement action against Permittee instead of, or in addition to, suspending or revoking the Agreement.

Nothing in the Agreement limits or otherwise affects CDFW's enforcement authority or that of its enforcement personnel.

OTHER LEGAL OBLIGATIONS

This Agreement does not relieve Permittee or any person acting on behalf of Permittee, including its officers, employees, representatives, agents, or contractors and subcontractors, from obtaining any other permits or authorizations that might be required under other federal, state, or local laws or regulations before beginning the project or an activity related to it.

This Agreement does not relieve Permittee or any person acting on behalf of Permittee, including its officers, employees, representatives, agents, or contractors and subcontractors, from complying with other applicable statutes in the FGC including, but not limited to, FGC sections 2050 et seq. (threatened and endangered species), 3503 (bird nests and eggs), 3503.5 (birds of prey), 5650 (water pollution), 5652 (refuse disposal into water), 5901 (fish passage), 5937 (sufficient water for fish), and 5948 (obstruction of stream).

Nothing in the Agreement authorizes Permittee or any person acting on behalf of Permittee, including its officers, employees, representatives, agents, or contractors and subcontractors, to trespass.

AMENDMENT

CDFW may amend the Agreement at any time during its term if CDFW determines the amendment is necessary to protect an existing fish or wildlife resource.

Permittee may amend the Agreement at any time during its term, provided the amendment is mutually agreed to in writing by CDFW and Permittee. To request an amendment, Permittee shall submit to CDFW a completed CDFW “Request to Amend Lake or Streambed Alteration” form and include with the completed form payment of the corresponding amendment fee identified in CDFW’s current fee schedule (see Cal. Code Regs., tit. 14, § 699.5).

TRANSFER AND ASSIGNMENT

This Agreement may not be transferred or assigned to another entity, and any purported transfer or assignment of the Agreement to another entity shall not be valid or effective,

unless the transfer or assignment is requested by Permittee in writing, as specified below, and thereafter CDFW approves the transfer or assignment in writing.

The transfer or assignment of the Agreement to another entity shall constitute a minor amendment, and therefore to request a transfer or assignment, Permittee shall submit to CDFW a completed CDFW "Request to Amend Lake or Streambed Alteration" form and include with the completed form payment of the minor amendment fee identified in CDFW's current fee schedule (see Cal. Code Regs., tit. 14, § 699.5).

EXTENSIONS

In accordance with FGC section 1605(b), Permittee may request one extension of the Agreement, provided the request is made prior to the expiration of the Agreement's term. To request an extension, Permittee shall submit to CDFW a completed CDFW "Request to Extend Lake or Streambed Alteration" form and include with the completed form payment of the extension fee identified in CDFW's current fee schedule (see Cal. Code Regs., tit. 14, § 699.5). CDFW shall process the extension request in accordance with FGC 1605(b) through (e).

If Permittee fails to submit a request to extend the Agreement prior to its expiration, Permittee must submit a new notification and notification fee before beginning or continuing the project the Agreement covers [FGC, §1605, subd. (f)].

EFFECTIVE DATE

The Agreement becomes effective on the date of CDFW's signature, which shall be: 1) after Permittee's signature; 2) after CDFW complies with all applicable requirements under the California Environmental Quality Act (CEQA); and 3) after payment of the applicable FGC section 711.4 filing fee listed at http://www.wildlife.ca.gov/habcon/ceqa/ceqa_changes.html.

TERM

This Agreement shall expire on **December 31, 2022** unless it is terminated or extended before then. All provisions in the Agreement shall remain in force throughout its term. Permittee shall remain responsible for implementing any provisions specified herein to protect fish and wildlife resources after the Agreement expires or is terminated, as FGC section 1605(a)(2) requires.

EXHIBITS

The documents listed below are included as exhibits to the Agreement and incorporated herein by reference.

REVISED AS OF MAY 16, 2018. INCLUDES AMENDMENTS 1 THOUGH 5.

A. Mapbook of District Preserves
B. Midpeninsula Regional Open Space District Best Management Practices for Routine Maintenance Activities in Water Courses, 2018 ~~2008~~
C. Definition of Terms
D. Annual Notifications of Proposed Work (reserved for future exhibits)
E. USFWS Recovery Permit Number: TE225974-2, dated 12/22/16
F. CDFW Memorandum of Understanding "Research and Recovery of San Francisco Garter Snake and California Tiger Salamander" dated April 6, 2017

AUTHORITY

If the person signing the Agreement (signatory) is doing so as a representative of Permittee, the signatory hereby acknowledges that he or she is doing so on Permittee's behalf and represents and warrants that he or she has the authority to legally bind Permittee to the provisions herein.

AUTHORIZATION

This Agreement authorizes only the project described herein. If Permittee begins or completes a project different from the project the Agreement authorizes, Permittee may be subject to civil or criminal prosecution for failing to notify CDFW in accordance with FGC section 1602.

REVISED AS OF MAY 16, 2018. INCLUDES AMENDMENTS 1 THOUGH 5.

CONCURRENCE

The undersigned accepts and agrees to comply with all provisions contained herein.

FOR MIDPENINSULA OPEN SPACE DISTRICT

Original Agreement signed by

Kirk Lennington — Date

Permittee

FOR DEPARTMENT OF FISH AND WILDLIFE

Original Agreement signed by

Craig J. Weightman — Date

Environmental Program Manager

Prepared by: Suzanne DeLeon
Environmental Scientist

Date Sent: March 27, 2013; August 20, 2013

REVISED AS OF MAY 16, 2018. INCLUDES AMENDMENTS 1 THOUGH 5.

Exhibit C. Definition of Terms

Definitions:

Debris: non-living vegetative or woody matter, trash, concrete rubble, etc. This definition does not include living vegetation.

Emergency project: is defined in the State Fish and Game Code, section 1600.

Fire Road/Unimproved vehicle width trail: Similar to narrow width trails, but up to 12' wide with natural surfaces (or baserock). These tracks are intended to allow access for emergency & maintenance vehicles.

Heavy equipment: any equipment used that is larger than a pick-up truck.

Improved Road: Accessible to all types of vehicles. They are of various widths, but not less than 12' wide, with paved surfaces and a minimum 2' shoulder on each side

Narrow width trail:- This is the standard trail, approximately 4-6' wide with a natural, or baserock, surface.

Natural channel: a stream or watercourse that has not been modified by human acts such as lining the channel with cement, or creating an artificial channel for drainage or flood control. A natural channel may have in it erosion control structures, culverts or other minor modifications.

Paved Roads: These allow more users to access Preserve lands. They are generally 12-16' in width, paved, and have a baserock or natural surface shoulder on each side.