



Amendment of the Mt. Tamalpais Watershed Road and Trail Management Plan – Restoration of Azalea Hill

MMWD Mt. Tamalpais Watershed, Unincorporated Marin County

Initial Study/Mitigated Negative Declaration

September 2017

Prepared by:

Marin Municipal Water District
220 Nellen Ave.
Corte Madera, CA 94925
www.marinwater.org



**MARIN MUNICIPAL
WATER DISTRICT**

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LIST OF ACRONYMS AND DEFINITIONS

| | |
|-------------------------------|---|
| APN | Assessor Parcel Map |
| BAAQMD | Bay Area Air Quality Management District |
| BMPs | Best Management Practices |
| CDFW | California Department of Fish and Wildlife |
| CEQA | California Environmental Quality Act |
| dBA | A single-number noise measurement based on the decibel, but weighted to approximate the response of the human ear with respect to frequencies |
| District | Marin Municipal Water District |
| USEPA | United States Environmental Protection Agency |
| MMWD | Marin Municipal Water District |
| RWQCB | Regional Water Quality Control Board |
| San Francisco Bay Area | The area encompassed by the counties of San Francisco, San Mateo, Santa Clara, Alameda, Contra Costa, Marin, Sonoma, Napa, and Solano. |

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Draft Mitigated Negative Declaration

PROJECT DESCRIPTION

The Marin Municipal Water District (District or MMWD) is proposing the Amendment of the Mt. Tamalpais Watershed Road and Trail Management Plan – Restoration of Azalea Hill. The project would: 1) amend the *Mt. Tamalpais Watershed Road and Trail Management Plan* (RTMP) for the Azalea Hill area; 2) remove approximately 4.4-miles of non-system roads and trails and restore those routes to natural conditions to improve habitat and water quality; 3) adopt and improve an approximately 1.9-mile route as an unpaved, approximately 4-foot-wide, small vehicle, or multi-use route (comprised of the existing Liberty Gulch Road (1.2 mile) and conversion of some existing non-system trails (0.7 mi) to the wider, small vehicle route); 4) improve the existing, approximately 1.1 mile hiking and horse route over Azalea Hill to fix its erosion problems and make it more sustainable; and 5) treat the Azalea Hill parking lot to fix its erosion problems and improve the visitor amenities serving Azalea Hill. Upon its completion, the project would prevent up to an estimated 219 cubic yards of sediment from entering Azalea Hill’s creeks or Alpine Lake annually (or 4,377 cu yds over 20 years), and would restore approximately one acre of habitat.

- 1. Applicant:** Marin Municipal Water District
220 Nellen Ave.
Corte Madera, CA 94925
- 2. Location:** Azalea Hill, approximately 4 miles west-southwest of the Town of Fairfax, CA (lat 37.9626, long -122.6206), APN 197-120-31 (**Figure 1**)
- 3. Proposed Action:** Amendment of the *Mt. Tamalpais Watershed Road and Trail Management Plan* and approval of its associated Azalea Hill Restoration Projects.

NEGATIVE DECLARATION MITIGATION MEASURES

Air Quality

Mitigation Measure 3-1. During construction activities, MMWD shall require its personnel and any construction contractor(s) assigned to the project to implement a dust abatement program that includes, but is not necessarily limited to, the following BAAQMD-recommended measures as needed, to control dust:

- a. All haul trucks transporting soil, sand, or other loose material off-site shall be covered.
- b. All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping shall be prohibited.
- c. All vehicle speeds on unpaved roads shall be limited to 15 miles per hour.
- d. Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to five minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations [CCR]).
- e. All construction equipment shall be maintained and properly tuned in accordance with manufacturer’s specifications.

Biological Resources

Mitigation Measure 4-1A. Prior to the commencement of construction activities, the District will commission or conduct protocol-level surveys for special-status plant species. The survey area will include all areas in which construction would occur during that construction season, as well as all adjacent areas that could be disturbed. Given the number of annual special-status plant species in the area, and that the distribution of such species changes annually, the surveys will be considered valid until the following spring. The following shall then be implemented:

- All special-status plants and/or boundaries of the population(s) will be flagged.
- For special-status species of low sensitivity ranking, that are common in the project vicinity, and/or resilient to disturbance (e.g., serpentine reed grass, Mt. St. Helena morning-glory, Mt. Tamalpais manzanita), disturbances shall be minimized to the degree practical but complete avoidance is not necessary, as directed by the MMWD botanist.
- If a special-status plant species is found in the project's disturbance boundary, the plants will be avoided to the degree practicable. Flagging and/or fencing shall be placed near any identified special-status plants during construction to prevent incidental disturbance.
- Supplement to Measure 3.2-B.2. If avoidance is not practicable, and if the plant(s) do not have a low sensitivity rating and are not common in the project vicinity and/or resilient to disturbance (as determined by a MMWD ecologist), then a rare plant mitigation shall be designed and implemented. At a minimum, the plan shall include the following elements:
 - a. For annual species, seed shall be collected from plants that will be removed or from other populations of the species on Azalea Hill, and those seeds shall be redistributed in the project vicinity, as directed by the MMWD botanist. For perennial species, seed collection may be augmented by transplanting entire plants or cuttings, as directed by the MMWD botanist.
 - b. Suitable sites shall be identified and prepared for redistribution of seeds (or transplants). The plan shall outline the site preparation activities.
 - c. Monitoring surveys of the seeded or transplanted areas shall be conducted for a minimum of two years.
 - d. Mitigation will be deemed successful provided that each of the relocated species establishes at least one stable population, defined as species presence over a 2-year period, taking into account fluctuations in local reference populations. If this goal is not achieved in 3 years, then contingency measures shall be implemented. Such measures will include: evaluating the environmental or other characteristics affecting plant survival and implementing corrective measures, which may include additional seeding and planting; altering or implementing a weed control regime; or introducing or altering other management activities. Efforts shall continue until the relocated individuals have been healthy for two years.

Mitigation Measure 4-1B. The following measures to protect special-status plant species from incidental harm from construction equipment and the spread of weeds will also be implemented:

- a. All construction personnel must attend a biological resources training to be provided by the MMWD (see 3.2-B.3). The training will address the importance of Azalea Hill's sensitive botanical resources and techniques for avoiding impacts.
- b. The number of vehicles on site will be minimized to reduce the potential for disturbance and ensure adequate space to park and maneuver within designated areas.

- c. All vehicle routes, staging, parking, and turnaround areas will be marked, and vehicle operation in unmarked areas is prohibited.
- d. Additional visual or physical barriers (fencing, signs, stakes, marking paint, or flagging) will be installed, as needed, to ensure vehicle compliance with approved vehicle routes, staging, parking, and turnaround areas.
- e. All vehicles and equipment must be cleaned of soil, seeds, and vegetative material prior to entering the project site; inspection and cleaning measures (washing, steaming, air blast, brushing/scrubbing, vacuuming) should be applied to material transport beds, buckets and blades, radiators, grills/filters, tires/axels and differentials, within slashing mulching and ripping equipment, chassis and body, between dual wheels, ledges and frames, inside drivers cab, and mudguards.
- f. Erosion control materials shall be composed of coconut/coir fiber, or other certified weed free materials, as approved by the MMWD botanist.
- g. All open bed vehicles carrying a load of material (unconsolidated fill, erosion control material, etc.) shall be covered to prevent the dispersal of weed seeds.

Mitigation Measure 4-2. While it is unlikely that California red-legged frog occurs in the study area, the following measures are recommended to further ensure that the species is not harmed by the proposed project:

- Before any construction activities begin on the site, a qualified biologist shall conduct a training session for all construction personnel. At a minimum, the training shall include a description of the California red-legged frog and its habitat, the measures that are being implemented to conserve the species as they relate to the project, the boundaries within which the project may be accomplished, and instructions that construction activities must be halted if a California red-legged frog is observed in the construction area and the biologist must be immediately notified.
- A qualified biologist shall survey the work sites within 500 feet of Bon Tempe Creek or Alpine Lake within 48 hours of the onset of construction activities for California red-legged frog. If California red-legged frogs are found, construction activities will be delayed until the USFWS is notified and guidance is provided on how to proceed.

Mitigation Measure 4-3. While it is unlikely that foothill yellow-legged frog occurs in the study area, the following measures are recommended to further ensure that the species is not harmed by the proposed project:

- The biological training session to be provided to construction personnel (see Mitigation Measure 4-2) shall also address the potential presence of foothill yellow-legged frog. At a minimum, the training shall include a description of the foothill yellow-legged frog and its habitat, the measures that are being implemented to conserve the species as they relate to the project, the boundaries within which the project may be accomplished, and instructions that construction activities must be halted if a foothill yellow-legged frog is observed in the construction area and the biologist must be immediately notified.
- A qualified biologist shall survey the work sites within 25 feet of Bon Tempe Creek within 48 hours of the onset of construction activities for foothill yellow-legged frog. If foothill yellow-legged frogs are found, construction activities will be delayed until the frog leaves the construction zone on its own or until a biologist in possession all required permits moves the frog(s) to an area outside of the construction zone. Temporary exclusionary fencing (designed to prevent frogs from entering

the work area) will then be installed under the guidance of a qualified biologist to prevent the relocated frog(s) from reentering the work site.

Mitigation Measure 4-4. The following measures are recommended to protect western pond turtle during construction activities:

- The biological training session to be provided to construction personnel (see Mitigation Measure 4-2) shall also address the potential presence of western pond turtle. At a minimum, the training shall include a description of western pond turtle and its habitat, the measures that are being implemented to conserve the species as they relate to the project, the boundaries within which the project may be accomplished, and instructions that construction activities must be halted if a pond turtle is observed in the construction area and the biologist must be immediately notified.
- A qualified biologist shall survey work sites within construction areas where suitable western pond turtle nesting or aquatic habitat exists within 48 hours of the onset of construction activities. If western pond turtle are found, the turtle will be relocated to a suitable location outside of the construction zone by a qualified biologist.
- Prior to the start of construction, construction fencing shall be placed between the lake or Bon Tempe Creek and the construction area or access routes where suitable western pond turtle habitat exists, at the direction of the qualified biologist. The fencing shall be placed at the edge of the construction area or access routes to maximize areas for turtle movement or nesting. Large-mesh construction fencing shall be used to allow hatchlings, but not adults of the species, to pass through the fencing. Additionally, prior to the start of construction each day, a designated biological monitor (who has received training from a qualified biologist) shall inspect the fence and construction area. Any pond turtles found on the upland side of the construction fencing shall be relocated to the lake-side of the construction fencing by a qualified biologist or the trained, designated biological monitor.

Mitigation Measure 4-5. If construction activities would commence anytime during the nesting/breeding season of native bird species potentially nesting on the project site (typically February through August in the project region), a pre-construction survey for nesting birds shall be conducted by a qualified biologist within one week of the commencement of construction activities.

If active nests are found in areas that could be directly affected, or that are within 300 feet of construction and would be subject to prolonged construction-related noise, then an appropriate no-disturbance buffer zone shall be created around active nests during the breeding season or until a qualified biologist determines that all young have fledged. The size of the buffer zone and types of construction activities restricted within will be determined by a qualified biologist taking into account factors such as the following:

- Noise and human disturbance levels at the construction site at the time of the survey and the noise and disturbance expected during the construction activity;
- Distance and amount of vegetation or other screening between the construction site and the nest; and
- Sensitivity of individual nesting species and behaviors of the nesting birds.

To minimize the potential for a construction-related delay due to the presence of an active bird nest, any required tree and vegetation removal may be conducted outside of the nesting season.

Mitigation Measure 4-6. Prior to any tree removal during the maternity roosting period (April 15 to August 31) or hibernation period (October 15 to February 28), a focused tree habitat assessment can

be conducted by a qualified bat biologist of all trees that will be removed or impacted by construction activities. Trees containing suitable potential bat roost habitat features would then be clearly marked. The habitat assessments should be conducted enough in advance to allow preparation of a report with specific recommendations, and to ensure tree removal can be scheduled during seasonal periods of bat activity if required. If it is determined that day roosting bats are unlikely to occur, the tree may be removed as described below. If the absence of roosting bats cannot be confirmed, then the removal of trees providing suitable maternity or hibernation roosting habitat should only be conducted during seasonal periods of bat activity, including:

- 1) Between March 1 (or after evening temperatures rise above 45F and/or no more than 1/2" of rainfall within 24 hours occurs) and April 15; or
- 2) Between September 1 and about October 15 (or before evening temperatures fall below 45F and/or more than 1/2" of rainfall within 24 hours occurs).

Appropriate methods will be used to minimize the potential of harm to bats during tree removal. Such methods may include using a two-step tree removal process. This method is conducted over two consecutive days, and works by creating noise and vibration by cutting non-habitat branches and limbs from habitat trees using chainsaws only (no excavators or other heavy machinery) on Day 1. The noise and vibration disturbance, together with the visible alteration of the tree, is very effective in causing bats that emerge nightly to feed, to not return to the roost that night. The remainder of the tree is removed on Day 2. A bat biologist qualified in two-step tree removal is required on Day 1 to supervise and instruct the tree-cutters who will be on the site conducting the work, but only for a sufficient length of time to train all tree cutters who will conduct two-step removal of habitat trees. The bat biologist is generally not required on Day 2, unless a very large cavity is present and a large colony is suspected.

Mitigation Measure 4-7A. Where trails will be rerouted or where activities will occur outside of existing trails, the removal of native vegetation will be minimized to the degree practical.

Mitigation Measure 4-7B. All areas temporarily disturbed during project activities that are outside of the finished trail/road alignment will be restored to their pre-disturbance condition. The pre-disturbance condition would be documented by a botanist prior to project implementation. A restoration plan will be implemented to restore all temporarily disturbed areas. Success criteria may include total plant cover, and non-native species cover shall not exceed pre-disturbance non-native species cover. The plan shall address acceptable thresholds for native and non-native species for each monitoring year for five years. The plan shall also define corrective actions that would be taken if the performance standards are not met and the triggers for taking corrective actions.

Mitigation Measure 4-7C. In addition to the requirements of Measure 3.2-F.1 from the *Mt. Tamalpais Watershed Road and Trail Management Plan* EIR, all decommissioned trails will be monitored by a qualified botanist annually for a period of five years. Corrective actions will be implemented if it is determined by the botanist that the trails are not revegetating with appropriate vegetation characteristic of surrounding areas on similar soils.

Cultural Resources

Mitigation Measure 5-1. Protect Archaeological Resources Identified during Construction: MMWD shall ensure that construction crews shall stop all work within 100 feet of the discovery until a qualified archaeologist can assess the previously unrecorded discovery and provide recommendations. Resources could include subsurface historic features such as artifact-filled privies, wells, and refuse pits, and artifact deposits, along with concentrations of adobe, stone, or concrete walls or foundations,

and concentrations of ceramic, glass, or metal materials. Native American archaeological materials could include obsidian and chert flaked stone tools (such as projectile and dart points), midden (culturally derived darkened soil containing heat-affected rock, artifacts, animal bones, and/or shellfish remains), and/or groundstone implements (such as mortars and pestles).

Mitigation Measure 5-2. Protect Human Remains Identified During Construction: MMWD shall treat any human remains and associated or unassociated funerary objects discovered during soil-disturbing activities according to applicable State laws. Such treatment includes work stoppage and immediate notification of the Marin County Coroner and qualified archaeologist, and in the event that the Coroner's determination that the human remains are Native American, notification of NAHC according to the requirements in PRC Section 5097.98. NAHC would appoint a Most Likely Descendant (MLD). A qualified archaeologist, MMWD and MLD shall make all reasonable efforts to develop an agreement for the treatment, with appropriate dignity, of any human remains and associated or unassociated funerary objects (CEQA Guidelines Section 15064.5[d]). The agreement would take into consideration the appropriate excavation, removal, recordation, analysis, custodianship, and final disposition of the human remains and associated or unassociated funerary objects. The PRC allows 48 hours to reach agreement on these matters.

Hazards and Hazardous Materials

Mitigation Measure 8-1. The accidental release of asbestos fibers shall be mitigated by implementation of the following measures for construction all construction activities:

- a. Construction vehicle speed at the work site shall be limited to fifteen (15) miles per hour or less.
- b. Prior to any ground disturbance, sufficient water must be applied to the area to be disturbed to prevent visible emissions.
- c. Areas to be graded or excavated must be kept adequately wetted to prevent visible emissions.
- d. Storage piles must be kept adequately wetted, treated with a chemical dust suppressant, or covered when material is not being added to or removed from the pile.
- e. Equipment must be washed down before moving from the property onto a paved public road.
- f. Visible track-out on the paved public road must be cleaned using wet sweeping or a HEPA filter equipped vacuum device within twenty-four (24) hours.

Mitigation Measure 8-2. MMWD and/or its contractor(s) shall use BMPs that will minimize the potential adverse effect of the project to groundwater and soils from chemicals used during construction activities. The BMPs will include the following measures:

- a. Establish fuel and vehicle maintenance areas away from all drainage courses and design these areas to control runoff;
- b. Follow manufacturer's recommendations on use, storage and disposal of chemical products used in construction;
- c. Avoid overtopping construction equipment fuel gas tanks;
- d. Provide secondary containment for any hazardous materials temporarily stored onsite;
- e. During routine maintenance of construction equipment, properly contain and remove grease and oils;

- f. Perform regular inspections of construction equipment and materials storage areas for leaks and maintain records documenting compliance with the storage, handling and disposal of hazardous materials;
- g. Properly dispose of discarded containers of fuels and other chemicals; and
- h. A spill prevention and countermeasure plan shall be developed that will identify proper storage, collection, and disposal measures for potential pollutants (such as fuel, fertilizers, pesticides, etc.) used onsite. The plan will also require the proper storage, handling, use, and disposal of petroleum products.

Mitigation Measure 8-3. MMWD and/or its contractor shall implement the following fire safety construction practices:

- a. MMWD or its contractors shall check in daily by phone for the NPS daily fire hazard rating for the area. On days when the fire hazard rating is Very High or Critical, use of two-stroke power tools, such as chain saws and weed whips, are prohibited at the project site;
- b. There shall be no work on red flag days declared by Marin County;
- c. Earthmoving and portable equipment with internal combustion engines shall be equipped with a spark arrestor to reduce the potential for igniting a wildland fire;
- d. Appropriate fire suppression equipment shall be maintained at the construction site;
- e. Flammable materials shall be removed to a distance of 10 feet from any equipment that could produce a spark, fire, or flame; and
- f. Construction personnel shall be trained in fire safe work practices, use of fire suppression equipment, and procedures to follow in the event of a fire.

REVIEW PERIOD

All comments regarding the correctness, completeness, or adequacy of this Draft Mitigated Negative Declaration must be received by the Marin Municipal Water District, 220 Nellen Avenue, Corte Madera, California 94925, no later than 4:00 p.m. on October 9, 2017.

CONTACT PERSON

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Corte Madera, CA 94925
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Environmental Checklist Form

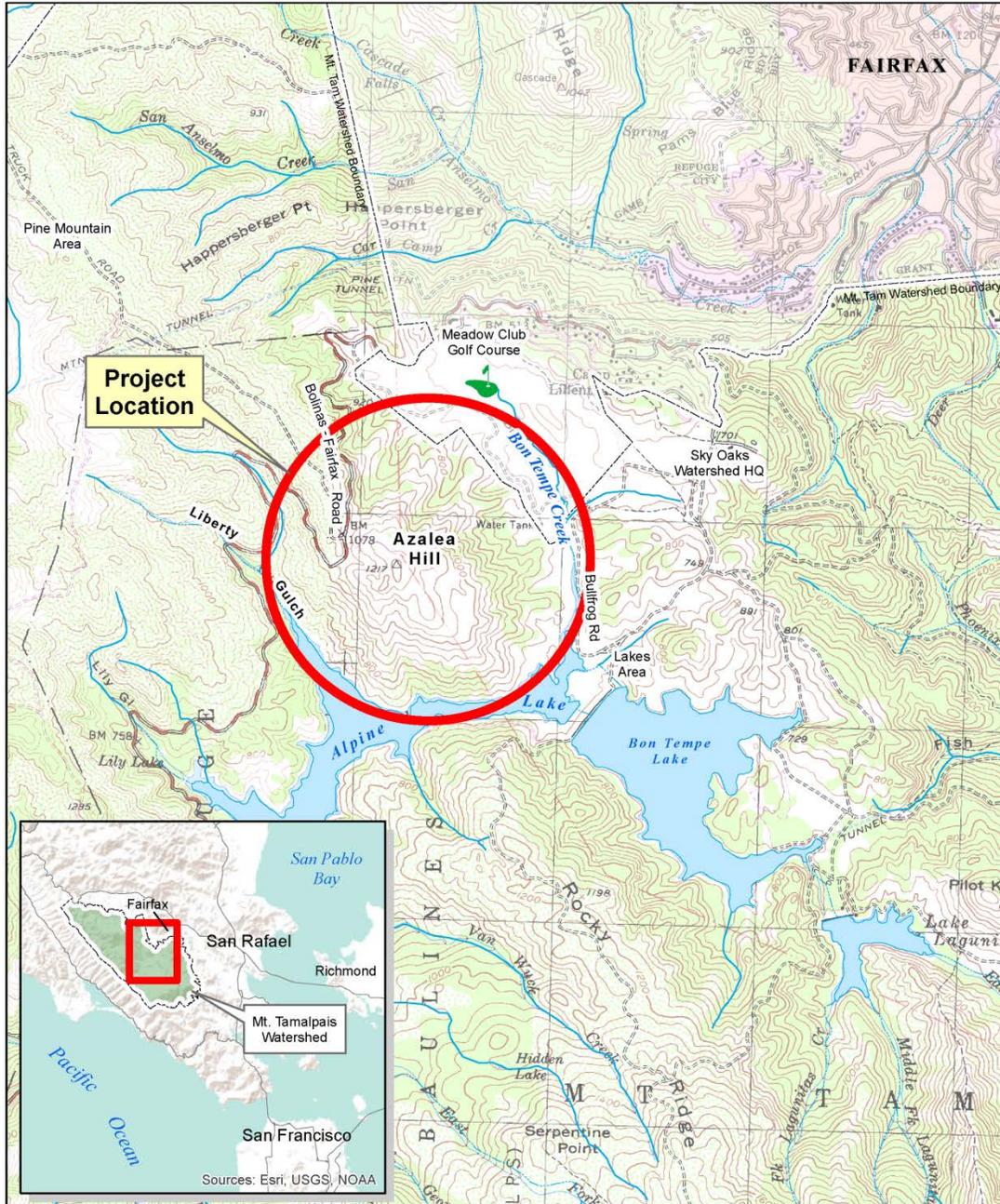
1. **Project Title:** Amendment of the *Mt. Tamalpais Watershed Road and Trail Management Plan - Restoration of Azalea Hill* (MMWD Project No. R17008)
2. **Lead Agency Name and Address:** Marin Municipal Water District, 220 Nellen Ave., Corte Madera, California 94925
3. **Contact Person and Phone Number:** Dain Anderson, Environmental Services Coordinator, Marin Municipal Water District 415-945-1586
4. **Project Location:** Azalea Hill, approximately 4 miles west-southwest of the Town of Fairfax, CA (lat 37.9626, long -122.6206), APN 197-120-31 (**Figure 1**).
5. **Project Sponsor's Name and Address:** Marin Municipal Water District, 220 Nellen Ave, Corte Madera, CA 94925
6. **General Plan Designation:** Marin Countywide Plan – Open Space (OS)
7. **Zoning:** Marin County Zoning Ordinance – Open Area (OA)
8. **Description of Project:**

The Marin Municipal Water District (District or MMWD) is proposing the Amendment of the *Mt. Tamalpais Watershed Road and Trail Management Plan – Restoration of Azalea Hill* (**Appendix A**). The project would: 1) amend the *Mt. Tamalpais Watershed Road and Trail Management Plan* (RTMP) for the Azalea Hill area; 2) remove approximately 4.4-miles of non-system roads and trails and restore those routes to natural conditions to improve habitat and water quality; 3) adopt and improve an approximately 1.9-mile route as an unpaved, approximately 4-foot-wide, small vehicle, or multi-use route (comprised of the existing Liberty Gulch Road (1.2 mile) and conversion of some existing non-system trails (0.7 mi) to the wider, small vehicle route); 4) improve the existing, approximately 1.1 mile hiking and horse route over Azalea Hill to correct its erosion problems and make it more sustainable; and 5) improve the Azalea Hill parking lot to correct erosion problems and improve the visitor amenities serving Azalea Hill. Upon its completion, the project would prevent up to an estimated 219 cubic yards of sediment from entering Azalea Hill's creeks or Alpine Lake annually (or 4,377 over 20 years), and would restore approximately one acre of habitat.

8.1 Background

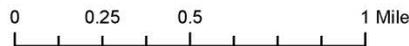
Azalea Hill is an approximately 370-acre area of the Mt. Tamalpais watershed bordered by Bon Tempe Creek and the Sky Oaks/Bullfrog area to the east, Alpine Lake to the south, Liberty Gulch, Bolinas-Fairfax Road and the Pine Mountain area to the west, and the Meadow Club golf course to the north. Elevation ranges from 646 feet along the shore of Alpine Lake to 1,217 feet at its summit (**Figure 1**). The area is crisscrossed by a network of approximately 7 miles of roads and trails that were constructed over time as hiking trails, carriage roads, ranch roads or county vehicle roads. There are a dozen or so intermittent creeks originating on Azalea Hill, as well as several seeps and springs. The vegetation is predominately a mixture of grasslands, chaparral and hardwood forest. Of note are pockets

Figure 1: Location Map



Sources: MMWD Sky Oaks HQ GIS, MarinMap and USGS Quad Maps (7.5 min.) Portions of Bolinas and San Rafael

Prepared by MMWD Sky Oaks Wtrshd HQ GIS January 2017



SOURCE: MMWD 2015



of serpentine soils in several areas that are highly erosive and that support many special-status plant species.¹

Of the 7-miles of roads and trails, approximately 6-miles are social or “non-system” routes. “Non-system” routes, as opposed to system, or official routes, are also known as “social,” “abandoned,” “illegal” or “unofficial” routes, and they add to the burden of road and trail management. These non-system routes have a wide variety of undesirable effects on the environment ranging from water quality impacts to migration or foraging barriers for wildlife to physical removal of habitat.² (Figure 2). These routes, some of which existed before the district acquired the land (i.e. the old ranching roads), or were constructed by others over time, have persisted through repeated off-trail use.

Key to the proposed project is what is now called Liberty Gulch Road. This road was originally constructed to replace the county’s Bolinas-Fairfax carriage road which was flooded by Alpine dam and its resulting reservoir in 1919. Subsequent raising of Alpine Dam in 1924 and 1941 resulted in additional road construction or re-routes in the area. At one time Liberty Gulch Road provided the connection for all users between Bullfrog Road, a gateway to the “lakes” area, and Fairfax-Bolinas Road, a gateway to the “Pine Mountain” area. However, the dam and road construction have eliminated, for the most part, the connections at either end (the lower portion is flooded by Alpine Lake and the upper portion was buried under today’s current Bolinas-Fairfax Road alignment) (Figure 3).

Other key elements of the site are Azalea Hill Road and the Azalea Hill Trail that currently make up the RTMP recognized route over Azalea Hill. While their origin is not known (speculation has the road being built by ranchers and the trail being built by equestrians), they provide the hiking and equestrian connection over the peak of Azalea Hill between Bullfrog Road and Bolinas-Fairfax Road. The western most part of this route (Azalea Hill Road) is open to bicycles and vehicles; however, the road is badly gullied and bicycle and vehicle access ends at the top of the hill. As such, there is no bicycle or vehicle connection between Bullfrog and Bolinas-Fairfax Roads (Figure 4).

a. Purpose and Need

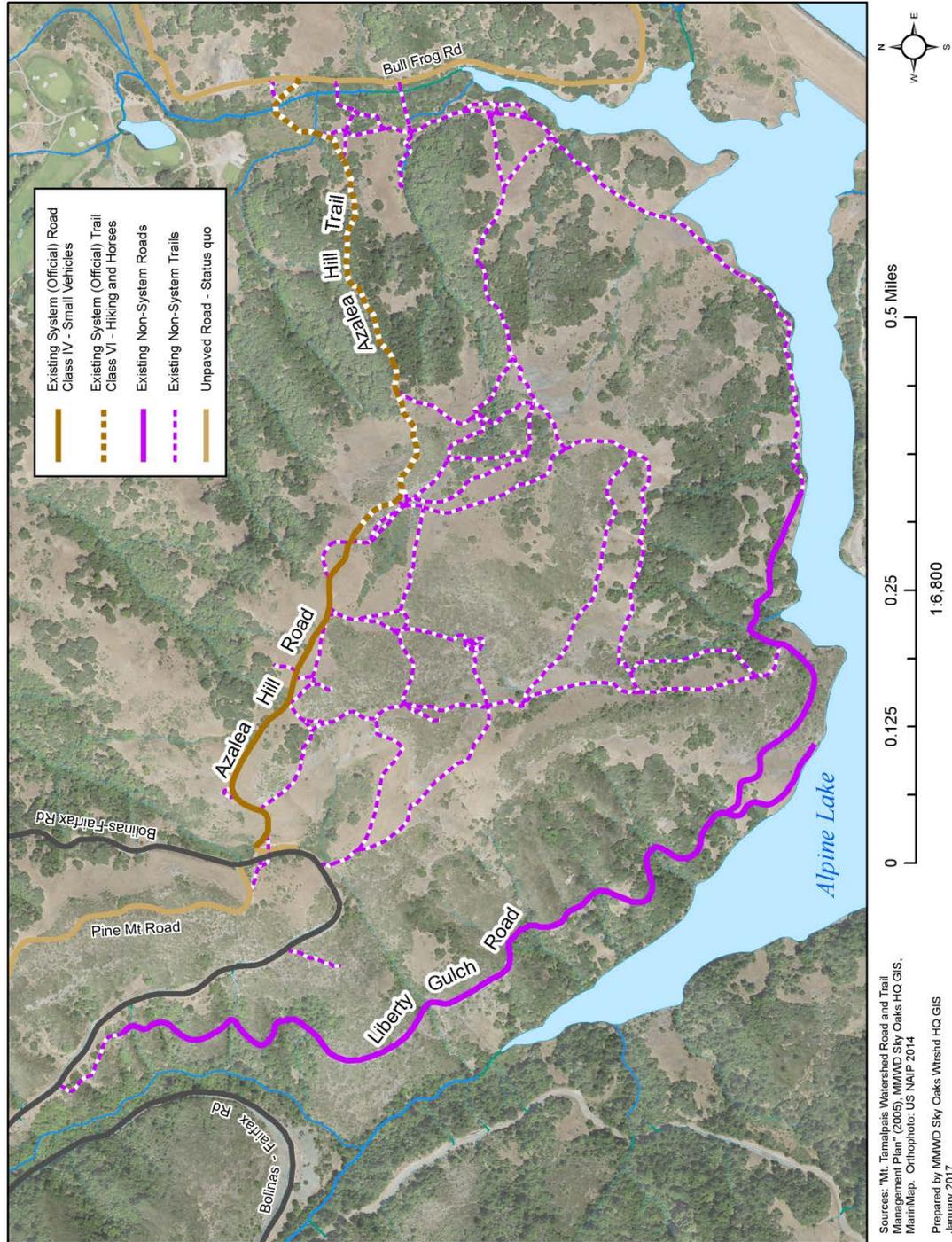
At issue on Azalea Hill are the areas with serpentine soils where many special-status plant species grow that can be easily damaged by people traveling off-trail. Serpentine soils are also very erosive, and sediment from these and other erosion sites makes its way to Alpine Lake. An assessment³ of only the erosion sites done as part of the RTMP for Liberty Gulch Road and the Azalea Hill Trail estimated approximately 2,573 cubic yards of sediment would run into Alpine Lake over the next 20 years if left untreated.

¹ A list of special-status plant species observed on Azalea Hill is found in Table 4-1.

² Refer to Chapter 5 of the “Mt. Tamalpais Watershed, Road and Trail Management Plan,” prepared by MMWD, 2005.

³ PWA, 2003. “Summary Report, Road and Trail Inventory and Assessment, Erosion Prevention Implementation Plan, Mt. Tamalpais Watershed, Marin Municipal Water District, Marin County, California.” Prepared for the Marin Municipal Water District by Pacific Watershed Associates, Arcata, California 95518

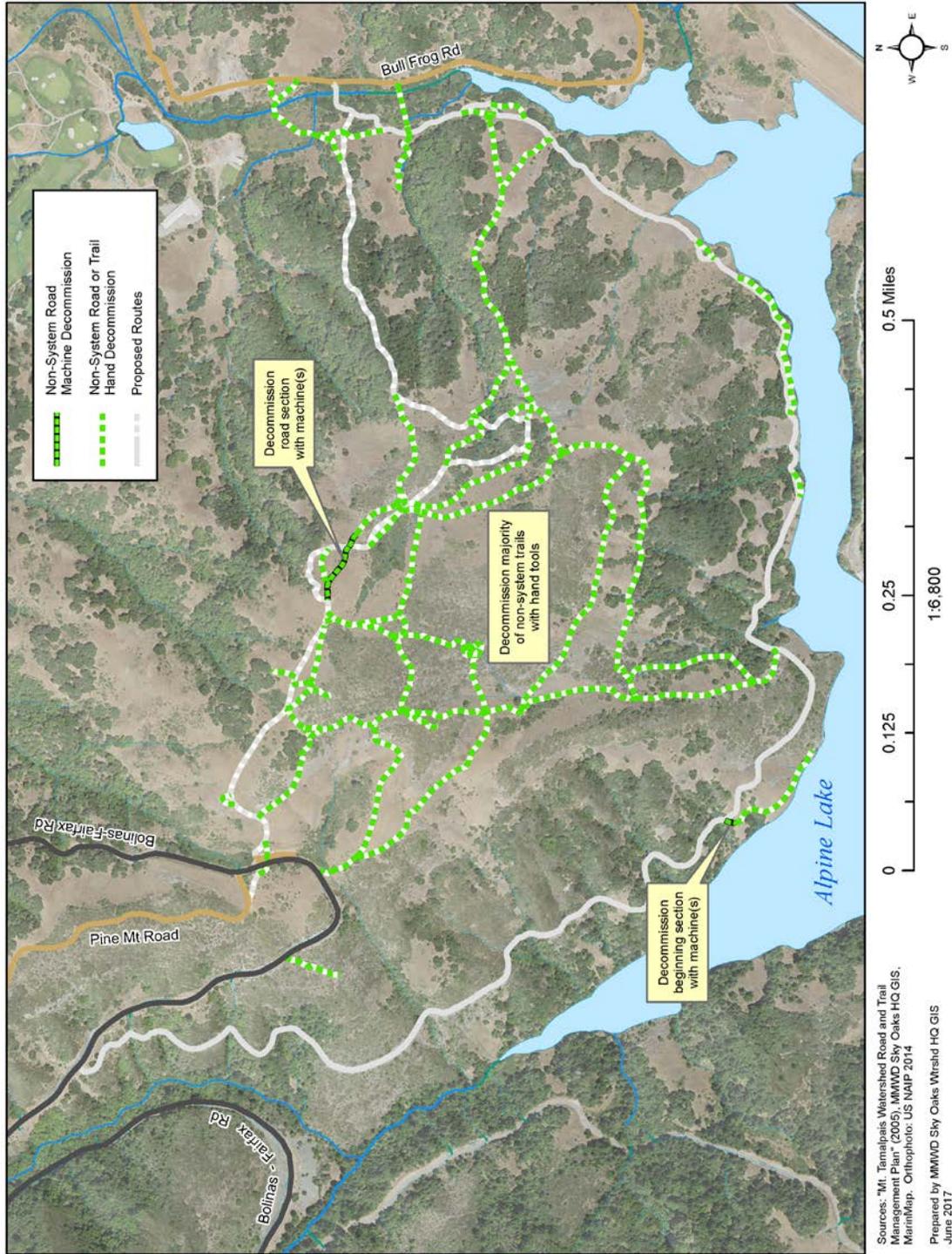
Figure 2: Existing Conditions



SOURCE: Marin County Assessor-Recorder-County Clerk 2017



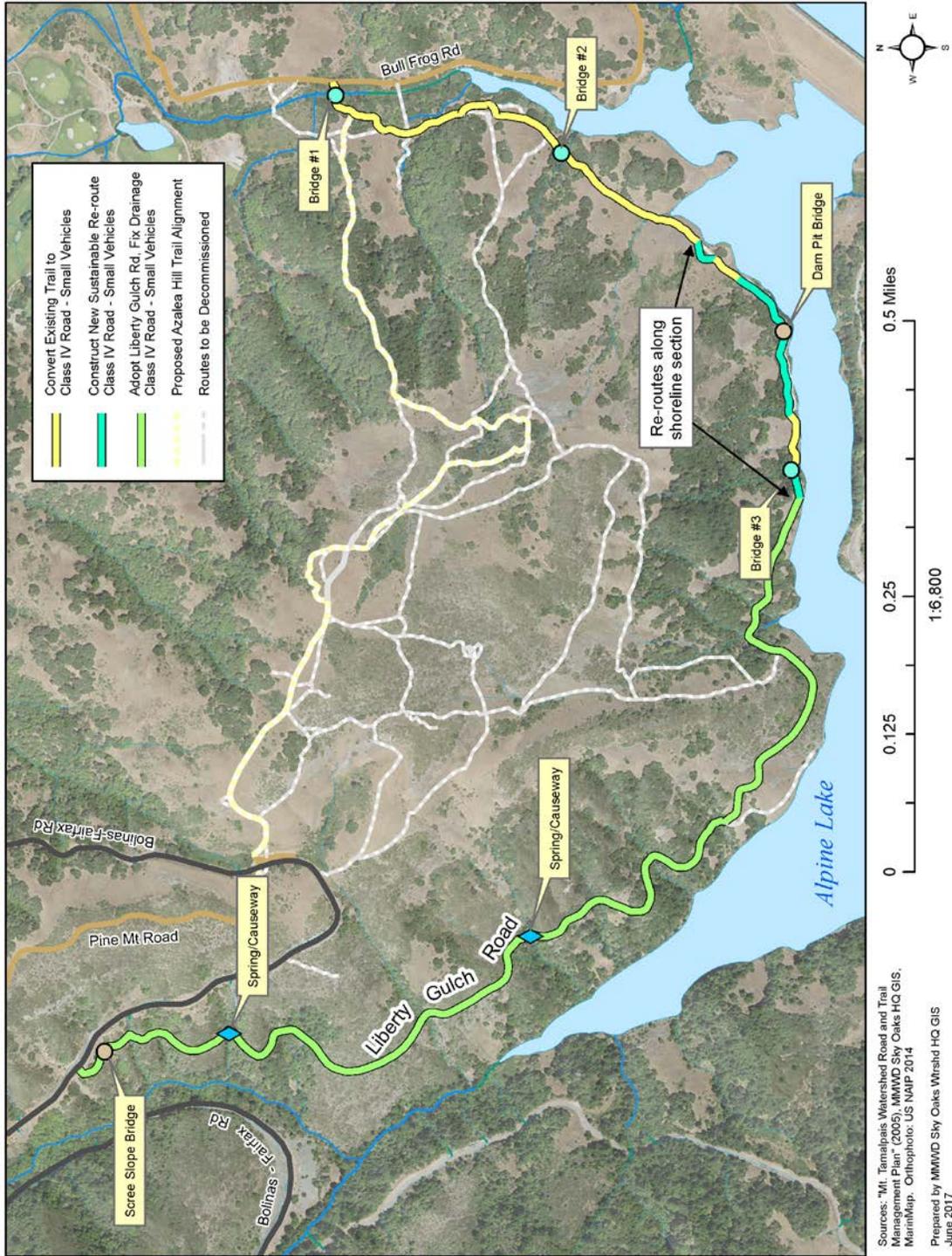
Figure 3: Removal of Non-System Routes



SOURCE: MMWD 2017



Figure 4: Adopt Small Vehicle, or Multi-use Route (Liberty Gulch Road)



SOURCE: MMWD 2017



Also at issue is the network of roads and trails on Azalea Hill. The one official route does not provide an adequate connection from the lakes area to the Pine Mountain area for all visitors or district patrol and response staff. Further, it is in poor condition and some sections are too steep to be sustainable. In addition, the network of non-system trails, some of which pass through this sensitive habitat, continue to have undesirable effects such as habitat fragmentation, disruption of wildlife, erosion and the increased risk of trail users getting lost or injured. Removal of this network of non-system trails would minimize these impacts and help restore many areas of Azalea Hill. And, adopting and improving the old, existing Liberty Gulch Road would improve the visitor experience by providing a sustainable route for bicycles, district patrol personnel and emergency response that connects closer to the Azalea Hill parking lot, via Bolinas-Fairfax Road, than currently exists. Additionally, the improvement visitor amenities at the existing Azalea Hill parking lot would further benefit the visitor experience, and educate them about the sensitive habitat in the area and the importance of keeping on designated trails.

b. 2005 Mt. Tamalpais Watershed Road and Trail Management Plan

The District adopted the *Mt. Tamalpais Watershed Road and Trail Management Plan* in 2005. The RTMP is a both a description of the official system of roads and trails and a detailed work plan on how to manage the roads and trails for the next quarter century. It also serves as a guide to further the protection of water quality in creeks and reservoirs, further the protection of environmentally sensitive habitats and special status species, and minimize road and trail related impacts on the Mt. Tamalpais Watershed.

The goals of the Plan are:

1. *To improve water quality and minimize sediment into the creeks and reservoirs;*
2. *To reduce the impact of the road and trail network on wetlands, riparian areas, other environmentally sensitive habitats and special status plant and animal species; and*
3. *To reduce the impact of the road and trail network on the Watershed's natural ecological functions.*

Azalea Hill is called out in Chapter Two of the plan as an area proposed for changes.⁴ Azalea Hill Road is proposed to be converted to a trail, mainly to keep cyclists from continuing beyond the road and down onto the trail, or worse, creating new trails that damage the environment and stress limited enforcement resources. In addition to being a dead end, other undesirable effects include its steepness, the presence of special status plant species and erosive serpentine soils. Azalea Hill Trail is proposed for a re-route because it is too steep and gullied in areas, passes through erosive serpentine soils in other areas and through a

⁴ Section 2.1.2 – Changes to the Old Road and trail System and Table 2.4 – Proposed Changes to the Road and Trail System on the Mt. Tamalpais Watershed.

wetland at the bottom of the trail (a new creek crossing would be needed to avoid the section that currently runs through the wetland).

8.3 Project Objective and Description

The Azalea Hill Restoration Project's goals are to:

- Restore habitat, including sensitive serpentine habitats, by removing unnecessary roads and trails;
- Provide environmentally sensitive routes (i.e. routes that avoid environmentally sensitive areas wherever possible, and minimize and mitigate their impacts when not possible) over Azalea Hill for all users (hikers, equestrians, cyclists and district patrol and response staff) to improve connectivity between the lakes area and the Pine Mountain area;
- Improve the visitor experience of these users by providing new, improved trail marker signage, informational kiosks, new trash and recycling facilities, parking lot improvements, a self-contained, serviceable convenience station (i.e. a porta potty or self-composting toilet), bicycle racks, split rail fencing and benches; and
- Ensure the routes are sustainable, and designed and managed in a manner that strictly minimizes erosion and water quality impacts (e.g. routes that meet the best management practices, design standards and environmental protection measures per Chapter 3 of the RTMP).

To achieve these goals, the project includes the following elements:

1. Amend the *Mt. Tamalpais Watershed Road and Trail Management Plan* for the Azalea Hill area. Chapter 2 already includes guidance for Azalea Hill – treat erosion sites (creek crossings and gullies), re-route it where it is too steep, and it notes the presence of serpentine habitats (and the special status plants that live there). The plan also recognizes the existing route connectivity problem. The road dead-ends at the top of the hill, so some cyclists use non-system routes or create new ones, damaging the environment or stressing limited enforcement resources to make a connection from the lakes area to the Pine Mountain area. This amendment would add language in Chapter 2 noting that Liberty Gulch Road would be adopted, including its associated re-routes and conversions, as a Class IV small vehicle road, or multi-use route, to improve connectivity between the lakes area and the Pine Mountain area. The amendment would also add Liberty Gulch Road to Table 2.4, “Non-System Routes to Become System – Adoptions,” and the maps in Figures 2.03 through 2.15, as a Class IV small vehicle road, or multi-use route. Lastly, the number of miles of roads and trails in the plan would be updated to reflect the current conditions on the Watershed. The full text of the new language and the revised maps can be found in **Appendix A**.
2. Remove approximately 4.4-miles of non-system roads and trails and restore those routes to natural conditions to improve habitat and water quality. This work would be accomplished by uncompacting the trail tread with hand tools (picks, McLeods, or shovels), then raking adjacent top soil,

duff and leaf litter on top of the decommissioned tread to aid its re-vegetation. There are two sites where equipment would be used to do the restoration work, one at a spur road at its intersection with Liberty Gulch Road near the bottom of the hill, the second at the upper end of the Azalea Hill Road (**Figure 3**). There may be locations where it is not necessary to uncompact the trail tread because segments have already re-vegetated or are no longer accessible. This would be determined, in part, by the type of vegetation a trail goes through. For example, tool work might be needed on a trail segment when it goes through grassland, maybe only here or there when it's in forest lands, and not at all when in chaparral. The re-vegetation of these areas after they are decommissioned would also minimize erosion from these areas, saving up to an estimated 85 cubic yards⁵ annually (approximately 1,702 cubic yards over 20 years) from entering Alpine Lake or one of Azalea Hill's creeks, thereby improving water quality in addition to restoring habitat;

3. Adopt and improve an approximately 1.9-mile section of the unpaved, existing Liberty Gulch Road, including associated re-routes and conversions, as a Class IV⁶ small vehicle road, or multi-use route (**Figure 4**). Following the guidance in the RTMP for Class IV roads, the route would be designed for not more than small vehicles (approximately four-foot-wide), necessitating only those improvements necessary to provide access for ATV quads and bicycles. Throughout the length of the route, speed calming features (i.e. changes in elevation such as earthen speed bumps, lane narrowing, diagonal diverters using local logs or rocks, etc.) would be maintained or installed to reduce the downhill speed of bicyclists. Passing opportunities, lines of sight and horse-friendly tread surfaces would also be included throughout the design to improve user safety along the route. What follows are more specifics on this route, beginning at the bottom of the hill and working one's way to its intersection with Bolinas-Fairfax Road:
 - At Bullfrog Road, convert approximately 0.4 miles of existing non-system trail to an approximately four-foot-wide Class IV road. Two, 40-foot-long, bridges, and two puncheons would be installed along this section, all of which would be clear span construction so there would be no construction in the creeks or ephemeral drainages.
 - Adjacent to Alpine Lake, convert approximately 0.3 miles of existing, non-system, "fishing access" trail to an approximately four-foot-wide Class IV road. The re-route would be mostly re-routed several feet up the hill, further away from the lake's shoreline, to help protect water quality. The re-route would also

⁵ A typical 10-wheel dump truck holds approximately 10 cubic yards of dirt. Therefore, 85 cubic yards would be the equivalent of eight and one-half truck loads per year.

⁶ Per Section 2.2 of the RTMP, "Road Designations," Class IV roads are defined as small vehicle, unpaved roads with a primary use of patrol and route connectivity. Some sections may only be passable with small vehicles (i.e. ATV quads or small "bobcat" sized tractors). They only have limited truck and heavy vehicle traffic, and seasonal closures may apply.

be constructed at a sustainable grade, would avoid sensitive habitats wherever possible, and would use best management practices to minimize its impact and need for maintenance. One 20-foot-long bridge, one puncheon and two armored rock crossings would be installed to cross the four small creeks along this section. Additionally, a second, 16-foot-long bridge would be constructed over an old “dam pit,” a remnant of an old dam that was never completed.

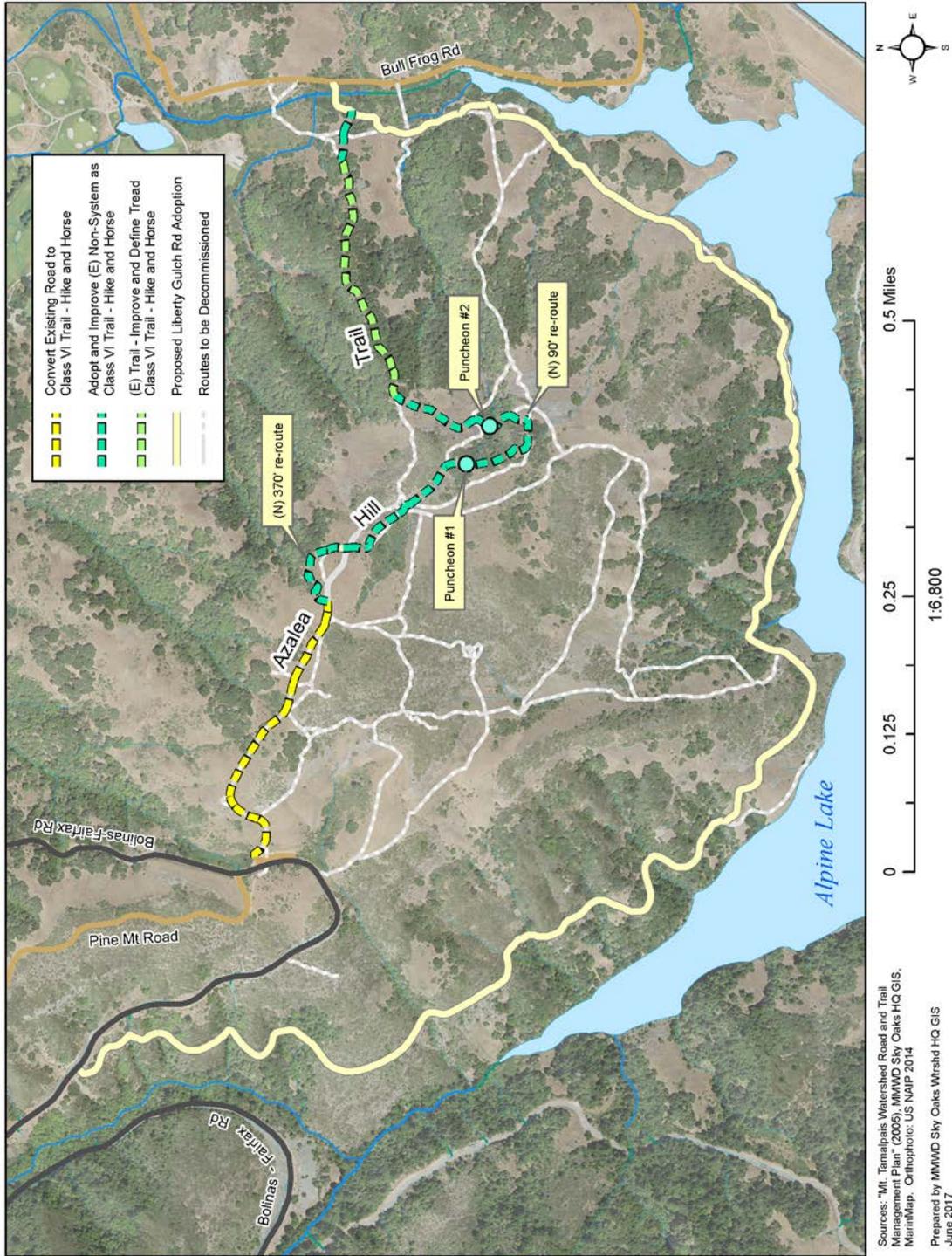
- Once the route meets the old Liberty Gulch Road, the next approximately 1.2 miles would need little in the way of tread improvements except near the upper end. The majority of the work here would be to correct the old road’s drainage issues by implementing best management practices from the RTMP (storm-proof creek crossings, critical and rolling dips, outsloping, etc.). Fifteen creek crossing sites would be upgraded along this section to strictly minimize their erosion potential. Nine of the upgrades would be armored rock crossings, two would be puncheons, one would be a bridge and one existing culvert would be slip-lined to prolong its life. At two sites which include springs, a combination of armored rock crossings and four-foot-wide causeways (set back from the fill slope) would be constructed. Lastly, one section of gullied road would be treated with rolling dips and one landslide would be mitigated by pulling its unstable fills and de-watering the road above with outsloping and rolling dips. Near the top of the old Liberty Gulch Road a pile supported bridge or trestle would be constructed across the unstable scree slope left over from the construction of Bolinas-Fairfax Road above. Lastly, at its intersection with Bolinas-Fairfax Road, and generally within the existing alignment of the route, a new approach and landing would be graded to provide a better, more sustainable connection to Bolinas-Fairfax Road.

The approach used to treat the erosion problems is one of being “light on the land.” In other words, instead of trying to do full landform restoration and restore all the creek channels, the work is designed to be the minimum to make the route passable for all users, sustainable, and to correct the existing erosion issues. Nevertheless, it would be used to upgrade the creek crossings, transport locally harvested materials (i.e. rock and dirt) from one location to another, and to re-shape the road where necessary. This work is estimated to save approximately an estimated 100 cubic yards annually (approximately 2,011 cubic yards over 20 years) of sediment from entering Alpine Lake, which is the majority of the sediment risk on Azalea Hill.

4. Improve the existing, approximately 1.1 mile Class VI⁷, or hiking and equestrian route over Azalea Hill to correct its erosion problems and make it more sustainable following the guidance in the RTMP (**Figure 5**). This involves three basic types of work, or improvements, as follows:
- Convert approximately 0.3 miles of the existing Azalea Hill Road from the parking lot to the top of the hill (the west side) to a Class VI trail and correct its existing gulling and erosion. This work would involve narrowing the route, re-shaping (outsloping and rolling dips) where appropriate, and armoring the tread. Puncheons could also be used as necessary to span road-related drainage features. Small equipment, such as mini-excavators, would be used to move locally harvested rock and dirt and re-shape the route.
 - Adopt and improve approximately 0.5 miles of existing, non-system trail as a sustainable Class VI trail. Two puncheons would be constructed to cross a small creek near the top of the hill. Hand tools (picks, McLeods, or shovels) would be adequate to perform most of the work; however, some mechanized equipment like motorized wheel barrows may be needed to transport locally harvested materials (i.e. rock and dirt) and the tools and materials needed to construct the puncheons. Chainsaws would also be used to trim vegetation to provide adequate height and width clearance for equestrians. Of note, less than 0.1 miles of this route would not actually use and improve an existing non-system trail. Instead, about 370 feet near the top of the hill and 90 feet near the south-east extreme of the trail would be a new re-route for the purposes of minimizing impacts to vegetation communities and to make the route more sustainable.
 - Improve and define approximately 0.3 miles of the existing Azalea Hill Trail through the hardwood forest to the bottom of the hill by making tread improvements, outsloping the trail and constructing rolling dips where necessary and defining the trail to make this system route more obvious. Hand tools (picks, McLeods, or shovels) would be adequate to perform this work. Chainsaws could also be used to trim, lop and scatter vegetation to improve way finding. Of note, the last 250 feet of this section would follow an existing non-system trail, instead of the official trail, because it provides a better connection to the new bridge over Bon Tempe Creek that would connect to Bullfrog Road. However, the work needed on this non-system trail is similar tread work to that above and can be accomplished with the same hand tools.

⁷ Per Section 2.3 of the RTMP, "Trail Designations," Class VI trails are defined as equestrian trails. They can have substantial infrastructure improvements when compared to other trails to support their use. Seasonal closures may apply.

Figure 5: Improve Existing Azalea Hill Road and Trail



SOURCE: MMWD 2017



The approach for work on this section of trail would also be “light on the land.” Work would stay within the existing routes as much as possible to avoid impacts to vegetation in the area, would be the minimum necessary to fix the erosion and to make the tread sustainable for the expected equestrian use. This work is estimated to save an estimated 28 cubic yards annually (approximately 562 cubic yards over 20 years) of sediment from entering Alpine Lake.

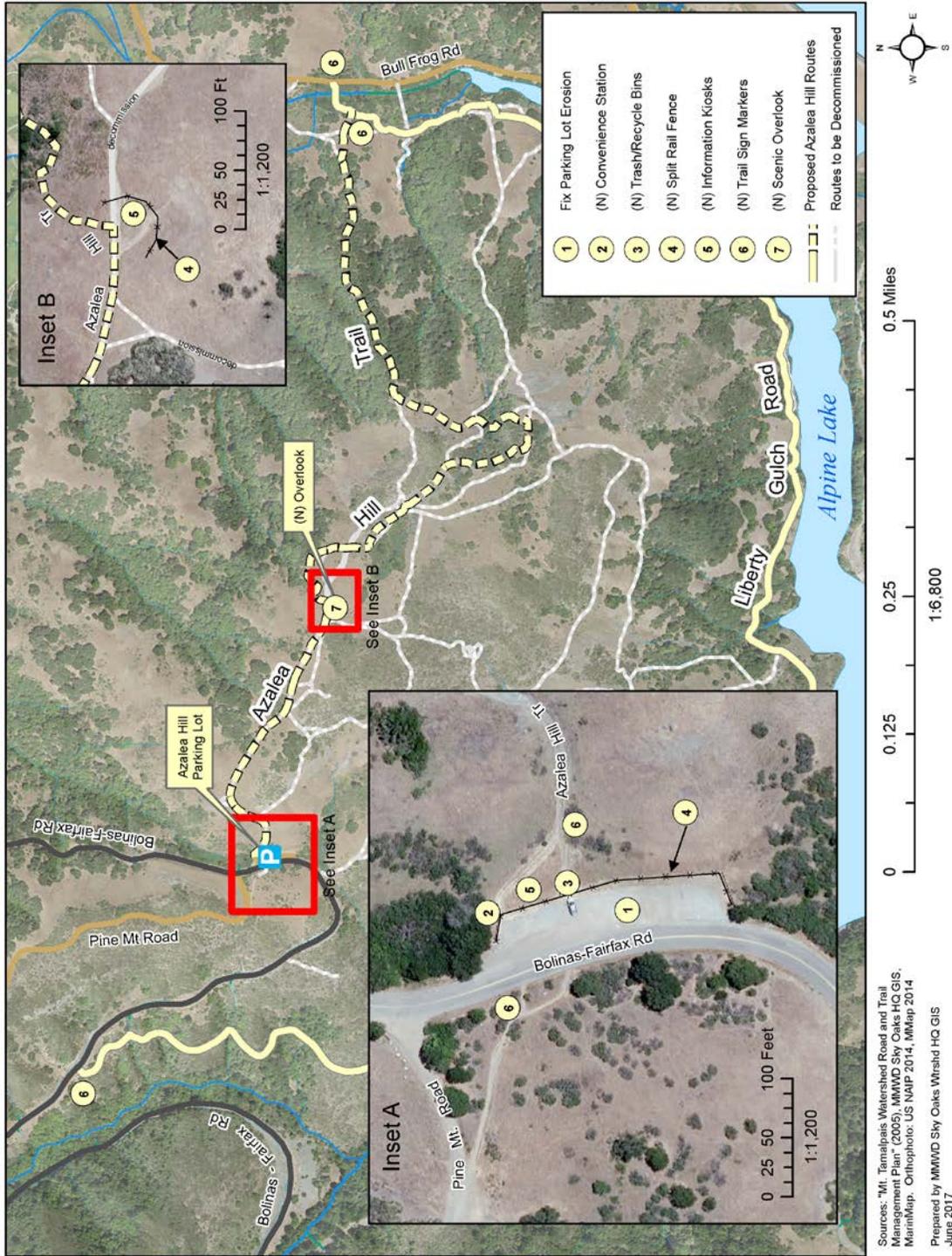
5. Treat the Azalea Hill parking lot to correct its erosion problems and improve the visitor amenities serving Azalea Hill (**Figure 6**). The parking lot improvements would correct its drainage problems by reducing its footprint and re-surfacing it with a permeable surface (rock or pervious concrete), thereby saving an estimated 5 cubic yards annually (approximately 102 cubic yards over 20 years) of sediment from entering one of Azalea Hill’s creeks. The number of parking spaces, 19, would not change. Additional visitor amenities would be installed to: (a) protect water quality (a self-contained, serviceable convenience station (i.e. a porta potty or self-composting toilet) and trash and recycling bins) and (b) protect the area’s natural habitat by educating visitors (with informational kiosks), by delineating parking areas, installing bicycle racks and by installing barricades designed to keep visitors out of sensitive habitats and on the designated trails in the vicinity of the parking lot. Additional trail marker signs would be installed at road and trail intersections to direct visitors onto the designated trails. Finally, an existing scenic overlook area would be improved to help draw users to this site, thereby discouraging the use of non-system routes by visitors who are looking for a destination near the top of the hill. Improvements would include interpretive signage (re-enforcing the importance of staying on designated routes to protect sensitive habitats), a bench or two, and split rail fencing.

Upon its completion, the project would save up to an estimated 219 cubic yards of sediment from entering Azalea Hill’s creeks or Alpine Lake annually (or 4,377 cubic yards over 20 years), and would restore approximately one acre of habitat.

8.3.1 Earthwork

Implementation of the project would require moving earth to decommission routes or make them sustainable so they strictly minimize erosion and sedimentation. The majority of the earth work would occur on the 1.9-mile section of the existing Liberty Gulch Road and its associated re-routes, conversions and decommissions. The Road and Trail Inventory and Assessment (PWA 2003) estimated 610 cubic yards of earthmoving would be required; primarily removal of erodible fill from creek crossings and to re-shape the road as it approaches the crossings. Additional earthwork along this section would involve constructing the new re-routes adjacent to Alpine Lake and the landing near the top. Footings or pilings would also need to be constructed for the four proposed bridges. This work would be achieved with the use of small, mechanized equipment like skid steers, mini excavators and motorized wheel barrows.

Figure 6: Improved Parking Lot and New Visitor Amenities at Azalea Hill



SOURCE: MMWD 2017



Small, mechanized equipment would also be used to convert the existing Azalea Hill Road from a small vehicle road to a hiking and equestrian trail, and decommission its eastern-most portion. This work would be limited to road re-shaping to improve its drainage (outsloping, rolling dips, critical dips and removing unstable fill or sidecast material) and to narrow its width, thereby strictly minimizing its erosion and sedimentation. This earthwork is estimated to disturb up to 350 cubic yards of material, but it would all be re-used in place to re-shape and narrow the existing road.

Larger equipment, such as skip loaders, dump trucks and rollers would likely be used to treat the existing parking lot. Up to 300 cubic yards of material could be moved to reshape the surface of the parking lot to correct its erosion problems.

In total, the project could disturb up to 1,260 cubic yards of material. However, all the material would be re-used near where it is disturbed to either re-shape the route to control drainage or to aid in the decommissioned route's re-vegetation. There would be no requirement to import or off-haul material. Additionally, since it's not likely that all the social trails would need to be "ripped," so the net total of disturbance would be less. More detail on the proposed earthwork can be found in the Geology and Soils Section.

In addition, the decommissioning of up to 4 miles of other, small social trails by scarifying the surface would disturb the earth in these areas. This work would be accomplished primarily with hand tools (picks, McLeods, or shovels), the purpose being to loosen, or scarify, compacted soil in the tread to aid re-vegetation. In areas where re-vegetation is occurring naturally, such earthwork would not be necessary. Overall, because this work is generally just loosening the soil and not necessarily moving it, the amount is considered negligible in terms of estimating cubic yards of material moved.

8.3.2 Tree Removal

Implementation of this project would require the removal of up to 21 trees. Eleven of these trees are Douglas fir (*Pseudotsuga menziesii*), three California bay (*Umbellularia californica*), three coast live oaks (*Quercus agrifolia*), two madrones (*Arbutus menziesii*) and two willows (*Salix* species). The average diameter of all these is about 6-inches, with one exception of a two-stem fir tree that is about 22-inches and 16-inches, respectively, in diameter. More details on the proposed tree removal can be found in the Biological Resources Section.

8.3.3 Construction Access

Construction access would be from Bullfrog Road and the Azalea Hill parking lot on Bolinas-Fairfax Road (**Figure 1**).

8.3.4 Construction Staging

All construction and material staging would occur at the Bullfrog parking lot, Bullfrog Road, the quarry site (located approximately 300 feet north of the intersection of Azalea Hill Trail and Bullfrog Road) and the Azalea Hill parking lot on Bolinas-Fairfax Road.

8.3.5 Construction Duration and Phasing

The proposed project's implementation is dependent on securing adequate funding. The plan is to secure environmental approvals and regulatory permits for the project, and then seek funding. The concept is that once the project is approved, or "shovel-ready," it would be more attractive both to governmental grant making sources and to philanthropic

funders. The estimated construction time-frame in total is approximately four to six months; however, the construction could be done in phases over several years dependent on funding. The potential construction phases could be, in no particular order: (1) removal, or decommissioning, of all the non-system trails; (2) conversion of the existing Azalea Hill Road to a trail and improvement of the re-route to a sustainable equestrian trail; (3) construction of the parking lot and visitor amenity improvements, and (4) upgrade of the existing Liberty Gulch Road and construction of the two connectors on each end. Other than the decommissioning of the non-system trails, items (2) through (4) could be re-ordered and implemented in a variety of sequences.

- 9. Surrounding Land Uses and Setting:** The project site is situated within the larger Mt. Tamalpais Watershed, which is owned and managed by the District. The watershed is an open space area utilized for the collection of rainwater for eventual treatment, distribution, and public use, as well as for recreational use and enjoyment.
- 10. Other Public Agencies whose Approval is Required:** Project implementation will require permit acquisition from the California Department of Fish and Wildlife (Section 1602 Lake or Streambed Alteration Agreement), the San Francisco Bay Regional Water Quality Control Board (Section 401 Water Quality Certification), the Army Corps of Engineers (Section 404 Water Quality Certification), and the Marin County Department of Public Works (Road Right-of-Way Encroachment Permit).

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED

The environmental factors checked below would be potentially affected by this project, involving several impacts that are "Less than Significant with Mitigation Incorporated" as indicated by the checklist on the following pages.

| | | | | | |
|---|--------------------------|---|----------------------------------|---|------------------------------------|
| | Aesthetics | | Agriculture and Forest Resources | √ | Air Quality |
| √ | Biological Resources | √ | Cultural Resources | | Geology/Soils |
| | Greenhouse Gas Emissions | √ | Hazards & Hazardous Materials | | Hydrology/Water Quality |
| | Land Use/Planning | | Mineral Resources | | Noise |
| | Population/Housing | | Public Services | | Recreation |
| | Traffic/Transportation | | Utilities/Service Systems | | Mandatory Findings of Significance |

DETERMINATION

On the basis of this initial evaluation:

| | |
|--|---|
| I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared. | |
| I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared. | √ |
| I find that the proposed project MAY have a significant effect on the environment and an ENVIRONMENTAL IMPACT REPORT is required. | |
| I find that the proposed project MAY have a “potentially significant impact” or “potentially significant unless mitigated” impact on the environment, but at least one effect (1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and (2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed. | |
| I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required. | |



Signature

Dain Anderson

Printed Name

September 8, 2017

Date

Environmental Services Coordinator

Title

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Environmental Analysis

The following analysis is intended to explain responses outlined in the Environmental Checklist as derived from Appendix G of the California Environmental Quality Act (CEQA) Guidelines.

| ENVIRONMENTAL IMPACTS | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact | Sources |
|--|--------------------------------|---|------------------------------|-----------|---------|
| 1. AESTHETICS. Would the project: | | | | | |
| a) Have a substantial adverse effect on a scenic vista? | | | √ | | A, K |
| b) Substantially damage scenic resources, including but not limited to trees, rock outcroppings, and historic buildings within a state scenic highway? | | | | √ | G |
| c) Substantially degrade the existing visual character or quality of the site and its surroundings? | | | √ | | A |
| d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area? | | | | √ | A |

- a) **Less Than Significant Impact.** The District-owned project site is situated within the District owned Mt. Tamalpais Watershed (**Figure 1**). The approximately 370-acre Azalea Hill area is part of the 18,600-acre Mt. Tamalpais watershed. Views of Azalea Hill are available from a variety of vantages including the top of Bon Tempe Dam, Bolinas-Fairfax Road, trails on and near the area, and even from East Ridgecrest Road as it ascends to the top of Mt. Tamalpais. The proposed project would result in some existing roads/trails being realigned, some social trails being decommissioned, and the installation of puncheons and bridges over drainages and creeks. There are no proposed large-scale movements of earth or terraforming of any type. Where trails are decommissioned revegetation would occur, eventually obscuring the visual scars of those trails. All in all, the project would result in a net improvement of the area’s aesthetic contribution to the larger scenic vista that includes Azalea Hill. No mitigation is required.
- b) **No Impact.** There are no existing or eligible State Scenic Highways in the project vicinity that would afford a view of the site. Therefore, the proposed project would not damage scenic resources, including but not limited to trees, rock outcroppings, and historic buildings within a state scenic highway. No mitigation is required.
- c) **Less Than Significant Impact.** The Azalea Hill area is a natural area bisected by various trails and roads. The proposed project would decommission a number of the trails, improve and re-align others, and install a number of puncheons and bridges, including one over Bon Tempe Creek, the only named creek in the project area.

Build-out of the project is anticipated to take several years, owing largely to the availability of funding.

Construction. Temporary visual construction impacts would involve work performed with the assistance of small heavy equipment, as well as hand work performed by construction crews. While the work, when occurring, would be visible from both on- and off-site, the viewers’ would generally

be mobile and the visual intrusion of construction activity on the 18,600-acre watershed would be fleeting. No mitigation is required.

Post-Construction. The proposed project would remove approximately 4.4-miles of non-system roads and trails and realign portions of others. Viewed from a distance, as well as from other routes on Azalea Hill, the visual characteristics of the area would evolve over time as the decommissioned trails are transformed to vegetated areas. Realigned segments of roads and trails would be new visual elements in the area, however, any visual influence associated with them would be more than offset by the decommissioning of non-system trails, producing over one acre of restored natural habitat, a net improvement of the existing visual character or quality of the site and its surroundings. No mitigation is required.

- d) **No Impact.** The proposed project does not include the installation of lighting or the construction of facilities that would be the source of daytime glare. No mitigation is required.

| ENVIRONMENTAL IMPACTS | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact | Sources |
|--|--------------------------------|---|------------------------------|-----------|---------|
| <p>2. AGRICULTURE AND FORESTRY RESOURCES. In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state’s inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board.. Would the project:</p> | | | | | |
| a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use? | | | | √ | E |
| b) Conflict with existing zoning for agricultural use, or a Williamson Act contract? | | | | √ | J, K, M |
| c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))? | | | | √ | M |
| d) Result in the loss of forest land or conversion of forest land to non-forest use? | | | | √ | M |
| e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural use or conversion of forest land to non-forest use? | | | | √ | M |

- a) **No Impact.** Azalea Hill and the surrounding lands are designated as Other Land⁸ by the Marin County Important Farmland map compiled and published by the California Department of Conservation, Farmland Mapping and Monitoring Program. None of the lands adjacent to the proposed project are currently in agricultural production. The proposed project would not convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance, as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use. No mitigation is required.
- b) **No Impact.** The Marin Countywide Plan does not designate the site or immediately adjacent lands for agricultural activities, nor is the site zoned for agricultural activities. Neither the site nor adjacent lands are encumbered by Williamson Act contracts. Therefore, the proposed project would not conflict with existing zoning for agricultural use, or a Williamson Act contract. No mitigation is required,
- c) **No Impact.** Neither the project site nor the immediately adjacent lands are zoned for forest land as defined by Public Resources Code Section 12220(g), for timberland as defined by Public Resources Code Section 4526, or for timberland production as defined by Government Code Section 51104(g). No mitigation is required.
- d) **No Impact.** Azalea Hill is comprised of undeveloped lands bisected by a variety of unpaved roads and trails. While the project area does include a variety of trees and associated vegetation, it is not considered a forest within the context of how CEQA defines forest-land. Further, implementation of the proposed project would only realign two existing roads and trails and decommission several other roads and trails, and would not represent a wholesale conversion of the entirety of Azalea Hill to a use other than what exists today. No mitigation is required.
- e) **No Impact.** Neither Azalea Hill nor the immediately adjacent lands are currently or have recently been in agricultural production, and there is no land in agricultural production or suitable for agricultural production in the project vicinity. Therefore, the proposed project would not involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural use or conversion of forest land to non-forest use. No mitigation is required.

| ENVIRONMENTAL IMPACTS | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact | Sources |
|--|--------------------------------|---|------------------------------|-----------|---------|
| 3. AIR QUALITY. Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project: | | | | | |
| a) Conflict with or obstruct implementation of the applicable air quality plan? | | | | √ | B, C |

⁸ Other Land is land not included in any other mapping category. Common examples include low density rural developments, brush, timber, wetland, and riparian areas not suitable for livestock grazing, confined livestock, poultry, or aquaculture facilities, strip mines, borrow pits, and water bodies smaller than 40 acres. Vacant and nonagricultural land surrounded on all sides by urban development and greater than 40 acres is mapped as other land.

| ENVIRONMENTAL IMPACTS | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact | Sources |
|---|--------------------------------|---|------------------------------|-----------|---------|
| b) Violate any air quality standard or contribute to an existing or projected air quality violation? | | √ | | | B, C |
| c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)? | | | √ | | B, C |
| d) Expose sensitive receptors to substantial pollutant concentrations? | | | √ | | B, C |
| e) Create objectionable odors affecting a substantial number of people? | | | √ | | A |

- a) **No Impact.** Regulation of air pollution is achieved through both national and State ambient air quality standards and emission limits for individual sources of air pollutants. As required by the federal Clean Air Act, the U.S. Environmental Protection Agency (USEPA) has identified criteria pollutants and has established the National Ambient Air Quality Standards (NAAQS) to protect public health and welfare. NAAQS have been established for the following pollutants: ozone (O₃); carbon monoxide (CO); nitrogen dioxide (NO₂); sulfur dioxide (SO₂); particulate matter less than 10 microns in diameter (PM₁₀); particulate matter 2.5 microns or less in diameter (PM_{2.5}); and lead (Pb). These pollutants are called “criteria” air pollutants because standards have been established for each of them to meet specific public health and welfare criteria. The State of California has also established its own more stringent set of air quality standards commonly referred to as the California Ambient Air Quality Standards (CAAQS). In addition to the criteria pollutants identified above, CAAQS have been established for sulfates, hydrogen sulfide, and vinyl chloride.

The project site is located within the San Francisco Bay air basin, which is currently designated as a nonattainment area for state and national ozone standards and as a nonattainment area for the state particulate matter (PM₁₀ and PM_{2.5}) standards. The Bay Area Air Quality Management District’s (BAAQMD) Final Bay Area 2010 Clean Air Plan outlines control strategies to reduce emissions of ozone and ozone precursors to help the Bay Area achieve attainment for the State 1-hour ozone standard.

Since air pollutant emissions are a function of population and human activity, emission reduction strategies set forth in the Bay Area 2010 Clean Air Plan were developed based on regional population, employment, and housing projections. The proposed project would not facilitate an increase in population in the air basin nor would it generate housing or employment opportunities leading to increased population or vehicle miles travelled in the region. As such, the proposed project would be consistent with the assumptions contained within the Bay Area 2010 Clean Air Plan and would not result in an impact. No mitigation is required.

- b) **Less than Significant with Mitigation.** Based on the following analysis, construction and operation of the proposed project would not result in a violation of an air quality standard or contribute significantly to an existing or projected air quality violation.

Construction. Implementation of the proposed project would include a variety of activities that may disturb the upper layers of soil along both system and non-system trails for trail realignment and decommissioning. Most of that work would be accomplished with hand tools, while some, as depicted on **Figure 3**, would be done with relatively small heavy equipment. For work done with small heavy equipment that would have the potential to affect air quality through the use of construction equipment, haul trucks for import and export of materials, and vehicles used by workers to travel to and from the construction site.⁹ In addition to exhaust emissions caused by the use of mobile equipment, earthmoving activities would result in emissions of fugitive dust including PM₁₀, which, given the relatively small amount of work to be accomplished with small heavy equipment, would not be expected to be significant.

BAAQMD's approach to CEQA analyses of construction emissions is to emphasize the implementation of control measures rather than require detailed quantification of emissions. BAAQMD recommends implementation of a set of feasible fugitive PM₁₀ control measures for construction projects of all sizes. According to BAAQMD, fugitive dust impacts from construction would be considered less than significant if all applicable recommended measures are applied. Inclusion of these measures as part of **Mitigation Measure 3-1** below would reduce construction impacts from fugitive dust emissions to less-than-significant levels.

Mitigation Measure 3-1. During construction activities, MMWD shall require its personnel and any construction contractor(s) assigned to the project to implement a dust abatement program that includes, but is not necessarily limited to, the following BAAQMD-recommended measures as needed, to control dust:

- a. All haul trucks transporting soil, sand, or other loose material off-site shall be covered.
- b. All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping shall be prohibited.
- c. All vehicle speeds on unpaved roads shall be limited to 15 miles per hour.
- d. Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to five minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations [CCR]).
- e. All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications.

There would be no change in operations at the site, hence the project would result in no changes to current operational emissions. No mitigation is required.

- c) **Less than Significant Impact.** According to the BAAQMD CEQA Guidelines, for a project to have a less-than-significant cumulative impact on air quality it must not have an individually significant operational air quality impact and it must be consistent with the local general plan as well as the regional air quality plan (BAAQMD, 2012). At project completion, the use of the Azalea Hill area would be unchanged from its current use (operation), thereby yielding a net no-change to

⁹ For worker transport, that would also apply to crews assigned to perform work with hand tools.

emissions. As such, the proposed project would not conflict with an applicable local or regional air quality plan, and the cumulative impacts would be less than significant. No mitigation is required.

- d) **Less than Significant Impact.** Sensitive receptors are typically defined as the segment of the population most susceptible to air quality effects including children, the elderly, and the sick, as well as land uses such as schools, hospitals, parks, and residential communities.

During project construction there would be localized air emissions of criteria constituents from construction vehicles and equipment powered by internal combustion engines, as well as from earth moving activities (approximately 1,260-cubic yards of soil are expected to be disturbed to facilitate construction of the proposed project). Past District experience with trail construction and decommissioning with the use of vehicles and equipment that emit criteria constituents is intermittent and would not be expected to rise to a level of significance. Further, Azalea Hill is not an enclosed space or area, and the air patterns generally reflect a constant movement of air, which would disperse any emissions within in a fairly rapid time frame. Finally, beyond workers, recreationalists using the broader area that includes Azalea Hill could select alternative routes or areas during active construction to avoid any dust or other emissions. No mitigation is required.

- e) **Less than Significant Impact.** Diesel equipment used during project construction may emit objectionable odors associated with combustion of diesel fuel. However, these emissions would be temporary and intermittent in nature, thus odor impacts associated with diesel combustion during construction activities would be less than significant. No mitigation is required.

| ENVIRONMENTAL IMPACTS | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact | Sources |
|---|--------------------------------|---|------------------------------|-----------|---------|
| 4. BIOLOGICAL RESOURCES. Would the project: | | | | | |
| a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game, U.S. Fish and Wildlife Service, or NOAA - Fisheries? | | √ | | | N |
| b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service? | | √ | | | N |
| c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal) through direct removal, filling, hydrological interruption, or other means? | | √ | | | N |
| d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites? | | | √ | | N |
| e) Conflict with any local policies or ordinances protecting | | | | √ | N |

| ENVIRONMENTAL IMPACTS | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact | Sources |
|--|--------------------------------|---|------------------------------|-----------|---------|
| biological resources, such as a tree preservation policy or ordinance? | | | | | |
| f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan? | | | | √ | N |

a) **Background Information**

The District commissioned the preparation of the Azalea Hill Restoration Project Biological Evaluation Report (Pacific Biology 2017). The report provides a detailed discussion of the biological resources present on and near the study area and evaluates potential impacts to these resources from the implementation of the proposed project. The report is included in **Appendix B**, and the relevant discussions are summarized and incorporated into the below analysis.

The majority of the study area is dominated by the following plant communities/habitat types, in order of extent: grassland, chaparral (two types), hardwood forest, oak woodland, and un-vegetated. These habitats comprise approximately 93% of the study area; the remaining 7% is comprised of shrubland, conifer forest, and riparian woodland and wetlands. The Habitats mapped within the study area are described in detail in **Appendix B** and the location of the plant communities are shown in **Figure 2 of Appendix B**.

In general, the woodland and forest habitats are associated with Franciscan complex geology and derivative soils (Tocaloma-Saurin association), and most of the chaparral and grassland habitats occur on the Coast Range ophiolite/serpentine substrate (Henneke stony clay loam soils). As a result of the prevalence of serpentine soils, as well as the relative lack of disturbance throughout the study area, the percentage of native plants is high, even in open, sunny habitats (which in cismontane California, are often dominated by introduced plant species).

The study area encompasses a number of sensitive plant communities and other sensitive habitats. There are three plant communities that are designated as rare and Threatened by the California Department of Fish and Wildlife (CDFW): Serpentine Bunchgrass, Purple Needle Grass Grassland, and Mt. Tamalpais Manzanita Chaparral. The study area also encompasses riparian habitats, wetlands, and other waters subject to the jurisdiction and legal protection of environmental regulatory agencies. The riparian woodland and wetland habitats are shown and further discussed in **Appendix B**.

It should be noted that, while the study area encompasses natural habitats, many of which are biologically sensitive, the project site disturbance area consists primarily of existing stretches of dirt fire roads and trails, which are generally un-vegetated.

Special-Status Plant Species

Less than Significant with Mitigation. Primarily as a result of the widespread serpentine substrates, multiple special-status plants occur within the study area and surrounding project area. The serpentine habitats support a significant majority of native plant species, and are associated with a large percentage of special-status plants. Indeed, of the 29 special-status taxa documented by the California Native Plant Society (CNPS) within the four topographic quadrangles surrounding the study area, 12—amounting to 41%—are associated with serpentine habitats, most of which are typically associated with habitats found within the study area. The onsite serpentine grassland and chaparral habitats are equally likely to support special-status plants known to occur on those habitats.

In addition, nearly all of the onsite habitats, serpentine and non-serpentine alike, are relatively undisturbed and support relatively high percentages of native plant species, and thus have potential to support additional special-status plant taxa known from the vicinity. Special-status plant taxa that have been documented in the general project area by the CNPS are identified in **Appendix B** (see Appendix D which is included as part of **Appendix B**), along with their status, habitat association(s), blooming period, and an evaluation of the suitability of onsite habitats to support the plant.

All special-status plants documented or potentially occurring within and adjacent to the study area are listed in **Table 4-1**, below, and many are mapped in **Figures 2 and 3A** of **Appendix B**. In total, 10 special-status plant species have been documented within or adjacent to the study area, while an additional 14 special-status plant species have potential to occur based on the presence of suitable habitat and known occurrences in the region. Many of the special-status plant species documented in or adjacent to the study area were identified during botanical surveys conducted by the MMWD in May and June 2016; the plant species observed during these surveys conducted by MMWD are in **Appendix B** (see Appendix C which is included as part of **Appendix B**).

As summarized in **Table 4-1**, 10 special-status plant species have been documented within or adjacent to the study area, while an additional 12 special-status plant species have potential to occur based on the presence of suitable habitat and known occurrences in the region. While many of the occurring and potentially occurring special-status plant species are associated with serpentine habitats (see Appendix D which is included as part of **Appendix B**), nearly all of the onsite habitats, serpentine and non-serpentine alike, are relatively undisturbed and support relatively high percentages of native plant species, and thus have potential to support special-status plant taxa known from the vicinity.

The proposed project would remove approximately 4.4-miles of non-system roads and trails and restore those routes to natural conditions to improve habitat. Many of the non-system trails traverse serpentine habitats known to support special-status plant populations. The unauthorized use of these trails degrades habitat quality for special-status plants and can result in trampling or other disturbances to special-status plants. Therefore, in the long term, the proposed closing and restoration of non-system trails would benefit special-status plants.

| TABLE 4-1. Special-Status Plants Documented or Potentially Occurring in Study Area | | |
|---|--|---|
| Common Name | Scientific Name | Listing Status |
| Documented Within or Adjacent to Study Area | | |
| Marin western flax | <i>Hesperolinon congestum</i> | Federally and State Threatened, CRPR List 1B.1 |
| Mt. Tamalpais thistle | <i>Cirsium hydrophilum</i> var. <i>vaseyi</i> | CRPR List 1B.2 |
| Tiburon buckwheat | <i>Eriogonum luteolum</i> var. <i>caninum</i> | CRPR List 1B.2 |
| Mt. Tamalpais lessingia | <i>Lessingia micradenia</i> ssp. <i>micradenia</i> | CRPR List 1B.2 |
| Marin County navarretia | <i>Navarretia rosulata</i> | CRPR List 1B.2 |
| Tamalpais bristly jewelflower* | <i>Streptanthus glandulosus</i> ssp. <i>pulchellus</i> | CRPR List 1B.2 |
| Mt. Tamalpais manzanita | <i>Arctostaphylos montana</i> ssp. <i>montana</i> | CRPR List 1B.3 |
| Oakland star-tulip | <i>Calochortus umbellatus</i> | CRPR List 4.2 |
| Mt. Saint Helena morning glory* | <i>Calystegia collina</i> ssp. <i>oxyphylla</i> | CRPR List 4.2 |
| Serpentine reed grass | <i>Calamagrostis ophitidis</i> | CRPR List 4.3 |
| Potentially Occurring Based on Suitable Habitat | | |
| Napa false indigo | <i>Amorpha californica</i> var. <i>napensis</i> | CRPR List 1B.2 |
| Bent-flowered fiddleneck | <i>Amsinckia lunaris</i> | CRPR List 1B.2 |
| Marin manzanita | <i>Arctostaphylos virgata</i> | CRPR List 1B.2 |
| Tiburon paintbrush | <i>Castilleja affinis</i> ssp. <i>neglecta</i> | Federally Endangered and State Threatened, CRPR List 1B.2 |
| Western leatherwood | <i>Dirca occidentalis</i> | CRPR List 1B.2 |
| Marin checker lily | <i>Fritillaria lanceolata</i> var. <i>tristulis</i> | CRPR List 1B.1 |
| Fragrant fritillary | <i>Fritillaria liliacea</i> | CRPR List 1B.2 |
| Diablo helianthella | <i>Helianthella castanea</i> | CRPR List 1B.2 |
| Pale yellow hayfield tarplant | <i>Hemizonia congesta</i> ssp. <i>congesta</i> | CRPR List 1B.2 |
| Mt. Diablo cottonweed | <i>Micropus amphibolus</i> | CRPR List 3.2 |
| Marsh microseris | <i>Microseris paludosa</i> | CRPR List 1B.2 |
| North Coast semaphore grass | <i>Pleuropogon hooverianus</i> | State Threatened, CRPR List 1B.1 |

*Not mapped on Figure 2 of Appendix B

The MMWD conducted botanical surveys in 2016 and one state and federally listed plant was observed (Marin western flax). As shown in Figure 2 of **Appendix B**, this occurrence is adjacent to a non-system trail that would be decommissioned by hand, and is near a location where an existing trail would be improved (and construction equipment would be used). In the absence of avoidance measures, this population of Marin western flax could be harmed due to its proximity to where trail improvements and decommissioning of a non-system trail would occur. However, this population of Marin western flax is not within an area where construction equipment must be operated or where other ground disturbances must occur, and therefore, the one known population of Marin western flax in the study area can be avoided and protected during construction with the implementation of the avoidance measures.

In the absence of avoidance measures, the restoration of trails to be closed could result in short-term impacts to other special-status plants. Similarly, other proposed project actions (e.g., improving existing trails, trail re-routes, conversion of non-system trail to official trails, bridge construction) could result in the loss of special-status plants. Based on the results of the 2016 botanical surveys, serpentine reed grass and Mt. Tamalpais manzanita are common in the study area, and therefore, the loss of a low number of individual plants of these species would not have a substantial adverse effect on the local population numbers. However, avoidance measures should still be implemented to limit the loss of individual serpentine reed grass and Mt. Tamalpais manzanita plants. Other special-status plant species that occur or potentially occur in the study area (see Table 4-1) are rarer and avoidance and minimization measures would be required to protect these species and reduce related impacts to a level of below significance. Given the above, in the absence of avoidance and mitigation measures, potential impacts to special-status plant could be significant.

Mitigation and Avoidance Measures

The proposed project would be implemented as part of the *Mt. Tamalpais Watershed Road and Trail Management Plan*, and therefore, the mitigation measures required by the associated EIR would be implemented as part of the project. The relevant measures from that EIR include 3.2-A.1, 3.2-A.2, 3.2-A.3, 3.2-B.1, 3.2-B.2, 3.2-B.3, 3.2-B.4, 3.2-B.5, 3.2-C.1, 3.2-D.1, 3.2-D.2, and 3.2-D.3. The following additional measures are would also be implemented to further reduce potential impacts to special-status plant species.

Mitigation Measure 4-1A. Prior to the commencement of construction activities, the District will commission or conduct protocol-level surveys for special-status plant species. The survey area will include all areas in which construction would occur during that construction season, as well as all adjacent areas that could be disturbed. Given the number of annual special-status plant species in the area, and that the distribution of such species changes annually, the surveys will be considered valid until the following spring. The following shall then be implemented:

- All special-status plants and/or boundaries of the population(s) will be flagged.
- For special-status species of low sensitivity ranking, that are common in the project vicinity, and/or resilient to disturbance (e.g., serpentine reed grass, Mt. St. Helena morning-glory, Mt. Tamalpais manzanita), disturbances shall be minimized to the degree practical but complete avoidance is not necessary, as directed by the MMWD botanist.
- If a special-status plant species is found in the project's disturbance boundary, the plants will be avoided to the degree practicable. Flagging and/or fencing shall be placed near any identified special-status plants during construction to prevent incidental disturbance.
- Supplement to Measure 3.2-B.2. If avoidance is not practicable, and if the plant(s) do not have a low sensitivity rating and are not common in the project vicinity and/or resilient to disturbance (as determined by a MMWD ecologist), then a rare plant mitigation shall be designed and implemented. At a minimum, the plan shall include the following elements:

- a. For annual species, seed shall be collected from plants that will be removed or from other populations of the species on Azalea Hill, and those seeds shall be redistributed in the project vicinity, as directed by the MMWD botanist. For perennial species, seed collection may be augmented by transplanting entire plants or cuttings, as directed by the MMWD botanist.
- b. Suitable sites shall be identified and prepared for redistribution of seeds (or transplants). The plan shall outline the site preparation activities.
- c. Monitoring surveys of the seeded or transplanted areas shall be conducted for a minimum of two years.
- d. Mitigation will be deemed successful provided that each of the relocated species establishes at least one stable population, defined as species presence over a 2-year period, taking into account fluctuations in local reference populations. If this goal is not achieved in 3 years, then contingency measures shall be implemented. Such measures will include: evaluating the environmental or other characteristics affecting plant survival and implementing corrective measures, which may include additional seeding and planting; altering or implementing a weed control regime; or introducing or altering other management activities. Efforts shall continue until the relocated individuals have been healthy for two years.

Mitigation Measure 4-1B. The following measures to protect special-status plant species from incidental harm from construction equipment and the spread of weeds will also be implemented:

- a. All construction personnel must attend a biological resources training to be provided by the MMWD (see 3.2-B.3). The training will address the importance of Azalea Hill's sensitive botanical resources and techniques for avoiding impacts.
- b. The number of vehicles on site will be minimized to reduce the potential for disturbance and ensure adequate space to park and maneuver within designated areas.
- c. All vehicle routes, staging, parking, and turnaround areas will be marked, and vehicle operation in unmarked areas is prohibited.
- d. Additional visual or physical barriers (fencing, signs, stakes, marking paint, or flagging) will be installed, as needed, to ensure vehicle compliance with approved vehicle routes, staging, parking, and turnaround areas.
- e. All vehicles and equipment must be cleaned of soil, seeds, and vegetative material prior to entering the project site; inspection and cleaning measures (washing, steaming, air blast, brushing/scrubbing, vacuuming) should be applied to material transport beds, buckets and blades, radiators, grills/filters, tires/axels and differentials, within slashing mulching and ripping equipment, chassis and body, between dual wheels, ledges and frames, inside drivers cab, and mudguards.
- f. Erosion control materials shall be composed of coconut/coir fiber, or other certified weed free materials, as approved by the MMWD botanist.
- g. All open bed vehicles carrying a load of material (unconsolidated fill, erosion control material, etc.) shall be covered to prevent the dispersal of weed seeds.

Significance After Implementation of Avoidance Measures: Less than Significant

The implementation of Mitigation Measures 3.2-A.1, 3.2-A.2, 3.2-A.3, 3.2-B.1, 3.2-B.2, 3.2-B.3, 3.2-B.4, 3.2-B.5, 3.2-C.1, 3.2-D.1, 3.2-D.2, and 3.2-D.3 from the *Mt. Tamalpais Watershed Road and Trail Management Plan EIR*, and Mitigation Measures BIO 4-1A and 4-1B would reduce potential impacts to special-status plant species to a less than significant level.

Special-Status Wildlife Species

Less than Significant with Mitigation. For the reasons discussed in **Appendix B**, the following special-status wildlife species have some potential to occur on the project site:

- **Invertebrates** – Marin blind harvestman, Robust walker, Ubick’s gnaphosid spider, a leaf-cutter bee, and Marin hesperian.
- **Amphibians** – California red-legged frog and foothill yellow-legged frog.
- **Reptiles** – Western pond turtle
- **Birds** – Cooper’s hawk, grasshopper sparrow, Bell’s sage sparrow, great blue heron, oak titmouse, olive-sided flycatcher, yellow warbler, white-tailed kite, California horned lark, San Francisco common yellowthroat, loggerhead shrike, osprey, “marin” chestnut-backed chickadee, purple martin, and Allen’s hummingbird.
- **Mammals** – Pallid bat, western red bat, hoary bat, river otter, long-eared myotis, fringed myotis, long-legged myotis, yuma myotis, and American badger.

The potential of these species to occur on the project site, and potential project-related impacts to these species, are further discussed below.

California red-legged frog (*Rana draytonii*) is a federally Threatened species and a California Species of Special Concern. The species occurs from sea level to elevations of 1,500 meters (5,200 feet). Breeding occurs in streams, deep pools, backwaters within streams, ponds, marshes, sag ponds, dune ponds, lagoons, and stock ponds. Breeding adults are often associated with deep (greater than 0.7 meter [2 feet]) still or slow moving water and dense, shrubby riparian or emergent vegetation (Hayes and Jennings 1988), but frogs have been observed in shallow sections of streams and ponds that are devoid of vegetative cover. The species also utilizes non-aquatic habitats for refuge and dispersal. The species is known to rest and feed in riparian vegetation and it is believed that the moisture and cover of the riparian zone provides foraging habitat and facilitates dispersal. The species has also been documented dispersing through areas with sparse vegetative cover and dispersal patterns are considered to be dependent on habitat availability and environmental conditions (N. Scott and G. Rathbun *in lit.* 1998).

There has been only one documented occurrence of California red-legged frog in the Mt. Tamalpais watershed, from a location at the northwest boundary of the watershed. This observation of a single frog (CNDDDB Occurrence #892) was documented in 2006 at the outflow from Kent Lake, just upstream from the confluence of Lagunitas Creek. The species has not been documented breeding in the Mt. Tamalpais watershed or at any other locations in the watershed. Protocol surveys of the Mt. Tamalpais watershed did not detect this species (GANDA 2003), and the species has also not been documented within the watershed at locations other than the Kent Lake outfall by District staff or others. Individual red-legged frogs have infrequently been observed in Lagunitas Creek (outside of the Mt. Tamalpais watershed).

Alpine Lake and Bon Tempe Creek both provide potentially suitable habitat for California red-legged frogs, but California red-legged frogs have not been documented at these locations. Based on the CNDDDB, California red-legged frogs have not been documented within 4 miles of the project site or from a location where the species could disperse onto the project site. The fact that the species has not been documented breeding in the Mt. Tamalpais watershed, and that the species has not been documented near the project site, limit the potential of the species to occur, but do not eliminate the possibility. Therefore, this species is considered to have a low potential to occur on the project site.

The proposed project does not include any activities within Alpine Lake, Bon Tempe Creek, or other areas containing long-lasting standing water. However, the proposed project includes the construction of a bridge over Bon Tempe Creek and other activities that could result in impacts to California red-legged frog, in the unlikely event that the species occurs in the area. Therefore, impacts to this species are potentially significant.

Mitigation and Avoidance Measures

Mitigation Measure 4-2. While it is unlikely that California red-legged frog occurs in the study area, the following measures are recommended to further ensure that the species is not harmed by the proposed project:

- Before any construction activities begin on the site, a qualified biologist shall conduct a training session for all construction personnel. At a minimum, the training shall include a description of the California red-legged frog and its habitat, the measures that are being implemented to conserve the species as they relate to the project, the boundaries within which the project may be accomplished, and instructions that construction activities must be halted if a California red-legged frog is observed in the construction area and the biologist must be immediately notified.
- A qualified biologist shall survey the work sites within 500 feet of Bon Tempe Creek or Alpine Lake within 48 hours of the onset of construction activities for California red-legged frog. If California red-legged frogs are found, construction activities will be delayed until the USFWS is notified and guidance is provided on how to proceed.

Significance After Implementation of Avoidance Measures: Less than Significant

The implementation of Mitigation Measure 4-2 would reduce potential impacts to California red-legged frog to a less than significant level.

Invertebrates. As discussed in **Appendix B** (see Table 3), several invertebrates which could potentially be considered of special-status have some potential to occur in the study area, including Marin blind harvestman, Robust walker, Ubick's gnaphosid spider, a leaf-cutter bee, and Marin hesperian. These invertebrates are included on the CDFW Special Animal List, but do not otherwise have any formal state or federal rarity status. Little is known about these species and Marin blind harvestman, robust walker, and Ubick's gnaphosid spider have not been documented on District lands or within approximately 11 miles of the project site. The leaf-cutter bee has not been documented on District lands since 1962, Marin Hesperian has not been documented on District lands since 1991, and neither species has been documented in the study area. However, given the presence of suitable habitat, Marin blind harvestman and Ubick's gnaphosid spider have some potential to occur in the onsite serpentine habitats, robust walker and Marin hesperian have some potential to occur in onsite wetlands/seeps, while the habitat associations of the leaf-cutter bee are not known.

Many of the proposed activities would have minimal impacts on habitats potentially occupied by these species, as project components such as decommissioning trails would improve habitat quality in the long-term, and making changes/improvements to existing trails would involve minimal disturbance to undisturbed habitats. New construction (i.e., “reroutes”) would occur in a relatively small area, much of which is outside of mapped serpentine habitat (which provides potential habitat for Marin blind harvestman and Ubick’s gnaphosid spider). Additionally, construction within seeps/wetlands would be limited to the placement of approximately 15 CY of rock in a seep (Site 42) and 25 CY of rock in another seep (Site 45); the seeps are currently within existing trails and the rock would facilitate crossing the seeps with less disturbance. These seeps provide potential habitat for robust walker and Marin Hesperian, and the rock/crossing improvements would serve to limit ongoing disturbance of the seeps. Given the limited extent of new construction in serpentine habitat, that new construction in seeps/wetlands would be limited to placing a small amount of rock to facilitate improved crossing of the features, the low sensitivity status of these potentially occurring invertebrates, and that none of these invertebrates have recently (and in some cases never) been observed on District lands, potential impacts to these species would not rise to a level of significance under CEQA.

Foothill yellow-legged frog (*Rana boylei*) is California Species of Special Concern and is currently proposed for listing as Threatened under the California Endangered Species Act (CESA). The species is characteristically found close to water in association with perennial streams and seasonal streams that retain perennial pools through the end of summer. Adults preferentially utilize shallow edgewater areas with low water velocities for breeding and egg laying, usually characterized by gravel, cobble, and boulder substrate. Juvenile and non-breeding adult frogs may be found adjacent to riffles, cascades, main channel pools, and plunge-pools that provide escape cover.

This species occurs in the Mt. Tamalpais watershed and has been documented breeding in Big Carson and Little Carson Creeks. These areas are approximately 2 miles west of Bon Tempe Creek, which is the only portion of the study area that provides potentially suitable habitat for foothill yellow-legged frog.

The proposed project does not include any activities within Bon Tempe Creek or other areas providing potentially suitable habitat for foothill yellow-legged frog. However, the proposed project includes the construction of a bridge over Bon Tempe Creek which could result in impacts to foothill yellow-legged frog, should the species occur in the area. Therefore, impacts to this species are potentially significant.

Mitigation and Avoidance Measures

Mitigation Measure 4-3. While it is unlikely that foothill yellow-legged frog occurs in the study area, the following measures are recommended to further ensure that the species is not harmed by the proposed project:

- The biological training session to be provided to construction personnel (see Mitigation Measure 4-2) shall also address the potential presence of foothill yellow-legged frog. At a minimum, the training shall include a description of the foothill yellow-legged frog and its habitat, the measures that are being implemented to conserve the species as they relate to the project, the boundaries within which the project may be accomplished, and instructions that construction activities must be halted if a foothill yellow-legged frog is observed in the construction area and the biologist must be immediately notified.

- A qualified biologist shall survey the work sites within 25 feet of Bon Tempe Creek within 48 hours of the onset of construction activities for foothill yellow-legged frog. If foothill yellow-legged frogs are found, construction activities will be delayed until the frog leaves the construction zone on its own or until a biologist in possession all required permits moves the frog(s) to an area outside of the construction zone. Temporary exclusionary fencing (designed to prevent frogs from entering the work area) will then be installed under the guidance of a qualified biologist to prevent the relocated frog(s) from reentering the work site.

Significance After Implementation of Avoidance Measures: Less than Significant

The implementation of Mitigation Measure 4-3 would reduce potential impacts to foothill yellow-legged frog to a less than significant level.

Western pond turtle (*Actinemys marmorata*) is a California Species of Special Concern. This turtle primarily inhabits aquatic habitats, including ponds, slow moving streams, lakes, marshes, and canals. The species frequently basks on logs or other objects out of the water. Western pond turtles also require upland oviposition (i.e., egg laying) sites in the vicinity (typically within 200 meters, but as far as 400 meters) of the aquatic site. Mating typically occurs in late April or early May and most oviposition occurs during May and June, although some individuals may deposit eggs as early as late April and as late as early August (Rathbun et al. 1993).

Western pond turtle is known to occur in Alpine Lake and in Bon Tempe Creek and may move from these areas to nest in nearby grassland habitats. The proposed project includes the construction of a new trail near the shoreline (where an informal trail currently exists), but the trail would be built to the design standards of the *Mt. Tamalpais Watershed Road and Trail Management Plan* and would not create a barrier to pond turtle movement between aquatic and nesting habitats. Alpine Lake and Bon Tempe Creek would not be directly disturbed by the proposed project activities. However, the species could move onto nearby construction areas and access roads. Should this occur, project activities could result in the loss or harm of individual pond turtles. Therefore, impacts to this species are potentially significant.

Mitigation and Avoidance Measures

Mitigation Measure 4-4. The following measures are recommended to protect western pond turtle during construction activities:

- The biological training session to be provided to construction personnel (see Mitigation Measure 4-2) shall also address the potential presence of western pond turtle. At a minimum, the training shall include a description of western pond turtle and its habitat, the measures that are being implemented to conserve the species as they relate to the project, the boundaries within which the project may be accomplished, and instructions that construction activities must be halted if a pond turtle is observed in the construction area and the biologist must be immediately notified.
- A qualified biologist shall survey work sites within construction areas where suitable western pond turtle nesting or aquatic habitat exists within 48 hours of the onset of construction activities. If western pond turtle are found, the turtle will be relocated to a suitable location outside of the construction zone by a qualified biologist.
- Prior to the start of construction, construction fencing shall be placed between the lake or Bon Tempe Creek and the construction area or access routes where suitable western pond turtle habitat exists, at the direction of the qualified biologist. The

fencing shall be placed at the edge of the construction area or access routes to maximize areas for turtle movement or nesting. Large-mesh construction fencing shall be used to allow hatchlings, but not adults of the species, to pass through the fencing. Additionally, prior to the start of construction each day, a designated biological monitor (who has received training from a qualified biologist) shall inspect the fence and construction area. Any pond turtles found on the upland side of the construction fencing shall be relocated to the lake-side of the construction fencing by a qualified biologist or the trained, designated biological monitor.

Significance After Implementation of Avoidance Measures: Less than Significant

The implementation of Mitigation Measure 4-4 would reduce potential impacts to western pond turtle to a less than significant level.

Birds. As discussed in **Appendix B** (see Table 3), the following special-status bird species have potential to nest on or near the project site: Cooper’s hawk, grasshopper sparrow, Bell’s sage sparrow, great blue heron, oak titmouse, olive-sided flycatcher, yellow warbler, white-tailed kite, California horned lark, San Francisco common yellowthroat, loggerhead shrike, osprey, “Marin” chestnut-backed chickadee, purple martin, and Allen’s hummingbird. While none of these species are state or federally listed, they may otherwise be considered to be of special-status under CEQA. Additionally, numerous common bird species could nest on the project site. The active nests of most common bird species are protected by the Migratory Bird Treaty Act (16 U.S.C. 704) and the California Fish and Game Code (Section 3503). Construction activities (i.e., tree and vegetation removal, grading, resurfacing) could result in the direct loss of a nest of a special-status or common bird species. Additionally, construction related noise has the potential to disturb nesting occurring in surrounding areas and to result in the abandonment of an active nest. Therefore, the direct loss or noise-related disturbance of an active nest of a special-status or otherwise protected bird species is a potentially significant impact.

Mitigation and Avoidance Measures

The proposed project would be implemented as part of the *Mt. Tamalpais Watershed Road and Trail Management Plan*, and therefore, the mitigation measures required by the associated EIR would be implemented as part of the project. The relevant measures from that EIR include 3.3-C.1 and 3.3-C.2. The following additional measures are would also be implemented to further reduce potential impacts to nesting birds.

Mitigation Measure 4-5. If construction activities would commence anytime during the nesting/breeding season of native bird species potentially nesting on the project site (typically February through August in the project region), a pre-construction survey for nesting birds shall be conducted by a qualified biologist within one week of the commencement of construction activities.

If active nests are found in areas that could be directly affected, or that are within 300 feet of construction and would be subject to prolonged construction-related noise, then an appropriate no-disturbance buffer zone shall be created around active nests during the breeding season or until a qualified biologist determines that all young have fledged. The size of the buffer zone and types of construction activities restricted within will be determined by a qualified biologist taking into account factors such as the following:

- Noise and human disturbance levels at the construction site at the time of the survey and the noise and disturbance expected during the construction activity;

- Distance and amount of vegetation or other screening between the construction site and the nest; and
- Sensitivity of individual nesting species and behaviors of the nesting birds.

To minimize the potential for a construction-related delay due to the presence of an active bird nest, any required tree and vegetation removal may be conducted outside of the nesting season.

Significance After Implementation of Avoidance Measures: Less than Significant

The implementation of Mitigation Measures 3.3-C.1 and 3.3-C.2 from the *Mt. Tamalpais Watershed Road and Trail Management Plan EIR*, and Mitigation Measure 4-5 would reduce potential impacts to nesting birds to a less than significant level.

Bats. As discussed in **Appendix B** (see Table 3), **pallid bat, western red bat, hoary bat, long-eared myotis, fringed myotis, long-legged myotis, and Yuma myotis** have potential to roost in the onsite trees. Collectively, these species may use cavities, crevices, foliage, and exfoliating bark for roosting, but the presence of large maternity colonies would be restricted to trees with large cavities. The proposed project would require the removal of approximately 21 trees. Only one tree is over 20-inches in diameter (a mature Douglas fir that may not need to be removed depending on final route alignment), the rest are all 10-inches or smaller in diameter and are therefore unlikely to support a large maternity colony. Therefore, while only one tree could potentially support a large maternity colony, should an active maternity or hibernation roost be present, the proposed removal of trees could result in harm to roosting bats. Therefore, impacts to roosting bats are potentially significant.

Mitigation and Avoidance Measures

The proposed project would be implemented as part of the *Mt. Tamalpais Watershed Road and Trail Management Plan*, and therefore, the mitigation measures required by the associated EIR would be implemented as part of the project. The relevant measures from that EIR include 3.3-D.2, 3.3-D.3, and 3.3-D.4. The following additional measure are would also be implemented to further reduce potential impacts to roosting bats.

Mitigation Measure 4-6. Prior to any tree removal during the maternity roosting period (April 15 to August 31) or hibernation period (October 15 to February 28), a focused tree habitat assessment can be conducted by a qualified bat biologist of all trees that will be removed or impacted by construction activities. Trees containing suitable potential bat roost habitat features would then be clearly marked. The habitat assessments should be conducted enough in advance to allow preparation of a report with specific recommendations, and to ensure tree removal can be scheduled during seasonal periods of bat activity if required. If it is determined that day roosting bats are unlikely to occur, the tree may be removed as described below. If the absence of roosting bats cannot be confirmed, then the removal of trees providing suitable maternity or hibernation roosting habitat should only be conducted during seasonal periods of bat activity, including:

- 1) Between March 1 (or after evening temperatures rise above 45F and/or no more than 1/2" of rainfall within 24 hours occurs) and April 15; or
- 2) Between September 1 and about October 15 (or before evening temperatures fall below 45F and/or more than 1/2" of rainfall within 24 hours occurs).

Appropriate methods will be used to minimize the potential of harm to bats during tree removal. Such methods may include using a two-step tree removal process. This method is conducted over two consecutive days, and works by creating noise and vibration by cutting non-habitat branches and limbs from habitat trees using chainsaws only (no excavators or other heavy machinery) on Day 1. The noise and vibration disturbance, together with the visible alteration of the tree, is very effective in causing bats that emerge nightly to feed, to not return to the roost that night. The remainder of the tree is removed on Day 2. A bat biologist qualified in two-step tree removal is required on Day 1 to supervise and instruct the tree-cutters who will be on the site conducting the work, but only for a sufficient length of time to train all tree cutters who will conduct two-step removal of habitat trees. The bat biologist is generally not required on Day 2, unless a very large cavity is present and a large colony is suspected.

Significance After Implementation of Avoidance Measures: Less than Significant

The implementation of Mitigation Measures 3.3-D.2, 3.3-D.3, and 3.3-D.4 from the *Mt. Tamalpais Watershed Road and Trail Management Plan EIR*, and Mitigation Measure 4-6 would reduce potential impacts to roosting bats to a less than significant level.

American Badger (*Taxidea taxus*) is a California Species of Special Concern. American badgers range throughout California but are most abundant in drier, open stages of shrub, forest, and herbaceous habitats with friable soils where they can dig burrows. No badger dens have been documented on the project site, but the species is known from the project area. Should a badger den be present in a work area, individual badgers could be harmed and related impacts would be significant.

Mitigation and Avoidance Measures

The proposed project would be implemented as part of the *Mt. Tamalpais Watershed Road and Trail Management Plan*, and therefore, the mitigation measures required by the associated EIR would be implemented as part of the project. The relevant measures from that EIR include 3.3-D.1.

Significance After Implementation of Avoidance Measures: Less than Significant

The implementation of Mitigation Measures 3.3-D.1 from the *Mt. Tamalpais Watershed Road and Trail Management Plan EIR* would reduce potential impacts to American badger to a less than significant level.

- b) **Less than Significant with Mitigation.** Sensitive plant communities are communities that are of limited distribution statewide or within a county or region and are often vulnerable to environmental effects of projects. These communities may or may not contain special-status species or their habitat. The most current version of the CDFW's List of California Terrestrial Natural Communities as well as the MCV indicate which natural communities are of special-status given the current state of the California classification.

The study area encompasses a number of sensitive plant communities. There are three plant communities that are designated as Rare and Threatened by the CDFW: Serpentine Bunchgrass, Purple Needle Grass Grassland, and Mt. Tamalpais Manzanita Chaparral. The study area also encompasses riparian habitats, wetlands, and other waters subject to the jurisdiction and legal protection of environmental regulatory agencies; these habitats are discussed below under Item C.

The proposed project would remove (i.e., decommission) approximately 4.4-miles of non-system roads and trails and restore those routes to natural conditions to improve habitat. Many of the non-system trails traverse serpentine habitats that support sensitive plant communities. The unauthorized use of these trails degrades habitat quality within sensitive plant communities. Therefore, in the long term, the proposed closing and restoration of non-system trails would benefit sensitive plant communities by eliminating trails that provide access to over one acre of habitat, including large areas of sensitive serpentine habitats on Azalea Hill.

New construction would generally be limited to the proposed trail reroutes. Some of the proposed trail reroutes would occur within small areas mapped as upland serpentine grassland. However, these reroutes do not include rerouting an existing trail from a common plant community into a sensitive plant community. Therefore, the restoration of the existing trail would offset impacts to sensitive plant communities associated with the rerouted trail.

The other project components include actions that would occur where a trail or road already exists, such as adopting and improving existing trails and converting an existing road to a trail (or vice-versa). These activities would primarily occur within the footprint of the existing road or trail and related habitat disturbances would be small and adjacent to existing trails.

As required by the *Mt. Tamalpais Road and Trail Management Plan* (Mitigation Measure 3.2-D.3), the Azalea Hill Trail reroute has been rerouted to avoid the stand of serpentine chaparral and the non-system trail that proceeds south of the Azalea Hill Trail would be decommissioned. The initial project design was also modified to avoid large stands of serpentine chaparral.

Given the above, project-related impacts to sensitive plant communities would largely be self-mitigating. The proposed closing and restoration of approximately 4.4 miles of non-system trails would benefit sensitive plant communities by eliminating trails that provide access to large areas of sensitive serpentine habitats on Azalea Hill. Measures would also be implemented to assist these areas revegetate with native vegetation. The proposed project does not include relocating any existing trails from a common plant community into a sensitive plant community, and other project activities would primarily occur within the footprint of the existing roads or trails and related habitat disturbances would be small and adjacent to existing trails. However, measures are still required to minimize impacts to sensitive plant communities and to restore temporarily disturbed habitats.

Potential impacts to sensitive plant communities could also occur due to the spread of weeds. It is possible that construction equipment could transport seeds of invasive plant species to the site, or that areas incidentally disturbed during construction could be colonized by invasive plant species. Therefore, given the above, impacts to sensitive plant communities are potentially significant.

Mitigation and Avoidance Measures

The proposed project would be implemented as part of the *Mt. Tamalpais Watershed Road and Trail Management Plan*, and therefore, the mitigation measures required by the associated EIR would be implemented as part of the project. The relevant measures from that EIR include 3.1-B.8, 3.2-E.1, 3.2-F.1, 3.2-I.1, 3.2-I.2, and 3.2-I.3. The following additional measures are would also be implemented to further reduce potential impacts to sensitive plant communities.

Mitigation Measure 4-7A. Where trails will be rerouted or where activities will occur outside of existing trails, the removal of native vegetation will be minimized to the degree practical.

Mitigation Measure 4-7B. All areas temporarily disturbed during project activities that are outside of the finished trail/road alignment will be restored to their pre-disturbance condition. The pre-disturbance condition would be documented by a botanist prior to project implementation. A restoration plan will be implemented to restore all temporarily disturbed areas. Success criteria may include total plant cover, and non-native species cover shall not exceed pre-disturbance non-native species cover. The plan shall address acceptable thresholds for native and non-native species for each monitoring year for five years. The plan shall also define corrective actions that would be taken if the performance standards are not met and the triggers for taking corrective actions.

Mitigation Measure 4-7C. In addition to the requirements of Measure 3.2-F.1 from the *Mt. Tamalpais Watershed Road and Trail Management Plan EIR*, all decommissioned trails will be monitored by a qualified botanist annually for a period of five years. Corrective actions will be implemented if it is determined by the botanist that the trails are not revegetating with appropriate vegetation characteristic of surrounding areas on similar soils.

Also see **Mitigation Measure 4-1B**, which includes measures to prevent the spread of weeds during construction activities.

Significance After Implementation of Avoidance Measures: Less than Significant

The implementation of Mitigation Measures 3.1-B.8, 3.2-E.1, 3.2-F.1, 3.2-I.1, 3.2-I.2, and 3.2-I.3 from the *Mt. Tamalpais Watershed Road and Trail Management Plan EIR*, and Mitigation Measures 4-7A, 4-7B, and 4-7C would reduce potential impacts to sensitive plant communities to a less than significant level.

- c) **Less than Significant with Mitigation.** Wetlands, streams, and permanent and intermittent drainages are subject to the jurisdiction of the U.S. Army Corps of Engineers (ACOE) under Section 404 of the Federal Clean Water Act (CWA). The CDFW also generally has jurisdiction over these resources, together with other aquatic features that provide an existing fish and wildlife resource pursuant to Sections 1602-1603 of the California Fish and Game Code. The CDFW asserts jurisdiction to the outer edge of vegetation associated with a riparian corridor. The Regional Water Quality Control Board also generally has jurisdiction over streams and wetlands.

A jurisdictional delineation of potential jurisdictional waters was completed for the project by VNLC in February 2017. The results of the delineation are summarized below while more detailed discussions of potential jurisdictional resources may be found the jurisdictional delineation report (VNLC 2017). The delineation identified a total of 0.351 acre of potentially jurisdictional Waters within the 15.5-acre study are. **Table 4-2**, below, provides a summary of the delineation results and the locations of these features are shown in **Appendix B** (see Appendix E, which is part of **Appendix B**).

| TABLE 4-2. Summary of Delineation Results | | |
|--|---------------------------|----------------------|
| Habitat Type | Number of Features | Total Acreage |
| Wetland | 5 | 0.104 |
| Other Waters (Bon Tempe Creek) | 1 | 0.031 |
| Other Waters (ephemeral and seasonal channels)* | 28 | 0.134 |
| Swale | 7 | 0.020 |
| Seep** | 3 | 0.057 |
| Eroded Channel (severely eroded channel along trail) | 1 | 0.006 |

* Includes 0.019 acre of tentative other Waters. **Only mapped as polygons along Liberty Gulch Road

Wetlands within the study area are all associated with drainages and/or with springs that augment the drainages. The onsite other Waters consist entirely of drainages that lack wetland vegetation (or are un-vegetated) and/or lack hydric soils. All of the drainages in the area flow into Alpine Lake, either on an ephemeral, seasonal, or semi-perennial timeframe. The drainages include Bon Tempe Creek, a semi-perennial stream (i.e., flows during most of the year and features perennial pools), as well as a large number of ephemeral to seasonal channels ranging from two to fifteen feet in width and featuring subtle to clearly defined bed and bank topography. Additionally, there are a number of seeps and swales that conduct surface water during (and typically for at least several days following) rain events, as observed during field surveys. Several seeps near the northwestern edge of the study area flow onto Azalea Hill Trail and, where the trail is relatively steep and straight, the flow has eroded a gully that conducts water for at least several days following rain. There are smaller rill features throughout the site, but these were not mapped because they are relatively shallow and conduct water only during rain events.

In addition to the potential jurisdictional Waters, the delineation identified 0.074 acre of riparian habitat in the study area, which is present along Bon Tempe Creek. The mapped area represents the outer edge of the dripline of riparian tree species or the tops of the stream channel banks, whichever is farther from the channel centerline. The riparian tree species along Bon Tempe Creek consist of Oregon ash and arroyo willow.

The proposed project includes constructing or improving 25 stream crossing sites, mostly using clear span bridges, puncheons, and/or armored wet crossings. In total, 308 linear feet of stream channels would be impacted and 665 square feet of fill would be placed in channels (consisting primarily of new rock armor). The stream crossing sites are generally unvegetated and the stream crossing improvements would serve to remedy existing erosion problems and prevent future erosion problems. Therefore, in the long term, the proposed stream crossing improvements would serve to reduce erosion and to protect habitats. The project also includes rerouting trails to avoid seeps and springs, including several wetlands as well as decommissioning trails that traverse potential Waters of the United States and/or State of California. Trails would be re-routed around springs and seeps along the southern portion of the study area, and numerous potential other Waters, mostly in the form of unvegetated channels, would be avoided by the decommissioning of trails throughout the hillslopes of Azalea Hill.

At two sites which include springs, a combination of armored rock crossings and four-foot-wide causeways (set back from the fill slope) would be constructed. Construction within seeps/wetlands would be limited to these two locations and would include the placement of approximately 15 CY of rock in a seep (Site 42) and 25 CY of rock in another seep (Site 45); the seeps are currently within existing trails and the rock would facilitate crossing the seeps with less disturbance. The proposed

bridge over Bon Tempe Creek would clear span the stream and no construction is proposed within the bed or banks of the stream, but the removal of some riparian vegetation may be required.

The small project-related impact to wetlands would be largely offset because the seeps are currently within existing trails and the rock would facilitate crossing the seeps with less disturbance; this would limit or eliminate ongoing disturbance to the seeps. Additionally, trails would be re-routed around springs and seeps along the southern portion of the study area, and numerous potential other Waters, mostly in the form of unvegetated channels, would be avoided by the decommissioning of trails throughout the hillslopes of Azalea Hill. While the project's impacts to seep, wetlands, and streams would largely self-mitigate, permits from the ACOE, RWQCB, and CDFW would be required. Additionally, in the absence of avoidance and minimization measures, construction activities could result in erosion and sedimentation or incidental disturbance to jurisdictional wetlands and streams. Therefore, related impacts are potentially significant.

Mitigation and Avoidance Measures

The proposed project would be implemented as part of the *Mt. Tamalpais Watershed Road and Trail Management Plan*, and therefore, the mitigation measures required by the associated EIR would be implemented as part of the project. The relevant measures from that EIR include 3.1-B.4, 3.1-B.8, 3.1-B.11, 3.1-B.12, 3.2-B.12, 3.2-H.1, 3.2-H.2, 3.2-H.3, 3.2-H.4, 3.2-H.5, 3.2-H.6, 3.2-H.7, 3.2-H.8, 3.2-H.9, 3.2-H.10.

Significance After Implementation of Avoidance Measures: Less than Significant

The implementation of Mitigation Measures 3.1-B.4, 3.1-B.8, 3.1-B.11, 3.1-B.12, 3.2-B.12, 3.2-H.1, 3.2-H.2, 3.2-H.3, 3.2-H.4, 3.2-H.5, 3.2-H.6, 3.2-H.7, 3.2-H.8, 3.2-H.9, 3.2-H.10 from the *Mt. Tamalpais Watershed Road and Trail Management Plan EIR* would reduce potential impacts to jurisdictional resources to a less than significant level.

- d) **Less than Significant.** Wildlife corridors are described as pathways or habitat linkages that connect discrete areas of natural open space otherwise separated or fragmented by topography, changes in vegetation, and other natural or manmade obstacles such as urbanization. The project site is located in an undeveloped area and is surrounded by large expanses of open space. Wildlife is expected to currently use the project site for local and regional movements. The proposed project does not include the construction of any structures that would inhibit wildlife movement. Additionally, construction activities would occur during daylight hours, when wildlife movements are less likely to occur. Therefore, the proposed project would not substantially interfere with the local or regional movement of wildlife species.
- e) **No Impact.** The District is exempt from local tree protection ordinances and associated permit requirements under Section 53091 of the California Government Code. Therefore, the proposed project would not conflict with a local tree protection ordinance or other local ordinance protecting biological resources, and no related impact would occur.
- f) **No Impact.** The site is not part of or near an existing Habitat Conservation Plan or Natural Communities Conservation Plan or any other local, regional, or state habitat conservation plan. Therefore, the proposed project would not conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan. Therefore, no related impact would occur.

| ENVIRONMENTAL IMPACTS | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact | Sources |
|---|--------------------------------|---|------------------------------|-----------|---------|
| 5. CULTURAL RESOURCES. Would the project: | | | | | |
| a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5? | | | | √ | H |
| b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5? | | √ | | | H |
| c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature? | | | | √ | H |
| d) Disturb any human remains, including those interred outside of formal cemeteries? | | √ | | | H |

The term “cultural resources” as used in this document refers to all “built environment” resources (structures, bridges, railroads, water conveyance systems, etc.), culturally important resources, and archaeological resources (both prehistoric and historic), regardless of significance.

The analysis for the CEQA Initial Study is based on the following cultural resources study conducted for the Project: Cultural Resources Investigation for the Azalea Hill Restoration Project (McWaters et al). Findings for this investigation are based on the following:

- A records search at the Northwest Information Center of the California Historic Resource Inventory System at Sonoma State University;
- Archival research and historic map review conducted at local, regional, and online repositories;
- Consultation with Native American groups and individuals identified by the Native American Heritage Commission and with local historical societies;
- A field survey of the Project area; and,
- Eligibility of cultural resources to the National Register of Historic Places or the California Register of Historical Resources.

This investigation resulted in the identification of four historic-period archaeological resources over 45 years old within the Project area: Sites 732-01, 732-02, 732-03, and 732-04. These resources are briefly described below and have been recorded on California Department of Parks and Recreation 523 forms. All of these sites are recommended ineligible for listing in either the National Register of Historic Places (NRHP) and the California Register of Historical Resources (CRHR). No prehistoric archaeological resources or built environment resources were identified within the Project area.

- 732-01 (Tamalpais Dam Remains): This resource is the remains of the unfinished, historic-era Tamalpais Dam. Construction began circa 1903 by the Marin Water and Power Company, but was halted before completion due to County objections to flooding a portion of the Bolinas-Fairfax Road. All that remains within the Project area are two features: a portion of the concrete dam foundation and a cut in the bedrock.

- 732-02 (Foundation Pad/Power Poles): This historic-era resource is comprised of a foundation pad and associated cut power poles. Historic maps indicate a comfort station or restroom is located in proximity to the Project area and was likely built between 1917 and 1931, however this location does not coincide with the foundation remnants within the Project area. The function and association of this resource is unknown.
- 732-03 (Old Bolinas-Fairfax Road): This site is a historic-era alignment of the Bolinas-Fairfax Road and related features, including culverts and spurs. Some of these spurs were built as truck roads during the construction of Alpine Dam or connecting roads leading to other resources (such as Site 732-02).
- 732-04 (Bull Frog Road): This site is comprised of a single context: a road segment that follows Bull Frog Road north to a quarry, referred to as the Bull Frog Quarry. The earliest map reviewed that shows the Bull Frog Road alignment dates to 1941.

No Impact: Based on the results of the cultural resources investigation, there are no significant cultural resources (historic properties or historical resources) identified within the Project area.

- a) **No Impact.** Based on the results of the cultural resources investigation, there are no significant cultural resources (historic properties or historical resources) identified within the Project area. No mitigation required.
- b) **Less Than Significant with Mitigation.** Based on the results of the cultural resources investigation, no prehistoric archaeological resources were identified within the Project area. The historic-era archaeological sites that were documented and evaluated during this investigation are considered ineligible for listing in the NRHP or the CRHR and are not considered historical resources under CEQA.

Although construction of the Project would have no impact on known archaeological resources, there is a possibility that previously unidentified archaeological resources and subsurface deposits are present within the Project area. If present, soil disturbing activities including movement of vehicles and equipment could expose, disturb or damage any such previously unrecorded archaeological resources. Because the possibility of encountering archaeological resources during construction cannot be completely discounted, the impact related to the potential disturbance or damage of previously undiscovered archaeological resources, if present, could be significant. Implementation of Mitigation Measure 5-1 (Protect of Archaeological Resources Identified during Construction) would reduce impacts on any previously unrecorded and buried archaeological resources to less-than significant-levels by requiring MMWD and its contractors to adhere to appropriate procedures and protocols for minimizing such impacts, in the event that a possible archaeological resource is discovered during construction. Therefore, impacts to previously unidentified archaeological resources within the Project Area would be reduced to a less-than-significant level with mitigation.

Mitigation Measure 5-1. Protect Archaeological Resources Identified during Construction: MMWD shall ensure that construction crews shall stop all work within 100 feet of the discovery until a qualified archaeologist can assess the previously unrecorded discovery and provide recommendations. Resources could include subsurface historic features such as artifact-filled privies, wells, and refuse pits, and artifact deposits, along with concentrations of adobe, stone, or concrete walls or foundations, and concentrations of ceramic, glass, or metal materials. Native American archaeological materials could include obsidian and chert flaked stone tools (such as projectile and dart points), midden

(culturally derived darkened soil containing heat-affected rock, artifacts, animal bones, and/or shellfish remains), and/or groundstone implements (such as mortars and pestles).

- c) **No Impact.** The Initial Study prepared to inform the scope of the Environmental Impact Report (EIR) for the *Mt. Tamalpais Watershed Road and Trail Management Plan* stated that “There are no known paleontological resources in the areas that might be affected by projects, and it is not expected that project construction would affect such resources.” The proposed project does not deviate from the land areas or project scale or scope considered in that Initial Study or the subsequent EIR for the RTMP. No mitigation is required.
- d) **Less Than Significant with Mitigation.** No evidence of human remains was identified within the Project area. However, the potential for their presence cannot be entirely ruled out. Construction-related excavation could expose and disturb or damage previously undiscovered human remains. Therefore, the impact related to the potential disturbance of human remains during construction could be significant. Mitigation Measure 5-2 (Protect Human Remains Identified during Construction) would be implemented during Project construction to minimize potential impacts on any buried human remains and associated or unassociated funerary objects that may be accidentally discovered during construction activities to less-than-significant levels by requiring the District to adhere to appropriate excavation, removal, recordation, analysis, custodianship, and final disposition protocols. Therefore, this potential impact on buried human remains would be less than significant with mitigation.

Mitigation Measure 5-2. Protect Human Remains Identified During Construction: MMWD shall treat any human remains and associated or unassociated funerary objects discovered during soil-disturbing activities according to applicable State laws. Such treatment includes work stoppage and immediate notification of the Marin County Coroner and qualified archaeologist, and in the event that the Coroner’s determination that the human remains are Native American, notification of NAHC according to the requirements in PRC Section 5097.98. NAHC would appoint a Most Likely Descendant (MLD). A qualified archaeologist, MMWD and MLD shall make all reasonable efforts to develop an agreement for the treatment, with appropriate dignity, of any human remains and associated or unassociated funerary objects (CEQA Guidelines Section 15064.5[d]). The agreement would take into consideration the appropriate excavation, removal, recordation, analysis, custodianship, and final disposition of the human remains and associated or unassociated funerary objects. The PRC allows 48 hours to reach agreement on these matters.

| ENVIRONMENTAL IMPACTS | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact | Sources |
|--|--------------------------------|---|------------------------------|-----------|---------|
| 6. GEOLOGY AND SOILS. | | | | | |
| a) Would the project expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving? i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42. | | | √ | | A, K |
| ii) Strong seismic ground shaking? | | | √ | | A, K |
| iii) Seismic-related ground failure, including liquefaction? | | | √ | | A, K |
| iv) Landslides? | | | √ | | A, K |
| b) Would the project result in substantial soil erosion or the loss of topsoil? | | | √ | | A, K |
| c) Would the project be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse? | | | √ | | A, K |
| d) Would the project be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property? | | | √ | | A, K |
| e) Would the project have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water? | | | | √ | A, K |

The Initial Study prepared to inform the scope of the Environmental Impact Report (EIR) for the *Mt. Tamalpais Watershed Road and Trail Management Plan* stated that “The projects included in the Draft Plan involve repairing erosion sources and decommissioning and rerouting a few trails and roads.” Further, the EIR stated implementing all the projects would reduce sedimentation and would repair 41 landslides near streams, both beneficial impacts. The EIR also stated that MMWD would implement the Best Management Practices (BMPs) in the Draft Plan to address potential construction related erosion impacts, and that MMWD would consult with a geotechnical engineer in the design of any road bridge or retaining wall on the Watershed (Mitigation Measure 3.4-C.1), which would reduce potential geologic and soil impacts to less than significant. The proposed project does not deviate from the land areas or project scale or scope considered in that Initial Study or the subsequent EIR for the RTMP.

- a, c) **Less than Significant Impact.** The project area, as is the entire San Francisco Bay Area, is a seismically active area traversed by a wide array of faults with their attendant effects. The proposed project would result in some existing roads/trails being realigned, some non-system trails

being decommissioned, and the installation of puncheons and bridges over drainages and creeks. The project has been designed to avoid areas of potential landslides, and to ensure that no improvements would generate or exacerbate existing landslides. With the exception of the puncheons and bridges over drainages and creeks, where road bridges or retaining walls would be subject to the original EIR mitigation measure for geotechnical consultation (Mitigation Measure 3.4-C.1), there are no structures proposed as part of the project’s implementation that could be impacted by any naturally occurring geologic characteristics. No additional mitigation is required.

- b) **Less than Significant Impact.** One of the proposed project’s overarching goals is to reduce existing erosion. The EIR for the original plan stated that MMWD would implement the Best Management Practices (BMPs) in the Draft Plan to address potential construction related erosion impacts. These include using silt fences, erosion control blankets, and mulch to prevent significant erosion during and after construction. Routes identified for realignment or recontouring, as well as those identified for decommissioning, would reduce erosion from the site that eventually is deposited into Alpine Lake. This would be accomplished through shaping techniques such as outsloping, rolling dips, or water bars consistent with the design standards of the RTMP. Decommissioned trails and areas disturbed by construction would be revegetated either through natural or human-assisted means. No mitigation is required.
- d) **Less than Significant Impact.** The proposed project does not include the construction of habitable structures. Prior to construction of bridges or retaining walls, which would be subject to the original EIR mitigation measure for geotechnical consultation (Mitigation Measure 3.4-C.1), soil sampling would be conducted to inform the bridges’ designers of the soils’ characteristics to consider in designing and then constructing a bridge to account for any potentially damaging soil conditions. No additional mitigation is required.
- e) **No Impact.** The proposed project does not include uses or activities that would generate waste water, nor involve the construction, modification, or demolition of septic tanks or alternative waste water systems that would rely on the underlying soil. The self-contained, serviceable convenience station that would be installed would be either a porta potty, self-composting toilet or other self-contained facility that would not rely on the soil for wastewater disposal.

| ENVIRONMENTAL IMPACTS | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact | Sources |
|--|--------------------------------|---|------------------------------|-----------|---------|
| 7. GREENHOUSE GAS EMISSIONS. Would the project: | | | | | |
| a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment? | | | √ | | B, C, K |
| b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases? | | | | √ | B, C, K |

- a) **Less than Significant Impact.** The proposed project would generate greenhouse gas (GHG) emissions from temporary construction activities, including from mobile equipment, site

preparation, and excavation. BAAQMD has not adopted a GHG emissions threshold with respect to construction-related GHGs. In lieu of specific guidance from BAAQMD regarding significance thresholds for construction-related GHG emissions, significance is assessed by consideration of the scope and duration of construction-related emissions. Given that the project activities would be temporary in nature and would occur intermittently over the construction timeframe described earlier, the proposed project is not expected to result in an ongoing burden to regional or global GHG inventories. No mitigation is required.

- b) **No Impact.** California has passed several bills and the governor has signed at least three executive orders regarding GHGs. For example, Assembly Bill (AB) 32 (the Global Warming Solutions Act) was passed by the California legislature on August 31, 2006. It requires the state's GHG emissions to be reduced to 1990 levels by 2020.

The purpose of the proposed project is to reduce erosion and sedimentation from Azalea Hill and would not conflict with any existing GHG laws, plans, policies, or regulations adopted by the California legislature or the CARB and would be consistent with applicable goals and policies of the Marin Countywide Plan. No mitigation is required.

| ENVIRONMENTAL IMPACTS | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact | Sources |
|--|--------------------------------|---|------------------------------|-----------|---------|
| 8. HAZARDS AND HAZARDOUS MATERIALS. Would the project: | | | | | |
| a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials? | | √ | | | A |
| b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment? | | √ | | | A |
| c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within ¼ mile of an existing or proposed school? | | | | √ | A |
| d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment? | | | | √ | A, F |
| e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area? | | | | √ | A, K |
| f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area? | | | | √ | A, K |
| g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan? | | | | √ | A |

| ENVIRONMENTAL IMPACTS | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact | Sources |
|--|--------------------------------|---|------------------------------|-----------|---------|
| h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands? | | √ | | | A |

a, b) **Less than Significant Impact with Mitigation.** Construction of the proposed project would involve the use of materials that are defined as hazardous, such as fuels, hydraulic fluids, and coolants for construction equipment. All of these materials are common in the construction industry and construction process and their transport, handling, use, and disposal within specifications outlined by their respective manufactures are designed to ensure that there are no environmental effects. Further, many of the manufactures’ recommendations are based on regulations promulgated by federal and state government; also with the intent of reducing the potential for accidental upset and environmental effects. After construction there would be no hazardous materials transported to or from the site on a regular basis. Therefore, construction and operation of the proposed project would not create a significant hazard to the public or the environment. No mitigation is required.

Within the Azalea Hill project area are serpentine soils, which when disturbed, could release naturally occurring asbestos, which is a carcinogen, into the immediate atmosphere. Serpentine substrates in the study are concentrated along the central, mostly convex slopes of the study area, as well at the western edge. Accidental release of asbestos fibers into the localized atmosphere would be a significant impact. The BAAQMD has issued a regulatory advisory for an Asbestos Airborne Toxic Control Measure (ATCM) for construction, grading, quarrying, and surface mining operations.¹⁰ This ATCM requires road construction and maintenance activities in areas where naturally-occurring asbestos is likely to be found to employ the best available dust mitigation measures. Mitigation Measure 8-1, which includes language from the ATCM, would reduce the potential impact to a less than significant level, thereby not creating a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment.

Mitigation Measure 8-1. The accidental release of asbestos fibers shall be mitigated by implementation of the following measures for construction all construction activities:

- a. Construction vehicle speed at the work site shall be limited to fifteen (15) miles per hour or less.
- b. Prior to any ground disturbance, sufficient water must be applied to the area to be disturbed to prevent visible emissions.

¹⁰ Final Regulation Order – Asbestos Airborne Toxic Control Measure for Construction, Grading, Quarrying, and Surface Mining Operations. California Code of Regulations Title 17, Section 93105

- c. Areas to be graded or excavated must be kept adequately wetted to prevent visible emissions.
- d. Storage piles must be kept adequately wetted, treated with a chemical dust suppressant, or covered when material is not being added to or removed from the pile.
- e. Equipment must be washed down before moving from the property onto a paved public road.
- f. Visible track-out on the paved public road must be cleaned using wet sweeping or a HEPA filter equipped vacuum device within twenty-four (24) hours.

Project construction would also require the use of certain hazardous materials such as fuels and oils. Inadvertent release of these materials into the environment could adversely impact soil, surface waters, or groundwater quality. This could be a significant impact. MMWD is a government agency and is subject to the strict safety practices developed and enforced by the Occupational Safety and Health Administration (OSHA). Furthermore, MMWD has a Safety Officer and safety training program, and its contracting procedures require that any contractor hired to carry out, or help in carrying out a project must also comply with the relevant OSHA regulations. Implementation of Mitigation Measure 8-2, along with MMWD's existing practices and OSHA's existing regulations, would reduce any risk associated with hazardous materials used during construction to less-than-significant levels.

Mitigation Measure 8-2. MMWD and/or its contractor(s) shall use BMPs that will minimize the potential adverse effect of the project to groundwater and soils from chemicals used during construction activities. The BMPs will include the following measures:

- a. Establish fuel and vehicle maintenance areas away from all drainage courses and design these areas to control runoff;
 - b. Follow manufacturer's recommendations on use, storage and disposal of chemical products used in construction;
 - c. Avoid overtopping construction equipment fuel gas tanks;
 - d. Provide secondary containment for any hazardous materials temporarily stored onsite;
 - e. During routine maintenance of construction equipment, properly contain and remove grease and oils;
 - f. Perform regular inspections of construction equipment and materials storage areas for leaks and maintain records documenting compliance with the storage, handling and disposal of hazardous materials;
 - g. Properly dispose of discarded containers of fuels and other chemicals; and
 - h. A spill prevention and countermeasure plan shall be developed that will identify proper storage, collection, and disposal measures for potential pollutants (such as fuel, fertilizers, pesticides, etc.) used onsite. The plan will also require the proper storage, handling, use, and disposal of petroleum products.
- c) **No Impact.** There are no existing or proposed schools located within ¼-mile of the project site. No mitigation is required.
- d) **No Impact.** California Government Code Section 65962.5(a)(1) requires the California Department of Toxic Substances to compile and update as appropriate a list of all hazardous waste facilities

subject to corrective action, all land designated as hazardous waste property or border zone property, all information received by the Department of Toxic Substances Control pursuant to Section 25242 of the Health and Safety Code on hazardous waste disposals on public land, all sites listed pursuant to Section 25356 of the Health and Safety Code, and all sites included in the Abandoned Site Assessment Program. These lists are commonly referred to as the Cortese List. The project site is not listed on any of the individual lists that comprise the Cortese List, and none of the lands bordering the site are on the Cortese List. No mitigation is required.

- e) **No Impact.** The project site is not located within an airport land use plan or within 2 miles of a public airport or public use airport, and would not result in a safety hazard for people residing or working in the project area. No mitigation is required.
- f) **No Impact.** The project site is not located within the vicinity of a private airstrip and would not result in a safety hazard for people residing or working in the project area. No mitigation is required.
- g) **No Impact.** The project site is an existing open space area that does not provide any access for traditional emergency vehicles, such as police cars, ambulances and fire trucks. After project completion, Liberty Gulch Road would provide District Rangers and Sheriff Deputies emergency small vehicle access (ATVs) to areas previously un-accessible. During construction activities equipment and materials would be delivered along one of two roadway networks (Bollinas-Fairfax Road and Sky Oaks/Bon Tempe/Bullfrog Roads) and the equipment and materials would not be stored and staged on these roads. Movement of equipment and materials along the roadway network would not impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan. No mitigation is required.
- h) **Less than Significant with Mitigation.** Construction of the proposed project would occur within forested areas of Marin County. The project setting amid mature trees, bushes, and grasslands provides a setting conducive to the ignition and spread of a wildland fire if appropriate measures are not taken during construction activities. The project area is generally classified as having a "high" fire risk by the County of Marin (2013b), which could expose people or structures to a significant risk of loss, injury or death involving wildland fires. Implementation of Mitigation Measure 8-3 would reduce the impact to less than significant.

Mitigation Measure 8-3. MMWD and/or its contractor shall implement the following fire safety construction practices:

- a. MMWD or its contractors shall check in daily by phone for the NPS daily fire hazard rating for the area. On days when the fire hazard rating is Very High or Critical, use of two-stroke power tools, such as chain saws and weed whips, are prohibited at the project site;
- b. There shall be no work on red flag days declared by Marin County;
- c. Earthmoving and portable equipment with internal combustion engines shall be equipped with a spark arrestor to reduce the potential for igniting a wildland fire;
- d. Appropriate fire suppression equipment shall be maintained at the construction site;
- e. Flammable materials shall be removed to a distance of 10 feet from any equipment that could produce a spark, fire, or flame; and
- f. Construction personnel shall be trained in fire safe work practices, use of fire suppression equipment, and procedures to follow in the event of a fire.

| ENVIRONMENTAL IMPACTS | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact | Sources |
|---|--------------------------------|---|------------------------------|-----------|---------|
| 9. HYDROLOGY AND WATER QUALITY. Would the project: | | | | | |
| a) Violate any water quality standards or waste discharge requirements? | | | | √ | A |
| b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local ground water table level (for example, the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)? | | | | √ | A |
| c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site? | | | | √ | A |
| d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site. | | | | √ | A |
| e) Create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff? | | | | √ | A |
| f) Otherwise substantially degrade water quality? | | | | √ | A |
| g) Place housing within a 100-year flood-hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map? | | | | √ | A, I, K |
| h) Place within a 100-year flood-hazard area structures which would impede or redirect flood flows? | | | | √ | A, I, K |
| i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam? | | | | √ | A, I, K |
| j) Inundation by seiche, tsunami, or mudflow? | | | | √ | A, K |

- a) **No Impact.** The existing network of roads and trails on Azalea Hill does not include operations or activities that would violate any water quality standards nor are there discharge requirements associated with its operation. The project site is located in the Lagunitas Creek Watershed, which has an established Total Maximum Daily Load (TMDL) for fine sediment and habitat enhancement per the S.F. Bay RWQCB,¹¹ primarily to conserve listed populations of coho salmon, steelhead and

¹¹ Lagunitas Creek Watershed Sediment TMDL, Final Order R2-2014-0027, approved by the California State Water Resources Control Board on November 18, 2014 and by the Office of Administrative Law on March 17, 2015.

California freshwater shrimp. However, runoff from the project site flows into Alpine Lake via Bon Tempe Creek or smaller, unnamed tributaries. Alpine Dam, which created Alpine Lake, disconnects sediment delivery from the project site to Lagunitas Creek. (Another dam and reservoir, Peters Dam and Kent Lake, are also located between Alpine Lake and the portion of Lagunitas Creek with fisheries and shrimp habitat). Nevertheless, a primary purpose of the project, and the overarching RTMP, is to reduce sedimentation to creeks and reservoirs – a long term beneficial impact. Overall, the project would save an estimated 4,377 cubic yards of sediment over 20 years would be saved from entering Alpine Lake. Furthermore, the project is subject the BMPs in the RTMP, and Mitigation Measures in the RTMP's PEIR (Mitigation Measures 3.1-B.4, 3.1-B.8, 3.1-B.11, 3.1-B.12 and 3.2-H.1 through 3.2-H.10), to control unpaved road and trail-related surface run-off, including shaping techniques such as outsloping, rolling dips, or water bars, and the use of silt fences, erosion control blankets, and mulch during and after construction to prevent significant erosion. No additional mitigation is required.

- b) **No Impact.** The project would not require groundwater withdrawals. The project does not include any structure or landform modification that would impede groundwater recharge. The project would result in a smaller footprint of compacted surfaces than currently exists in the area through the decommissioning of non-system roads and trails, and the improved parking lot would remain a permeable surface. No mitigation is required.
- c, d) **No Impact.** The project's purpose is to reduce erosion and sedimentation from the site. In part, drainage patterns would be modified to some extent by upgrading or rerouting existing roads and trails, and by decommissioning other roads and trails. Where roads and trails are planned for decommissioning, old stream fills would be removed to return the stream to its historic bed. This is a beneficial impact of the project. The project would create a more natural runoff pattern where water would tend to flow downslope in a dispersed manner, rather than being concentrated in road and trail related ditches and gullies. This would slow runoff to streams and would decrease flooding potential. This impact is considered to be at least less than significant. No mitigation is required.
- e) **No Impact.** As noted above, the proposed project would reduce sedimentation from road and trail related run-off, result in a smaller footprint of compacted surfaces and create a more natural runoff pattern, all of which would reduce storm water flows. Furthermore, the project is subject the Design Standards and BMPs in the RTMP, in part which require roads and trails to be "storm-proof," or have the capacity to handle 100-year storm events. All the bridges and puncheons would be clear span, above the top of bank, so would not impeded flows during storm events. No additional mitigation is required.
- f) **No Impact.** Other than potential impacts from soil erosion and sedimentation, as discussed and addressed previously under 9.a above, the project would not include elements that would affect water quality. A major project objective is to improve storm waters flowing off of the Azalea Hill area that runs into creeks and Alpine Lake. No mitigation is required.
- g, h, i) **No Impact.** The project site is located on the Federal Emergency Management Agency (FEMA) Flood Hazard Boundary Map for Marin County, California and Incorporated Areas. The site is located within a Zone X Flood Zone, which is defined as being outside of the 0.2% annual chance floodplain. The project area is also not within or adjacent to the floodway of a levee or dam. The proposed project does not involve the construction of housing or other structures. No mitigation is required.

- j) **No Impact.** A portion of the project site is adjacent to Alpine Lake and could be subject to a seiche. As part of the proposed project, the existing “fishing access” trail would be rerouted several feet up the hill, away from the lake, reducing the potential impact. The project area is situated at a minimum elevation of approximately 646-feet above mean sea level, and therefore would not be susceptible to a tsunami. Also, the project area is not downstream of an active or known potential mudflow area. Implementation of the proposed project would not alter the likelihood of a seiche or mudflow occurring. No mitigation is required.

| ENVIRONMENTAL IMPACTS | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact | Sources |
|---|--------------------------------|---|------------------------------|-----------|---------|
| 10. LAND USE AND PLANNING. Would the project: | | | | | |
| a) Physically divide an established community? | | | | √ | A, K |
| b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect? | | | | √ | A, K, M |
| c) Conflict with any applicable Habitat Conservation Plan or Natural Community Conservation Plan? | | | | √ | A |

- a) **No Impact.** The Azalea Hill project area is set within the larger Mt. Tamalpais watershed, which totals approximately 18,600-acres. The entire watershed is undeveloped open space and there is no community (defined as residential and/or commercial development) situated on any portion of the watershed. No mitigation is required.
- b) **No Impact.** The project site is designated by the Marin Countywide Plan as Open Space (OS), and is within the Open Area (OA) zoning district. The proposed project would result in some existing roads/trails being realigned, some non-system trails being decommissioned, and the installation of puncheons and bridges over drainages and creeks, with the overarching goal of reducing erosion and sedimentation from the site. No aspect of the proposed project would conflict with the Countywide Plan’s land use designation of Open Space nor the Marin County’s Open Area Zoning District. No mitigation is required.

The project area is included in the MMWD RTMP, which covers the entire 18,600-acre Mt. Tamalpais watershed. The District adopted the *Mt. Tamalpais Watershed Road and Trail Management Plan* in 2005. The RTMP is both a description of the official system of roads and trails and a detailed work plan on how to manage the roads and trails for the next quarter century. It also serves as a guide to further the protection of water quality in creeks and reservoirs, further the protection of environmentally sensitive habitats and special status species, and minimize road and trail related impacts on the Mt. Tamalpais Watershed.

The goals of the Plan are:

1. *To improve water quality and minimize sediment into the creeks and reservoirs;*

2. To reduce the impact of the road and trail network on wetlands, riparian areas, other environmentally sensitive habitats and special status plant and animal species; and
3. To reduce the impact of the road and trail network on the Watershed’s natural ecological functions.

Azalea Hill is called out in Chapter Two of the plan as an area proposed for changes.¹² Azalea Hill Road is proposed to be converted to a trail, mainly to keep cyclists from continuing beyond the road and down onto the trail, or worse, creating new trails that damage the environment and stress limited enforcement resources. In addition to being a dead end, other undesirable effects include its steepness, the presence of special status plant species and erosive serpentine soils. Azalea Hill Trail is proposed for a re-route because it is too steep and gullied in areas, passes through erosive serpentine soils in other areas and through a wetland at the bottom of the trail (a new creek crossing would be needed to avoid the section that currently runs through the wetland). Once amended to include revisions to the RTMP, the proposed project would be consistent with the Plan. No mitigation is required.

- c) **No Impact.** The project area is not part of or near lands subject to an existing Habitat Conservation Plan or Natural Communities Conservation Plan.

| ENVIRONMENTAL IMPACTS | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact | Sources |
|--|--------------------------------|---|------------------------------|-----------|---------|
| 11. MINERAL RESOURCES. Would the project: | | | | | |
| a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state? | | | | √ | A, K |
| b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan? | | | | √ | A, K |

- a) **No Impact.** The California Legislature enacted the Surface Mining and Reclamation Act (SMARA) in 1975 to address the need for a continuing supply of mineral resources, and to prevent or minimize the negative impacts of surface mining to public health, property, and the environment. SMARA requires the California Department of Conservation (CDC), CGS, to conduct Mineral Land Classification surveys. These surveys designate land areas, such as mineral resources zones or aggregate resource zones, depending on the type of resources identified in the area. The CGS has mapped aggregate availability in the state, and no aggregate resource zones have been identified in the project area or surrounding the project area. No mitigation is required.
- b) **No Impact.** The Marin Countywide Plan, adopted in 2007, does not identify the project area as a locally important-mineral resource site. No mitigation is required.

¹² Section 2.1.2 – Changes to the Old Road and trail System and Table 2.4 – Proposed Changes to the Road and Trail System on the Mt. Tamalpais Watershed.

| ENVIRONMENTAL IMPACTS | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact | Sources |
|---|--------------------------------|---|------------------------------|-----------|---------|
| 12. NOISE. Would the project result in: | | | | | |
| a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance or applicable standards of other agencies? | | | | √ | A, L |
| b) Exposure of persons to or generation of excessive ground borne vibration or ground borne noise levels? | | | √ | | A, L |
| c) Substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project? | | | | √ | A |
| d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project? | | | √ | | A |
| e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels? | | | | √ | A, K |
| f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels? | | | | √ | A, K |

a) **No Impact.** The short-term noise that would be generated during project construction is discussed in 11.d below. Post construction, use of the area and any associated noise generation with that use would not change from current levels. No mitigation is required.

b) **Less than Significant Impact.** Ground borne vibration or noise is typically associated with earth moving activities or various types of pile driving; both are construction related activities. Depending on soil type, ground borne vibration can be generated from heavy equipment moving over large expanses of unpaved earth. Typically, most ground borne vibration and noise dissipate rapidly as the distance from the source increases. There are no structures that house residents or workers within ¼-mile of Azalea Hill, which is well beyond a distance over which ground borne vibration or noise would be perceptible. No mitigation is required.

Construction. Most of the work involved in re-routing trails and decommissioning non-system trails would be accomplished using hand labor and tools. As noted on Figure 3, there are select locations where the decommissioning work would involve the use of small equipment (similar to Bobcat branded tractors and excavators). Additionally, small equipment would be used to construct the footings for the bridges, re-routing and storm-proofing Liberty Gulch Road and re-grading the parking lot. It is projected that the work involving the use of small power equipment would require no more than 800-hours over the overall construction of the proposed project. Further, the use of small power equipment would be spread over several years in all likelihood, since project implementation is closely tied to grant and similar off-budget resources. All work would be conducted during daylight hours, and access by non-construction personnel would be limited (for

assurance of visitor safety) and at most of brief duration. As such, exposure to protracted periods of ground borne vibration or noise would be very limited, if at all. No mitigation is required.

Operation. After full implementation of the proposed project, there would be no on-site source of activities that would generate ground borne vibration or noise. No mitigation is required.

- c) **No Impact.** The project area is part of the 18,600-acre Mt. Tamalpais watershed, which except for routine maintenance activities, is generally devoid of urban noise influences. The proposed project is limited to re-routing of existing open space trails, decommissioning of non-system trails, and general open space restoration activities. No aspect of the proposed project would result in activities or operations that would include new or additional sources of noise when compared to the existing conditions. No mitigation is required.

- d) **Less than Significant Impact.**

Construction. As noted, most of the work to implement the proposed project would be accomplished with manual labor and hand tools. Small heavy equipment would be used to decommission select locations of non-system road and to construct footings for the bridges, re-route and stormproof Liberty Gulch Road and re-grade the parking lot. During use of the small equipment, there would be noise generated that would exceed ambient levels for the area.

The evaluation of project construction noise is based on typical noise level emissions. The Federal Highway Administration (FHWA) Construction Noise Handbook includes a listing of typical noise levels for construction activities. Average noise levels for the types of construction equipment expected on site are:

- Compressor – 78 dBA @ 50 feet
- Mini Excavator – 85 dBA @ 50 feet
- Medium Excavator – 85 dBA @ 50 feet
- Small Dozer – 83 dBA @ 50 feet
- Roller Compactor – 74 dBA @ 50 feet
- Pickup truck – 75 dBA @ 50 feet

This above information is an average value; typically the magnitude of construction noise emission varies over time because construction activity is intermittent and power demands on construction equipment (and the resulting noise output) are cyclical.

Section 6.70.030(5) of the Marin County Municipal Code establishes limitations on the hours of construction as a means of ensuring a minimum of noise generation associated with construction activities.

- a. *Hours for construction activities and other work undertaken in connection with building, plumbing, electrical, and other permits issued by the community development agency shall be limited to the following:*
- i. *Monday through Friday: seven a.m. to six p.m.*
 - ii. *Saturday: 9 am to 5 pm*
 - iii. *Prohibited on Sundays and Holidays (New Year's Day, President's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, and Christmas Day.)*

Section 6.70.030(5)(c)(ii) establishes a “*Special exceptions to these limitations may occur for*” “*Construction projects of city, county, state, other public agency, or other public utility.*”

The nearest habitable structure to the Azalea Hill area is the District-owned Sky Oaks Ranger Residence, a distance of more than ½ -mile. The most probable user group who could be impacted by temporary and intermittent construction noise would be trail users who frequent the Azalea Hill area. However, Azalea Hill is part of the larger 18,600-acre Mt. Tamalpais watershed which affords considerable alternative recreational trail areas should users experience impact levels deemed personally unacceptable, but which do not exceed County-established standards for construction activities.

The compliment of power equipment expected to be used for the project’s construction coupled with the District’s intent to conform to the construction hour limitations outlined by Marin County, and the fact that active construction areas would be closed to watershed users, would ensure that any increase in the ambient noise level of the area would be minimal and of short duration. No mitigation is required.

Post-Construction. Following completion of project construction there would be no noise generated by the project that would differ from current conditions. No mitigation is required.

- e, f) **No Impact.** Azalea Hill and the surrounding area is not located within an airport land use plan, within two miles of a public use airport, or within the general vicinity of a private airstrip. Additionally, the proposed project does not include housing or other facilities that would harbor employees. No mitigation is required.

| ENVIRONMENTAL IMPACTS | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact | Sources |
|---|--------------------------------|---|------------------------------|-----------|---------|
| 13. POPULATION AND HOUSING. Would the project: | | | | | |
| a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)? | | | | √ | A, K |
| b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere? | | | | √ | A, K |
| c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere? | | | | √ | A, K |

- a) **No Impact.** The proposed project is limited to re-routing of existing open space trails, decommissioning of non-system trails, and general open space and habitat restoration activities. The proposed project does not include the construction of housing units nor changes to public road or utility systems that in turn would induce any population growth. No mitigation is required.
- b, c) **No Impact.** There is no housing on, nor population inhabiting the Azalea Hill area, and as such the proposed project would not displace people or housing. No mitigation is required.

| ENVIRONMENTAL IMPACTS | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact | Sources |
|---|--------------------------------|---|------------------------------|-----------|---------|
| 14. PUBLIC SERVICES. Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities or need for new or physical altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the public services: | | | | | |
| a) Fire protection? | | | | √ | A, K |
| b) Police protection? | | | | √ | A, K |
| c) Schools? | | | | √ | A, K |
| d) Parks? | | | | √ | A, K |
| e) Other public facilities? | | | | √ | A, K |

a-e) **No Impact.** The proposed project is limited to re-routing of existing open space trails, decommissioning of non-system trails, and general open space and habitat restoration activities. The proposed project does not include the construction of any structures or facilities, nor include housing that might generate additional demands on public schools, that would require a net increase in public services. Furthermore, the adoption and conversion of the Liberty Gulch Road, and the addition of improved trail marker signage, would improve ranger patrol and emergency response in the area. No mitigation is required.

| ENVIRONMENTAL IMPACTS | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact | Sources |
|--|--------------------------------|---|------------------------------|-----------|---------|
| 15. RECREATION. Would the project: | | | | | |
| a) Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated? | | | | √ | A, K |
| b) Include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment? | | | | √ | A, K |

a) **No Impact.** The Azalea Hill project area is used for passive recreation currently, and would be available for passive recreation activities during and after complete project implementation. Adopting and converting the existing Liberty Gulch Road would provide an additional route for recreationists in the area, improving connectivity in the area for all users, District staff, emergency response personal and recreationalists (hiker, bicyclists and equestrians). This additional route would, in part, reduce the recreational demand on other areas of Azalea Hill thereby allowing those areas currently being deteriorated to be restored to natural habitat. While some portions of

the area may be closed during project implementation, between those areas that remain open and the remainder of the 18,600-acre Mt. Tamalpais there would be an abundance of alternatives to offset any temporary closures in the project area within impact. No mitigation is required.

- b) **No Impact.** The proposed project includes work on recreational facilities in the form of road and trail upgrades, conversions and realignments. Other project elements include decommissions of non-system roads and trails, and the installation of puncheons and bridges to provide crossing drainages and creeks. As noted, the overarching purpose of the project is to restore natural habitat and reduce erosion and sedimentation from the site, which is considered to be a positive effect on the environment which outweighs the temporary construction related impacts of the project or expansion of the recreational elements of the project. Project construction could produce short-term, temporary impacts, all of which can be mitigated to a level of less than significant with implementation of mitigation measures identified throughout this Initial Study. No additional mitigation is required.

| ENVIRONMENTAL IMPACTS | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact | Sources |
|---|--------------------------------|---|------------------------------|-----------|---------|
| 16. TRANSPORTATION/TRAFFIC. Would the project: | | | | | |
| a) Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit? | | | | √ | A, K |
| b) Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways? | | | | √ | A, K |
| c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location, that results in substantial safety risks? | | | | √ | A, K |
| d) Substantially increase hazards due to a design feature (for example, sharp curves or dangerous intersections) or incompatible uses (for example, farm equipment)? | | | | √ | A, K |
| e) Result in inadequate emergency access? | | | | √ | A, K |
| f) Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities? | | | | √ | A, K |

- a, b) **No Impact.** Vehicular access to the Azalea Hill area is available off of Bolinas-Fairfax Road at the Azalea Hill parking lot and from Bullfrog Road (for District vehicles only) (**Figures 1 and 6**).

Construction. Implementation of the proposed project would be periodic and likely span several years since it is dependent on funding from both the District and outside sources. At any one time

the number of construction vehicles needed for the project would be minimal. Hand-tool work would likely be served by one or two crew trucks. During activities involving small heavy equipment it would be expected that 2-3 crew trucks and a lowboy truck to deliver the equipment to and from the site. Access to the area would be divided between Bolinas-Fairfax Road and from Bullfrog Road. Bullfrog Road is an unpaved roadway on the Mt. Tamalpais watershed and is open only to District vehicles, and as such is not covered by any plan or performance standard.

The addition of at most 4 vehicles on any one day along Bolinas-Fairfax Road for a few days each of the next several years would not be discernible within the context of existing traffic volumes on the area's network.

Typical construction days would tend to have construction traffic concentrated at the beginning and end of the workday. Development along the roadway network leading to the project site is low density residential. The project area's roadway network traffic volumes would not be marginally impacted by construction activities.

Because the construction period is expected to be periodic and span several years and is temporary, there would be no conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit. Further, there would be no conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways. No mitigation is required.

Operation. Following construction, the number and frequency of motor vehicle trips associated with operation and maintenance of the Azalea Hill area would be unchanged from existing conditions. The number of parking spaces would remain the same. The Marin Countywide Plan and Marin County's Congestion Management Program contain policies to encourage non-motor vehicle modes of travel. It is expected that more bicyclists and district patrol vehicles (ATVs) would use Liberty Gulch Road to traverse from the lakes area to the Pine Mountain area thereby removing some of these users from Bolinas-Fairfax Road for a distance of about 1.5 miles to 3.5 miles, depending upon what route they take. Reducing the number of the District's truck and trailer trips, and the number of bicyclists on Bolinas-Fairfax road is considered a positive impact on transportation and traffic. No mitigation is required.

- c) **No Impact.** The proposed project is not adjacent to or beneath the flight path of any existing airports. No mitigation is required.
- d) **No Impact.** The proposed project does not include any modifications to or construction of new public roadways. As mentioned above in 16a-b, the project is expected to reduce the number of District vehicles and bicyclists on Bolinas-Fairfax Road, a positive impact on transportation and traffic. No mitigation is required.
- e) **No Impact.**

Construction. Construction vehicles and material deliveries would utilize the existing roadway network on the watershed and along Bolinas-Fairfax Road to travel to and from the project site. There would be no material staging on any of the local public roadways; the project's construction would not impede the movement of emergency vehicles or otherwise hamper emergency response activities since there is no access. The movement of construction-related vehicles along the

roadway network leading to the project site would have no greater or lesser impact on the movement of emergency vehicles than would any other vehicle on the roadway network. No mitigation is required.

Operation. Following construction, the maintenance of the Azalea Hill area would be changed from the current pattern in that 4.4 miles of non-system roads and trails would be decommissioned and visitors would most likely use the re-routed Azalea Hill Trail or the adopted and converted Liberty Gulch Road. This would reduce the miles of roads and trails that need to be maintained and patrolled in the area (note: while non-system trails are not maintained in the traditional sense for user access, they still need maintenance to minimize their erosion and impacts on native habitats). Furthermore, the adoption and conversion of the Liberty Gulch Road, and the addition of improved trail marker signage, would improve ranger patrol and emergency response in the area. No mitigation is required.

- f) **No Impact.** The proposed project would re-route several existing open space roads and trails, decommissioning non-system roads and trails, and also include general open-space and habitat restoration activities. Additionally, the project includes the amendment of the District's RTMP for the adoption and conversion of the Liberty Gulch Trail. No element of the Azalea Hill as it currently exists or as it would after full implementation of the proposed project would affect public transit. Equestrian, bicycle and hiking (pedestrian) facilities would be improved by the addition and conversion of the Liberty Gulch Road to a Class VI, or small vehicle road, and the re-route of the Azalea Hill Trail to a gentler, more sustainable grade. Furthermore, the performance (sediment reduction, habitat restoration and protection) of these "facilities" on Azalea Hill would be improved. Similarly, safety would be improved throughout the length of the route, speed calming features (i.e. changes in elevation (e.g. earthen speed bumps), lane narrowing, diagonal diverters using local logs or rocks, etc.) would be maintained or installed to reduce the downhill speed of bicyclists. Passing opportunities, lines of sight and horse-friendly tread surfaces would also be included throughout the design to improve user safety along the route.

With the adoption of the amendment of the RTMP for Azalea Hill, the project is consistent that plan. Furthermore, all other actions associated with the project are consistent with the RTMP in that they: (1) strictly minimizing road and trail related erosion into creeks and reservoirs, (2) reduce their impact of the road and trail network (both system and non-system trails) on environmentally sensitive habitats, and (3) reduce their impact on the Watershed's natural ecological functions. Construction and operational impacts associated with the project, all of which can be mitigated to a level of less than significant with implementation of "Best Management Practices" and "Environmental Protection Measures" identified in the RTMP (Chapter 3), and mitigation measures identified throughout this Initial Study, would ensure the project remains consistent with the RMTP. The project is also consistent with the policies in the Marin Countywide Plan and Marin County's Congestion Management Program that encourage non-motor vehicle modes of travel. No additional mitigation is required.

| ENVIRONMENTAL IMPACTS | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact | Sources |
|---|--------------------------------|---|------------------------------|-----------|---------|
| 17. TRIBAL CULTURAL RESOURCES. Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is: | | | | | |
| a) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k)? | | | √ | | H |
| b) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe? | | | √ | | H |

a, b) **Less Than Significant.** Less Than Significant: As part of the tribal consultation process with Native American groups and individuals, as per CEQA (PCR section 21080.3.1) MMWD sent letters on January 26, 2017, to the Federated Indians of Graton Rancheria (FIGR) who are listed by the Native American Heritage Commission and who are identified as the California Native American tribe that is traditionally and cultural affiliated with the Project area. Letters were sent to Greg Sarris, FIGR Chairperson, Gene Buvelot, FIGR member, and Buffy McQuillen, FIGR Tribal Heritage Preservation Officer (THPO). Included in the correspondence were the Project description and Project maps, with the request that MMWD be notified of any information or concerns about the Project. On February 21, 2017 Dain Anderson, MMWD Environmental Compliance Manager received a letter from B. McQuillen requesting formal tribal consultation under the provisions of CEQA. On March 14, 2017 MMWD (Dain Anderson and Nick Salcedo), GANDA (Cassidy DeBaker), and FIGR representatives (Tim Campbell and Gene Buvelot) met to discuss the details of the proposed restoration Project including topics such as, potential project alternatives, mitigation measures, project effects and the results of the archaeological research and field efforts. On July 20, 2017, C. DeBaker contacted Buffy McQuillen to follow up on the previous meeting held in March 2017. At that time, B. McQuillen stated that the tribe did not have any project-specific requests, however she would like to receive a copy of the cultural resources report for review. An electronic copy of the technical report was emailed to FIGR on September 5, 2017.

Based on the results of the cultural resources investigation and consultation with FIGR, no tribal cultural resources have been identified within the Project area. In the event that Native American resources or prehistoric archaeological resources are identified during construction, adhere to measures protocols and described under Section 5b and 5d.

| ENVIRONMENTAL IMPACTS | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact | Sources |
|---|--------------------------------|---|------------------------------|-----------|---------|
| 18. UTILITIES AND SERVICE SYSTEMS. Would the project: | | | | | |
| a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board? | | | | √ | A, K |
| b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction or which could cause significant environmental effects? | | | | √ | A, K |
| c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects? | | | | √ | A, K |
| d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed? | | | | √ | A, K |
| e) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments? | | | | √ | A, K |
| f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs? | | | | √ | A |
| g) Comply with federal, state, and local statutes and regulations related to solid waste? | | | | √ | A, K |

- a-e) **No Impact.** The proposed project is limited to re-routing of existing open space trails, decommissioning of non-system trails, and general open space and habitat restoration activities. The proposed project does not include the construction of any structures or facilities that would require typical municipal services such as water, waste water collection and treatment, or storm water drainage systems. As such, implementation of the proposed project would have no negative effect on any utilities or service systems. No mitigation is required.
- f, g) **No Impact.** Implementation of the proposed project would not yield any construction debris that would be delivered to area landfills. No mitigation is required.

| ENVIRONMENTAL IMPACTS | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact | Sources |
|---|--------------------------------|---|------------------------------|-----------|---------|
| 19. MANDATORY FINDINGS OF SIGNIFICANCE. Does the project: | | | | | |
| a) Have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory? | | | √ | | |
| b) Have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of the past projects, the effects of other current projects, and the effects of probable future projects.) | | | √ | | |
| c) Have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly? | | | | √ | |

- a) **Less Than Significant Impact.** The proposed project would amend the Mt. Tamalpais Watershed Road and Trail Management Plan for the Azalea Hill area of the watershed. There are several protected terrestrial and avian species having the potential to occur within the project area and mitigation measures have been identified that would reduce project impacts to less than significant levels. Additionally, the project site does not include any structures or buried resources that would be considered an example of major periods of California history or prehistory. No further mitigation is required.
- b) **Less Than Significant Impact.** The proposed project would generate a series of individual impacts that could be potentially significant, but can be mitigated to less than significant levels with mitigation measures outlined in this Initial Study. Cumulatively, those potential impacts after mitigation would not be expected to combine to generate a potentially significant effect for the project by itself. No further mitigation is required.
- c) **No Impact.** Construction and operation of the proposed project would not have environmental effects which would cause substantial adverse effects on human beings, either directly or indirectly. No further mitigation is required.

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INFORMATION SOURCES

The following information sources were used in the preparation of this document and referenced throughout the Initial Study Checklist:

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- F. California Department of Toxic Substances Control "EnvironStor." [dtsc.ca.gov](http://www.dtsc.ca.gov). August 23, 2017. <http://www.envirostor.dtsc.ca.gov/public>. Path: Bon Tempe Lake.
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- H. DeBakker, Cassidy, M.A., McWaters, Josh, B.A., and Newland, Michael, M.A., Garcia and Associates, Cultural Resources Inventory and Evaluation Report for the Marin Municipal Water District Azalea Hill Restoration Project. August 2017.
- I. Federal Emergency Management Agency (FEMA). Flood Insurance Rate Map (FIRM), Marin County, California and Incorporated Areas, Flood Hazard Rate Map Community Panel No. 06041C0453D. May 24, 2009.
- J. Marin County Assessor-Recorder-County Clerk
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- L. Marin County. *Municipal Code, Chapter 6.70, Loud and Unnecessary Noises*.
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Amendment of the Mt. Tamalpais Watershed Road and Trail Management Plan – Restoration of Azalea Hill

MMWD Mt. Tamalpais Watershed, Unincorporated Marin County

Initial Study/Mitigated Negative Declaration – Appendix A

**Mt. Tamalpais Watershed Road and Trail Management Plan –
Restoration of Azalea Hill – Amendment**

Proposed Amendments to Chapter 2 of the *Mt. Tamalpais Watershed Road and Trail Management Plan*

Chapter 2: Developing the Official Road and Trail System

Page 2.8, Paragraph 5, Redundancy and Connectivity

The District took a very conservative approach in adopting any new routes for route connectivity. This approach resulted in only a very few adoptions (just over 1% percent of the old system) of stable, low impact and relatively well-known trails. ~~No~~ Only one non-system roads ~~were~~ was adopted for use as a small vehicle road. Before recommending a ~~trail~~ route for adoption, the District carefully considered each prospective route to see if it could possibly increase any undesirable effects on the Watershed. In some cases, the ~~trails~~ routes recommended for adoption were already signed by the District and received some sort of improvement work. In these cases, it is beneficial for the District to adopt these trails for good connectivity and to include them in the system for scheduled maintenance and patrol.

Page 2.11, Chart, Determining the Future of the Road and Trail Network

Add as a footnote to the chart:

Liberty Gulch Road is being adopted as a small vehicle road and therefore is being considered a trail for the purposes of this flow diagram

Page 2.13, Paragraph 2, Changes to the Old Road and Trail System

Noteworthy changes include the removal of redundant or unused roads in the vicinity of Peters Dam. Some other roads will be converted to Class IV, or small vehicle roads, to minimize erosion while still providing route connectivity. These include Grassy Slope Rd., Old Vee Rd., Lower Rocky Ridge, the southern portion of Concrete Pipe Rd., ~~and~~ Lower Eldridge Grade and Liberty Gulch Rd. A few roads will be converted to trails. Azalea Hill Rd. will be converted to a trail, mainly to keep cyclists from continuing beyond the road and down onto the trail, or worse, creating new trails that damage the environment and stress limited enforcement resources. A noteworthy area of decommissioning is in the Upper Berry-Lagoon Road area, primarily because of environmentally sensitive habitat concerns (serpentine soils), erosion and route redundancy that results in considerable search and rescue efforts. Most of the adoptions are on the periphery of the watershed and serve as established connectors to the near-by cities and towns. The decommissioning of Bald Hill Road and the end of Worn Springs Road, totaling approximately 0.15 miles, will be replaced with a new trail rerouted to a more stable

location. ~~No~~ Only one non-system roads ~~were~~ was adopted, Liberty Gulch Road, to improve connectivity for all users between the lakes area and the Pine Mountain area.

Page 2.17, Table 2.4, Non-System Routes to Become System - Adoptions

Add to Table 2.4 the following line:

| Name of Route | Existing Class: Road ort Trail | 1 st Level Action: System or Non-System | 2 nd Level Action: Convert, Decom, Reroute or Adopt | Criteria for Decisions | | | | Comments |
|-------------------------|--------------------------------|--|--|------------------------|-----------|---------|------|--|
| | | | | Water Quality | Redundant | Habitat | Cost | |
| <u>Liberty Gulch Rd</u> | <u>Road</u> | | <u>Adopt 9,978 ft</u> | <u>X</u> | | | | <u>Important connector, Improve drainage</u> |

Page 2.29, Table 2.5, Road Classifications on the Watershed

Change the total miles for Class IV and the Total as follows:

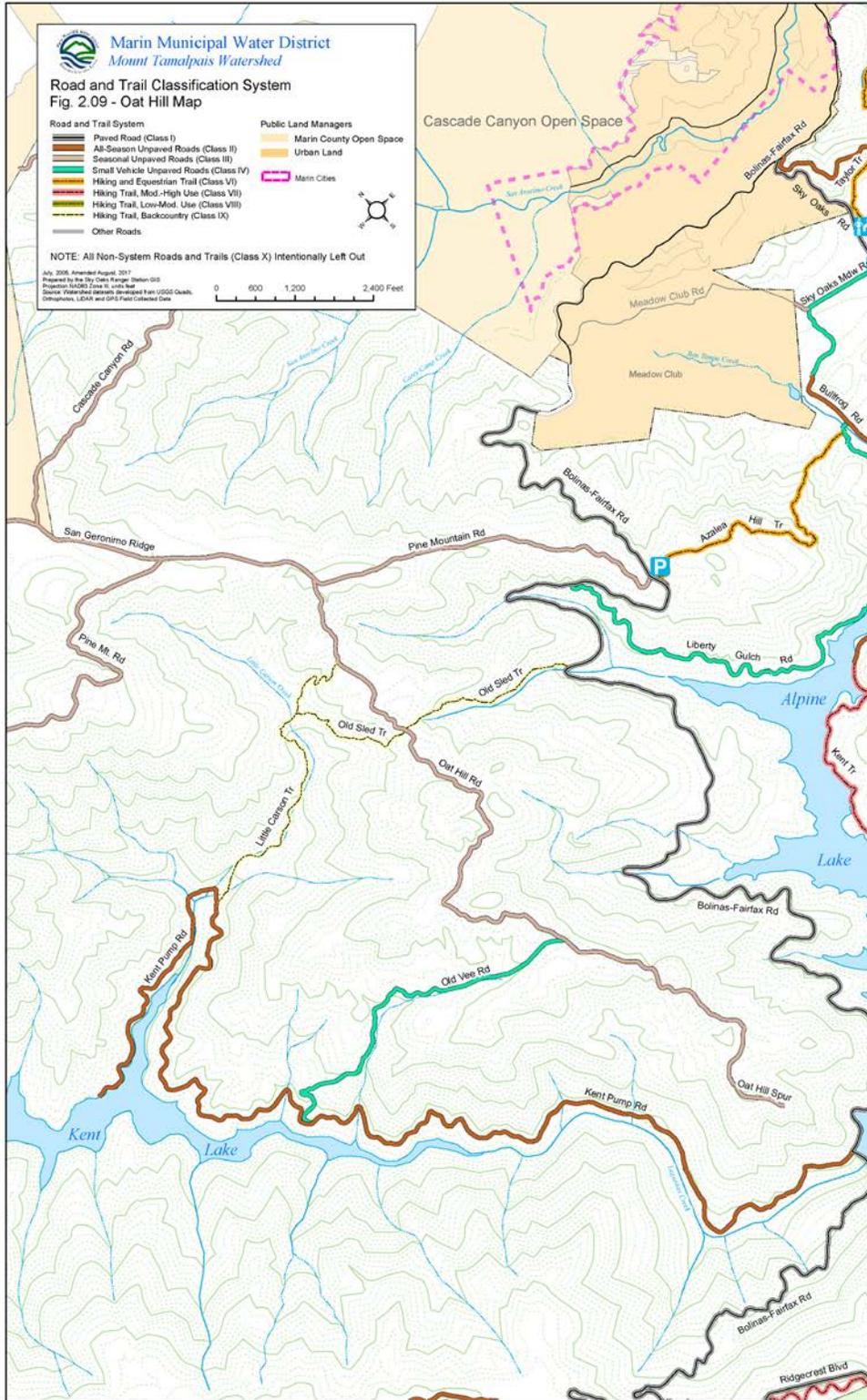
| Classification | Road Type | Characteristics | Miles |
|------------------|------------------------------|---|--------------------------------|
| Class I | Paved Roads | High traffic volumes, year round access to critical facilities, main ingress and egress routes for the Watershed. | 17.6 |
| Class II | All Season Unpaved Roads | Receive regular use, typically have hardened surfaces, provide access to important water infrastructure and for important Watershed management. | 44.2 |
| Class III | Seasonal Unpaved Roads | Serves as emergency and recreational access. Typically, unsurfaced, narrower than Class I and II roads. Closed to vehicle traffic in the winter. | 24.5 |
| Class IV | Small Vehicle, Unpaved Roads | Primary use for patrol and route connectivity. Unsurfaced. Some sections only passable with small vehicles (i.e. ATV quads or small “bobcat” sized tractors). Limited truck and heavy vehicle traffic. Seasonal closures may apply. | 4.5 <u>6.5</u> |
| Class V | Restricted Roads | Roads with special use restrictions (e.g. FAA facility) | 3.7 |
| | | Total | 94.5 <u>96.5</u> |

Page 2.30, Table 2.6, Trail Classifications on the Watershed

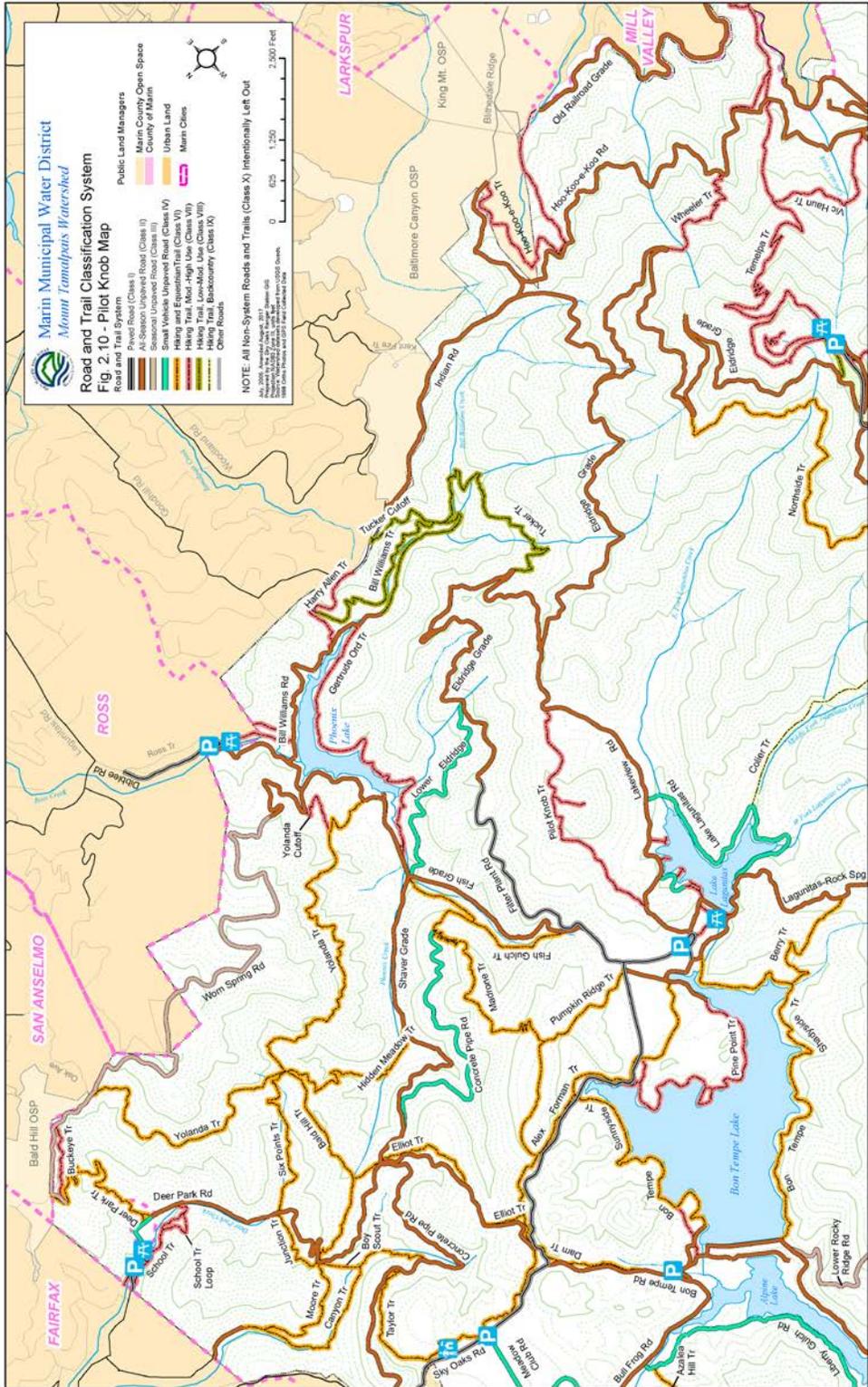
Change the total miles for Class VI and the Total as follows:

| Classification | Road Type | Characteristics | Miles |
|----------------|----------------------------|---|-----------------------------|
| Class VI | Equestrian Trails | Substantial infrastructure improvements required to support use. Seasonal closures may apply. | 17.8 <u>18.3</u> |
| Class VII | High Use Hiking Trails | Hikers only. High to medium level of use and maintenance. Can be an important trail connector. Infrastructure improvements consistent with use levels. | 26.2 |
| Class VIII | Moderate Use Hiking Trails | Hikers only. Medium to low level of use. Not an important trail connector. Little to no trail infrastructure improvements. Seasonal closures may apply. | 11.8 |
| Class IX | Backcountry Trails | Hikers only. Low level of use. Minor maintenance. Not important trail connectors. Rustic-style trail infrastructure improvements only. Typically farthest from parking areas and towns. | 1.7 |
| Class X | Reserved | This classification reserved for future use. | n/a |
| | | Total | 57.5 <u>58.0</u> |

Page 2.33, Figure 2.09 Oat Hill Classifications



Page 2.35, Figure 2.10 Pilot Knob Classifications



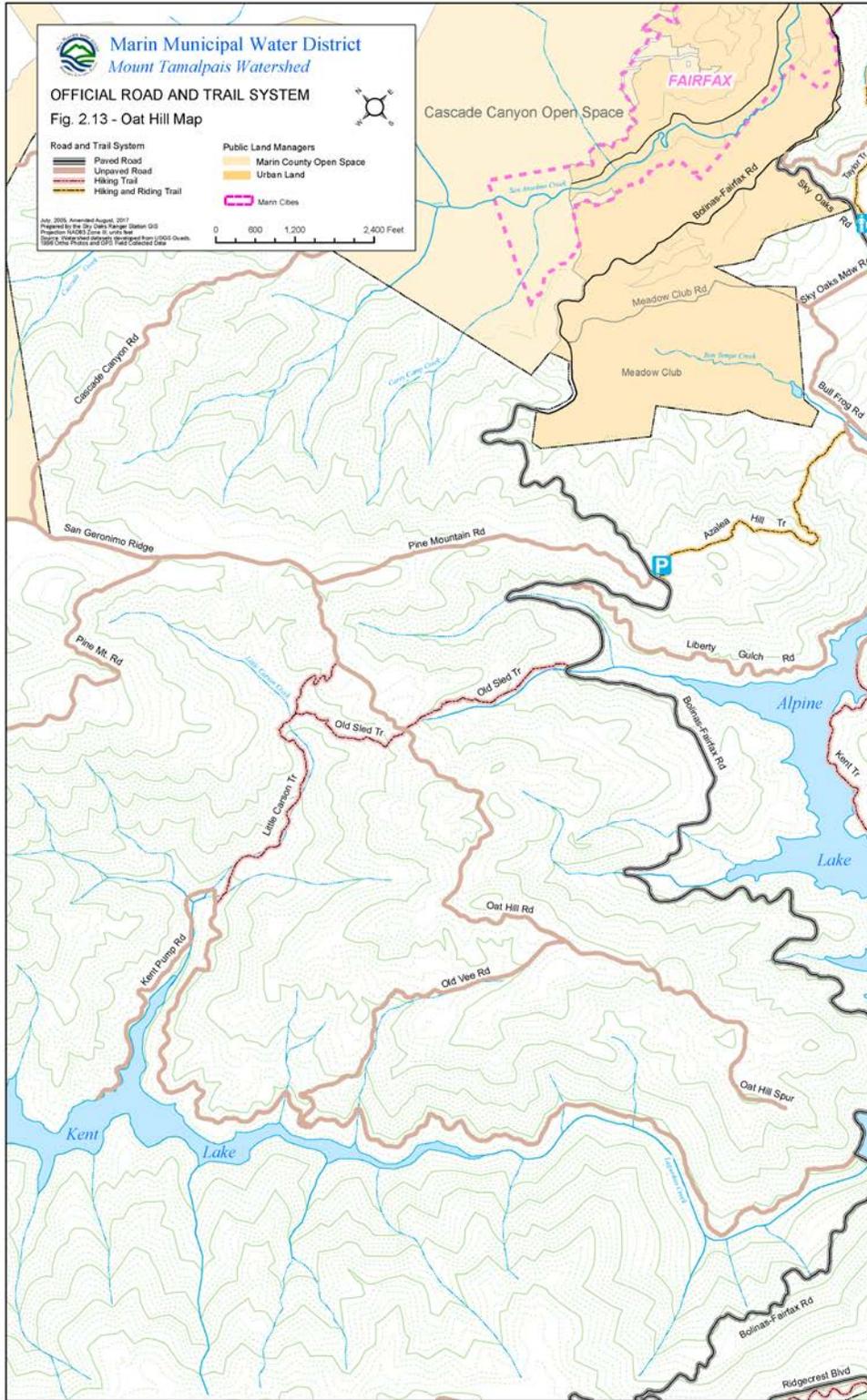
Mar 8 Aug, 2017 - Amstl - Fig. 2.10_PilotKnobClassMap path-

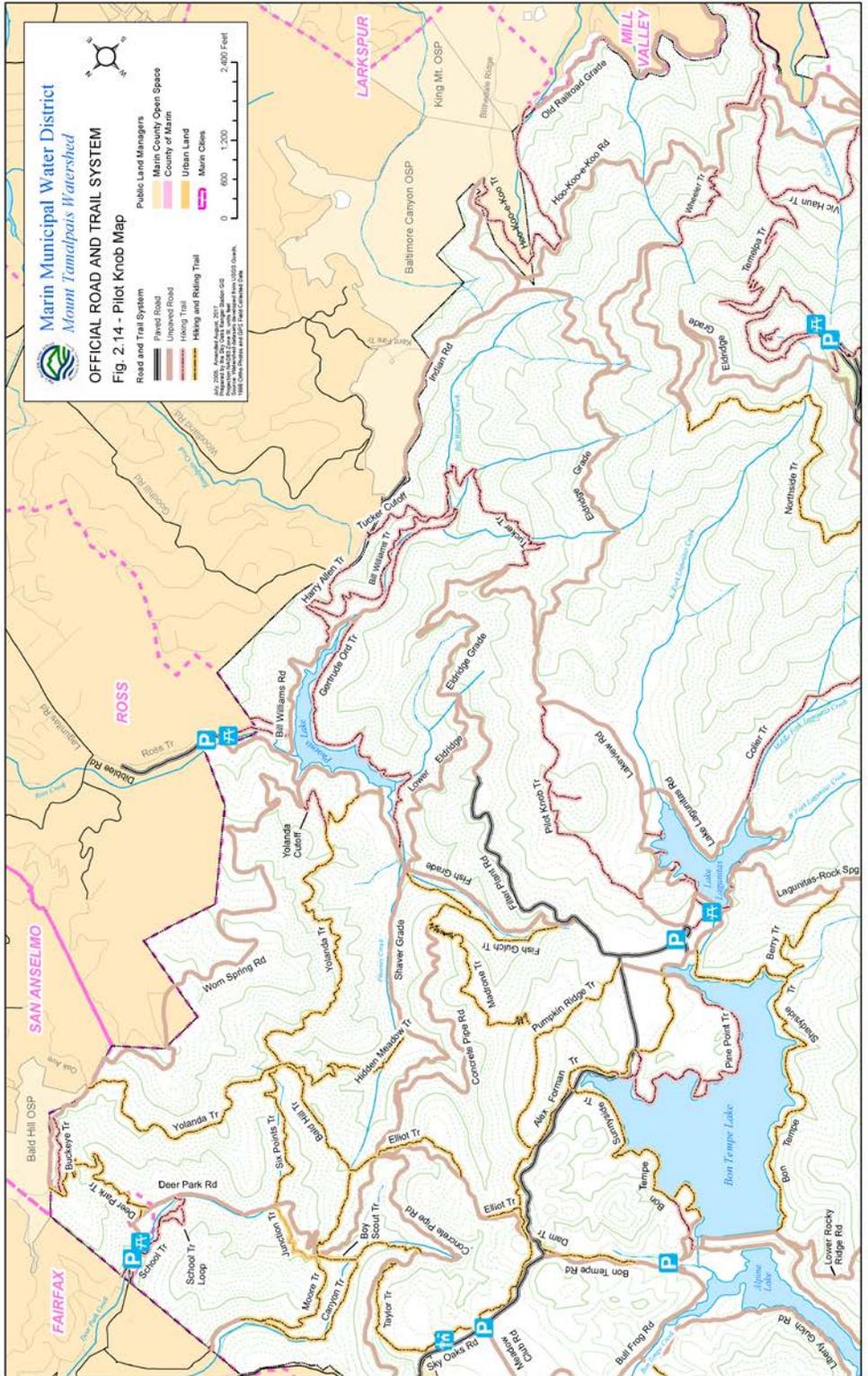
Page 2.39, 2.4 The Official System of Roads and Trails

As a result of the process detailed above, the District developed this current plan for the officially recognized system of roads and trails on the Watershed. The official system of roads and trails, after the changes, will include ~ ~~91~~93 miles¹ of roads and ~ ~~57.5~~58 miles of trails. This amount is similar to the ~ 90 miles of roads and ~ 54 miles of trails identified by the District as part of the old road and trail system. However, consistent with some of the goals, objectives and assumptions in this Plan, it represents a reduction in the number of routes when compared to the ~ 100 miles of roads and ~ 110 miles of trails that were identified on the Watershed as part of this planning effort.

¹ Does not include the 3.7 miles of "Restricted Roads," (Class V) which are not available to the general public for recreational use.

Page 2.43, Figure 2.13 Oat Hill Visitor Map





Map 12 Aug. 2017 -Amnd1.Fig_2.14_PilotKnobVisitorMap.pdf

Amendment of the Mt. Tamalpais Watershed Road and Trail Management Plan – Restoration of Azalea Hill

MMWD Mt. Tamalpais Watershed, Unincorporated Marin County

Initial Study/Mitigated Negative Declaration – Appendix B

Biological Evaluation Report

PACIFIC BIOLOGY



635 Carmel Avenue, Albany, CA 94706

**AZALEA HILL RESTORATION PROJECT
BIOLOGICAL EVALUATION REPORT**

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August 2017

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EXECUTIVE SUMMARY

The Marin Municipal Water District (District or MMWD) is proposing the Amendment of the Mt. Tamalpais Watershed Road and Trail Management Plan – Restoration of Azalea Hill. The project would:

1. Amend the *Mt. Tamalpais Watershed Road and Trail Management Plan* for the Azalea Hill area;
2. Remove approximately 4.4-miles of non-system roads and trails and restore those routes to natural conditions to improve habitat and water quality;
3. Adopt and improve an approximately 1.9-mile route as an unpaved, approximately 4-foot-wide, small vehicle (e.g., ATV), or multi-use route (comprised of the existing Liberty Gulch Road [1.2 mi] and conversion of some existing non-system trails [0.7 mi] to the wider, small vehicle route);
4. Improve the existing, approximately 1.1-mile hiking and horse route over Azalea Hill to fix its erosion problems and make it more sustainable; and
5. Treat the Azalea Hill parking lot to fix its erosion problems and improve the visitor amenities serving Azalea Hill.

The Azalea Hill Restoration Project's goals are to (1) restore habitat, including sensitive serpentine habitats, by removing unnecessary roads and trails; (2) provide environmentally sensitive routes (i.e. routes that avoid environmentally sensitive areas wherever possible); (3) improve the visitor experience; and (4) ensure the routes are sustainable, and designed and managed in a manner that strictly minimizes erosion and water quality impacts.

Upon its completion, the project would prevent up to an estimated 219 cubic yards (CY) of sediment from entering Azalea Hill's creeks or Alpine Lake annually (or 4,377 CY over 20 years), and would restore approximately one acre of habitat.

With the implementation of avoidance measures, potential impacts to federally listed wildlife species would be avoided. California red-legged frog (*Rana draytonii*), a federally Threatened species, has not been documented within four miles of the project site. However, as potentially suitable habitat is present, avoidance measures will be implemented to protect the species during construction activities. The project site is located entirely within designated critical habitat for the northern spotted owl (*Strix occidentalis caurina*), a federally Threatened species. Impacts to

this species and its habitat are not expected to occur because suitable nesting habitat does not occur on or adjacent to the project site, and no activity centers have been documented within 0.5 mile of the site. Bon Tempe Creek and the other drainages on the project site are inaccessible to steelhead (*Oncorhynchus mykiss*) and coho salmon (*Oncorhynchus kisutch*) due to reservoir dams and other downstream barriers, and no construction activities are proposed within creeks that could otherwise potentially be used by these species.

Other special-status wildlife species with potential to occur on the project site include foothill yellow-legged frog (*Rana boylei*), western pond turtle (*Actinemys marmorata*), numerous bird species, several bat species, and American badger (*Taxidea taxus*). The implementation of the recommended avoidance measures would protect these species during construction activities.

The project site supports several special-status plant populations, and provides high-quality habitat for additional special-status species. The proposed project would remove approximately 4.4-miles of non-system roads and trails and restore those routes to natural conditions to improve habitat. Many of the non-system trails traverse serpentine habitats known to support special-status plant populations. The unauthorized use of these trails degrades habitat quality for special-status plants and native plants in general, and can result in direct impacts via trampling or other disturbances to special-status plants. Therefore, in the long term, the proposed closing and restoration of non-system trails would benefit special-status plants and sensitive plant communities. The proposed project has also been designed to minimize impacts to sensitive plant communities (which are associated with special-status plants) and would avoid large stands of serpentine chaparral and native grasses. Avoidance measures would be implemented to avoid impacts to federally listed plants and to minimize and compensate for impacts to other special-status plant species. Avoidance measures would also be implemented to protect sensitive plant communities and to restore temporarily disturbed habitats.

The proposed project includes constructing or improving 25 stream crossings, using clear span bridges, puncheons, and/or armored wet crossings. At one site (Site 30), an existing culvert will be slip-lined to prolong its life. The stream crossing sites are generally unvegetated and the improvements would serve to address existing erosion problems and prevent future erosion problems. Therefore, in the long term, the proposed stream crossing improvements would serve to reduce erosion and to protect habitats. Construction within seeps/wetlands would be limited to two sites and would include the placement of approximately 15 CY of rock in a seep (Site 42) and 25 CY of rock in another seep (Site 45); the seeps are currently within existing trails and the rock would facilitate crossing the seeps with minimal disturbance. Avoidance measures would be

implemented to protect jurisdictional resources during construction, and impacts to wetlands would be compensated for through removing existing trails from wetlands, facilitating crossings of seeps to minimize ongoing disturbances, and the implementation of the other required measures.

1.0 INTRODUCTION

Pacific Biology conducted a biological habitat evaluation of the Azalea Hill Restoration Project (project site), located in Marin County, California. The purpose of this biological habitat evaluation is to review the proposed project in sufficient detail to determine to what extent the proposed action may affect any federally listed Threatened or Endangered species or their designated critical habitat, species proposed to be federally listed, or other species or biological resources considered to be of special-status under the California Environmental Quality Act (CEQA). The evaluation identifies and characterizes onsite and surrounding habitats; assesses the potential of these habitats to support special-status plant and wildlife species; identifies all wetlands, riparian areas, and other sensitive habitats present; evaluates potential project-related impacts to sensitive biological resources; and identifies feasible mitigation and avoidance measures to protect sensitive biological resources.

The project site is an approximately 2.97-mile stretch of existing and proposed trails and fire roads that straddle the base and ridges of Azalea Hill. The study area that was surveyed in support of this document consists of buffers surrounding the existing and proposed roads and trails, with roads buffered by 25 feet on either side, and trails buffered by 10 feet on either side. The total size of the study area is 15.5 acres.

2.0 PROJECT LOCATION

The project site is located on Azalea Hill, approximately 4 miles west-southwest of the Town of Fairfax, in Marin County, California (**Figure 1**). Azalea Hill is an approximately 370-acre area of the Mt. Tamalpais watershed bordered by Bon Tempe Creek and the Sky Oaks/Bullfrog area to the east, Alpine Lake to the South, Liberty Gulch, Bolinas-Fairfax Road and the Pine Mountain area to the west and the Meadow Club golf course further to the north. The project site is approximately 6.5 air miles from the Pacific Ocean and is mapped on the San Rafael and Bolinas USGS 7.5-minute topographic quadrangles. Elevation ranges from 646 feet along the shore of Alpine Lake to 1,217 feet at the high point of the project site (USGS 1997). The approximate centroid of the project site is -122° 37' 12.8" longitude and 37° 57' 34.8" latitude.

The site may be accessed from State Highway 101 by exiting at Sir Francis Drake Boulevard in Larkspur, and heading northwest on Sir Francis Drake to the town of Fairfax, then turning left (southwest) onto Bolinas Road in central Fairfax—this road becomes Bolinas-Fairfax Road in the vicinity of the Meadow Club Golf Course, near the study area. The study area is most easily accessed from a parking lot along Bolinas-Fairfax Road, approximately four miles southwest of the intersection of Sir Francis Drake Boulevard and Bolinas Road.

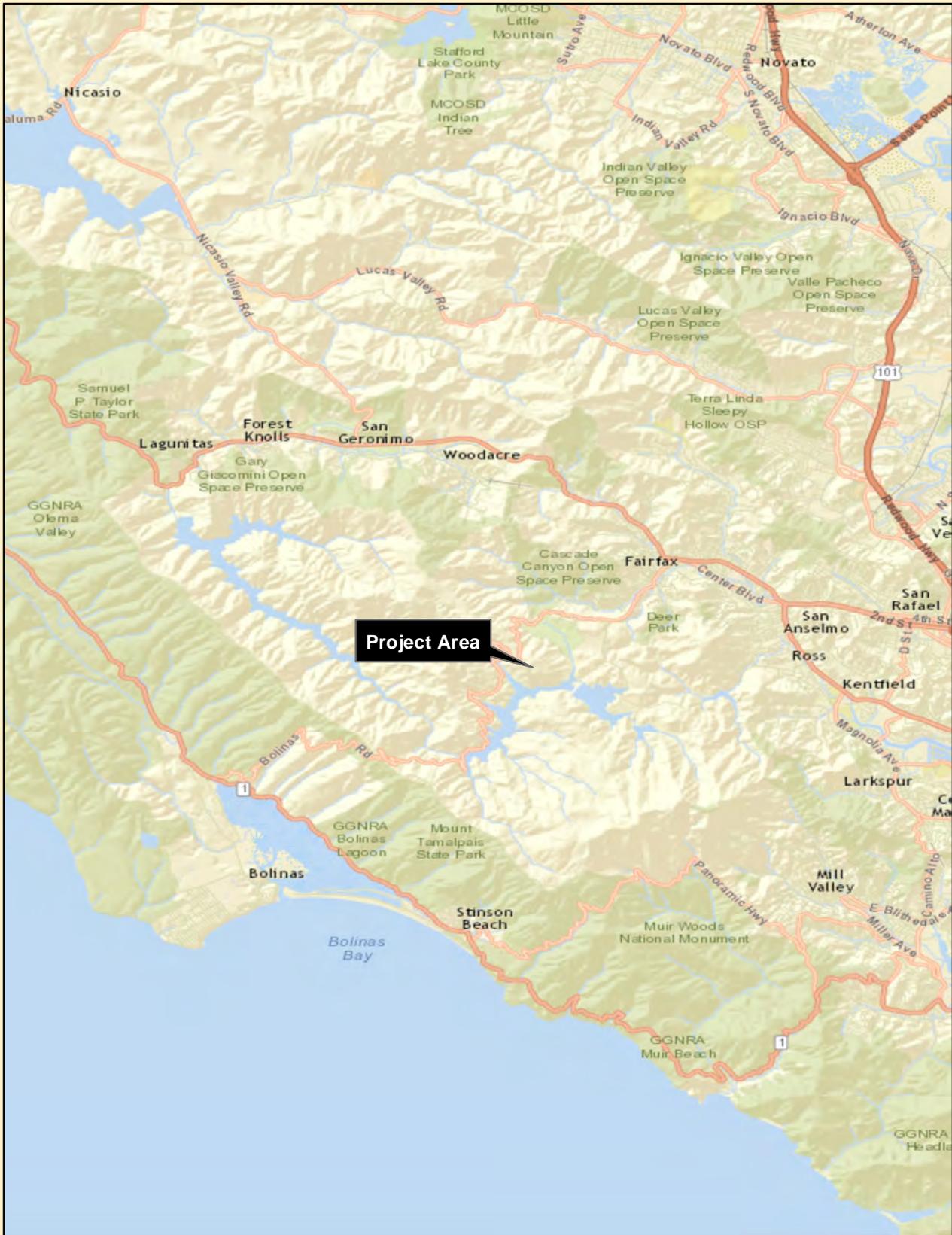
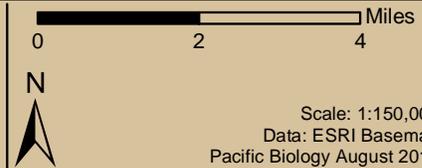


FIGURE 1
REGIONAL LOCATION
Azalea Hill Restoration Project



At a regional scale, Azalea Hill is situated within the outer Coast Range Province of California, and is mapped within the Jepson Manual's San Francisco Bay Area ecological subregion (SnFrB) (Baldwin et al. 2012). The SnFrB subregion is defined as encompassing a wide diversity of vegetation types, "from very wet redwood forest to dry oak/pine woodland and chaparral" (Baldwin et al. 2012).

3.0 PROJECT DESCRIPTION

Project Overview and Proposed Improvements

The Marin Municipal Water District (District or MMWD) is proposing the Amendment of the Mt. Tamalpais Watershed Road and Trail Management Plan – Restoration of Azalea Hill. The project would:

1. Amend the *Mt. Tamalpais Watershed Road and Trail Management Plan* for the Azalea Hill area;
2. Remove approximately 4.4-miles of non-system roads and trails and restore those routes to natural conditions to improve habitat and water quality (see **Appendix A, Figure 3**). This work would generally be accomplished by uncompacting the trail tread with hand tools (picks, McLeods, or shovels), then raking adjacent top soil, duff and leaf litter on top of the decommissioned tread to aid its re-vegetation. There are two sites where equipment would be used to do the restoration work, one at a spur road at its intersection with Liberty Gulch Road near the bottom of the hill, the second at the upper end of the Azalea Hill Road.
3. Adopt and improve an approximately 1.9-mile route as an unpaved, approximately 4-foot-wide, small vehicle, or multi-use route (comprised of the existing Liberty Gulch Road (1.2 mi) and conversion of some existing non-system trails (0.7 mi) to the wider, small vehicle route) (see **Appendix A, Figure 4**). Key components include:
 - At Bullfrog Road, convert approximately 0.4 mile of an existing non-system trail to an approximately four-foot-wide Class IV road. Two 40-foot-long bridges, and two puncheons would be installed along this section, all of which would be clear span construction so there would be no construction in the creeks or ephemeral drainages.
 - Adjacent to Alpine Lake, convert approximately 0.3 mile of an existing, non-system, "fishing access" trail to an approximately four-foot-wide Class IV road. One 20-foot-long bridge, one puncheon, and two armored rock crossings would be installed to cross the four small creeks along this section.

Additionally, a second 16-foot-long bridge would be constructed over an old “dam pit,” which is a remnant of an old dam that was never completed.

- Once the route meets the old Liberty Gulch Road, the next approximately 1.2 miles would need little in the way of tread improvements except near the upper end. The majority of the work here would be to address the old road’s drainage issues by implementing best management practices from the Mt. Tamalpais Road and Trail Management Plan (RTMP) (storm-proof creek crossings, critical and rolling dips, outsliping, etc.). Fifteen creek crossing sites would be upgraded along this section to strictly minimize their erosion potential. Nine of the upgrades would be armored rock crossings, two would be puncheons, one would be a bridge and one existing culvert would be slip-lined to prolong its lifespan. At two sites which include springs, a combination of armored rock crossings and four-foot-wide causeways (set back from the fill slope) would be constructed. Lastly, one section of gullied road would be treated with rolling dips and one landslide would be mitigated by pulling its unstable fills and de-watering the road above with outsliping and rolling dips. Near the top of the old Liberty Gulch Road a pile supported bridge or trestle would be constructed across the unstable scree slope left over from the construction of Bolinas-Fairfax Road above. Lastly, at its intersection with Bolinas-Fairfax Road, and generally within the existing alignment of the route, a new approach and landing would be graded to provide a better, more sustainable connection to Bolinas-Fairfax Road.
4. Improve the existing, approximately 1.1-mile hiking and horse route over Azalea Hill to fix its erosion problems and make it more sustainable (see **Appendix A, Figure 5**). Puncheons would also be used as necessary to span road-related drainage features and to cross a small creek at the top of the hill.
 5. Treat the Azalea Hill parking lot to fix its erosion problems and improve the visitor amenities serving Azalea Hill (see **Appendix A, Figure 6**).

Upon its completion, the project would prevent up to an estimated 219 CY of sediment from entering Azalea Hill’s adjacent creeks or Alpine Lake annually (or 4,377 CY over 20 years), and would restore approximately one acre of habitat.

This biological habitat evaluation report focuses on Actions 2 through 5 (above), as these actions would require construction activities that could disturb biological resources. The complete project description is included in **Appendix A**.

Project Goals

The Azalea Hill Restoration Project’s goals are to:

- Restore habitat, including sensitive serpentine habitats, by removing unnecessary roads and trails;

- Provide environmentally sensitive routes (i.e. routes that avoid environmentally sensitive areas wherever possible, and minimize and mitigate their impacts when not possible) over Azalea Hill for all users (hikers, equestrians, cyclists and district patrol and response staff) to improve connectivity between the lakes area and the Pine Mountain area;
- Improve the visitor experience of these users by providing improved signage, new trash and recycling facilities, parking lot improvements, etc.; and
- Ensure the routes are sustainable, and designed and managed in a manner that strictly minimizes erosion and water quality impacts (e.g. routes that meet the best management practices, design standards and environmental protection measures per Chapter 3 of the RTMP).

4.0 METHODS

Information and Database Review

Prior to conducting the field surveys, project biologists from Pacific Biology and Vollmar Natural Lands Consulting (VNLC) reviewed all relevant existing documentation pertaining to the project site's habitats and special-status plant taxa and plant communities. Geographic Information Systems (GIS) boundaries for the study area were overlaid with aerial photography and special-status species and habitat data (e.g., CNDDDB and critical habitat data), as well as geomorphic and hydrographic data (e.g., geology and soils, topography, hydrography, and public wetlands data).

Documents and data that were reviewed prior to the field survey include the following:

- MMWD in-house documentation on rare plants and plant communities (2009-2016)
- The MMWD in-house plant inventory for the project area (2016)
- Special-status species plant and wildlife occurrence records in the vicinity of the study area from California Department of Fish and Wildlife's CNDDDB (CDFW 2016)
- A four-quad plant search on the CNPS database website, using the following 7.5' USGS quadrangles: San Rafael, Novato, San Geronimo, and Bolinas.
- U.S. Fish and Wildlife Service (USFWS) critical habitat data (2017)
- Geologic mapping of the project vicinity (USGS 2012)
- Site aerial photography (Digital Globe 2014 and U.S. Department of Agriculture [USDA] National Agriculture [NAIP] Imagery Program 2014)
- MMWD-provided county-wide LiDAR-based DEM and contour data (2007-2010)
- USGS 7½ minute topographic quadrangles

- USDA SSURGO soil survey data (USDA 2012) and online USDA Web Soil Survey (2017)
- Bay Area Aquatic Resources Inventory (BAARI) wetlands and streams data (SFEI 2015)

Spatial data layers were integrated using GIS software, in order to analyze spatial relationships between mapped biological resources and other site characteristics. Maps and data were loaded onto a professional-grade GPS unit to facilitate navigation and data collection in the field.

Field Survey

Josh Phillips (Principal Biologist with Pacific Biology) and Jake Schweitzer (VNLC Senior Botanist) conducted an intensive habitat survey in the study area on January 17, 2017. The purpose of this survey was to confirm the accuracy of existing vegetation mapping of the study area, characterize the biological resources occurring in the study area, and to evaluate the potential of special-status species to occur based on the suitability of habitat, known range and life history requirements of special-status species occurring in the region, and other factors. Additional vegetation data were collected concurrently with jurisdictional wetland delineation surveys that were conducted by VNLC from late November to early December 2016. It should be noted that the surveys were conducted within several days to one week following rain events, and there was above average rainfall for the winter of 2016-2017.

The surveys involved walking along the study area roads and trails and recording dominant plant species and relative abundance from each stratum (tree, shrub/vine/sapling, and herbaceous strata) throughout the study area. Additional habitat parameters recorded include hydrology, geology and soils information, and level of disturbance. Representative digital photographs were taken of habitat conditions and features of interest. The recorded habitat data and photos were then compared with existing mapped habitats and the project area plant inventory, in order to assess the accuracy and completeness of the documentation.

It should be emphasized that the surveys were conducted during late fall and winter, and were reconnaissance in nature. As such, the focus of the surveys was to document habitat conditions rather than to document special-status plant taxa (most of which were not identifiable during the surveys). The study area has been intensively surveyed by MMWD for botanical resources in recent years, including during May and June of 2016.¹

¹ Approximately 100 meters of Liberty Gulch Road at the northwestern edge of the study area was not included in the 2016 survey by MMWD because it was originally to be decommissioned.

5.0 EXISTING BIOLOGICAL CONDITIONS

(i) Climate

The climate of the project area is characterized as “Mediterranean,” with cool, wet winters and warm, fairly dry summers. Approximately 99% of precipitation in the area occurs during the “wet season,” from October through May. The site is approximately 6.5 air miles from the Pacific Ocean, and is thus subject to considerable maritime influences. The moisture-laden westerly winds bring most of the moisture to the region, and the study area’s high elevation help to extract the moisture as the air rises and condenses upon contact with the local mountains and ridges. According to the PRISM climate data model (2017), mean annual temperature and precipitation at the study area (from 1981 to 2010) are 58.1° F and 48.6 inches, respectively. The 2015-2016 wet season, which would have influenced the 2016 botanical surveys in the study area, experienced slightly lower than average precipitation and higher than average temperatures. Specifically, mean precipitation modeled for the study area was 88% of normal, and mean temperatures were 103% of normal (ibid). It is expected that the 2015-2016 wet season, which is also the growing season for the region, provided fairly normal conditions for plant growth and persistence, though conditions may have been impacted to some degree by the historic drought conditions of the previous few years.

(ii) Geology and Soils

The study area encompasses two distinct geologic formations: Coast Range ophiolite and Franciscan complex, mélangé (USGS 2012). In turn, soils derived from each geologic formation are distinct and support different vegetation. The geologic formation and soil types occurring within the study area are described below.

Coast Range Ophiolite

An “ophiolite” is broadly defined as a section of the earth’s oceanic crust and/or the underlying upper mantle that has been uplifted and emplaced within continental crust (Alexander et al. 2007). In contrast to more strictly continental crust (i.e., rocks from shallower depths in the earth’s crust—far above the mantle), which is relatively high in silicates such as quartz and feldspar, ophiolites are composed of higher concentrations of minerals such as olivine, chromite, and pyroxene. Referred to as mafic (a term derived by contracting “magnesium” and “ferric”—iron), or ultramafic for materials with even higher concentrations of these minerals (up to 90 percent), ophiolites include sedimentary, igneous, and metamorphic rocks, but all are relatively low in minerals more associated with continental materials. The Coast Range ophiolite in the vicinity of the study area consists primarily of serpentinite (often simply referred to as

serpentine), an ultramafic rock of great botanical significance. Most plant taxa, having evolved on soils derived from continental materials, are adapted to minerals with higher concentrations of elements such as potassium and calcium, as well as elements such as nitrogen that are associated with the atmosphere. Far fewer plants have adapted to oceanic and mantle minerals that are high in magnesium, iron and nickel, and relatively low in such elements as potassium and calcium (Kruckeberg 1984).

Thus soils derived from ultramafic rocks such as serpentinite generally support relatively few—often uniquely-adapted—plant taxa. The Calflora website (2017) lists 320 of California’s 2,424 special-status plants as having an affinity for serpentine substrates. Despite the fact that only one third of the study area encompasses serpentine substrates, all of the special-status plants identified in the study area were identified on serpentine or serpentine-influenced habitats (e.g., downslope of serpentine soils).

Serpentine substrates in the study are concentrated along the central, mostly convex slopes of the study area, as well at the western edge. The onsite serpentine soils are generally shallow and rocky, and in many areas appear to underlie Franciscan complex, mélange substrates. The serpentine has likely been exposed as a result of uplift and erosion of overlying soils. Therefore, several small serpentine outcrops are evident in the area, and in some cases, they are mixed with other substrates where the erosion is relatively shallow.

Franciscan Complex, Mélange

Rocks from the Franciscan complex formation, which are found in the central and eastern portions of the study area, are primarily the result of sediments from submarine fans and igneous (volcanic) rocks associated with oceanic crust. The rocks were amalgamated in transit to a subduction zone (where the Pacific Plate was forced under the North American Plate upon contact), where the sediments were ground up and often metamorphosed at great depths during the Mesozoic era (Sloan 2006). This Complex is dominated by sandstone and shale rocks and sporadic outcroppings of radiolarian chert as well as igneous, limestone, and intrusive ophiolitic rocks. While rocks generally consist of marine sediments, most of the sediments are originally derived from materials deposited in marine fans resulting from turbidity currents (the marine equivalent of landslides, possibly caused by earthquakes) from the North American Plate’s edge (ibid). About 80 percent of the complex consists of greywacke sandstone and shale, mostly from turbidity currents. Thus, though Franciscan rocks are highly deformed from being thrust deep into the subduction zone, occasionally forming such metamorphic rocks as schist and gneiss, a majority of Franciscan complex rocks are sedimentary and consist primarily of continental

minerals and elements, to which most plants are adapted. Special-status or otherwise rare plants are less frequently associated with soils derived from such sedimentary rocks. All of the special-status plants indentified in the study area are primarily associated with serpentine substrates.

Soil Units

Two soil units are mapped within the study area: Henneke stony clay loam, and the Tocaloma-Saurin association. The Henneke stony clay loam is derived from serpentinite, while the Tocaloma-Saurin association is derived from Franciscan complex mélange. In many cases, the serpentine areas mapped on **Figure 2**, which are derived from the mapped plant communities, are more precise than the soil mapping, though in a few areas the soil mapping is more precise. All areas not mapped as serpentine on **Figure 2** are classified as Tocaloma-Saurin association. Table 1 below presents characteristics of the soil units that are most significant for botanical resources. As the table indicates, the Henneke stony clay loam soils are generally stony/gravelly and low in nutrients, while the Tocaloma-Saurin association soils are more loamy and slightly more fertile. In addition, the former is considered to be “somewhat excessively drained,” while the latter is considered to be “well drained”. These soil characteristics are clearly reflected in the plant communities, most conspicuously as a complete absence of tree habitats on the serpentine substrates.

TABLE 1. Characteristics of Soil Units Mapped within the Study Area

| Soil Unit Name | Parent Material | Surface Texture* | pH* | Organic Content* |
|-----------------------------|---|------------------|-----|------------------|
| Henneke stony clay loam | residuum weathered from serpentinite of Coast Range ophiolite | Stony clay loam | 7.0 | 1.24% |
| Tocaloma-Saurin association | residuum weathered from sandstone and shale of Franciscan complex mélange | Loam | 6.1 | 1.33% |

Source: U.S. Department of Agriculture Natural Resources Conservation Service, 2017.

*Dominant condition of top 24 inches.

FIGURE 2
Plant Communities and
Sensitive Botanical Resources

Azalea Hill Restoration Project
 Marin County, California

Legend

- Habitat Not as Mapped (see map notes)
 - Field-Verified as Serpentine
 - Field-Verified as Not Serpentine
 - ▲ Special-status Plant Occurrence¹
 - Spring or Seep
 - Project Area Road
 - Project Area Trail
 - Other Road
 - Trail Section to be Decommissioned by Hand²
 - Stream or Other Drainage Channel
 - Study Area (roads and trails buffer)³
- Plant Communities/Habitats**
- 1 Chaparral (1)
 - 2 Mt. Tamalpais Manzanita Chaparral (2)
 - 3 Conifer Forest (3)
 - 4 Conifer Forest (Serpentine) (4)
 - 5 Grassland (5)
 - 6 Hardwood Forest (6)
 - 7 Oak Woodland (7)
 - 8 Upland Redwood Forest (Pure and Mixed) (8)
 - 9 Willow/Alder Riparian Woodland (9)
 - 10 Other Riparian Woodland (10)
 - 11 Shrubland (11)
 - 13 Unvegetated (13 [code 12=unmapped areas])
 - 14 Wetland (15)
 - 14 Water Body (14)
 - ▨ Serpentine Habitat

1. From MMWD and CNDDb. Many serpentine-associated plants are widespread in area surrounding point. Some species are not fully mapped, as they are quite widespread (e.g., little glandular lessingia, Mt. Tamalpais manzanita, and serpentine reed grass).
 2. Areas of no impact to botanical resources. Not surveyed.
 3. Roads are buffered by 25 feet and trails are buffered by 10 feet



Data Sources: Vollmar Natural Lands Consulting, 2016
 USDA, 2014 (photo) | MMWD, 2009-2016
 SFEI BAARI Streams Database, 2012
 GIS/Cartography by: Jake Schweitzer, Feb. 2017
 Map File: Veg_233-15_B-L_2017-0828.mxd



1:6,000
 (1 inch = 500 feet at tabloid layout)

0 125 250 Meters

0 250 500 1,000 Feet



(iii) Onsite Plant Communities and Habitats

The majority of the study area is dominated by the following plant communities/habitat types, in order of extent: grassland, chaparral (two types), hardwood forest, oak woodland, and un-vegetated. These habitats comprise approximately 93% of the study area; the remaining 7% is comprised of shrubland, conifer forest, and riparian woodland and wetlands (**Figure 2**). The named habitats depicted on **Figure 2** have been grouped, with the purpose of focusing on the most important habitats and reducing the very large number of treated habitats. With the exception of conifer forest, which is not a sensitive habitat and covers less than 1% of the study area, all habitats mapped within the study area are described in detail below. Representative photographs of the habitats are included as **Appendix B**.

In general, the woodland and forest habitats are associated with Franciscan complex geology and derivative soils (Tocaloma-Saurin association), and most of the chaparral and grassland habitats occur on the Coast Range ophiolite/serpentine substrate (Henneke stony clay loam soils). As a result of the prevalence of serpentine soils, as well as the relative lack of disturbance throughout the study area, the percentage of native plants is high, even in open, sunny habitats (which in cismontane California, are often dominated by introduced plant species).

It should be noted that, while the study area encompasses natural habitats, many of which are biologically sensitive, the project site disturbance area consists primarily of existing stretches of dirt fire roads and trails, which are generally un-vegetated.

Sensitive Habitats

The study area encompasses a number of sensitive plant communities and other sensitive habitats. There are three plant communities that are designated as rare and Threatened by the California Department of Fish and Wildlife (CDFW): Serpentine Bunchgrass, Purple Needle Grass Grassland, and Mt. Tamalpais Manzanita Chaparral. The study area also encompasses riparian habitats, wetlands, and other waters subject to the jurisdiction and legal protection of environmental regulatory agencies. The riparian woodland and wetland habitats are included on **Figure 2** and discussed below. Other potentially jurisdictional waters, primarily drainage channels, are not discussed since they are generally un-vegetated and/or feature the same vegetation as the surrounding mapped habitats, as a result of the steep gradients with which they are associated. The channels are documented within a separate wetland delineation report.

Sensitive habitats within the study area are discussed below:

Serpentine Bunchgrass/Purple Needle Grass Grassland

The entire 15.5-acre study area is mapped as Serpentine Bunchgrass in the CNDDDB, and extensive portions of this habitat in the study area and larger project area also include Purple Needle Grass Grassland. The habitat polygon is not included on the plant community map in this report due to the highly generalized nature of the mapped area. However, all areas of grasslands on serpentine soils mapped on **Figure 2** would qualify as Serpentine Bunchgrass. This area amounts to 28% of the mapped grasslands in the study area, and 12% of the entire study area. Significant areas of the Serpentine Bunchgrass as well as a large portion of all other mapped grasslands in the study area are dominated by purple needle grass (*Stipa pulchra*) and would be considered “Purple Needle Grass Grassland” in the Manual of California Vegetation (MCV) classification system. Most of the mapped grasslands meet the requisite threshold of purple needlegrass constituting at least 10% relative cover in the herbaceous layer and/or greater than 5% absolute plant cover. Specific stands of this habitat have not been mapped and are not included on the habitats map due to the fact that they are so widespread. Purple Needle Grass Grassland is ranked as a G4 S3? plant community in the MCV (Sawyer et al. 2009). Within the MCV, the “G” is the global rank, with a rank of “4” indicating it is relatively common at the global scale, while the “S” is a California state rank, with the rank of “3” indicating it is “rare or Threatened in California” (i.e., sensitive). The “?” indicates that the rank is provisional. The broader grassland plant community that encompasses both Serpentine Bunchgrass and Purple Needle Grass Grassland is described below (**Section 3.3.2**) in terms of species composition and general habitat conditions.

These grassland habitats have potential to support numerous special-status plants, and several have been documented within the study area and surrounding areas. Documented species include the federally Threatened Marin western flax (*Hesperolinon congestum*), as well as the Mt. Tamalpais lessingia (*Lessingia micradenia* var. *micradenia*) (CRPR List 1B.2), Oakland star tulip (*Calochortus umbellatus*) (CRPR List 4.2), and serpentine reed grass (*Calamagrostis ophitidis*) (CRPR List 4.3); these and other special-status plant species are further discussed in **Section 6**.

Mt. Tamalpais Manzanita Chaparral

Within the study area and surrounding region, Mt. Tamalpais manzanita (*Arctostaphylos montana* ssp. *montana*) is a dominant shrub species within chaparral habitat occurring on serpentine soils. This species is ranked by the CNPS as California Rare Plant Rank (CRPR) List 1B.3, and chaparral including the species as a dominant is ranked “sensitive” by the CDFW. The habitat is ranked as G2 S2 in the MCV, indicating that there are only 6-20 occurrences

worldwide (G rank) and statewide (S rank), and/or more than 32,000 acres (12,950 hectares). This is the second most rare habitat rank in the MCV, after G1 S1. It should be noted that Mt. Tamalpais Manzanita Chaparral is defined as chaparral in which Mt. Tamalpais manzanita represents greater than 50% of the relative shrub cover. The species percent cover is not included in the habitat documentation for the plant community mapping depicted on **Figure 2**. Therefore, only habitats which list this namesake manzanita as the primary shrub species are mapped as this sensitive habitat.

This onsite habitat comprises approximately 6% of the study area, occurring primarily on moderately steep to steep slopes and features gravelly soils with abundant stones and boulders. The most common associate shrubs include musk brush (*Ceanothus jepsonii*) and leather oak (*Quercus durata*). Other associated shrubs include chamise (*Adenostoma fasciculatum*), toyon (*Heteromeles arbutifolia*), and California coffeeberry (*Frangula californica*). Associated herb species observed include Torrey's melic (*Melica californica*), amole (*Chlorogalum pomeridianum*), yarrow (*Achillea millefolium*), Indian's dream (*Aspidotis densa*), and the special-status serpentine reed grass (CRPR List 4.3). Other special-status plants associated with this habitat, aside from the eponymous manzanita itself, include Marin County navarretia (*Navarretia rosulata*) (CRPR List 1B.2), Tiburon buckwheat (*E. luteolum* var. *caninum*) (CRPR List 1B.2), Tamalpais bristly jewelflower (*Streptanthus glandulosus* ssp. *pulchellus*) (CRPR List 1B.2), Tamalpais lessingia (CRPR List 1B.2), and Mt. Saint Helena morning glory (*Calystegia collina* ssp. *oxyphylla*) (CRPR List 4.2): these and other special-status plant species are further discussed in **Section 6**.

Riparian Woodland

Riparian woodland forms a mappable stand (i.e., meets the minimum mapping unit set for the vegetation mapping) within the study area along Bon Tempe Creek, at the northeastern corner of the study area. Within the study area, Bon Tempe Creek is a fourth-order semi-perennial stream that flows south into Alpine Lake (SFEI 2015). The stream supports willow riparian woodland and "other" riparian woodland along most of its length, with the latter occurring within the study area. Though only covering 1% of the study area, this plant community is addressed here due to the importance of riparian woodland as habitat for a great diversity of plants and animals. The dominant riparian tree species in this habitat is Oregon ash (*Fraxinus latifolia*), a tree that seldom occurs outside of stream corridors. Arroyo willow (*Salix lasiolepis*) is relatively common as well, but not sufficiently to classify the habitat as willow riparian woodland. Both of these species are only found within the floodplain of Bon Tempe Creek, though several individuals are

large enough that their driplines extend well beyond the stream bank tops. The stream bank slopes and tops are dominated by California bay (*Umbellularia californica*) and coast live oak (*Quercus agrifolia*) trees, neither of which occurs within the floodplain. The shrub/vine stratum consists of toyon, poison oak (*Toxicodendron diversilobum*), California blackberry (*Rubus ursinus*), and a few scattered French brooms (*Genista monspessulana*). As expected, most of these upland plants were observed along the bank slopes and bank tops, though a few were growing along a stream terrace that supported mostly upland plant species. The herbaceous stratum consists of a mix of wetland and upland species. Wetland herbs identified within a small wetland in the stream floodplain include tall nutsedge (*Cyperus eragrostis*), sneezeweed (*Helenium puberulum*), and pennyroyal (*Mentha pulegium*). Upland herbs along the bank slopes and tops include wood fern (*Dryopteris arguta*), trailing snowberry (*Symphoricarpos mollis*), wild strawberry (*Fragaria vesca*), and blue wildrye (*Elymus glaucus*). With the exception of French broom and pennyroyal, all of the plants noted above are native species, indicating that the habitat is generally undisturbed. However, no special-status plants have been documented within this habitat, and few are associated with the habitat.

Wetland

Aside from the wetland within Bon Tempe Creek, several other wetlands occur within the study area, most of which are fed by springs and/or small streams. Some of these features flow across Liberty Gulch Road, such that as part of the project the road will be re-routed or modified to reduce the impact to the wetlands, and in some cases to reduce sedimentation into Alpine Lake. Another wetland occurs at the bottom of the hill, on its northeast side, and is bisected by the existing Azalea Hill Trail. This section of trail would also be re-routed to remove its impact from the wetland. All of the wetlands extend beyond the study area boundaries. The percent cover of wetlands in the study area amounts to well under 1%, but the habitat is addressed here due to the unique nature of the vegetation as well as the its sensitive status.

Consistent with the formal definition of wetlands, the onsite habitats feature hydric, often saturated soils that support plant species adapted to the anoxic soils. The common wetland species include, at the shrub stratum, western azalea (*Rhododendron occidentale*) (the namesake plant for the project and topographic feature—Azalea Hill). The most prevalent herbs observed include giant horsetail (*Equisetum telmateia* ssp. *braunii*), tall nutsedge, yellow monkeyflower (*Mimulus guttatus*), short spike hedge nettle (*Stachys pycnantha*), and giant chain fern (*Woodwardia fimbriata*). The special-status Mt. Tamalpais thistle (*Cirsium hydrophilum* var. *vaseyi*) (CRPR List 1B.2) is documented within wetland habitats on serpentine soils in the study

area vicinity, but was not observed within any of the mapped wetlands in the study area boundary.

In addition to springs, there are numerous seeps scattered throughout the study area. Seeps are distinguished from springs by the relatively short duration during which water flows, or by a complete lack of flowing water. Many of the seeps in the study area do feature flowing water, but only during and within a few days of a rain event. While seeps are considered a sensitive habitat and may be regulated by the state of California, none of the onsite seeps support wetland vegetation and thus are not further discussed here.

Other Habitats

Grassland

The most widespread habitat in the study area is Grassland, which occupies approximately 45 percent of the study area. The majority of this habitat occurs along central and eastern portions of the study, and occurs on both serpentine and Franciscan complex soil units. With the exception of a few small areas, the grassland habitats are in generally good condition and support significant covers of native plant species. Despite not being grazed, thatch from dead annual grasses is thick in only a few areas. The most common grass species observed within the habitat include the native and perennial purple needle grass as well an assortment of introduced annual grasses, particularly slim oat (*Avena barbata*), Italian rye grass (*Festuca perennis*), and big rattlesnake grass (*Briza maxima*). Associated forbs identified in the grasslands include smooth cats ear (*Hypochaeris glabra*), big heron bill (*Erodium botrys*), rosin weed (*Calycadenia multiglandulosa*), English plantain (*Plantago lanceolata*), and several *Clarkia* species. While several of these dominant species are introduced (see plant inventory included as **Appendix C**), none are considered to be invasive weeds that cause ecological disruption. In addition to herbaceous species, the grasslands support occasional individual shrubs or small stands of shrubs, primarily coyote brush (*Baccharis pilularis*) and poison oak. This is a result of the lack of grazing as well as fire suppression, which allows colonization by such shrubs.

Several of the same special-status plant taxa associated with the special-status grasslands described above may be associated with the wider grassland habitat, which is generally characterized by relatively low levels of disturbances.

Hardwood Forest

This plant community encompasses 17% of the study area. It is widely distributed on lower slopes of Azalea Hill and within drainages and swales, in areas generally featuring greater soil

depth and moisture. As its name suggest, the habitat is comprised of predominantly hardwood tree species, and forms a nearly contiguous canopy cover (hence “forest”). The most common tree species include coast live oak, California bay, and madrone (*Arbutus menziesii*). The habitat presumably once included large numbers of tanoak (*Notholithocarpus densiflorus*), but this species has suffered from sudden oak death syndrome and has declined precipitously throughout the region in the past two decades (author’s observation). A conifer species that has increased in cover within this habitat in recent decades is Douglas-fir (*Pseudotsuga menziesii*), which has benefited from fire suppression—it is shade tolerant and is more susceptible to the detrimental effects of fire compared to the hardwood tree species known from the region. The shrub and herb strata are sporadic, with cover depending on the degree of shade. The most prevalent shrubs include coyote brush, poison oak, and toyon. The herb stratum is primarily comprised of low-growing broadleaf forbs, ferns, and scattered, mostly native stands of grasses. The most common forbs observed are rough hedgenettle (*Stachys rigida*), Pacific sanicle (*Sanicula crassicaulis*), irises (*Iris* spp.), and trailing snowberry. Common ferns include gold back fern (*Pentagramma triangularis*), wood fern, common maidenhair (*Adiantum jordanii*), and western sword fern (*Polystichum munitum*). The few grass species include leafy bentgrass (*Agrostis pallens*), woodland brome (*Bromus laevipes*), and blue wildrye.

No special-status plants have been documented within hardwood forest in the study area, and relatively few are expected to occur as compared with other onsite habitats.

Oak Woodland

This habitat is similar to the hardwood forest habitat described above, but occupies slightly steeper slopes and more shallow, less fertile soils. It occupies 13% of the study area, and is most prevalent along the southern slopes of Azalea Hill. Coast live oak is the dominant tree species, with interior live oak (*Quercus wislizeni*) forming occasional small stands as an associate. Other hardwood tree species such as California bay and madrone are present but are less abundant than within the hardwood forest. Douglas-fir is similarly common as an associate and poses a potential problem for the regeneration and long-term persistence of the oaks. The shrub and herb strata are quite similar to the hardwood forest (see above), though the cover is slightly higher due to the increased sunlight.

No special-status plants have been documented within oak woodland in the study area, and relatively few are expected to occur as compared with other onsite habitats.

Chaparral and Shrubland

Covering just under 8% of the study area, this habitat is most prevalent in the central and western portions of the study area, and is primarily associated with steeper slopes with shallow, rocky soils, a majority of which are serpentine. The primary difference between the mapped chaparral occurring on serpentine and Mt. Tamalpais Manzanita Chaparral is that the namesake species for the latter is not dominant in the former—though it may be present in relatively low cover. Within the serpentine chaparral, the same shrub species are common as the associates of Mt. Tamalpais manzanita, particularly musk brush and leather oak. Shrub species common to both serpentine and Franciscan complex substrates include chamise, toyon, and California coffeeberry. The shrub stratum throughout the chaparral is occasionally punctured by emergent tree species, especially California bay, but also coast live oak and Douglas-fir in areas with less pure serpentine soils. Herbaceous understory species are generally sparse except in areas with lower shrub cover. Associated herb species observed include Torrey’s melic, amole, bird’s foot fern (*Pellaea mucronata*), and coast sanicle (*Sanicula laciniata*). Special-status species documented in the serpentine habitat within and surrounding the study area include the same as those found in the Mt. Tamalpais Manzanita Chaparral, as noted for this habitat above.

Areas mapped as “shrubland” on **Figure 2** represent only 3% of the study area. The plant community overlaps to some degree with chaparral, and at least one area mapped as chaparral is classified as shrubland. This habitat occurs primarily along the northern edge of the study area, within generally deeper soils derived from Franciscan complex geology. The most dominant shrub within this habitat is coyote brush, which also occurs in areas mapped as chaparral, albeit in relatively low cover. The most common associate shrub species is poison oak, a species that is dominant in a few localized areas of the habitat. The invasive French broom, which is widespread and has had detrimental impacts within MMWD watershed lands in other locations, is relatively sparse in the study area. It is present in this habitat, but does not form large stands. The composition of understory herbaceous species consists primarily of annual grasses and forbs, a majority of which are non-native. These include slim oat, dogtail grass (*Cynosurus echinatus*), and English plantain. No special-status plants have been identified in the shrublands habitat, though a few known from the region are associated with the habitat (see **Appendix D**)

Unvegetated

This habitat type within the study area includes developed areas along larger roads (i.e., paved roads and gravel-filled shoulders) and trails as well as serpentine balds. The habitat amounts to 4% of the study area. Much of the mapped habitat in the study area is along Liberty Gulch Road

where natural serpentine balds have been augmented by road cuts. All of the mapped areas feature some amount of plant cover, but the cover is generally well under 5%. Within the developed road areas the plants are mostly weedy introduced herbs, such as English plantain, coastal heron's bill (*Erodium cicutarium*), purple false brome (*Brachypodium distachyon*), and bristly ox-tongue (*Helminthotheca echioides*). In contrast, the serpentine balds support primarily native species, such as Indian's dream, naked buckwheat (*Eriogonum nudum*), and small fescue (*Festuca microstachys*). A few occurrences of the special-status serpentine reed grass (CRPR List 4.3) were also observed within this habitat, and other serpentine-associated special-status plants with an affinity for rocky soils have potential to occur as well, including the Tamalpais bristly jewelflower.

6.0 SPECIAL-STATUS SPECIES

Figures 2, 3A, and 3B shows the location of special-status plant and wildlife species documented in the CNDDDB within the project area (i.e., within approximately three miles of the project site). The potential of these and other locally occurring special-status species to occur on the project site is discussed below.

(i) Special-Status Plant Species

For the purposes of this report, special-status plants include those species that are state or federally listed as Rare, Threatened or Endangered; federal candidates for listing; proposed for state or federal listing; or identified by the CNPS Inventory of Rare and Endangered Plants of California (CNPS Inventory) as Rank 1, 2, 3, or 4 species.

Primarily as a result of the widespread serpentine substrates, multiple special-status plants occur within the study area and surrounding project area. The serpentine habitats support a significant majority of native plant species, and are associated with a large percentage of special-status plants. Indeed, of the 29 special-status taxa documented by the CNPS within the four topographic quadrangles surrounding the study area, 12—amounting to 41%—are associated with serpentine habitats, most of which are typically associated with habitats found within the study area. The onsite serpentine grassland and chaparral habitats are equally likely to support special-status plants known to occur on those habitats.

In addition, nearly all of the onsite habitats, serpentine and non-serpentine alike, are relatively undisturbed and support relatively high percentages of native plant species, and thus have potential to support additional special-status plant taxa known from the vicinity. Special-status plant taxa that have been documented in the general project area by the CNPS are identified in

Appendix D, along with their status, habitat association(s), blooming period, and an evaluation of the suitability of onsite habitats to support the plant.²

² It should be noted that **Appendix D** includes only CRPR List 1-3 taxa – it excludes List 4 plants. List 4 plants are not included within CNPS quadrangle searches. List 4 plants are also not mapped in the CNDDDB reliably but may occasionally be included. An analysis of potential impacts to CRPR List 1-4 taxa is included in this report.



- Special-Status Plant Species (CNDDB)
- Project Site
- Serpentine Habitats

FIGURE 3A
DOCUMENTED SPECIAL-STATUS
PLANT SPECIES
Azalea Hill Restoration Project

0 1 2 Miles

N

Scale: 1:70,000
 Data: CNDDB 2017
 Data: ESRI Basemap
 Pacific Biology August 2017

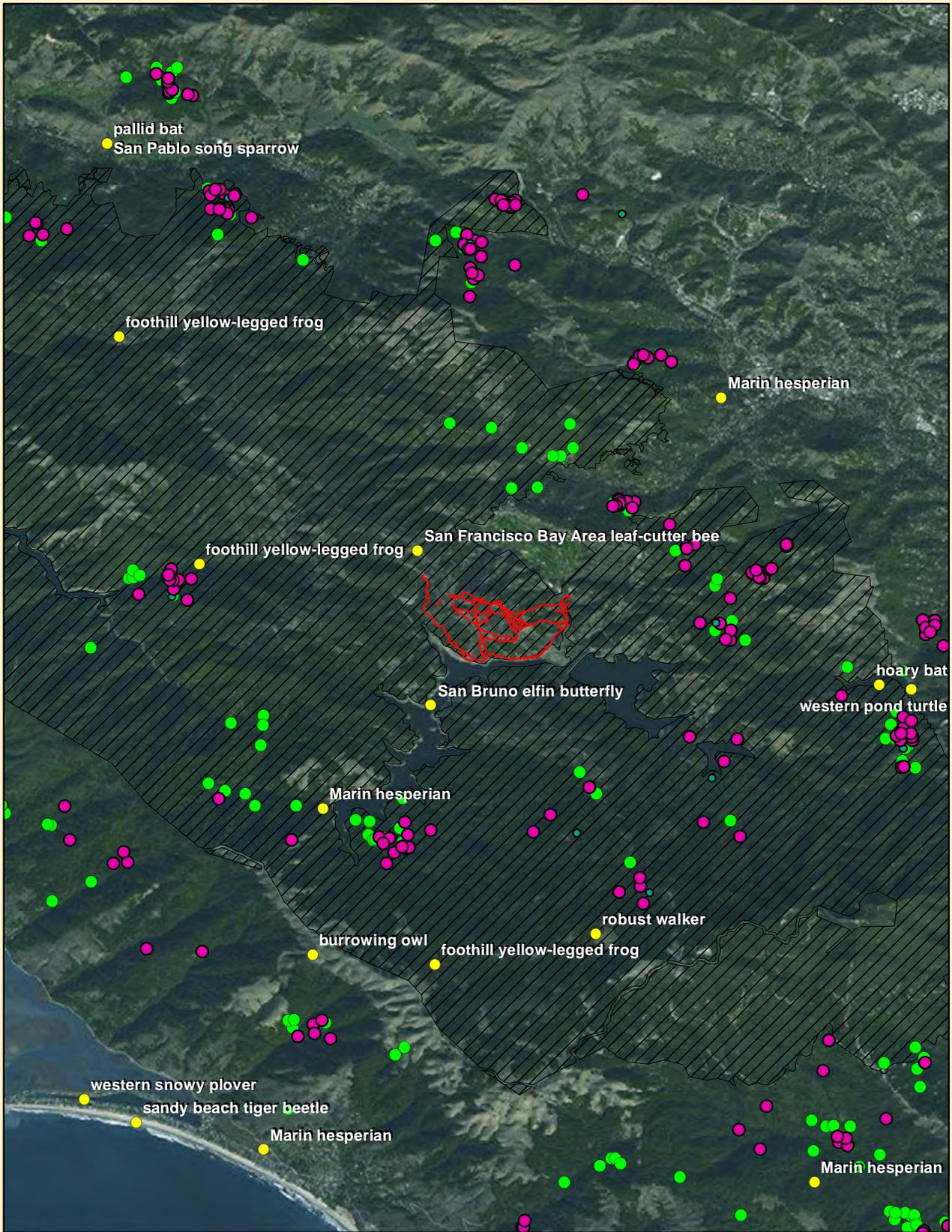
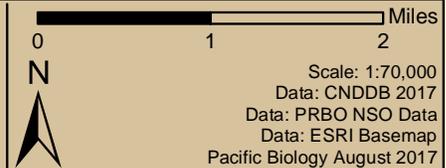


FIGURE 3B
DOCUMENTED SPECIAL-STATUS
WILDLIFE SPECIES
Azalea Hill Restoration Project



All special-status plants documented or potentially occurring within and adjacent to the study area are listed in **Table 2**, below, and many are mapped on **Figures 2** and **3A**. In total, 10 special-status plant species have been documented within or adjacent to the study area, while an additional 14 special-status plant species have potential to occur based on the presence of suitable habitat and known occurrences in the region. Many of the special-status plant species documented in or adjacent to the study area were identified during botanical surveys conducted by the MMWD in 2016 (**Appendix C**).

TABLE 2. Special-status Plants Documented or Potentially Occurring in Study Area

| Common Name | Scientific Name | Listing Status |
|--|--|---|
| Documented Within or Adjacent to Study Area | | |
| Marin western flax | <i>Hesperolinon congestum</i> | Federally and State Threatened, CRPR List 1B.1 |
| Mt. Tamalpais thistle | <i>Cirsium hydrophilum</i> var. <i>vaseyi</i> | CRPR List 1B.2 |
| Tiburon buckwheat | <i>Eriogonum luteolum</i> var. <i>caninum</i> | CRPR List 1B.2 |
| Mt. Tamalpais lessingia | <i>Lessingia micradenia</i> ssp. <i>micradenia</i> | CRPR List 1B.2 |
| Marin County navarretia | <i>Navarretia rosulata</i> | CRPR List 1B.2 |
| Tamalpais bristly jewelflower* | <i>Streptanthus glandulosus</i> ssp. <i>pulchellus</i> | CRPR List 1B.2 |
| Mt. Tamalpais manzanita | <i>Arctostaphylos montana</i> ssp. <i>montana</i> | CRPR List 1B.3 |
| Oakland star-tulip | <i>Calochortus umbellatus</i> | CRPR List 4.2 |
| Mt. Saint Helena morning glory* | <i>Calystegia collina</i> ssp. <i>oxyphylla</i> | CRPR List 4.2 |
| Serpentine reed grass | <i>Calamagrostis ophitidis</i> | CRPR List 4.3 |
| Potentially Occurring Based on Suitable Habitat | | |
| Napa false indigo | <i>Amorpha californica</i> var. <i>napensis</i> | CRPR List 1B.2 |
| Bent-flowered fiddleneck | <i>Amsinckia lunaris</i> | CRPR List 1B.2 |
| Marin manzanita | <i>Arctostaphylos virgata</i> | CRPR List 1B.2 |
| Tiburon paintbrush | <i>Castilleja affinis</i> ssp. <i>neglecta</i> | Federally Endangered and State Threatened, CRPR List 1B.2 |
| Western leatherwood | <i>Dirca occidentalis</i> | CRPR List 1B.2 |
| Marin checker lily | <i>Fritillaria lanceolata</i> var. <i>tristulis</i> | CRPR List 1B.1 |
| Fragrant fritillary | <i>Fritillaria liliacea</i> | CRPR List 1B.2 |
| Diablo helianthella | <i>Helianthella castanea</i> | CRPR List 1B.2 |
| Pale yellow hayfield tarplant | <i>Hemizonia congesta</i> ssp. <i>congesta</i> | CRPR List 1B.2 |
| Mt. Diablo cottonweed | <i>Micropus amphibolus</i> | CRPR List 3.2 |
| Marsh microseris | <i>Microseris paludosa</i> | CRPR List 1B.2 |
| North Coast semaphore grass | <i>Pleuropogon hooverianus</i> | State Threatened, CRPR List 1B.1 |

*Not mapped on **Figure 2**

Potential Impacts to Special-Status Plants

As summarized in **Table 2**, 10 special-status plant species have been documented within or adjacent to the study area, while an additional 12 special-status plant species have potential to occur based on the presence of suitable habitat and known occurrences in the region. While many of the occurring and potentially occurring special-status plant species are associated with serpentine habitats (see **Appendix D**), nearly all of the onsite habitats, serpentine and non-serpentine alike, are relatively undisturbed and support relatively high percentages of native plant species, and thus have potential to support special-status plant taxa known from the vicinity.

The proposed project would remove approximately 4.4-miles of non-system roads and trails and restore those routes to natural conditions to improve habitat. Many of the non-system trails traverse serpentine habitats known to support special-status plant populations. The unauthorized use of these trails degrades habitat quality for special-status plants and can result in trampling or other disturbances to special-status plants. Therefore, in the long term, the proposed closing and restoration of non-system trails would benefit special-status plants.

The MMWD conducted botanical surveys in 2016 and one state and federally listed plant was observed (Marin western flax). As shown in **Figure 2**, this occurrence is adjacent to a non-system trail that would be decommissioned by hand, and is near a location where an existing trail would be improved (and construction equipment would be used). In the absence of avoidance measures, this population of Marin western flax could be harmed due to its proximity to where trail improvements and decommissioning of a non-system trail would occur. However, this population of Marin western flax is not within an area where construction equipment must be operated or where other ground disturbances must occur, and therefore, the one known population of Marin western flax in the study area can be avoided and protected during construction with the implementation of the avoidance measures described below.

In the absence of avoidance measures, the restoration of trails to be closed could result in short-term impacts to other special-status plants. Similarly, other proposed project actions (e.g., improving existing trails, trail re-routes, conversion of non-system trail to official trails, bridge construction) could result in the loss of special-status plants. Based on the results of the 2016 botanical surveys, serpentine reed grass and Mt. Tamalpais manzanita are common in the study area, and therefore, the loss of a low number of individual plants of these species would not have a substantial adverse effect on the local population numbers. However,

avoidance measures should still be implemented to limit the loss of individual serpentine reed grass and Mt. Tamalpais manzanita plants. Other special-status plant species that occur or potentially occur in the study area (see **Table 2**) are rarer and avoidance and minimization measures would be required to protect these species and reduce related impacts to a level of below significance. Given the above, in the absence of avoidance and mitigation measures, potential impacts to special-status plant could be significant.

The proposed project would be implemented as part of the *Mt. Tamalpais Watershed Road and Trail Management Plan*, and therefore, the mitigation measures required by the associated EIR would be implemented as part of the project. These measures are identified below, and as appropriate, additional measures are recommended to further reduce potential impacts to sensitive biological resources.

Measures Required by the *Mt. Tamalpais Watershed Road and Trail Management Plan* EIR

Federal or State Listed Plant Species

- 3.2-A.1 Prior to finalizing construction plans for each project, a qualified botanist will survey the area to be disturbed for Marin dwarf (western) flax, Mason's ceanothus, Baker's larkspur, Santa Cruz tarplant, white-rayed pentachaeta, Hoover's semaphore grass, and other Federal or State listed plant species, unless the area has been previously surveyed by the MMWD Vegetation Ecologist. NOTE: The MMWD conducted botanical surveys in 2016 and identified a population of Marin western flax; the location of this population is discussed above and is shown in **Figure 2**.
- 3.2-A.2 All projects will be designed to avoid any Marin dwarf (western) flax, Mason's ceanothus, or other Federal or State listed plant species (if subsequent surveys find these species on the Watershed). NOTE: The identified population of Marin western flax, which is the only state and federally listed plant documented in the study area, is not within an area where construction is required, and therefore, can be avoided and protected during construction with the implementation of the avoidance measures described below.
- 3.2-A.3 For projects near known populations, the individual plant will be identified for protection with flagging and construction monitoring will occur to ensure that there will be no adverse impacts to the populations.

Other Special-Status Plant Species

- 3.2-B.1 Project sites not yet surveyed for Special Status Species shall be surveyed prior to final project design. NOTE: The MMWD conducted botanical surveys in 2016 and updated surveys will be conducted prior to construction activities.
- 3.2-B.2 To the maximum degree feasible, projects will be designed and constructed to avoid eliminating other Special Status Species of plants. Where avoidance of these Special Status Species of plants is unavoidable, then MMWD shall reestablish the plants that are eliminated. Efforts should be made to collect and preserve propagules from the affected population for later reintroduction. Reintroduction can occur near the disturbed area or in other suitable habitat where the species would benefit from reintroduction (e.g., on decommissioned roads and trails or, for reroutes, the old trail/road that is being abandoned, if there are suitable soils and habitat). (Also see Mitigation Measure 3.1-B.14 and BIO-1A)
- 3.2-B.3 The District will conduct regular training for its permanent and seasonal construction crews in Special Status Species and environmentally sensitive habitats so they are more likely to prevent accidental environmental impacts to these resources. (Also see Mitigation Measure 3.1-B.14 and BIO-1B)
- 3.2-B.4 The District shall monitor construction to ensure that plants scheduled for avoidance are protected during the construction process.
- 3.2-B.5 The District will retain records of all surveys and the locations of all special status plants identified at project sites so that these plants can be avoided during construction of any future projects in the area. Roadside plants that could be harmed by normal maintenance activities shall be flagged or otherwise marked so that equipment operators and other staff are aware of their presence and avoid them.

Decommissioning Roads and Trails

- 3.2-C.1 When decommissioning roads, MMWD shall survey the areas to be disturbed for Special Status Species. Areas supporting such plants will not be included in fillslope/cutbank decommissioning unless such decommissioning is critical to repair potentially failing fillslopes that would deposit sediment into streams or

decommissioning is essential to closing the route or to restoring the integrity of the habitat, and revegetation of such species is feasible.

Construction of Trails and Road Reroutes, Conversion of Roads and Trails, Adoption of Roads and Trails

- 3.2-D.1 The area where the new trail section for the Potrero Meadow Trail, Laurel Dell to Barth's Retreat Trail, and Azalea Hill Trail could be constructed will be surveyed for the presence and location of Special Status Species of plants. NOTE: The MMWD conducted botanical surveys in 2016 and additional surveys will be conducted prior to construction (see BIO-1A).
- 3.2-D.2 To the maximum degree feasible, the location for the new trail shall be selected to avoid destruction of Special Status Species of plants. Where avoidance is not feasible, then revegetation per Mitigation Measure 3.2-B.2 shall apply. Note: Also see BIO-1A.
- 3.2-D.3 The Azalea Hill Trail reroute shall be rerouted to avoid the stand of serpentine chaparral. The non-system trail that proceeds south of the Azalea Hill Trail shall be decommissioned. NOTE: The proposed project complies with both of these requirements.

Additional Recommended Avoidance and Mitigation Measure

BIO-1A: Prior to the commencement of construction activities, the District will commission or conduct protocol-level surveys for special-status plant species. The survey area will include all areas in which construction would occur during that construction season, as well as all adjacent areas that could be disturbed. Given the number of annual special-status plant species in the area, and that the distribution of such species changes annually, the surveys will be considered valid until the following spring. The following shall then be implemented:

- All special-status plants and/or boundaries of the population(s) will be flagged.
- For special-status species of low sensitivity ranking, that are common in the project vicinity, and/or resilient to disturbance (e.g., serpentine reed grass, Mt. St. Helena morning-glory, Mt. Tamalpais manzanita), disturbances shall be minimized to the degree practical but complete avoidance is not necessary, as directed by the MMWD botanist.

- If a special-status plant species is found in the project's disturbance boundary, the plants will be avoided to the degree practicable. Flagging and/or fencing shall be placed near any identified special-status plants during construction to prevent incidental disturbance.
- Supplement to Measure 3.2-B.2. If avoidance is not practicable, and if the plant(s) do not have a low sensitivity rating and are not common in the project vicinity and/or resilient to disturbance (as determined by a MMWD ecologist), then a rare plant mitigation shall be designed and implemented. At a minimum, the plan shall include the following elements:
 - a. For annual species, seed shall be collected from plants that will be removed or from other populations of the species on Azalea Hill, and those seeds shall be redistributed in the project vicinity, as directed by the MMWD botanist. For perennial species, seed collection may be augmented by transplanting entire plants or cuttings, as directed by the MMWD botanist.
 - b. Suitable sites shall be identified and prepared for redistribution of seeds (or transplants). The plan shall outline the site preparation activities.
 - c. Monitoring surveys of the seeded or transplanted areas shall be conducted for a minimum of two years.
 - d. Mitigation will be deemed successful provided that each of the relocated species establishes at least one stable population, defined as species presence over a 2-year period, taking into account fluctuations in local reference populations. If this goal is not achieved in 3 years, then contingency measures shall be implemented. Such measures will include: evaluating the environmental or other characteristics affecting plant survival and implementing corrective measures, which may include additional seeding and planting; altering or implementing a weed control regime; or introducing or altering other management activities. Efforts shall continue until the relocated individuals have been healthy for two years.

BIO-1B: The following measures to protect special-status plant species from incidental harm from construction equipment and the spread of weeds will also be implemented:

- a. All construction personnel must attend a biological resources training to be provided by the MMWD (see 3.2-B.3). The training will address the importance of Azalea Hill's sensitive botanical resources and techniques for avoiding impacts.
- b. The number of vehicles on site will be minimized to reduce the potential for disturbance and ensure adequate space to park and maneuver within designated areas.
- c. All vehicle routes, staging, parking, and turnaround areas will be marked, and vehicle operation in unmarked areas is prohibited.
- d. Additional visual or physical barriers (fencing, signs, stakes, marking paint, or flagging) will be installed, as needed, to ensure vehicle compliance with approved vehicle routes, staging, parking, and turnaround areas.
- f. All vehicles and equipment must be cleaned of soil, seeds, and vegetative material prior to entering the project site; inspection and cleaning measures (washing, steaming, air blast, brushing/scrubbing, vacuuming) should be applied to material transport beds, buckets and blades, radiators, grills/filters, tires/axels and differentials, within slashing mulching and ripping equipment, chassis and body, between dual wheels, ledges and frames, inside drivers cab, and mudguards.
- g. Erosion control materials shall be composed of coconut/coir fiber, or other certified weed free materials, as approved by the MMWD botanist.
- h. All open bed vehicles carrying a load of material (unconsolidated fill, erosion control material, etc.) shall be covered to prevent the dispersal of weed seeds.

(ii) Special-Status Wildlife Species

The presence of special-status wildlife species on District lands has been well documented through focused surveys, and other observations made by District staff and the public. The District conducts annual surveys for northern spotted owls (nesting/activity centers), steelhead, and Coho salmon. The District has also conducted surveys for California red-legged frog, foothill yellow-legged frog, western pond turtle, osprey, and bat species.

Based on data collected and maintained by the District, a review of the CNDDDB and the USFWS database, information provided by District wildlife staff, and other sources, 45 special-status wildlife species were identified that are known to occur or possibly occur on District lands or surrounding areas. These species are identified in **Table 2** below, along with their regulatory status, habitat requirements, and a short discussion of their occurrence or potential occurrence in the study area. The location of documented special-status wildlife species and /or designated critical habitat on and surrounding the project site is shown in **Figures 3B**. As shown, almost the entire Mt. Tamalpais watershed, including the project site, is within designated critical habitat for the northern spotted owl.

Table 3. Special-Status Wildlife Known to Occur or with Potential to Occur on Project Site

| Common Name <i>Scientific Name</i> | Federal/State Status ¹ / Other | Habitat | Potential to Occur on Project Site |
|--|--|---|---|
| INVERTEBRATES | | | |
| Marin blind harvestman <i>Calicina diminua</i> | --/SA/-- | Rocky serpentine grasslands. | Potential (low): Suitable habitat present. However, not observed on District lands and the species has not been documented in over 30 years. Type location is Mt. Burdell in Novato, approximately 11 miles north of project site; specimens collected at that location between 1968-1986. |
| San Bruno elfin butterfly <i>Callophrys mossii bayensis</i> | FE/--/-- | Steep, north-facing slopes within the fog belt. Larval host plant is stonecrop (<i>Sedum spathulifolium</i>). | Not Expected: Specimen collected (date unknown) from "near Alpine Lake", in the Mt. Tamalpais watershed. However, the larval host plant has not been observed on the project site. Additionally, all known locations are restricted to San Mateo County, where several populations are known from San Bruno Mountain, Milagra Ridge, the San Francisco Peninsula Watershed and Montara Mountain. |
| Marin elfin butterfly <i>Callophrys mossi marinensis</i> | --/SA/-- | North-facing slopes near redwood forest. Larval host plant is stonecrop. | Not Expected: Redwood forest habitat not present and the larval host plant has not been observed on the site. One specimen has been recorded from the Mt. Tamalpais watershed in 1971, at the confluence of Lagunitas Creek and San Geronimo Creek. |

| Common Name Scientific Name | Federal/State Status ¹ / Other | Habitat | Potential to Occur on Project Site |
|--|--|--|--|
| Robust walker <i>Pomatiopsis binneyi</i> | --/SA/-- | Freshwater springs and seeps. | Potential (low): Suitable habitat is present, but the species has not been documented on District lands in over 38 years - 1978 specimen from Potrero Meadow, in the Mt. Tamalpais watershed. |
| California freshwater shrimp <i>Syncaris pacifica</i> | FE/SE/-- | Shallow pools away from main streamflow. Winters under exposed underwater roots; may be found in summer under leafy branches touching water. | Not Expected: Not known to occur on District lands or in any streams/drainages that cross the project site. Known to occur downstream of District land in Lagunitas Creek and Walker Creek. Only 17 coastal streams known to support this species endemic to Marin, Sonoma and Napa Counties. |
| Ubick's gnaphosid spider <i>Talanites ubicki</i> | --/SA/-- | Moist, rocky serpentine. | Potential (low): Suitable habitat present. However, not observed on District lands and the species has not been documented in over 24 years. Type location is Mt. Burdell in Novato, approximately 11 miles north of project site; specimens collected from location between 1982-1992. |
| A leaf-cutter bee <i>Trachusa gummifera</i> | --/SA/-- | Unknown – chaparral? | Potential (low): This species was documented near the project site in 1962- specimen from Carson Ridge, in the Mt. Tamalpais watershed. However, there are no known reported occurrences in the last 54 years. |

| Common Name Scientific Name | Federal/State Status ¹ / Other | Habitat | Potential to Occur on Project Site |
|--|--|--|---|
| Marin hesperian <i>Vespericola marinensis</i> | --/SA/-- | Moist brushy areas or grasslands, around springs or seeps, in riparian forest. | Potential: Suitable habitat present and the species has been documented nearby on District lands - 1991 specimen from Lagunitas Creek below Alpine Dam, in the Mt. Tamalpais watershed. There is another documented occurrence of the species (not on District lands) approximately 1.5 miles northeast of the project site. |

FISHES

| | | | |
|---|---------|--|---|
| Tomales roach <i>Lavinia symmetricus</i> ssp. 2 | -/CSC/- | Freshwater tributaries to Tomales Bay. | Not Expected: Bon Tempe Creek and the other drainages on the project site are inaccessible to Tomales Roach due to reservoirs and associated dams. Occurs on District lands in Lagunitas Creek below Peters Dam, also in downstream locations. Present in Walker Creek downstream of Soulajule Reservoir, and in Devils Gulch. Also present in Ross Creek (below Phoenix Lake) and Corte Madera Creek. |
|---|---------|--|---|

| Common Name Scientific Name | Federal/State Status ¹ / Other | Habitat | Potential to Occur on Project Site |
|---|--|--|---|
| Central California coast coho salmon <i>Oncorhynchus kisutch</i> | FE/SE/- | Anadromous; migrates through San Francisco Bay and spawns in coastal rivers and streams. | Not Expected: Bon Tempe Creek and the other drainages on the project site are inaccessible to coho due to reservoirs, associated dams, and other barriers. Occurs on District land in Lagunitas Creek below Peters Dam, also in downstream locations. Low likelihood of occurrence in other waters within District lands. Present in Redwood Creek, Walker Creek (downstream from Soulajule Reservoir), Devils Gulch, San Geronimo Creek, and Olema Creek (all on State Parks Land). |
| Central California coast steelhead <i>Oncorhynchus mykiss irideus</i> | FT/-/- | Anadromous, migrates through San Francisco Bay spawns in coastal rivers and streams. | Not Expected: Bon Tempe Creek and the other drainages on the project site are inaccessible to steelhead due to reservoirs, associated dams, and other barriers. Known to occur in Lagunitas Creek and most of its perennial tributaries, Arroyo Sausal, Corte Madera Creek, Redwood Creek, Walker Creek, San Geronimo Creek, Devils Gulch, Arroyo Corte Madera del Presidio, Tamalpais Creek, Larkspur Creek, and Miller Creek. |

| Common Name Scientific Name | Federal/State Status ¹ / Other | Habitat | Potential to Occur on Project Site |
|--|--|---|---|
| AMPHIBIANS | | | |
| California red-legged frog <i>Rana draytonii</i> | FT/CSC/- | Marshes, stream pools, reservoirs, ponds. Uses both riparian and upland habitats for foraging, shelter, cover, and non-dispersal movement (Recovery Plan 2010) | Potential (low): Alpine Lake and Bon Tempe Creek provide potentially suitable habitat. However, the species has not been documented within 4 miles of the project site. Very infrequent observations of individual California red-legged frogs in Lagunitas Creek. Documented at a location 0.75 mile due west of Peters Dam, and in Olema Creek |
| Foothill yellow-legged frog <i>Rana boylei</i> | -- /SPT/CSC/-- | Foothill woodlands and chaparral near streams and ponds, riparian woodlands, wet meadows, also inhabits mixed conifer forest streams, slow streams and rivers with sunny, sandy and rocky or gravelly banks at 6,000 ft. and below in elevation. | Potential (low): Not known to occur in Bon Tempe Creek or the other onsite drainages. However, the species has been documented within approximately 1 mile of the project site. Known to occur in Little Carson Creek and Big Carson Creek. Also observed in Walker Creek and Salmon Creek (downstream of Soulajule Reservoir). |
| REPTILES | | | |
| Western pond turtle <i>Actinemys marmorata</i> | --/CSC/- | Perennial ponds, deep slow moving streams, marshes and lakes are habitat for this species at 6,000 ft. and below in elevation. However, eggs are laid in loose soil on land in oak woodlands, mixed coniferous forests, broadleaf forests and grasslands, usually within 400 ft. of ponds, lakes, slow streams and marshes with vegetated borders, rocks, or logs. Logs, rocks, cattail mats, and exposed banks are required for basking. | Potential: Known to occur in Alpine and Bon Tempe Reservoirs, and in Bon Tempe Creek, and to nest in nearby areas. |

| Common Name Scientific Name | Federal/State Status ¹ / Other | Habitat | Potential to Occur on Project Site |
|--|--|---|--|
| BIRDS | | | |
| Cooper's hawk <i>Accipiter cooperi</i> | -/WL/- | Mature forests, open woodland, riparian forest. Nests in coast live oak and other forest habitats. | Potential: Suitable nesting habitat present. |
| Sharp-shinned hawk <i>Accipiter striatus</i> | -/WL/- | Mixed woodlands and forests. Nests in conifers or deciduous trees in dense woodlands or mountain forests. | Not Expected: Occurs as a winter migrant on MMWD lands. Very localized nesting on east slope of Bolinas Ridge (Kent Lake Watershed) and Point Reyes Peninsula, but does not nest in the project vicinity. |
| Grasshopper sparrow <i>Ammodramus savannarum</i> | -/CSC/- | Nests in grasslands; especially moist coastal prairie. | Potential: Suitable nesting habitat present. |
| Bell's sage sparrow <i>Amphispiza belli belli</i> | FCC/CSC/- | Homogenous stands of chaparral dominated by chamise. | Potential: Suitable nesting habitat present. Nests on MMWD lands, with very limited distribution, confined to south-facing slopes in the Carson Ridge/Pine Mountain area. |
| Golden eagle <i>Aquila chrysaetos</i> | - /WL, CFP/- | Frequents open woodlands and less populated areas. | Not Expected: No documented nesting occurrences on or near project site. Known to occur on MMWD lands, but nesting status unknown. |
| Great blue heron <i>Ardea herodias</i> | -/SOLI (4)/- | Nests in large stands of trees near water | Potential: Nests (or formerly nested) within MMWD lands at Lake Nicasio and Alpine Lake. |
| Oak titmouse <i>Baeolophus inornatus</i> | FCC/-/- | Nests in tree cavities in oak-woodlands. | Potential: Suitable nesting habitat present. |
| Vaux's swift <i>Chaetura vauxi</i> | -/CSC/- | Nests in hollow trees and snags in heavily forested areas. | Not Expected: Marginal nesting habitat as the project site is not heavily forested. Known to occur on MMWD lands, but nesting status is unknown. |

| Common Name Scientific Name | Federal/State Status ¹ / Other | Habitat | Potential to Occur on Project Site |
|--|--|--|---|
| Northern Harrier <i>Circus cyaneus</i> | -/CSC/- | Nests on ground in swales and low-lying grasslands | Not Expected: Marginal nesting habitat given the lack of large open foraging habitat. Known to occur on MMWD lands, but nesting status unknown. |
| Olive-sided flycatcher <i>Contopus cooperi</i> | FCC/-/- | Nests in trees, with preference for conifers, but also eucalyptus. | Potential: Some suitable nesting habitat. Nests on MMWD lands, relatively common around Phoenix Lake and Kent Lake. |
| Yellow warbler <i>Dendroica petechial brewsteri</i> | FCC/CSC/- | Nests in deciduous saplings or shrubs in riparian habitats. | Potential: Some suitable nesting habitat present. |
| White-tailed kite <i>Elanus leucurus</i> | -/FP/- | Generally nests in trees near fields, open groves, grasslands, or marshes. | Potential: Some suitable nesting habitat present. |
| California horned lark <i>Eremophila alpestris actia</i> | -/WL/- | Nests in grasslands. | Potential: Some suitable nesting habitat present. |
| San Francisco Common Yellowthroat <i>Geothlypis trichas sinuosa</i> | FCC/CSC/- | Freshwater marsh, swale, etc. | Potential: Some suitable nesting habitat present. Likely occurs on MMWD land, but nesting status unknown. |
| Bald eagle <i>Haliaeetus leucocephalus</i> | FCC/SE, CFP/- | Wide-ranging in coastal California; often near water. | Not Expected: Nests on MMWD land at Kent Lake. Observed foraging in project area but has not been documented nesting at Alpine Lake or nearby areas. |
| Loggerhead shrike <i>Lanius ludovicianus</i> | FCC/CSC/- | Semi-open country with lookout posts, wires, trees, scrub. Nests in dense tree or shrub foliage. | Potential: Some suitable nesting habitat present. Nests on MMWD lands, though decreasing in recent decades. |
| Osprey <i>Pandion haliaetus</i> | -/WL/- | Uses snags and large trees for nesting. Forages mainly in lakes and the ocean. | Potential: Some suitable nesting habitat present. Nests on MMWD lands at Kent Lake. |

| Common Name Scientific Name | Federal/State Status ¹ / Other | Habitat | Potential to Occur on Project Site |
|---|--|--|---|
| "Marin" Chestnut-backed Chickadee <i>Parus rufescens neglectus</i> | SOLI (3)/- | Oak woodlands and riparian corridors. | Potential: Some suitable nesting habitat present. |
| Purple martin <i>Progne subis</i> | -/CSC/- | Nests in large standing snags with cavities near open foraging areas. | Potential: The species has been documented nesting the project vicinity at Pine Point and potential nesting habitat is present on and near the project site. |
| Allen's hummingbird <i>Selasphorus sasin</i> | FCC/-/- | Semi-open habitats including open oak woods, streamside groves, and parks. Nests in trees and shrubs. | Potential: Some suitable nesting habitat present. |
| Northern spotted owl <i>Strix occidentalis caurina</i> | FT/CSC/- | In Marin Co. resides in second growth conifer, mixed conifer-hardwood, and evergreen hardwood forests. | Not Expected: Typical nesting habitat does not occur within 0.25 mile of the project site, and no activity centers documented within 0.5 mile of the site (see Figure 3A). |
| MAMMALS | | | |
| Pallid bat <i>Antrozous pallidus</i> | --/CSC/WBWH | Variety of habitats; prefer open dry lands with rocky areas for roosting. | Potential: Any onsite trees with suitable cavities provide potential roosting habitat. |
| Point Reyes mountain beaver <i>Aplodontia rufa phaea</i> | -/CSC/- | Friable soil in densely vegetated conifer forests | Not Expected: Project site is outside of the expected range of the species. Occurs on Point Reyes Peninsula; possible along portions of Lagunitas Creek. |
| Townsend's big-eared bat <i>Corynorhinus townsendii</i> | -/CSC/ WBWH H | Variety of woodland and forest habitats, but prefers conifers. Roosts primarily in caves, mines, tunnels, and sometimes in buildings, bridges, or other human made structures. | Not Expected: Suitable roost structures not present on the project site. |

| Common Name Scientific Name | Federal/State Status ¹ / Other | Habitat | Potential to Occur on Project Site |
|---|--|--|--|
| Western red bat <i>Lasiurus blossevillii</i> | FS/CSC/WBVG H | Edges of open to moderately dense deciduous foothill woodlands along streams. Roosts in moderately dense foliage. | Potential: Trees on the project site provide potential roosting habitat. |
| Hoary bat <i>Lasiurus cinereus</i> | -/SOLI (2)/WBVG M | Forested habitat | Potential: Trees on the project site provide potential roosting habitat. |
| Long-eared myotis <i>Myotis evotis</i> | --/-/WBVG M | Variety of woodland and forest habitats, but prefers conifers. Roosts in crevices, buildings, snags, and under bark. | Potential: Any onsite trees with suitable cavities provide potential roosting habitat. |
| Fringed myotis <i>Myotis thysanodes</i> | --/-/WBVG H | Roosts in mines, caves, trees and buildings. | Potential: Any onsite trees with suitable cavities provide potential roosting habitat. |
| Long-legged myotis <i>Myotis volans</i> | -/-/WBVG H | Montane conifer forests, pinyon-juniper woodland, and Joshua tree woodland. Roosts in hollow trees, rock crevices and buildings. | Potential: Any onsite trees with suitable cavities provide potential roosting habitat. |
| Yuma myotis <i>Myotis yumanensis</i> | -/-/WBVG LM | Woodland and open forest with freshwater sources over which to feed. | Potential: Any onsite trees with suitable cavities provide potential roosting habitat. |
| American badger <i>Taxidea taxus</i> | -/CSC/- | Suitable habitat is characterized by herbaceous, shrub, and open stages of most habitats with dry, friable soils. | Potential: Suitable habitat present and known from the areas. Documented on District lands and burrows have been noted on grassy slopes above Kent and Bon Tempe Lakes. |

Notes: 1. FE = federally listed Endangered, FT = federally listed Threatened, FCC = Federal Bird of Conservation Concern, SE = state listed Endangered, ST = state listed Threatened, SPT = state Proposed Threatened, CSC = California Species of Concern, CFP = Fully protected, SA = Included on CDFW Special Animals List, SOLI = Tomales Bay Watershed Species of Local Interest. WBVG = Western Bat Working Group; H = High Priority, M = Medium Priority, ML = Medium/Low Priority.

As indicated above in **Table 3**, the following special-status wildlife species have some potential to occur on the project site:

- **Invertebrates** – Marin blind harvestman, Robust walker, Ubick’s gnaphosid spider, a leaf-cutter bee, and Marin hesperian.
- **Amphibians** – California red-legged frog and foothill yellow-legged frog.
- **Reptiles** – Western pond turtle
- **Birds** – Cooper’s hawk, grasshopper sparrow, Bell’s sage sparrow, great blue heron, oak titmouse, olive-sided flycatcher, yellow warbler, white-tailed kite, California horned lark, San Francisco common yellowthroat, loggerhead shrike, osprey, “marin” chestnut-backed chickadee, purple martin, and Allen’s hummingbird.
- **Mammals** – Pallid bat, western red bat, hoary bat, river otter, long-eared myotis, fringed myotis, long-legged myotis, yuma myotis, and American badger.

The potential of these species to occur on the project site, and potential project-related impacts to these species, are further discussed below.

Federally and/or State Listed Species

California red-legged frog (*Rana draytonii*) is a federally Threatened species and a California Species of Special Concern. The species occurs from sea level to elevations of 1,500 meters (5,200 feet). Breeding occurs in streams, deep pools, backwaters within streams, ponds, marshes, sag ponds, dune ponds, lagoons, and stock ponds. Breeding adults are often associated with deep (greater than 0.7 meter [2 feet]) still or slow moving water and dense, shrubby riparian or emergent vegetation (Hayes and Jennings 1988), but frogs have been observed in shallow sections of streams and ponds that are devoid of vegetative cover. The species also utilizes non-aquatic habitats for refuge and dispersal. The species is known to rest and feed in riparian vegetation and it is believed that the moisture and cover of the riparian zone provides foraging habitat and facilitates dispersal. The species has also been documented dispersing through areas with sparse vegetative cover and dispersal patterns are considered to be dependent on habitat availability and environmental conditions (N. Scott and G. Rathbun *in lit.* 1998).

There has been only one documented occurrence of California red-legged frog in the Mt. Tamalpais watershed, from a location at the northwest boundary of the watershed. This observation of a single frog (CNDDDB Occurrence #892) was documented in 2006 at the outflow from Kent Lake, just upstream from the confluence of Lagunitas Creek. The species has not

been documented breeding in the Mt. Tamalpais watershed or at any other locations in the watershed. Protocol surveys of the Mt. Tamalpais watershed did not detect this species (GANDA 2003), and the species has also not been documented within the watershed at locations other than the Kent Lake outfall by District staff or others. Individual red-legged frogs have infrequently been observed in Lagunitas Creek (outside of the Mt. Tamalpais watershed).

Alpine Lake and Bon Tempe Creek both provide potentially suitable habitat for California red-legged frogs, but California red-legged frogs have not been documented at these locations. Based on the CNDDDB, California red-legged frogs have not been documented within 4 miles of the project site or from a location where the species could disperse onto the project site. The fact that the species has not been documented breeding in the Mt. Tamalpais watershed, and that the species has not been documented near the project site, limit the potential of the species to occur, but do not eliminate the possibility. Therefore, this species is considered to have a low potential to occur on the project site.

The proposed project does not include any activities within Alpine Lake, Bon Tempe Creek, or other areas containing long-lasting standing water. However, the proposed project includes the construction of a bridge over Bon Tempe Creek and other activities that could result in impacts to California red-legged frog, in the unlikely event that the species occurs in the area. Therefore, conservatively, the following avoidance measures are recommended:

Measures Required by the Mt. Tamalpais Watershed Road and Trail Management Plan EIR

No measures are required by the *Mt. Tamalpais Watershed Road and Trail Management Plan* EIR to protect California red-legged frog during construction activities because the species is not known to occur in the watershed.

Additional Recommended Avoidance and Mitigation Measures

BIO-2: While it is unlikely that California red-legged frog occurs in the study area, the following measures are recommended to further ensure that the species is not harmed by the proposed project:

- Before any construction activities begin on the site, a qualified biologist shall conduct a training session for all construction personnel. At a minimum, the training shall include a description of the California red-legged frog and its habitat, the measures that are being implemented to conserve the species as they relate to the project, the boundaries within which the project may be accomplished, and instructions that construction

activities must be halted if a California red-legged frog is observed in the construction area and the biologist must be immediately notified.

- A qualified biologist shall survey the work sites within 500 feet of Bon Tempe Creek or Alpine Lake within 48 hours of the onset of construction activities for California red-legged frog. If California red-legged frogs are found, construction activities will be delayed until the USFWS is notified and guidance is provided on how to proceed.

Other Special-Status Species

Invertebrates

As discussed in **Table 3**, several invertebrates which could potentially be considered of special-status have some potential to occur in the study area, including **Marin blind harvestman**, **Robust walker**, **Ubick's gnaphosid spider**, **a leaf-cutter bee**, and **Marin hesperian**. These invertebrates are included on the CDFW Special Animal List, but do not otherwise have any formal state or federal rarity status. Little is known about these species and Marin blind harvestman, robust walker, and Ubick's gnaphosid spider have not been documented on District lands or within approximately 11 miles of the project site. The leaf-cutter bee has not been documented on District lands since 1962, Marin Hesperian has not been documented on District lands since 1991, and neither species has been documented in the study area. However, given the presence of suitable habitat, Marin blind harvestman and Ubick's gnaphosid spider have some potential to occur in the onsite serpentine habitats, robust walker and Marin hesperian have some potential to occur in onsite wetlands/seeps, while the habitat associations of the leaf-cutter bee are not known.

Many of the proposed activities would have minimal impacts on habitats potentially occupied by these species, as project components such as decommissioning trails would improve habitat quality in the long-term, and making changes/improvements to existing trails would involve minimal disturbance to undisturbed habitats. New construction (i.e., "reroutes") would occur in a relatively small area, much of which is outside of mapped serpentine habitat (which provides potential habitat for Marin blind harvestman and Ubick's gnaphosid spider). Additionally, construction within seeps/wetlands would be limited to the placement of approximately 15 CY of rock in a seep (Site 42) and 25 CY of rock in another seep (Site 45); the seeps are currently within existing trails and the rock would facilitate crossing the seeps with less disturbance. These seeps provide potential habitat for robust walker and Marin Hesperian, and the rock/crossing improvements would serve to limit ongoing disturbance of the seeps. Given the

limited extent of new construction in serpentine habitat, that new construction in seeps/wetlands would be limited to placing a small amount of rock to facilitate improved crossing of the features, the low sensitivity status of these potentially occurring invertebrates, and that none of these invertebrates have recently (and in some cases never) been observed on District lands, potential impacts to these species would not rise to a level of significance under CEQA.

Measures Required by the Mt. Tamalpais Watershed Road and Trail Management Plan EIR

No measures are required by the *Mt. Tamalpais Watershed Road and Trail Management Plan* EIR to protect these low-sensitivity status invertebrates.

Additional Recommended Avoidance and Mitigation Measures

No measures are recommended.

Amphibians

Foothill yellow-legged frog (*Rana boylei*) is California Species of Special Concern and is currently proposed for listing as Threatened under the California Endangered Species Act (CESA). The species is characteristically found close to water in association with perennial streams and ephemeral streams that retain perennial pools through the end of summer. Adults preferentially utilize shallow edgewater areas with low water velocities for breeding and egg laying, usually characterized by gravel, cobble, and boulder substrate. Juvenile and non-breeding adult frogs may be found adjacent to riffles, cascades, main channel pools, and plunge-pools that provide escape cover.

This species occurs in the Mt. Tamalpais watershed and has been documented breeding in Big Carson and Little Carson Creeks. These areas are approximately 2 miles west of Bon Tempe Creek, which is the only portion of the project that provides potentially suitable habitat for foothill yellow-legged frog.

The proposed project does not include any activities within Bon Tempe Creek or other areas providing potentially suitable habitat for foothill yellow-legged frog. However, the proposed project includes the construction of a bridge over Bon Tempe Creek which could result in impacts to foothill yellow-legged frog, should the species occur in the area. Therefore, the following avoidance measures are recommended:

Measures Required by the Mt. Tamalpais Watershed Road and Trail Management Plan EIR

No measures are required by the *Mt. Tamalpais Watershed Road and Trail Management Plan* EIR to protect foothill yellow-legged frog in the study area (including Bon Tempe Creek) because known populations of the species do not occur in the area.

Additional Recommended Avoidance and Mitigation Measures

BIO-3: While it is unlikely that foothill yellow-legged frog occurs in the study area, the following measures are recommended to further ensure that the species is not harmed by the proposed project:

- The biological training session to be provided to construction personnel (see Avoidance Measure BIO-2) shall also address the potential presence of foothill yellow-legged frog. At a minimum, the training shall include a description of the foothill yellow-legged frog and its habitat, the measures that are being implemented to conserve the species as they relate to the project, the boundaries within which the project may be accomplished, and instructions that construction activities must be halted if a foothill yellow-legged frog is observed in the construction area and the biologist must be immediately notified.
- A qualified biologist shall survey the work sites within 25 feet of Bon Tempe Creek within 48 hours of the onset of construction activities for foothill yellow-legged frog. If foothill yellow-legged frogs are found, construction activities will be delayed until the frog leaves the construction zone on its own or until a biologist in possession all required permits moves the frog(s) to an area outside of the construction zone. Temporary exclusionary fencing (designed to prevent frogs from entering the work area) will then be installed under the guidance of a qualified biologist to prevent the relocated frog(s) from reentering the work site.

Reptiles

Western pond turtle (*Actinemys marmorata*) is a California Species of Special Concern. This turtle primarily inhabits aquatic habitats, including ponds, slow moving streams, lakes, marshes, and canals. The species frequently basks on logs or other objects out of the water. Western pond turtles also require upland oviposition (i.e., egg laying) sites in the vicinity (typically within 200 meters, but as far as 400 meters) of the aquatic site. Mating typically occurs in late April or early

May and most oviposition occurs during May and June, although some individuals may deposit eggs as early as late April and as late as early August (Rathbun et al. 1993).

Western pond turtle is known to occur in Alpine Lake and in Bon Tempe Creek and may move from these areas to nest in nearby grassland habitats. The proposed project includes the construction of a new trail near the shoreline (where an informal trail currently exists), but the trail would be built to the design standards of the *Mt. Tamalpais Watershed Road and Trail Management Plan* and would not create a barrier to pond turtle movement between aquatic and nesting habitats. Alpine Lake and Bon Tempe Creek would not be directly disturbed by the proposed project activities. However, the species could move onto nearby construction areas and access roads. Should this occur, project activities could result in the loss or harm of individual pond turtles. Therefore, impacts to this species are potentially significant.

Measures Required by the *Mt. Tamalpais Watershed Road and Trail Management Plan* EIR

No measures are required by the *Mt. Tamalpais Watershed Road and Trail Management Plan* EIR to protect western pond turtle.

Additional Recommended Avoidance and Mitigation Measures

BIO-4: The following measures are recommended to protect western pond turtle during construction activities:

- The biological training session to be provided to construction personnel (see Avoidance Measure BIO-2) shall also address the potential presence of western pond turtle. At a minimum, the training shall include a description of western pond turtle and its habitat, the measures that are being implemented to conserve the species as they relate to the project, the boundaries within which the project may be accomplished, and instructions that construction activities must be halted if a pond turtle is observed in the construction area and the biologist must be immediately notified.
- A qualified biologist shall survey work sites within construction areas where suitable western pond turtle nesting or aquatic habitat exists within 48 hours of the onset of construction activities. If western pond turtle are found, the turtle will be relocated to a suitable location outside of the construction zone by a qualified biologist.
- Prior to the start of construction, construction fencing shall be placed between the lake or Bon Tempe Creek and the construction area or access

routes where suitable western pond turtle habitat exists, at the direction of the qualified biologist. The fencing shall be placed at the edge of the construction area or access routes to maximize areas for turtle movement or nesting. Large-mesh construction fencing shall be used to allow hatchlings, but not adults of the species, to pass through the fencing. Additionally, prior to the start of construction each day, a designated biological monitor (who has received training from a qualified biologist) shall inspect the fence and construction area. Any pond turtles found on the upland side of the construction fencing shall be relocated to the lake-side of the construction fencing by a qualified biologist or the trained, designated biological monitor.

Birds

As discussed in **Table 3**, the following special-status bird species have potential to nest on or near the project site: Cooper's hawk, grasshopper sparrow, Bell's sage sparrow, great blue heron, oak titmouse, olive-sided flycatcher, yellow warbler, white-tailed kite, California horned lark, San Francisco common yellowthroat, loggerhead shrike, osprey, "Marin" chestnut-backed chickadee, purple martin, and Allen's hummingbird. While none of these species are state or federally listed, they may otherwise be considered to be of special-status under CEQA. Additionally, numerous common bird species could nest on the project site. The active nests of most common bird species are protected by the Migratory Bird Treaty Act (16 U.S.C. 704) and the California Fish and Game Code (Section 3503). Construction activities (i.e., tree and vegetation removal, grading, resurfacing) could result in the direct loss of a nest of a special-status or common bird species. Additionally, construction related noise has the potential to disturb nesting occurring in surrounding areas and to result in the abandonment of an active nest. Therefore, the direct loss or noise-related disturbance of an active nest of a special-status or otherwise protected bird species is a potentially significant impact.

Measures Required by the *Mt. Tamalpais Watershed Road and Trail Management Plan EIR*

The following measures are required by the *Mt. Tamalpais Watershed Road and Trail Management Plan EIR* to protect nesting birds:

- 3.3-C.1 If shrubs or trees would need to be removed to construct a specific project, MMWD should remove those trees and shrubs prior to the onset of the nesting season (i.e., after late July and before mid-March of any year) so birds will not nest in trees or shrubs on the construction site. However, trees known to be used for northern spotted owl and golden eagle nesting shall not be removed.

- 3.3-C.2 For projects that would remove trees or shrubs (that were not removed per Mitigation Measure 3.3-C.1) and projects that would use heavy equipment in forested areas or areas of chaparral during the primary bird breeding season (mid-March through the end of July), a qualified wildlife biologist shall examine the project site and surrounding area to determine the presence of nests of any Special Status Species of birds. If said nests are found in trees or shrubs planned for removal and/or if the wildlife biologist determines that the proximity of nearby nests to the site where heavy equipment would be operating would or could result in the adult birds abandoning the nest, work at the site will be scheduled to occur after the breeding season.

Additional Recommended Avoidance and Mitigation Measure

Additional measures to those required by the *Mt. Tamalpais Watershed Road and Trail Management Plan* EIR are recommended to protect nesting birds for the entire nesting season, for birds that may nest in grasslands or on the ground in other habitats, and for noise-related disturbance to nesting birds. These measures are:

- BIO-5:** If construction activities would commence anytime during the nesting/breeding season of native bird species potentially nesting on the project site (typically February through August in the project region), a pre-construction survey for nesting birds shall be conducted by a qualified biologist within one week of the commencement of construction activities.

If active nests are found in areas that could be directly affected, or that are within 300 feet of construction and would be subject to prolonged construction-related noise, then an appropriate no-disturbance buffer zone shall be created around active nests during the breeding season or until a qualified biologist determines that all young have fledged. The size of the buffer zone and types of construction activities restricted within will be determined by a qualified biologist taking into account factors such as the following:

- Noise and human disturbance levels at the construction site at the time of the survey and the noise and disturbance expected during the construction activity;
- Distance and amount of vegetation or other screening between the construction site and the nest; and

- Sensitivity of individual nesting species and behaviors of the nesting birds.

To minimize the potential for a construction-related delay due to the presence of an active bird nest, any required tree and vegetation removal may be conducted outside of the nesting season.

Mammals

As discussed in **Table 3**, **pallid bat**, **western red bat**, **hoary bat**, **long-eared myotis**, **fringed myotis**, **long-legged myotis**, and **Yuma myotis** have potential to roost in the onsite trees. Collectively, these species may use cavities, crevices, foliage, and exfoliating bark for roosting, but the presence of large maternity colonies would be restricted to trees with large cavities. The proposed project would require the removal of approximately 21 trees. Only one tree is over 20-inches in diameter (a mature Douglas fir that may not need to be removed depending on final route alignment), the rest are all 10-inches or smaller in diameter and are therefore unlikely to support a large maternity colony. Therefore, while only one tree could potentially support a large maternity colony, should an active maternity or hibernation roost be present, the proposed removal of trees could result in harm to roosting bats.

Measures Required by the Mt. Tamalpais Watershed Road and Trail Management Plan EIR

The following measures are required by the *Mt. Tamalpais Watershed Road and Trail Management Plan EIR* to protect roosting bats:

- 3.3-D.2 Tree removal larger than 24 inches (dbh) shall occur during one of two time windows: a) after the bat maternity season, when young bats are volant (i.e., flying) (September 1), and before the hibernation period (October 30), or b) after hibernation (March 1), and before birth of young (April 15). Trees smaller than 24-inches dbh not immediately adjacent (within 15 feet) to large trees (>24-inches dbh) may be removed at any time.
- 3.3-D.3 Smaller trees (<24-inches dbh) that are adjacent to larger trees (>24-inches dbh) shall be removed first, one day (24 hours) before removal of adjacent large trees. This will provide an indirect disturbance that should be sufficient to cause bats roosting in adjacent larger trees to vacate the roost, without providing enough time for re-colonization of the roost.
- 3.3-D.4 Snags shall not be removed without first being surveyed by a qualified bat biologist, 2-4 weeks prior to planned tree removal to determine whether bats are roosting inside the trees. If no roosting is observed, the snag shall be removed

within one week following surveys. If bat roosting activity is observed, limbs not containing cavities, as identified by the bat biologist, shall be removed first, and the remainder of the tree removed the following day. The disturbance caused by limb removal, followed by a one night interval, will allow bats to abandon the roost.

Additional Recommended Avoidance and Mitigation Measures

The measures required by the *Mt. Tamalpais Watershed Road and Trail Management Plan* EIR to protect roosting bats do not provide a mechanism for removing large trees during the breeding or hibernation period, even if the tree in question does not provide suitable roosting habitat (e.g., it does not contain deep cavities). Therefore, BIO-6, see below, is recommended to supplement Measures 3.3-D.3, 3.3-D.4, and 3.3-D.5:

BIO-6: Prior to any tree removal during the maternity roosting period (April 15 to August 31) or hibernation period (October 15 to February 28), a focused tree habitat assessment can be conducted by a qualified bat biologist of all trees that will be removed or impacted by construction activities. Trees containing suitable potential bat roost habitat features would then be clearly marked. The habitat assessments should be conducted enough in advance to allow preparation of a report with specific recommendations, and to ensure tree removal can be scheduled during seasonal periods of bat activity if required. If it is determined that day roosting bats are unlikely to occur, the tree may be removed as described below. If the absence of roosting bats cannot be confirmed, then the removal of trees providing suitable maternity or hibernation roosting habitat should only be conducted during seasonal periods of bat activity, including:

- 1) Between March 1 (or after evening temperatures rise above 45F and/or no more than 1/2" of rainfall within 24 hours occurs) and April 15; or
- 2) Between September 1 and about October 15 (or before evening temperatures fall below 45F and/or more than 1/2" of rainfall within 24 hours occurs).

Appropriate methods will be used to minimize the potential of harm to bats during tree removal. Such methods may include using a two-step tree removal process. This method is conducted over two consecutive days, and works by creating noise and vibration by cutting non-habitat branches and limbs from habitat trees using chainsaws only (no excavators or other heavy machinery) on Day 1. The noise and vibration disturbance, together with the visible alteration

of the tree, is very effective in causing bats that emerge nightly to feed, to not return to the roost that night. The remainder of the tree is removed on Day 2. A bat biologist qualified in two-step tree removal is required on Day 1 to supervise and instruct the tree-cutters who will be on the site conducting the work, but only for a sufficient length of time to train all tree cutters who will conduct two-step removal of habitat trees. The bat biologist is generally not required on Day 2, unless a very large cavity is present and a large colony is suspected.

American Badger (*Taxidea taxus*) is a California Species of Special Concern. American badgers range throughout California but are most abundant in drier, open stages of shrub, forest, and herbaceous habitats with friable soils where they can dig burrows. No badger dens have been documented on the project site, but the species is known from the project area. Should a badger den be present in a work area, individual badgers could be harmed and related impacts would be significant.

Measures Required by the *Mt. Tamalpais Watershed Road and Trail Management Plan EIR*

The following measures are required by the *Mt. Tamalpais Watershed Road and Trail Management Plan EIR* to American badgers:

- 3.3-D.1 Prior to construction of any project, the site will be surveyed for the presence of badger dens or burrows. If such sites are identified, work shall not start at that site until a qualified wildlife biologist has determined that the den is not active or, if active, until the young have left the site and are capable of surviving away from the site.

Additional Recommended Avoidance and Mitigation Measures

No additional measures are required.

7.0 JURISDICTIONAL RESOURCES

Wetlands, streams, and permanent and intermittent drainages are subject to the jurisdiction of the U.S. Army Corps of Engineers (ACOE) under Section 404 of the Federal Clean Water Act (CWA). The CDFW also generally has jurisdiction over these resources, together with other aquatic features that provide an existing fish and wildlife resource pursuant to Sections 1602-1603 of the California Fish and Game Code. The CDFW asserts jurisdiction to the outer edge of vegetation associated with a riparian corridor. The Regional Water Quality Control Board also generally has jurisdiction over streams and wetlands.

A jurisdictional delineation of potential jurisdictional waters was completed for the project by VNLC in February 2017. The results of the delineation are summarized below while more detailed discussions of potential jurisdictional resources may be found the jurisdictional delineation report (VNLC 2017). The delineation identified a total of 0.351 acre of potentially jurisdictional Waters within the 15.5-acre study are. **Table 4**, below, provides a summary of the delineation results and the locations of these features are shown in **Appendix E**.

TABLE 4. Summary of Delineation Results

| Habitat Type | Number of Features | Total Acreage |
|--|--------------------|---------------|
| Wetland | 5 | 0.104 |
| Other Waters (Bon Tempe Creek) | 1 | 0.031 |
| Other Waters (ephemeral and seasonal channels)* | 28 | 0.134 |
| Swale | 7 | 0.020 |
| Seep** | 3 | 0.057 |
| Eroded Channel (severely eroded channel along trail) | 1 | 0.006 |

* Includes 0.019 acre of tentative other Waters. **Only mapped as polygons along Liberty Gulch Road

Wetlands within the study area are all associated with drainages and/or with springs that augment the drainages. The onsite other Waters consist entirely of drainages that lack wetland vegetation (or are un-vegetated) and/or lack hydric soils. All of the drainages in the area flow into Alpine Lake, either on an ephemeral, seasonal, or semi-perennial timeframe. The drainages include Bon Tempe Creek, a semi-perennial stream (i.e., flows during most of the year and features perennial pools), as well as a large number of ephemeral to seasonal channels ranging from two to fifteen feet in width and featuring subtle to clearly defined bed and bank topography. Additionally, there are a number of seeps and swales that conduct surface water during (and typically for at least several days following) rain events, as observed during field surveys. Several seeps near the northwestern edge of the study area flow onto Azalea Hill Trail and, where the trail is

relatively steep and straight, the flow has eroded a gully that conducts water for at least several days following rain. There are smaller rill features throughout the site, but these were not mapped because they are relatively shallow and conduct water only during rain events.

In addition to the potential jurisdictional Waters, the delineation identified 0.074 acre of riparian habitat in the study area, which is present along Bon Tempe Creek. The mapped area represents the outer edge of the dripline of riparian tree species or the tops of the stream channel banks, whichever is farther from the channel centerline. The riparian tree species along Bon Tempe Creek consist of Oregon ash and arroyo willow.

The proposed project includes constructing or improving 25 stream crossing sites, mostly using clear span bridges, puncheons, and/or armored wet crossings. In total, 308 linear feet of stream channels will be impacted and 665 square feet of fill will be placed in channels (consisting primarily of new rock armor). The stream crossing sites are generally unvegetated and the stream crossing improvements would serve to remedy existing erosion problems and prevent future erosion problems. Therefore, in the long term, the proposed stream crossing improvements would serve to reduce erosion and to protect habitats. The project also includes rerouting trails to avoid seeps and springs, including several wetlands as well as decommissioning trails that traverse potential Waters of the United States and/or State of California. Trails will be re-routed around springs and seeps along the southern portion of the study area, and numerous potential other Waters, mostly in the form of unvegetated channels, will be avoided by the decommissioning of trails throughout the hillslopes of Azalea Hill.

At two sites which include springs, a combination of armored rock crossings and four-foot-wide causeways (set back from the fill slope) would be constructed. Construction within seeps/wetlands would be limited to these two locations and would include the placement of approximately 15 CY of rock in a seep (Site 42) and 25 CY of rock in another seep (Site 45); the seeps are currently within existing trails and the rock would facilitate crossing the seeps with less disturbance. The proposed bridge over Bon Tempe Creek would clear span the stream and no construction is proposed within the bed or banks of the stream, but the removal of some riparian vegetation may be required.

The small project-related impact to wetlands would be largely offset because the seeps are currently within existing trails and the rock would facilitate crossing the seeps with less disturbance; this would limit or eliminate ongoing disturbance to the seeps. Additionally, trails will be re-routed around springs and seeps along the southern portion of the study area, and numerous potential other Waters, mostly in the form of unvegetated channels, will be avoided by

the decommissioning of trails throughout the hillslopes of Azalea Hill. While the project's impacts to seep, wetlands, and streams would self-mitigate, permits from the ACOE, RWQCB, and CDFW would be required. Additionally, the relevant measures for the RTMP EIR would be implemented to protect wetlands and streams during construction activities.

Measures Required by the *Mt. Tamalpais Watershed Road and Trail Management Plan EIR*

The *Mt. Tamalpais Watershed Road and Trail Management Plan EIR* includes numerous measures to protect hydrology and water quality, including streams, wetlands, and reservoirs. The District would be required to comply with all of the related measures contained in the *Mt. Tamalpais Watershed Road and Trail Management Plan EIR* (Measures 3.1-B through 3.1-G). The measures directly relevant to protecting resources under the jurisdiction of the Corps, RWQCB, and/or CDFW are listed below:

- 3.1-B.4 Sufficient erosion control will be in place during and after work to insure that sediment does not enter the stream channel and that there is no increase in stream turbidity levels resulting from construction. Disturbance of streamside vegetation will be the minimum necessary to complete operations. Other restrictions may be applied for specific sites.
- 3.1-B.8 To prevent construction debris from entering the creek, appropriate best management practices set forth in the California Storm Water Best Management Practice Handbooks will be employed. In upland work areas, barriers will be placed between the construction area and the creek to prevent construction debris or surface runoff from entering the creek. The District will install temporary erosion control measures, such as silt fences, erosion control matting, wattles or hay bales, to prevent transport of sediment and other wastes off the project, storage or staging areas that could possibly enter a creek or reservoir. Erosion control will be in place by October 30. Furthermore, the District will control dust at the project, storage or staging areas to prevent the transport of such material into a creek or reservoir. Imported wattle, hay bales, and matting used for erosion control should be certified "weed free."
- Mulches, jute netting, and/or native plant materials will be used wherever bare ground can erode into a creek or reservoir. This includes all excavated hillslopes above these waterbodies and all excavated stream crossings. Weed free straw (3,000 to 5,000 lbs/acre) is one of the most common products used for mulch,

but there are other products available as well. On steep slopes or in windy areas, mulch will be tacked, punched or secured to the ground. Imported mulch should be certified weed free. Mulched sites will be mapped and monitored for nascent weed populations. Rather than random scattering of debris, vegetative material will be collected and concentrated on slopes adjacent to live streams and other locations where fine sediment may be mobilized and enter the stream system. If there is not enough on-site vegetative debris to achieve the desired level of ground cover, excess vegetation from nearby restoration sites may be utilized or additional materials may be imported to the site. Materials will be selected to comply with MMWD requirements to minimize introduction of exotics and interference with re-establishment of native forest species. The Contractor will be required to assist in the transport of such materials from their point of delivery to the actual job site where they will be used. Site-specific conditions both on the finished slope and within the buffer will affect the amount of ground cover actually needed to achieve the goals of reducing downstream turbidity and suspended sediment. Where particularly vulnerable species or habitat are located immediately downstream, or where highly erodible soils are found, the guidelines shall be adjusted to favor more complete surface erosion control. Conversely, some areas may allow relaxing of guidelines, for example where buffer zones have atypically high sediment trapping efficiency due to topographic benches or particularly dense understory and litter accumulations or where excavated materials contain large coarse fragment content that would readily form an erosion pavement. These guidelines will be used and adapted as needed to actual field conditions to insure that fine sediment is prevented from entering the stream systems as much as is reasonably possible.

- 3.1-B.11 All work activities will be timed to avoid, or minimize, the environmental impacts of those work activities. Work in a stream crossing will be done during the dry season to help protect water quality and fisheries. Work around streams will be confined to the period of April 15 through October 15 or the first rainfall. In-water work will cease on or before October 15 of any year.
- 3.1-B.12 Any disturbed banks shall be fully restored upon completion of construction. Revegetation shall be done using native species. Planting techniques can include seed casting, hydroseeding, or live planting methods using the techniques in the latest version of the California Salmonid Stream Habitat Restoration Manual.

- 3.2-H.1 Prior to designing or finalizing construction documents/plans for each project, a field survey of the project site shall be conducted by a qualified wetland expert. This expert shall identify all Army Corps jurisdictional wetlands and wetlands subject to RWQCB oversight. These wetland delineations and identifications shall be submitted to the Army Corps, California Department of Fish and Game, and the RWQCB when submitting the annual list of projects to be carried out the following year.
- 3.2-H.2 All wetlands created by springs shall be maintained to the maximum degree feasible. If the drainage of the spring must be altered to allow proper road or trail drainage, the District shall strive to create a drainage pattern that provides an equal or greater amount of wetland habitat in the area of the spring.
- 3.2-H.3 Any roadside ditch wetlands will be assessed by the District to determine whether they can be retained. Unless displacement of these wetlands is critical to reducing a substantial erosion problem, these wetlands will be retained.
- 3.2-H.4 When removing culverts for replacement, the minimum amount of vegetation shall be removed. No equipment should be allowed within any wetland.
- 3.2-H.5 Culverts draining upslope wetlands shall be placed so that the inlet is set at the same elevation as the existing culvert to maintain the upslope hydrologic regime.
- 3.2-H.6 When decommissioning roads and trails, all wetlands should be retained unless their retention would cause substantial future erosion.
- 3.2-H.7 All ditches supporting wetlands shall be clearly identified so that ongoing road and trail maintenance avoids grading or cleaning these ditches except where needed to restore ditch function.
- 3.2-H.8 Where wetland plants must be removed or wetland habitat is created, the District shall collect seed from wetland plants in the area and reseed the area once construction is complete. Suitable live plants can also be planted. Planting techniques can include seed casting, hydroseeding, or live planting methods using the techniques in the latest version of the California Salmonid Stream Habitat Restoration Manual.

- 3.2-H.9 The District shall abide by any additional permit conditions required by the Army Corps, California Department of Fish and Game (Wildlife), and the RWQCB.
- 3.2-H.10 To ensure there is no net loss of wetlands due to the project, the District is committed to creating approximately 290 feet of new creek as the result of the road and trail decommissioning called for in the Draft Plan. The unavoidable impact of loss of isolated wetlands in in-board ditches due to road re-contouring (subject to Mitigation Measures 3.2-H.1 and 3.2-H.3) shall be assessed, quantified, and calculated for size, condition, function, and value of the ditch wetlands. The loss of isolated, in-board ditch wetlands shall not exceed the 290 feet of new creek that will be created. Once the threshold is reached, no additional wetlands shall be displaced or impacted without further environmental analysis and mitigation. NOTE: The 290 feet of new creeks has been created, and this biological resources report provides analysis of wetland impacts associated with the currently proposed project.

Additional Recommended Avoidance and Mitigation Measures

No additional measures are required.

8.0 SENSITIVE PLANT COMMUNITIES

Sensitive plant communities are communities that are of limited distribution statewide or within a county or region and are often vulnerable to environmental effects of projects. These communities may or may not contain special-status species or their habitat. The most current version of the CDFW's *List of California Terrestrial Natural Communities* as well as the MCV indicate which natural communities are of special-status given the current state of the California classification.

The study area encompasses a number of sensitive plant communities. There are three plant communities that are designated as Rare and Threatened by the CDFW: Serpentine Bunchgrass, Purple Needle Grass Grassland, and Mt. Tamalpais Manzanita Chaparral. The study area also encompasses riparian habitats, wetlands, and other waters subject to the jurisdiction and legal protection of environmental regulatory agencies; these habitats are discussed above (see **7.0 Jurisdictional Resources**).

The proposed project would remove (i.e., decommission) approximately 4.4-miles of non-system roads and trails and restore those routes to natural conditions to improve habitat. Many of the

non-system trails traverse serpentine habitats that support sensitive plant communities. The unauthorized use of these trails degrades habitat quality within sensitive plant communities. Therefore, in the long term, the proposed closing and restoration of non-system trails would benefit sensitive plant communities by eliminating trails that provide access to over one acre of habitat, including large areas of sensitive serpentine habitats on Azalea Hill.

New construction would generally be limited to the proposed trail reroutes. Some of the proposed trail reroutes would occur within small areas mapped as upland serpentine grassland. However, these reroutes do not include rerouting an existing trail from a common plant community into a sensitive plant community. Therefore, the restoration of the existing trail would offset impacts to sensitive plant communities associated with the rerouted trail.

The other project components include actions that would occur where a trail or road already exists, such as adopting and improving existing trails and converting an existing road to a trail (or vice-versa). These activities would primarily occur within the footprint of the existing road or trail and related habitat disturbances would be small and adjacent to existing trails.

As required by the Mt. Tamalpais Road and Trail Management Plan (Mitigation Measure 3.2-D.3), the Azalea Hill Trail reroute has been rerouted to avoid the stand of serpentine chaparral and the non-system trail that proceeds south of the Azalea Hill Trail will be decommissioned. The initial project design was also modified to avoid large stands of serpentine chaparral.

Given the above, project-related impacts to sensitive plant communities would largely be self-mitigating. The proposed closing and restoration of approximately 4.4 miles of non-system trails would benefit sensitive plant communities by eliminating trails that provide access to large areas of sensitive serpentine habitats on Azalea Hill. Measures would also be implemented to assist these areas revegetate with native vegetation. The proposed project does not include relocating any existing trails from a common plant community into a sensitive plant community, and other project activities would primarily occur within the footprint of the existing roads or trails and related habitat disturbances would be small and adjacent to existing trails. However, measures are still required to minimize impacts to sensitive plant communities and to restore temporarily disturbed habitats.

Potential impacts to sensitive plant communities could also occur due to the spread of weeds. It is possible that construction equipment could transport seeds of invasive plant species to the site, or that areas incidentally disturbed during construction could be colonized by invasive plant species.

Measures Required by the *Mt. Tamalpais Watershed Road and Trail Management Plan EIR*

The *Mt. Tamalpais Watershed Road and Trail Management Plan EIR* includes the following measures to protect sensitive plant communities and prevent the spread of weeds:

- 3.1-B.8 See Jurisdictional Resources, above
- 3.2-E.1 All projects shall be designed and constructed to remove only that native vegetation needed to accomplish the erosion control objectives. MMWD shall monitor work to ensure only targeted plants are removed.
- 3.2-F.1 Decommissioned roads and trails should be covered with native mulch available in the site area. MMWD may also collect seeds of plants or live plants common to the area and revegetate the disturbed slope. Decommissioned sections should be ripped or otherwise treated to encourage the establishment of seeds or seedlings. Planting techniques can include seed casting, hydroseeding, or live planting methods using the techniques in the latest version of the California Salmonid Stream Habitat Restoration Manual.
- 3.2-I.1 Invasive exotic weed populations in and adjacent to project sites will be treated prior to any soil disturbing activities to minimize the seed dispersal of those plants. Sites where imported gravel or other fill materials are installed or stored should be mapped and monitored to prevent the introduction of new weeds.
- 3.2-I.2 MMWD shall monitor project sites and remove new exotic weeds spread into the site area by project construction.
- 3.2-I.3 Monitoring and/or treatment of these sites shall occur quarterly, or until it has been determined that there is no longer a risk of an unintentional release of an invasive, exotic species.

Additional Recommended Avoidance and Mitigation Measures

See BIO-1B, which includes measures to prevent the spread of weeds during construction activities.

BIO-7A Where trails will be rerouted or where activities will occur outside of existing trails, the removal of native vegetation will be minimized to the degree practical.

BIO-7B All areas temporarily disturbed during project activities that are outside of the finished trail/road alignment will be restored to their pre-disturbance condition. The pre-disturbance condition would be documented by a botanist prior to

project implementation. A restoration plan will be implemented to restore all temporarily disturbed areas. Success criteria may include total plant cover, and non-native species cover shall not exceed pre-disturbance non-native species cover. The plan shall address acceptable thresholds for native and non-native species for each monitoring year for five years. The plan shall also define corrective actions that would be taken if the performance standards are not met and the triggers for taking corrective actions.

BIO-7C In addition to the requirements of Measure 3.2-F.1 from the *Mt. Tamalpais Watershed Road and Trail Management Plan* EIR, all decommissioned trails will be monitored by a qualified botanist annually for a period of five years. Corrective actions will be implemented if it is determined by the botanist that the trails are not revegetating with appropriate vegetation characteristic of surrounding areas on similar soils.

9.0 WILDLIFE MOVEMENT CORRIDORS

Wildlife corridors are described as pathways or habitat linkages that connect discrete areas of natural open space otherwise separated or fragmented by topography, changes in vegetation, and other natural or manmade obstacles such as urbanization. The project site is located in an undeveloped area and is surrounded by large expanses of open space. Wildlife is expected to currently use the project site for local and regional movements. The proposed project does not include the construction of any structures that would inhibit wildlife movement. Additionally, construction activities would occur during daylight hours, when wildlife movements are less likely to occur. Therefore, the proposed project would not substantially interfere with the local or regional movement of wildlife species.

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Appendix A – Project Description and Figures



Environmental Checklist Form

1. **Project Title:** Amendment of the *Mt. Tamalpais Watershed Road and Trail Management Plan - Restoration of Azalea Hill* (MMWD Project No. R17008)
2. **Lead Agency Name and Address:** Marin Municipal Water District, 220 Nellen Ave., Corte Madera, California 94925
3. **Contact Person and Phone Number:** Dain Anderson, Environmental Services Coordinator, Marin Municipal Water District 415-945-1586
4. **Project Location:** Azalea Hill, approximately 4 miles west-southwest of the Town of Fairfax, CA (lat 37.9626, long -122.6206), APN 197-120-31 (**Figure 1**).
5. **Project Sponsor's Name and Address:** Marin Municipal Water District, 220 Nellen Ave, Corte Madera, CA 94925
6. **General Plan Designation:** Marin Countywide Plan – Open Space (OS)
7. **Zoning:** Marin County Zoning Ordinance – Open Area (OA)
8. **Description of Project:**

The Marin Municipal Water District (District or MMWD) is proposing the Amendment of the Mt. Tamalpais Watershed Road and Trail Management Plan – Restoration of Azalea Hill (Appendix A). The project would: 1) amend the *Mt. Tamalpais Watershed Road and Trail Management Plan* (RTMP) for the Azalea Hill area; 2) remove approximately 4.4-miles of non-system roads and trails and restore those routes to natural conditions to improve habitat and water quality; 3) adopt and improve an approximately 1.9-mile route as an unpaved, approximately 4-foot-wide, small vehicle, or multi-use route (comprised of the existing Liberty Gulch Road (1.2 mile) and conversion of some existing non-system trails (0.7 mi) to the wider, small vehicle route); 4) improve the existing, approximately 1.1 mile hiking and horse route over Azalea Hill to correct its erosion problems and make it more sustainable; and 5) improve the Azalea Hill parking lot to correct erosion problems and improve the visitor amenities serving Azalea Hill. Upon its completion, the project would prevent up to an estimated 219 cubic yards of sediment from entering Azalea Hill's creeks or Alpine Lake annually (or 4,377 cu.yds over 20 years), and would restore approximately one acre of habitat.

8.1 Background

Azalea Hill is an approximately 370-acre area of the Mt. Tamalpais watershed bordered by Bon Tempe Creek and the Sky Oaks/Bullfrog area to the east, Alpine Lake to the south, Liberty Gulch, Bolinas-Fairfax Road and the Pine Mountain area to the west, and the Meadow Club golf course to the north. Elevation ranges from 646 feet along the shore of Alpine Lake to 1,217 feet at its summit (**Figure 1**). The area is crisscrossed by a network of approximately 7 miles of roads and trails that were constructed over time as hiking trails, carriage roads, ranch roads or county vehicle roads. There are a dozen or so intermittent creeks originating on Azalea Hill, as well as several seeps and springs. The vegetation is predominately a mixture of grasslands, chaparral and hardwood forest. Of note are pockets

of serpentine soils in several areas that are highly erosive and that support many special-status plant species.¹

Of the 7-miles of roads and trails, approximately 6-miles are social or “non-system” routes. “Non-system” routes, as opposed to system, or official routes, are also known as “social,” “abandoned,” “illegal” or “unofficial” routes, and they add to the burden of road and trail management. These non-system routes have a wide variety of undesirable effects on the environment ranging from water quality impacts to migration or foraging barriers for wildlife to physical removal of habitat.² (Figure 2). These routes, some of which existed before the district acquired the land (i.e. the old ranching roads), or were constructed by others over time, have persisted through repeated off-trail use.

Key to the proposed project is what is now called Liberty Gulch Road. This road was originally constructed to replace the county’s Bolinas-Fairfax carriage road which was flooded by Alpine dam and its resulting reservoir in 1919. Subsequent raising of Alpine Dam in 1924 and 1941 resulted in additional road construction or re-routes in the area. At one time Liberty Gulch Road provided the connection for all users between Bullfrog Road, a gateway to the “lakes” area, and Fairfax-Bolinas Road, a gateway to the “Pine Mountain” area. However, the dam and road construction have eliminated, for the most part, the connections at either end (the lower portion is flooded by Alpine Lake and the upper portion was buried under today’s current Bolinas-Fairfax Road alignment) (Figure 3).

Other key elements of the site are Azalea Hill Road and the Azalea Hill Trail that currently make up the RTMP recognized route over Azalea Hill. While their origin is not known (speculation has the road being built by ranchers and the trail being built by equestrians), they provide the hiking and equestrian connection over the peak of Azalea Hill between Bullfrog Road and Bolinas-Fairfax Road. The western most part of this route (Azalea Hill Road) is open to bicycles and vehicles; however, the road is badly gullied and bicycle and vehicle access ends at the top of the hill. As such, there is no bicycle or vehicle connection between Bullfrog and Bolinas-Fairfax Roads (Figure 4).

a. Purpose and Need

At issue on Azalea Hill are the areas with serpentine soils where many special-status plant species grow that can be easily damaged by people traveling off-trail. Serpentine soils are also very erosive, and sediment from these and other erosion sites makes its way to Alpine Lake. An assessment³ of only the erosion sites done as part of the RTMP for Liberty Gulch Road and the Azalea Hill Trail estimated approximately 2,573 cubic yards of sediment would run into Alpine Lake over the next 20 years if left untreated.

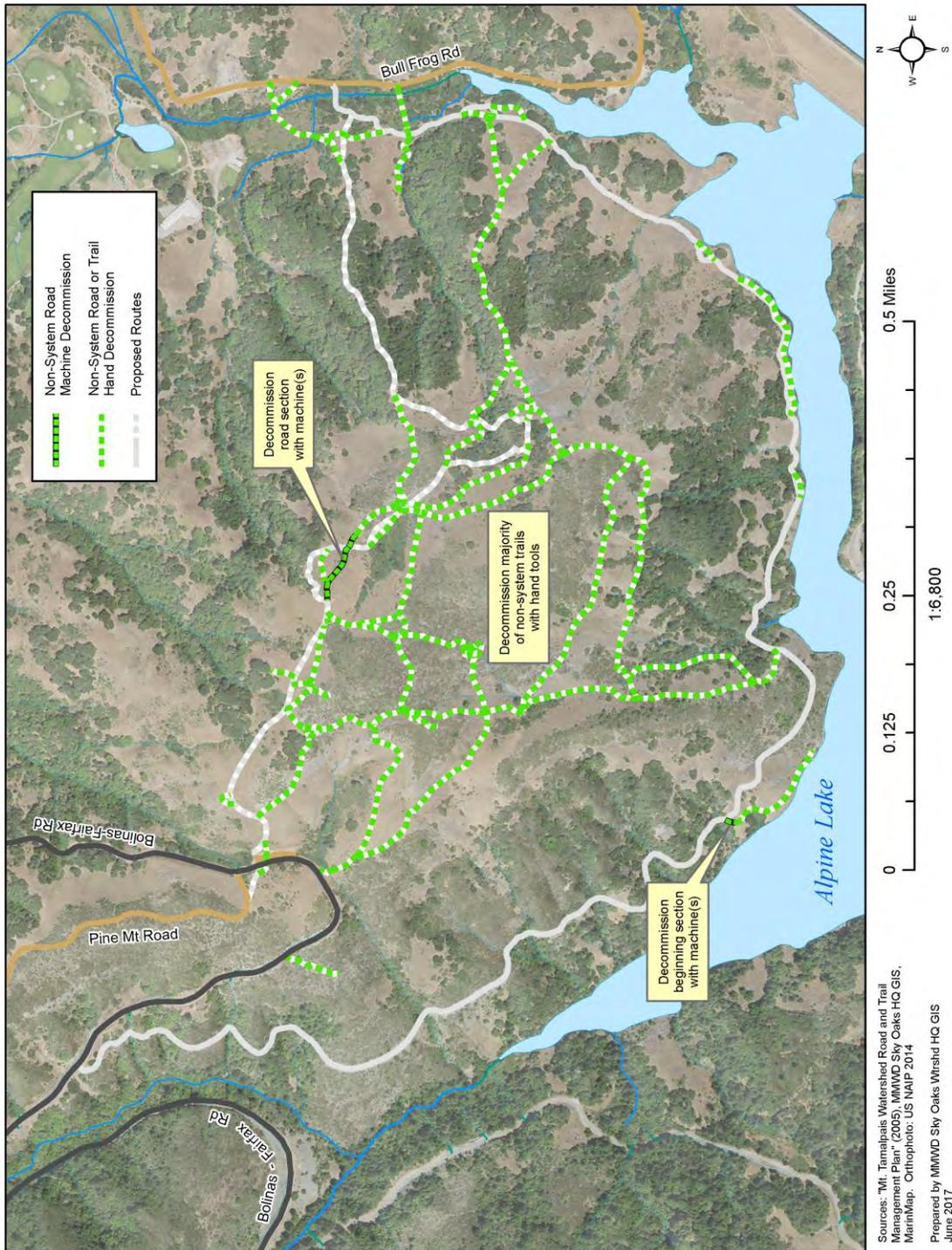
Also at issue is the network of roads and trails on Azalea Hill. The one official route does not provide an adequate connection from the lakes area to the Pine Mountain area for all visitors or district patrol and response staff. Further, it is in poor condition and some

¹ A list of special-status plant species observed on Azalea Hill is found in Table __, Section __.

² Refer to Chapter 5 of the “Mt. Tamalpais Watershed, Road and Trail Management Plan,” prepared by MMWD, 2005.

³ PWA, 2003. “Summary Report, Road and Trail Inventory and Assessment, Erosion Prevention Implementation Plan, Mt. Tamalpais Watershed, Marin Municipal Water District, Marin County, California.” Prepared for the Marin Municipal Water District by Pacific Watershed Associates, Arcata, California 95518

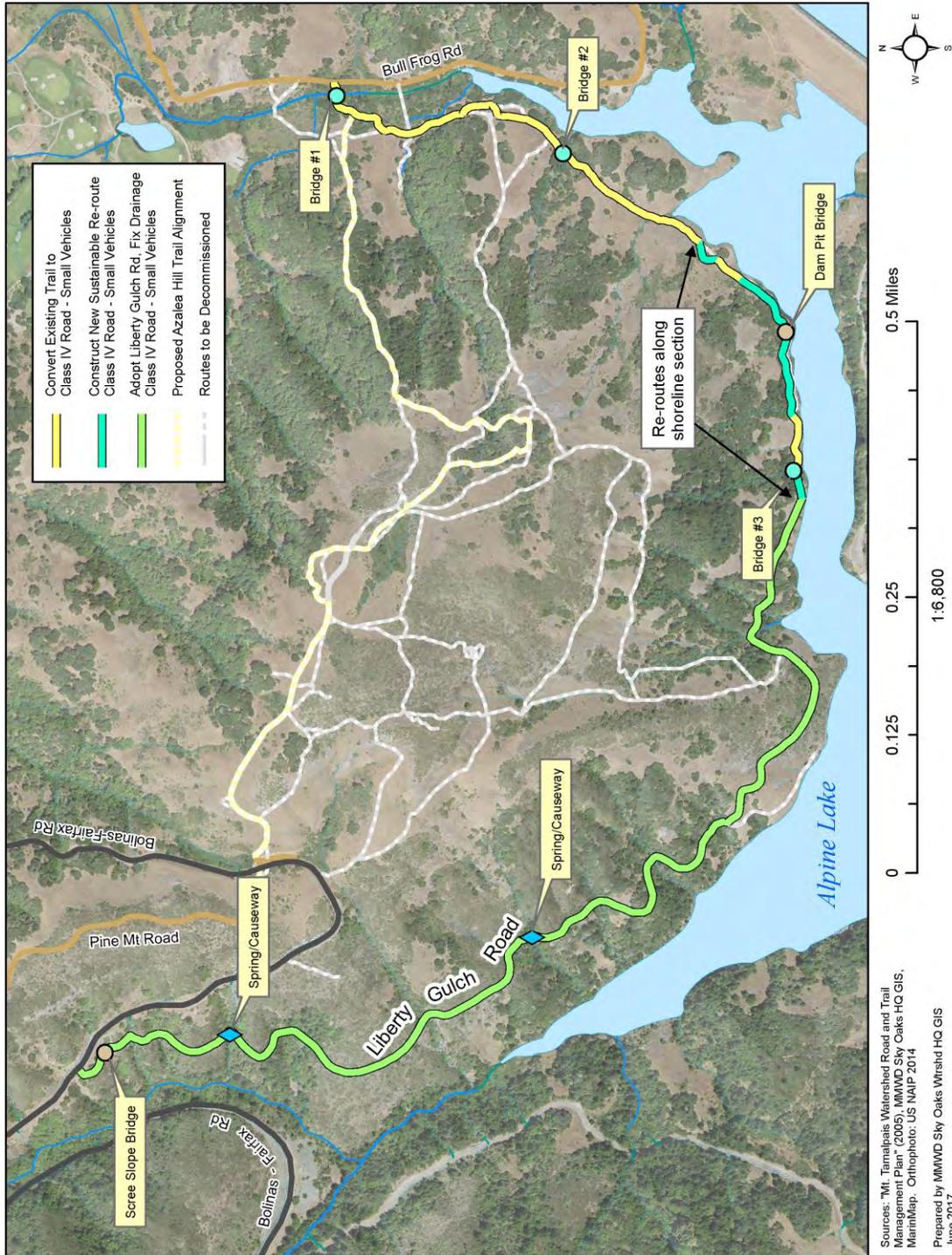
Figure 3: Removal of Non-System Routes



SOURCE: MMWD 2017



Figure 4: Adopt Small Vehicle, or Multi-use Route (Liberty Gulch Road)



SOURCE: MMWD 2017



sections are too steep to be sustainable. In addition, the network of non-system trails, some of which pass through this sensitive habitat, continue to have undesirable effects such as habitat fragmentation, disruption of wildlife, erosion and the increased risk of trail users getting lost or injured. Removal of this network of non-system trails would minimize these impacts and help restore many areas of Azalea Hill. And, adopting and improving the old, existing Liberty Gulch Road would improve the visitor experience by providing a sustainable route for bicycles, district patrol personnel and emergency response that connects closer to the Azalea Hill parking lot, via Bolinas-Fairfax Road, than currently exists. Additionally, the improvement visitor amenities at the existing Azalea Hill parking lot would further benefit the visitor experience, and educate them about the sensitive habitat in the area and the importance of keeping on designated trails.

b. 2005 Mt. Tamalpais Watershed Road and Trail Management Plan

The District adopted the *Mt. Tamalpais Watershed Road and Trail Management Plan* in 2005. The RTMP is a both a description of the official system of roads and trails and a detailed work plan on how to manage the roads and trails for the next quarter century. It also serves as a guide to further the protection of water quality in creeks and reservoirs, further the protection of environmentally sensitive habitats and special status species, and minimize road and trail related impacts on the Mt. Tamalpais Watershed.

The goals of the Plan are:

1. *To improve water quality and minimize sediment into the creeks and reservoirs;*
2. *To reduce the impact of the road and trail network on wetlands, riparian areas, other environmentally sensitive habitats and special status plant and animal species; and*
3. *To reduce the impact of the road and trail network on the Watershed's natural ecological functions.*

Azalea Hill is called out in Chapter Two of the plan as an area proposed for changes.⁴ Azalea Hill Road is proposed to be converted to a trail, mainly to keep cyclists from continuing beyond the road and down onto the trail, or worse, creating new trails that damage the environment and stress limited enforcement resources. In addition to being a dead end, other undesirable effects include its steepness, the presence of special status plant species and erosive serpentine soils. Azalea Hill Trail is proposed for a re-route because it is too steep and gullied in areas, passes through erosive serpentine soils in other areas and through a wetland at the bottom of the trail (a new creek crossing would be needed to avoid the section that currently runs through the wetland).

8.3 Project Objective and Description

The Azalea Hill Restoration Project's goals are to:

- Restore habitat, including sensitive serpentine habitats, by removing unnecessary roads and trails;

⁴ Section 2.1.2 – Changes to the Old Road and trail System and Table 2.4 – Proposed Changes to the Road and Trail System on the Mt. Tamalpais Watershed.

- Provide environmentally sensitive routes (i.e. routes that avoid environmentally sensitive areas wherever possible, and minimize and mitigate their impacts when not possible) over Azalea Hill for all users (hikers, equestrians, cyclists and district patrol and response staff) to improve connectivity between the lakes area and the Pine Mountain area;
- Improve the visitor experience of these users by providing new, improved trail marker signage, informational kiosks, new trash and recycling facilities, parking lot improvements, a self-contained, serviceable convenience station (i.e. a porta potty or self-composting toilet), bicycle racks, split rail fencing and benches; and
- Ensure the routes are sustainable, and designed and managed in a manner that strictly minimizes erosion and water quality impacts (e.g. routes that meet the best management practices, design standards and environmental protection measures per Chapter 3 of the RTMP).

To achieve these goals, the project includes the following elements:

1. Amend the *Mt. Tamalpais Watershed Road and Trail Management Plan* for the Azalea Hill area. Chapter 2 already includes guidance for Azalea Hill – treat erosion sites (creek crossings and gullies), re-route it where it is too steep, and it notes the presence of serpentine habitats (and the special status plants that live there). The plan also recognizes the existing route connectivity problem. The road dead-ends at the top of the hill, so some cyclists use non-system routes or create new ones, damaging the environment or stressing limited enforcement resources to make a connection from the lakes area to the Pine Mountain area. This amendment would add language in Chapter 2 noting that Liberty Gulch Road would be adopted, including its associated re-routes and conversions, as a Class IV small vehicle road, or multi-use route, to improve connectivity between the lakes area and the Pine Mountain area. The amendment would also add Liberty Gulch Road to Table 2.4, “Non-System Routes to Become System – Adoptions,” and the maps in Figures 2.03 through 2.15, as a Class IV small vehicle road, or multi-use route. Lastly, the number of miles of roads and trails in the plan would be updated to reflect the current conditions on the Watershed. The full text of the new language and the revised maps can be found in **Appendix A**.
2. Remove approximately 4.4-miles of non-system roads and trails and restore those routes to natural conditions to improve habitat and water quality. This work would be accomplished by uncompacting the trail tread with hand tools (picks, McLeods, or shovels), then raking adjacent top soil, duff and leaf litter on top of the decommissioned tread to aid its re-vegetation. There are two sites where equipment would be used to do the restoration work, one at a spur road at its intersection with Liberty Gulch Road near the bottom of the hill, the second at the upper end of the Azalea Hill Road (**see Figure 3**). There may be locations where it is not necessary to compact the trail tread because segments have already re-vegetated or are no longer accessible. This would be determined, in part, by the type of vegetation a trail goes through. For example, tool work might be needed on a trail segment when it goes through grassland, maybe only here or there when it’s in forest lands, and not at all when in chaparral. The re-vegetation of these areas

after they are decommissioned would also minimize erosion from these areas, saving up to an estimated 85 cubic yards⁵ annually (approximately 1,702 cubic yards over 20 years) from entering Alpine Lake or one of Azalea Hill's creeks, thereby improving water quality in addition to restoring habitat;

3. Adopt and improve an approximately 1.9-mile section of the unpaved, existing Liberty Gulch Road, including associated re-routes and conversions, as a Class IV⁶ small vehicle road, or multi-use route (**see Figure 4**). Following the guidance in the RTMP for Class IV roads, the route would be designed for not more than small vehicles (approximately four-foot-wide), necessitating only those improvements necessary to provide access for ATV quads and bicycles. Throughout the length of the route, speed calming features (i.e. changes in elevation such as earthen speed bumps, lane narrowing, diagonal diverters using local logs or rocks, etc.) would be maintained or installed to reduce the downhill speed of bicyclists. Passing opportunities, lines of sight and horse-friendly tread surfaces would also be included throughout the design to improve user safety along the route. What follows are more specifics on this route, beginning at the bottom of the hill and working one's way to its intersection with Bolinas-Fairfax Road:
 - At Bullfrog Road, convert approximately 0.4 miles of existing non-system trail to an approximately four-foot-wide Class IV road. Two, 40-foot-long, bridges, and two puncheons would be installed along this section, all of which would be clear span construction so there would be no construction in the creeks or ephemeral drainages.
 - Adjacent to Alpine Lake, convert approximately 0.3 miles of existing, non-system, "fishing access" trail to an approximately four-foot-wide Class IV road. The re-route would be mostly re-routed several feet up the hill, further away from the lake's shoreline, to help protect water quality. The re-route would also be constructed at a sustainable grade, would avoid sensitive habitats wherever possible, and would use best management practices to minimize its impact and need for maintenance. One 20-foot-long bridge, one puncheon and two armored rock crossings would be installed to cross the four small creeks along this section. Additionally, a second, 16-foot-long bridge would be constructed over an old "dam pit," a remnant of an old dam that was never completed.
 - Once the route meets the old Liberty Gulch Road, the next approximately 1.2 miles would need little in the way of tread improvements except near the upper end. The majority of the work here would be to correct the old road's drainage issues by implementing best management practices from the RTMP (storm-proof creek crossings, critical and rolling dips, outsloping, etc.). Fifteen creek crossing sites would be upgraded along this section to

⁵ A typical 10-wheel dump truck holds approximately 10 cubic yards of dirt. Therefore, 85 cubic yards would be the equivalent of eight and one-half truck loads per year.

⁶ Per Section 2.2 of the RTMP, "Road Designations," Class IV roads are defined as small vehicle, unpaved roads with a primary use of patrol and route connectivity. Some sections may only be passable with small vehicles (i.e. ATV quads or small "bobcat" sized tractors). They only have limited truck and heavy vehicle traffic, and seasonal closures may apply.

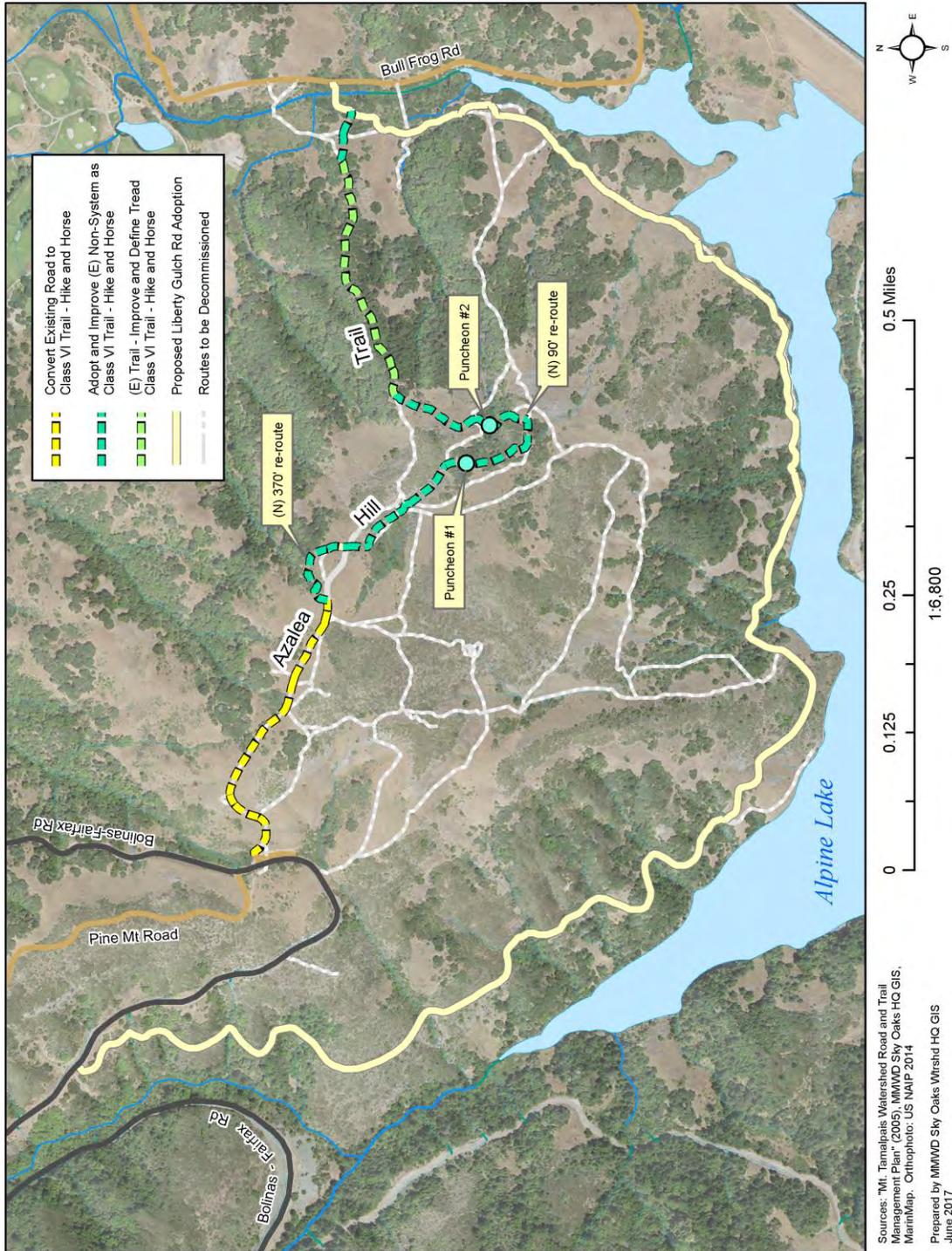
strictly minimize their erosion potential. Nine of the upgrades would be armored rock crossings, two would be puncheons, one would be a bridge and one existing culvert would be slip-lined to prolong its life. At two sites which include springs, a combination of armored rock crossings and four-foot-wide causeways (set back from the fill slope) would be constructed. Lastly, one section of gullied road would be treated with rolling dips and one landslide would be mitigated by pulling its unstable fills and de-watering the road above with outsloping and rolling dips. Near the top of the old Liberty Gulch Road a pile supported bridge or trestle would be constructed across the unstable scree slope left over from the construction of Bolinas-Fairfax Road above. Lastly, at its intersection with Bolinas-Fairfax Road, and generally within the existing alignment of the route, a new approach and landing would be graded to provide a better, more sustainable connection to Bolinas-Fairfax Road.

The approach used to treat the erosion problems is one of being “light on the land.” In other words, instead of trying to do full landform restoration and restore all the creek channels, the work is designed to be the minimum to make the route passable for all users, sustainable, and to correct the existing erosion issues. Nevertheless, it would be used to upgrade the creek crossings, transport locally harvested materials (i.e. rock and dirt) from one location to another, and to re-shape the road where necessary. This work is estimated to save approximately an estimated 100 cubic yards annually (approximately 2,011 cubic yards over 20 years) of sediment from entering Alpine Lake, which is the majority of the sediment risk on Azalea Hill.

4. Improve the existing, approximately 1.1 mile Class VI⁷, or hiking and equestrian route over Azalea Hill to correct its erosion problems and make it more sustainable following the guidance in the RTMP (see **Figure 5**). This involves three basic types of work, or improvements, as follows:
 - Convert approximately 0.3 miles of the existing Azalea Hill Road from the parking lot to the top of the hill (the west side) to a Class VI trail and correct its existing gulling and erosion. This work would involve narrowing the route, re-shaping (outsloping and rolling dips) where appropriate, and armoring the tread. Puncheons could also be used as necessary to span road-related drainage features. Small equipment, such as mini-excavators, would be used to move locally harvested rock and dirt and re-shape the route.

⁷ Per Section 2.3 of the RTMP, “Trail Designations,” Class VI trails are defined as equestrian trails. They can have substantial infrastructure improvements when compared to other trails to support their use. Seasonal closures may apply.

Figure 5: Improve Existing Azalea Hill Road and Trail



SOURCE: MMWD 2017

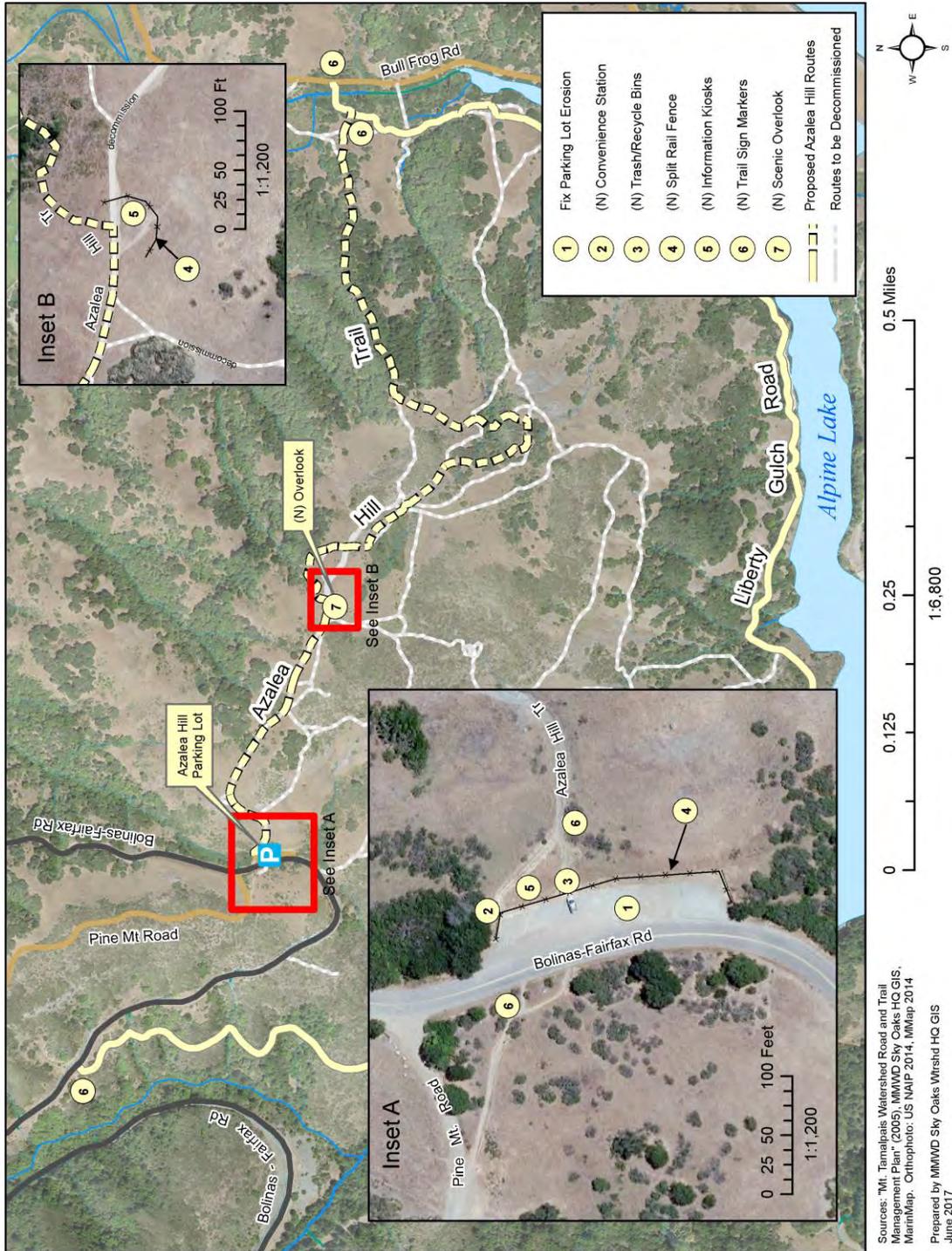


- Adopt and improve approximately 0.5 miles of existing, non-system trail as a sustainable Class VI trail. Two puncheons would be constructed to cross a small creek near the top of the hill. Hand tools (picks, McLeods, or shovels) would be adequate to perform most of the work; however, some mechanized equipment like motorized wheel barrows may be needed to transport locally harvested materials (i.e. rock and dirt) and the tools and materials needed to construct the puncheons. Chainsaws would also be used to trim vegetation to provide adequate height and width clearance for equestrians. Of note, less than 0.1 miles of this route would not actually use and improve an existing non-system trail. Instead, about 370 feet near the top of the hill and 90 feet near the south-east extreme of the trail would be a new re-route for the purposes of minimizing impacts to vegetation communities and to make the route more sustainable.
- Improve and define approximately 0.3 miles of the existing Azalea Hill Trail through the hardwood forest to the bottom of the hill by making tread improvements, outsloping the trail and constructing rolling dips where necessary and defining the trail to make this system route more obvious. Hand tools (picks, McLeods, or shovels) would be adequate to perform this work. Chainsaws could also be used to trim, lop and scatter vegetation to improve way finding. Of note, the last 250 feet of this section would follow an existing non-system trail, instead of the official trail, because it provides a better connection to the new bridge over Bon Tempe Creek that would connect to Bullfrog Road. However, the work needed on this non-system trail is similar tread work to that above and can be accomplished with the same hand tools.

The approach for work on this section of trail would also be “light on the land.” Work would stay within the existing routes as much as possible to avoid impacts to vegetation in the area, would be the minimum necessary to fix the erosion and to make the tread sustainable for the expected equestrian use. This work is estimated to save an estimated 28 cubic yards annually (approximately 562 cubic yards over 20 years) of sediment from entering Alpine Lake.

5. Treat the Azalea Hill parking lot to correct its erosion problems and improve the visitor amenities serving Azalea Hill (**see Figure 6**). The parking lot improvements would correct its drainage problems by reducing its footprint and re-surfacing it with a permeable surface (rock or pervious concrete), thereby saving an estimated 5 cubic yards annually (approximately 102 cubic yards over 20 years) of sediment from entering one of Azalea Hill’s creeks. The number of parking spaces, 19, would not change. Additional visitor amenities would be installed to: (a) protect water quality (a self-contained, serviceable convenience station (i.e. a porta potty or self-composting toilet) and trash and recycling bins) and (b) protect the area’s natural habitat by educating visitors (with informational kiosks), by delineating parking areas, installing bicycle racks and by installing barricades designed to keep visitors out of sensitive habitats and on the designated trails in the vicinity of the parking lot. Additional trail marker signs would be installed at road and trail intersections to direct visitors onto the designated trails. Finally, an existing scenic overlook area would be improved to help draw users to this site, thereby discouraging the

Figure 6: Improved Parking Lot and New Visitor Amenities at Azalea Hill



SOURCE: MMWD 2017



use of non-system routes by visitors who are looking for a destination near the top of the hill. Improvements would include interpretive signage (re-enforcing the importance of staying on designated routes to protect sensitive habitats), a bench or two, and split rail fencing.

Upon its completion, the project would save up to an estimated 219 cubic yards of sediment from entering Azalea Hill's creeks or Alpine Lake annually (or 4,377 cubic yards over 20 years), and would restore approximately one acre of habitat.

8.3.1 Earthwork

Implementation of the project would require moving earth to decommission routes or make them sustainable so they strictly minimize erosion and sedimentation. The majority of the earth work would occur on the 1.9-mile section of the existing Liberty Gulch Road and its associated re-routes, conversions and decommissions. The Road and Trail Inventory and Assessment (PWA 2003) estimated 610 cubic yards of earthmoving would be required; primarily removal of erodible fill from creek crossings and to re-shape the road as it approaches the crossings. Additional earthwork along this section would involve constructing the new re-routes adjacent to Alpine Lake and the landing near the top. Footings or pilings would also need to be constructed for the four proposed bridges. This work would be achieved with the use of small, mechanized equipment like skid steers, mini excavators and motorized wheel barrows.

Small, mechanized equipment would also be used to convert the existing Azalea Hill Road from a small vehicle road to a hiking and equestrian trail, and decommission its eastern-most portion. This work would be limited to road re-shaping to improve its drainage (outsloping, rolling dips, critical dips and removing unstable fill or sidecast material) and to narrow its width, thereby strictly minimizing its erosion and sedimentation. This earthwork is estimated to disturb up to 350 cubic yards of material, but it would all be re-used in place to re-shape and narrow the existing road.

Larger equipment, such as skip loaders, dump trucks and rollers would likely be used to treat the existing parking lot. Up to 300 cubic yards of material could be moved to reshape the surface of the parking lot to correct its erosion problems.

In total, the project could disturb up to 1,260 cubic yards of material. However, all the material would be re-used near where it is disturbed to either re-shape the route to control drainage or to aid in the decommissioned route's re-vegetation. There would be no requirement to import or off-haul material. Additionally, since it's not likely that all the social trails would need to be "ripped," so the net total of disturbance would be less. More detail on the proposed earthwork can be found in the Geology and Soils Section.

In addition, the decommissioning of up to 4 miles of other, small social trails by scarifying the surface would disturb the earth in these areas. This work would be accomplished primarily with hand tools (picks, McLeods, or shovels), the purpose being to loosen, or scarify, compacted soil in the tread to aid re-vegetation. In areas where re-vegetation is occurring naturally, such earthwork would not be necessary. Overall, because this work is generally just loosening the soil and not necessarily moving it, the amount is considered negligible in terms of estimating cubic yards of material moved.

8.3.2 Tree Removal

Implementation of this project would require the removal of up to 21 trees. Eleven of these trees are Douglas fir (*Pseudotsuga menziesii*), three California bay (*Umbellularia californica*), three coast live oaks (*Quercus agrifolia*), two madrones (*Arbutus menziesii*) and two willows (*Salix* species). The average diameter of all these is about 6-inches, with one exception of a two-stem fir tree that is about 22-inches and 16-inches, respectively, in diameter. More details on the proposed tree removal can be found in the Biological Resources Section.

8.3.3 Construction Access

Construction access would be from Bullfrog Road and the Azalea Hill parking lot on Bolinas-Fairfax Road (**Figure 1**).

8.3.4 Construction Staging

All construction and material staging would occur at the Bullfrog parking lot, Bullfrog Road, the quarry site (located approximately 300 feet north of the intersection of Azalea Hill Trail and Bullfrog Road) and the Azalea Hill parking lot on Bolinas-Fairfax Road.

8.3.5 Construction Duration and Phasing

The proposed project's implementation is dependent on securing adequate funding. The plan is to secure environmental approvals and regulatory permits for the project, and then seek funding. The concept is that once the project is approved, or "shovel-ready," it would be more attractive both to governmental grant making sources and to philanthropic funders. The estimated construction time-frame in total is approximately four to six months; however, the construction could be done in phases over several years dependent on funding. The potential construction phases could be, in no particular order: (1) removal, or decommissioning, of all the non-system trails; (2) conversion of the existing Azalea Hill Road to a trail and improvement of the re-route to a sustainable equestrian trail; (3) construction of the parking lot and visitor amenity improvements, and (4) upgrade of the existing Liberty Gulch Road and construction of the two connectors on each end. Other than the decommissioning of the non-system trails, items (2) through (4) could be re-ordered and implemented in a variety of sequences.

9. **Surrounding Land Uses and Setting:** The project site is situated within the larger Mt. Tamalpais Watershed, which is owned and managed by the District. The watershed is an open space area utilized for the collection of rainwater for eventual treatment, distribution, and public use, as well as for recreational use and enjoyment.
10. **Other Public Agencies whose Approval is Required:** Project implementation will require permit acquisition from the California Department of Fish and Wildlife (Section 1602 Lake or Streambed Alteration Agreement), the San Francisco Bay Regional Water Quality Control Board (Section 401 Water Quality Certification), the Army Corps of Engineers (Section 404 Water Quality Certification), and the Marin County Department of Public Works (Road Right-of-Way Encroachment Permit).

Appendix B – Site Photographs

Representative Photographs of the Study Area

(November - December 2016)

Photos by Vollmar Natural Lands Consulting



Grassland Habitat. Central Portion of Study Area



Chaparral Habitat. Western Portion of Study Area.



Hardwood Forest Habitat. Northeastern Portion of Study Area.



Oak Woodland Habitat. Northeastern Portion of Study Area.



Unvegetated Habitat. Northwestern Portion of Study Area.



Shrubland Habitat. Northeastern Portion of Study Area.



Riparian Woodland Habitat. Northeastern Portion of Study Area.



Wetland Habitat. Western Portion of Study Area.

Appendix C – Plant Inventory

APPENDIX C.
Azalea Hill Restoration Project Plant Surveys.
Conducted in May and June, 2016 by Marin Municipal Water District Botanist Andrea Williams.

| Common Name | Scientific Name | Status | Riparian and Oak Woodlands | Serpentine | Re-route (Lower) | Azalea Hill Proper | Re-route (Upper) | Wetland |
|--------------------------|--|-----------|----------------------------|------------|------------------|--------------------|------------------|---------|
| Yarrow | <i>Achillea millefolium</i> | | X | | | X | | |
| American lotus | <i>Acmispon americanus</i> | | X | | | X | X | X |
| Short podded lotus | <i>Acmispon brachycarpus</i> | | | X | | X | | |
| Hill lotus | <i>Acmispon parviflorus</i> | | X | | | | | |
| Chilean trefoil | <i>Acmispon wrangelianus</i> | | | X | | | X | |
| Chamise | <i>Adenostoma fasciculatum</i> | | | X | X | | | |
| California maidenhair | <i>Adiantum jordanii</i> | | X | | | X | | |
| Barbed goatgrass | <i>Aegilops triuncialis</i> | Cal-IPC | | | | X | | |
| Buckeye | <i>Aesculus californica</i> | | X | | | | | |
| Giant mountain dandelion | <i>Agoseris grandiflora</i> | | X | | | X | X | |
| Mountain dandelion | <i>Agoseris heterophylla</i> | | | | | | | |
| Woolly goat chicory | <i>Agoseris hirsuta</i> | | | X | | X | | |
| Hall's bentgrass | <i>Agrostis hallii</i> | | X | | | | X | |
| Leafy bentgrass | <i>Agrostis pallens</i> | | X | | X | X | X | |
| Silvery hairgrass | <i>Aira caryophyllea</i> | Cal-IPC | X | | X | X | X | |
| Woodland tarweed | <i>Anisocarpus madioides</i> | | X | | | X | | |
| Sweet vernal grass | <i>Anthoxanthum odoratum</i> | Cal-IPC | X | | | | | |
| Columbine | <i>Aquilegia formosa</i> | | X | | | | | |
| Madrono | <i>Arbutus menziesii</i> | | X | | X | X | | |
| Eastwood manzanita | <i>Arctostaphylos glandulosa ssp. glandulosa</i> | | X | | X | | | |
| Mt. Tamalpais manzanita | <i>Arctostaphylos montana ssp. montana</i> | CRPR 1B.3 | X | X | X | | X | |
| California pipevine | <i>Aristolochia californica</i> | | X | | | | | |
| Lace fern | <i>Aspidotis densa</i> | | | X | X | | X | |
| Loco weed | <i>Astragalus gambelianus</i> | | | | | X | | |
| Slim oat | <i>Avena barbata</i> | Cal-IPC | X | X | | X | X | X |
| Coyote brush | <i>Baccharis pilularis</i> | | X | | X | X | X | X |
| Purple false brome | <i>Brachypodium distachyon</i> | Cal-IPC | X | X | | X | X | X |
| Big rattlesnake grass | <i>Briza maxima</i> | Cal-IPC | X | | | X | X | X |
| Little rattlesnake grass | <i>Briza minor</i> | | X | | | X | X | X |
| Harvest brodiaea | <i>Brodiaea elegans</i> | | X | | | | X | |
| California brome grass | <i>Bromus carinatus</i> | | X | | X | X | X | |

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|--------------------------------|--|---------------|-----------------------------------|-------------------|-------------------------|---------------------------|-------------------------|----------------|
| Ripgut brome | <i>Bromus diandrus</i> | Cal-IPC | X | X | | X | X | |
| Soft chess | <i>Bromus hordeaceus</i> | Cal-IPC | X | X | | | X | X |
| Woodland brome | <i>Bromus laevipes</i> | | X | X | X | X | | X |
| Red brome | <i>Bromus madritensis ssp. rubens</i> | Cal-IPC | X | X | | X | | |
| Serpentine reed grass | <i>Calamagrostis ophitidis</i> | CRPR 4.3 | X | X | X | | X | |
| Yellow mariposa | <i>Calochortus luteus</i> | | X | X | | X | X | |
| Oakland star-tulip | <i>Calochortus umbellatus</i> | CRPR 4.2 | | X | X | | X | |
| Rosin weed | <i>Calycadenia multiglandulosa</i> | | | X | | X | X | |
| Hillside morning glory | <i>Calystegia collina ssp. collina</i> | | | X | | | X | |
| Mt. Saint Helena morning glory | <i>Calystegia collina ssp. oxyphylla</i> | CRPR 4.2 | | | X | | | |
| Smooth western morning glory | <i>Calystegia purpurata ssp. purpurata</i> | | X | X | | | X | |
| Hill morning glory | <i>Calystegia subacaulis</i> | | X | | | X | | |
| Italian thistle | <i>Carduus pycnocephalus</i> | Cal-IPC | X | | | X | | |
| Whiteroot sedge | <i>Carex barbarae</i> | | X | | | | | |
| Dense-flowered sedge | <i>Carex densa</i> | | X | | | | X | X |
| Globe sedge | <i>Carex globosa</i> | | X | | | | X | |
| Slender-footed sedge | <i>Carex leptopoda</i> | | X | | | | X | |
| Field sedge | <i>Carex praegracilis</i> | | | | | X | | |
| Bifid sedge | <i>Carex serratodens</i> | | X | | | | | |
| Texas paintbrush | <i>Castilleja foliosa</i> | | | X | | | | |
| Cream sacs | <i>Castilleja rubicundula var. lithospermoides</i> | | | | | X | | |
| Buck brush | <i>Ceanothus cuneatus var. cuneatus</i> | | | X | | | | |
| Musk brush | <i>Ceanothus jepsonii var. jepsonii</i> | | | X | X | | X | |
| Blueblossom | <i>Ceanothus thyrsiflorus</i> | | X | | | | | |
| Tocalote | <i>Centaurea melitensis</i> | Cal-IPC | X | X | | | | X |
| Mouse-ear chickweed | <i>Cerastium glomeratum</i> | | X | | | | | |

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|-----------------------------|--|---------------|-----------------------------------|-------------------|-------------------------|---------------------------|-------------------------|----------------|
| Birchleaf mountain-mahogany | <i>Cercocarpus betuloides</i> | WR | X | | | | | |
| Amole | <i>Chlorogalum pomeridianum</i> | | X | X | X | X | X | |
| Western thistle | <i>Cirsium occidentale</i> | | X | X | | | | |
| Bullthistle | <i>Cirsium vulgare</i> | | X | | | | X | |
| Farewell to spring | <i>Clarkia amoena</i> | | X | X | | | | |
| Graceful clarkia | <i>Clarkia gracilis var. gracilis</i> | | X | | | | X | |
| Purple clarkia | <i>Clarkia purpurea var. quadrivulnera</i> | | X | X | | X | | |
| Viridis | <i>Claytonia exigua ssp. exigua</i> | | | | X | | | |
| Yerba buena | <i>Clinopodium douglasii</i> | | | | X | | | |
| Coast sanicle | <i>Coast sanicle</i> | | X | | | | | |
| Chinese houses | <i>Collinsia heterophylla</i> | | | | | X | | |
| Poison hemlock | <i>Conium maculatum</i> | Cal-IPC | | | | X | | |
| Field bindweed | <i>Convolvulus arvensis</i> | Cal-IPC | X | | | | | |
| Hairy bird's beak | <i>Cordylanthus pilosus ssp. pilosus</i> | WR | X | | | | | |
| Pampas grass | <i>Cortaderia</i> | Cal-IPC | | X | | | | |
| Silverleaf cotoneaster | <i>Cotoneaster pannosus</i> | Cal-IPC | | | | X | | |
| English hawthorn | <i>Crataegus monogyna</i> | Cal-IPC | X | | | | | X |
| Houndstongue | <i>Cynoglossum grande</i> | | X | | | X | | |
| Dogtail grass | <i>Cynosurus echinatus</i> | Cal-IPC | X | | | X | X | X |
| Tall nutsedge | <i>Cyperus eragrostis</i> | | X | | | | | |
| Orchardgrass | <i>Dactylis glomerata</i> | Cal-IPC | | | | | | X |
| California oatgrass | <i>Danthonia californica</i> | | X | X | | X | X | X |
| Wild carrot | <i>Daucus pusillus</i> | | X | | | | | |
| Western larkspur | <i>Delphinium hesperium</i> | | | | | X | | |
| Clustered brodiaea | <i>Dichelostemma congesta</i> | | X | | | | | |
| Wood fern | <i>Dryopteris arguta</i> | | X | | X | | X | |
| Spreading wood fern | <i>Dryopteris expansa</i> | | X | | | | | |
| Rock lettuce | <i>Dudleya cymosa</i> | | X | | | | | |
| Spikerush | <i>Eleocharis</i> | | X | | | | | |
| Blue wildrye | <i>Elymus glaucus ssp. glaucus</i> | | X | | X | X | X | X |

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| Virginia wildrye | <i>Elymus glaucus</i> ssp. <i>virescens</i> | WR | X | | | | | |
| Big squirreltail grass | <i>Elymus multisetus</i> | | X | X | | X | | |
| Dense-flower willow herb | <i>Epilobium densiflorum</i> | WR | | | | | X | |
| Minute willowherb | <i>Epilobium minutum</i> | | | X | X | X | | |
| Stream orchid | <i>Epipactis gigantea</i> | WR | | X | | | | |
| Common horsetail | <i>Equisetum arvense</i> | | X | | | | | X |
| Giant horsetail | <i>Equisetum telmateia</i> ssp. <i>braunii</i> | | X | | | | | |
| Golden fleece | <i>Ericameria arborescens</i> | | | | X | | | |
| Yerba santa | <i>Eriodictyon californicum</i> | | | X | X | X | X | |
| Tiburon buckwheat | <i>Eriogonum luteolum</i> var. <i>caninum</i> | CRPR 1B.2 | | X | | X | | |
| Naked buckwheat | <i>Eriogonum nudum</i> | | X | | | X | | |
| Yellow yarrow | <i>Eriophyllum confertiflorum</i> | | | X | | | X | |
| Big heron bill | <i>Erodium botrys</i> | | | | | X | | |
| Whitestem fillaree | <i>Erodium brachycarpum</i> | Cal-IPC | | | | X | X | |
| Coastal heron's bill | <i>Erodium cicutarium</i> | Cal-IPC | X | | | | | |
| California poppy | <i>Eschscholzia californica</i> | | X | X | | X | | |
| Roughleaf aster | <i>Eurybia radulina</i> | | | | | | X | |
| Tall fescue | <i>Festuca arundinacea</i> | Cal-IPC | X | | | | | X |
| Brome fescue | <i>Festuca bromoides</i> | | X | | | X | X | |
| California fescue | <i>Festuca californica</i> | | X | X | X | | X | |
| Blue fescue | <i>Festuca idahoensis</i> | | X | | | X | X | |
| Small fescue | <i>Festuca microstachys</i> | | X | X | X | X | | |
| Rattail fescue | <i>Festuca myuros</i> | Cal-IPC | | | | X | X | |
| Italian rye grass | <i>Festuca perennis</i> | | X | X | | X | X | X |
| Red fescue | <i>Festuca rubra</i> | | X | | | X | X | |
| Wild strawberry | <i>Fragaria vesca</i> | | X | | | | X | |
| California coffeeberry | <i>Frangula californica</i> | | | | X | | X | X |
| Oregon ash | <i>Fraxinus latifolia</i> | | X | | | | | X |
| Cleavers | <i>Galium aparine</i> | | X | | | X | | |
| California bedstraw | <i>Galium californicum</i> | | X | | X | | X | |
| Climbing bedstraw | <i>Galium nuttallii</i> | | X | | | | | |

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|---------------------------|--|---------------|-----------------------------------|-------------------|-------------------------|---------------------------|-------------------------|----------------|
| Wall bedstraw | <i>Galium parisiense</i> | | X | | | | | X |
| Climbing bedstraw | <i>Galium porrigens</i> | | X | | X | | | |
| Fragrant bedstraw | <i>Galium triflorum</i> | | | | | | X | |
| Coast silk tassel | <i>Garrya elliptica</i> | | | X | | | X | |
| Nit grass | <i>Gastridium phleoides</i> | | | X | | X | X | X |
| French broom | <i>Genista monspessulana</i> | Cal-IPC | X | | | X | | |
| Wild geranium | <i>Geranium dissectum</i> | Cal-IPC | | | | | | X |
| Crane's bill geranium | <i>Geranium molle</i> | Cal-IPC | | | | | | |
| Herb Robert | <i>Geranium purpureum</i> | | X | | | | | |
| Blue field gilia | <i>Gilia capitata ssp. capitata</i> | | | | | X | X | |
| Purple spot gilia | <i>Gilia clivorum</i> | | | | | X | | |
| Gumweed | <i>Grindelia camporum</i> | | | | | X | | |
| Sneezeweed | <i>Helenium puberulum</i> | | X | | | | | |
| Bristly oxtongue | <i>Helminthotheca echioides</i> | Cal-IPC | | | | | | X |
| Hayfield tarweed | <i>Hemizonia congesta ssp. lutescens</i> | | X | X | | X | X | X |
| Few flowered evax | <i>Hesperovax sparsiflora var. sparsiflora</i> | | | X | | X | | |
| Marin western flax | <i>Hesperolinon congestum</i> | Endangered | | | | X | | |
| Small flower western flax | <i>Hesperolinon micranthum</i> | | | | X | X | X | |
| Toyon | <i>Heteromeles arbutifolia</i> | | X | X | X | | X | |
| White-flowered hawkweed | <i>Hieracium albiflorum</i> | | | | | X | | |
| California hemp | <i>Hoita macrostachya</i> | | | | | X | | |
| Creeping leather root | <i>Hoita orbicularis</i> | WR | X | | | | | |
| Velvet grass | <i>Holcus lanatus</i> | Cal-IPC | X | | | X | | |
| Oceanspray | <i>Holodiscus discolor</i> | | X | | | | | |
| Barley | <i>Hordeum marinum</i> | Cal-IPC | | | | X | X | |
| Foxtail barley | <i>Hordeum murinum</i> | Cal-IPC | | X | | | | |
| Smooth cats ear | <i>Hypochaeris glabra</i> | Cal-IPC | X | | | | X | |
| Hairy cats ear | <i>Hypochaeris radicata</i> | Cal-IPC | X | | | X | X | X |
| Douglas iris | <i>Iris douglasiana var. major</i> | | X | X | X | X | X | |
| Ground iris | <i>Iris macrosiphon</i> | | X | X | | | | X |
| Common toad rush | <i>Juncus bufonius</i> | | X | | | X | | |
| Common bog rush | <i>Juncus effusus</i> | | X | | | | X | |

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|---------------------------------|---|---------------|-----------------------------------|-------------------|-------------------------|---------------------------|-------------------------|----------------|
| Slender juncus | <i>Juncus occidentalis</i> | | X | | | X | X | X |
| Brown-headed rush | <i>Juncus phaeocephalus</i> | | X | | | | X | X |
| June grass | <i>Koeleria macrantha</i> | | | | | | X | |
| Willow lettuce | <i>Lactuca saligna</i> | | X | | | X | | |
| Goldfields | <i>Lasthenia californica</i> | | | | | | | |
| Angled peavine | <i>Lathyrus angulatus</i> | | X | | X | X | X | X |
| Common pacific pea | <i>Lathyrus vestitus</i> | | X | | | | | |
| Variable linanthus | <i>Leptosiphon parviflorus</i> | | | X | | X | | |
| Little glandular lessingia | <i>Lessingia micradenia ssp. micradenia</i> | CRPR 1B.2 | X | X | X | X | | |
| Flax | <i>Linum bienne</i> | | X | | | X | | X |
| California cottonrose | <i>Logfia filaginoides</i> | | X | | | | | |
| Narrowleaf cottonrose | <i>Logfia gallica</i> | | X | | | X | | |
| Lace parsnip | <i>Lomatium dasycarpum</i> | | X | X | | X | X | |
| Large fruited lomatium | <i>Lomatium macrocarpum</i> | | X | X | | | | |
| Pink honeysuckle | <i>Lonicera hispidula</i> | | X | | X | X | X | |
| Narrow-leaf bird's-foot trefoil | <i>Lotus tenuis</i> | | | | | | | X |
| Silver lupine | <i>Lupinus albifrons var. collinus</i> | | X | | | | | |
| Miniature annual lupine | <i>Lupinus bicolor</i> | | X | | | X | | |
| Valley sky lupine | <i>Lupinus nanus</i> | | | | | X | | |
| Hairy wood rush | <i>Luzula comosa</i> | | X | | | | | |
| Scarlet pimpernel | <i>Lysimachia arvensis</i> | | X | X | X | X | X | X |
| Pacific starflower | <i>Lysimachia latifolia</i> | | | | X | | | |
| Hyssop loosestrife | <i>Lythrum hyssopifolia</i> | | | | | | | X |
| Elegant tarweed | <i>Madia elegans</i> | | X | | | | | |
| Small tarweed | <i>Madia exigua</i> | | | | | | X | |
| Gumweed | <i>Madia gracilis</i> | | X | X | X | | X | |
| Starry false lily of the valley | <i>Maianthemum stellatum</i> | | | | X | | | |
| Oregon manroot | <i>Marah oregana</i> | | X | | | | | |
| California burclover | <i>Medicago polymorpha</i> | Cal-IPC | X | | | | | |
| Alaska melic | <i>Melica subulata</i> | | | | | X | | |
| Torrey's melica | <i>Melica torreyana</i> | | X | X | X | | X | |
| Yellow sweetclover | <i>Melilotus indicus</i> | | X | | | | | |

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|-------------------------|---|---------------|-----------------------------------|-------------------|-------------------------|---------------------------|-------------------------|----------------|
| Pennyroyal | <i>Mentha pulegium</i> | Cal-IPC | | | | | | X |
| Q tips | <i>Micropus californicus</i> | | X | X | | X | | |
| Douglas' microseris | <i>Microseris douglasii</i> | | X | X | | X | | |
| Sticky monkeyflower | <i>Mimulus aurantiacus</i> | | X | | X | X | X | |
| Yellow monkey flower | <i>Mimulus guttatus</i> | | X | X | | | | X |
| Douglas' sandwort | <i>Minuartia douglasii</i> | | X | X | | X | | |
| Siskiyou monardella | <i>Monardella purpurea</i> | | X | X | X | | X | |
| Coyote mint | <i>Monardella villosa</i> var. <i>villosa</i> | | X | | | | X | |
| California wax myrtle | <i>Morella californica</i> | | X | X | | | | |
| Broadleaf forget-me-not | <i>Myosotis latifolia</i> | Cal-IPC | X | | | | | |
| Marin county navarretia | <i>Navarretia rosulata</i> | CRPR 1B.2 | | X | X | X | X | |
| Skunkweed | <i>Navarretia squarrosa</i> | | X | | | X | | X |
| Tanoak | <i>Notholithocarpus densiflorus</i> var. <i>densiflorus</i> | | | | X | | | |
| Clustered broomrape | <i>Orobanche fasciculata</i> | | | | X | | | |
| Sweet cicely | <i>Osmorhiza berteroi</i> | | X | | | X | | |
| Dallis grass | <i>Paspalum dilatatum</i> | | X | | | | | |
| Indian warrior | <i>Pedicularis densiflora</i> | | X | | | | | |
| Coffee fern | <i>Pellaea andromedifolia</i> | | X | | | | | |
| Bird's foot fern | <i>Pellaea mucronata</i> | | X | | | | | |
| Gold back fern | <i>Pentagramma triangularis</i> | | X | | X | X | X | |
| Yampah | <i>Perideridia kelloggii</i> | | X | | | X | X | |
| Grass pink | <i>Petrorhagia</i> | | X | X | | | | |
| Harding grass | <i>Phalaris aquatica</i> | Cal-IPC | | | | | | X |
| Canarygrass | <i>Phalaris californica</i> | | | | | | X | |
| Oak mistletoe | <i>Phoradendron leucarpum</i> ssp. <i>tomentosum</i> | | | | | X | | |
| Turkey tangle fogfruit | <i>Phyla nodiflora</i> | | X | | | | | |
| Chaparral pea | <i>Pickeringia montana</i> | | | X | | | | |
| California plantain | <i>Plantago erecta</i> | | X | X | X | | | |
| Lanceleaf plantain | <i>Plantago lanceolata</i> | Cal-IPC | X | | | X | X | X |
| Kentucky bluegrass | <i>Poa pratensis</i> | | | | | | | X |
| Milkwort | <i>Polygala californica</i> | | X | X | X | | X | |

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|----------------------------------|---|---------------|-----------------------------------|-------------------|-------------------------|---------------------------|-------------------------|----------------|
| Water pepper | <i>Polygonum hydropiperoides</i> | | X | | | | | |
| California polypody | <i>Polypodium californicum</i> | | | | | X | | |
| Licorice fern | <i>Polypodium calirhiza</i> | | X | | | X | | |
| Annual beardgrass | <i>Polypogon monspeliensis</i> | | X | | | X | | |
| Water beardgrass | <i>Polypogon viridis</i> | | X | X | | | | |
| Western sword fern | <i>Polystichum munitum</i> | | X | | | X | | |
| Cherry plum | <i>Prunus cerasifera</i> | Cal-IPC | X | | | | X | X |
| Cudweed | <i>Pseudognaphalium beneolens</i> | | X | | | X | | |
| Ladies' tobacco | <i>Pseudognaphalium californicum</i> | | | | | | X | |
| Douglas-fir | <i>Pseudotsuga menziesii</i> | | X | | X | X | X | |
| Slender woolly heads | <i>Psilocarphus tenellus</i> | | | | | X | | |
| Western bracken fern | <i>Pteridium aquilinum var. pubescens</i> | | X | | X | X | | |
| Firethorn | <i>Pyracantha angustifolia</i> | Cal-IPC | X | | | | | |
| Coast live oak | <i>Quercus agrifolia</i> | | X | X | | X | X | X |
| Blue oak | <i>Quercus douglasii</i> | WR | X | | | | | |
| Leather oak | <i>Quercus durata</i> | | | X | X | | X | |
| Oregon white oak | <i>Quercus garryana</i> | | | | | X | | |
| California black oak | <i>Quercus kelloggii</i> | | X | | | X | | |
| Valley oak | <i>Quercus lobata</i> | | X | | | | | |
| Shreve oak | <i>Quercus parvula var. shreve</i> | | X | | X | | X | |
| Interior live oak, chapparal oak | <i>Quercus wislizeni</i> | | X | | X | | | |
| Oracle oak | <i>Quercus xmorehus</i> | | X | X | | | | |
| Hybrid white oak | <i>Quercus xsubconvexa</i> | | | X | | | | |
| Common buttercup | <i>Ranunculus californicus</i> | | X | | | X | X | |
| Redberry | <i>Rhamnus crocea</i> | | | | X | | X | |
| Western azalea | <i>Rhododendron occidentale</i> | | | | | X | | |
| Wood rose | <i>Rosa gymnocarpa</i> | | | | X | | | |
| Sweetbrier rose | <i>Rosa rubiginosa</i> | | X | | | X | | X |
| Thimbleberry | <i>Rubus parviflorus</i> | | X | | | | | |
| California blackberry | <i>Rubus ursinus</i> | | X | | | | | |
| Sheep sorrel | <i>Rumex acetosella</i> | Cal-IPC | X | | | X | | |

APPENDIX C.

Azalea Hill Restoration Project Plant Surveys.

Conducted in May and June, 2016 by Marin Municipal Water District Botanist Andrea Williams.

| Common Name | Scientific Name | Status | Riparian and Oak Woodlands | Serpentine | Re-route (Lower) | Azalea Hill Proper | Re-route (Upper) | Wetland |
|-------------------------------|---|---------------|-----------------------------------|-------------------|-------------------------|---------------------------|-------------------------|----------------|
| Curly dock | <i>Rumex crispus</i> | Cal-IPC | | | | X | | X |
| Western pearlwort | <i>Sagina decumbens ssp. occidentalis</i> | WR | | | | X | | |
| Blue elderberry | <i>Sambucus nigra ssp. caerulea</i> | | | | | | X | |
| Purple sanicle | <i>Sanicula bipinnatifida</i> | | X | | | X | | |
| Pacific sanicle | <i>Sanicula crassicaulis</i> | | X | | | X | | |
| Smallflower bullrush | <i>Scirpus microcarpus</i> | | X | X | | | | |
| Wild hollyhock | <i>Sidalcea malviflora var. laciniata</i> | | X | | | X | | |
| Common catchfly | <i>Silene gallica</i> | | X | X | | | | |
| California indian pink | <i>Silene laciniata ssp. californica</i> | | | | | | | |
| Blue eyed grass | <i>Sisyrinchium bellum</i> | | X | X | X | X | | |
| California goldenrod | <i>Solidago velutina ssp. californica</i> | | | | | | X | |
| Spiny sow thistle | <i>Sonchus asper</i> | | X | | | | | |
| Sow thistle | <i>Sonchus oleraceus</i> | | X | | | | | X |
| Spanish broom | <i>Spartium junceum</i> | Cal-IPC | X | | | X | | |
| Purple sand spurry | <i>Spergularia rubra</i> | | | X | | X | | |
| Western ladies tresses | <i>Spiranthes porrifolia</i> | | | | | | X | |
| Short spike hedge nettle | <i>Stachys pycnantha</i> | | X | | | | | |
| Rough hedgenettle | <i>Stachys rigida var. quercetorum</i> | | X | | X | | X | |
| Mouseear chickweed | <i>Stellaria media</i> | | | | | X | | |
| Foothill needle grass | <i>Stipa lepida</i> | | | X | | X | | |
| Purple needle grass | <i>Stipa pulchra</i> | | X | X | | X | X | X |
| Tamalpais bristly jewelflower | <i>Streptanthus glandulosus ssp. pulchellus</i> | CRPR 1B.2 | | X | | | | |
| One sided jewelflower | <i>Streptanthus glandulosus ssp. secundus</i> | | X | | | X | | |
| Trailing snowberry | <i>Symphoricarpus mollis</i> | | X | | X | | | |
| Pacific aster | <i>Symphotrichum chilense</i> | | | | | | X | X |
| Common dandelion | <i>Taraxacum officinale</i> | | X | | | | | |

APPENDIX C.

Azalea Hill Restoration Project Plant Surveys.

Conducted in May and June, 2016 by Marin Municipal Water District Botanist Andrea Williams.

| Common Name | Scientific Name | Status | Riparian and Oak Woodlands | Serpentine | Re-route (Lower) | Azalea Hill Proper | Re-route (Upper) | Wetland |
|-------------------------|---|---------|----------------------------|------------|------------------|--------------------|------------------|---------|
| Sun cup | <i>Taraxia ovata</i> | | | | | | | |
| Kellogg's tauschia | <i>Tauschia kelloggii</i> | | | | X | | | |
| California goldenbanner | <i>Thermopsis californica</i> | | | | | | X | |
| Field hedge parsley | <i>Torilis arvensis</i> | Cal-IPC | X | | | | X | |
| Wild parsley | <i>Torilis nodosa</i> | | X | | | X | | |
| Poison-oak | <i>Toxicodendron diversilobum</i> | | X | X | X | X | X | X |
| Fremont's star lily | <i>Toxicoscordion fremontii</i> | | X | | X | | | |
| Salsify | <i>Tragopogon porrifolius</i> | | | | | | | X |
| Narrow leaved clover | <i>Trifolium angustifolium</i> | | | | | | | X |
| Bearded clover | <i>Trifolium barbigerum</i> | | X | | | | | |
| Notch leaf clover | <i>Trifolium bifidum var. decipiens</i> | | X | | | X | | X |
| Shamrock | <i>Trifolium dubium</i> | | X | | | | | |
| Bull clover | <i>Trifolium fucatum</i> | | X | | | X | | |
| Rose clover | <i>Trifolium hirtum</i> | Cal-IPC | X | | | | | |
| Small head clover | <i>Trifolium microcephalum</i> | | X | | | | | |
| Valparaiso clover | <i>Trifolium microdon</i> | | X | | | | | |
| Clammy clover | <i>Trifolium obtusiflorum</i> | | X | | | | | |
| Tall trisetum | <i>Trisetum canescens</i> | | X | | X | | | |
| Wild hyacinth | <i>Triteleia hyacinthina</i> | | X | | | | X | |
| Ithuriel's spear | <i>Triteleia laxa</i> | | X | X | X | X | | |
| California bay | <i>Umbellularia californica</i> | | X | X | X | X | | |
| Silver puffs | <i>Uropappus lindleyi</i> | | | X | | X | | |
| American vetch | <i>Vicia americana</i> | | X | | X | X | X | |
| Smaller common vetch | <i>Vicia sativa ssp. nigra</i> | | X | | | X | | X |
| Smooth vetch | <i>Vicia tetrasperma</i> | | X | | | | | |
| Smooth vetch | <i>Vicia villosa ssp. varia</i> | | | | | X | | |
| Western modesty | <i>Whipplea modesta</i> | | | | X | | | |
| Giant chain fern | <i>Woodwardia fimbriata</i> | | X | | | | | |
| Narrow leaved mule ears | <i>Wyethia angustifolia</i> | | | | | X | X | |
| Centaury | <i>Zeltnera</i> | | X | X | | X | | |

Note: Approximately 100 meters of Liberty Gulch Road at the northwestern edge of the study area was not included in the 2016 survey by MMWD because it was originally to be decommissioned

Appendix D – Special-Status Plant Table

APPENDIX D. Special-Status Vascular Plant Taxa Documented on or in the Vicinity of the Azalea Hill Restoration Project Study Area, Marin County, California. Compiled by Vollmar Natural Lands Consulting, February 2017. *

| <i>Scientific Name</i> (Common Name) | Status Federal/State/ CNPS Listing** | Preferred Habitat; Elevation Range | Bloom Period | Habitat Suitability/ Occurrence on Site |
|---|--|--|------------------|---|
| <i>Amorpha californica</i> var. <i>napensis</i> (Napa false indigo) | --/--/1B.2 | Broadleafed upland forest(openings), Chaparral, Cismontane woodland; 120-2000 meters | Apr-Jul | Suitable habitat present but not observed in the study area during 2016 surveys. |
| <i>Amsinckia lunaris</i> (bent-flowered fiddleneck) | --/--/1B.2 | Coastal bluff scrub, Cismontane woodland, Valley and foothill grassland; 3-500 meters | Mar-Jun | Suitable habitat present but not observed in the study area during 2016 surveys. |
| <i>Arctostaphylos montana</i> ssp. <i>montana</i> (Mt. Tamalpais manzanita) | --/--/1B.3 | Chaparral, Valley and foothill grassland/serpentinite, rocky; 160-760 meters | Feb-Apr | Observed in the study area during 2016 surveys. |
| <i>Arctostaphylos virgata</i> (Marin manzanita) | --/--/1B.2 | Broadleafed upland forest, Closed-cone coniferous forest, Chaparral, North Coast coniferous forest/sandstone or granitic; 60-700 meters | Jan-Mar | Suitable habitat present but not observed in the study area during 2016 surveys. |
| <i>Castilleja affinis</i> ssp. <i>neglecta</i> (Tiburon paintbrush) | E/T/1B.2 | Valley and foothill grassland(serpentinite); 60-400 meters | Apr-Jun | Suitable habitat present but not known from general vicinity and not observed during 2016 surveys. |
| <i>Chloropyron maritimum</i> ssp. <i>palustre</i> (Point Reyes bird's-beak) | --/--/1B.2 | Marshes and swamps(coastal salt); 0-10 meters | June-Oct | No suitable habitat present. No marshes or swamp. |
| <i>Chorizanthe cuspidata</i> var. <i>cuspidata</i> (San Francisco Bay spineflower) | --/--/1B.2 | Coastal bluff scrub, Coastal dunes, Coastal prairie, Coastal scrub/sandy; 3-215 meters | Apr-Jul | Marginal habitat present. Not sandy. Not known from general vicinity. |
| <i>Cirsium hydrophilum</i> var. <i>vaseyi</i> (Mt. Tamalpais thistle) | --/--/1B.2 | Broadleafed upland forest, Chaparral, Meadows and seeps/serpentinite seeps; 240-620 meters | May-Aug | Documented in study area, but not observed during 2016 surveys because location of occurrences was in an area originally to be decommissioned. |
| <i>Dirca occidentalis</i> (western leatherwood) | --/--/1B.2 | Broadleafed upland forest, Closed-cone coniferous forest, Chaparral, Cismontane woodland, North Coast coniferous forest, Riparian forest, Riparian woodland/mesic; 50-395 meters | Jan- Mar(Apr) | Suitable habitat present but not observed during 2016 surveys. |
| <i>Eriogonum luteolum</i> var. <i>caninum</i> (Tiburon buckwheat) | --/--/1B.2 | Chaparral, Cismontane woodland, Coastal prairie, Valley and foothill grassland/serpentinite, sandy to gravelly; 0-700 meters | May-Sep | Observed in the study area during 2016 surveys. |
| <i>Fritillaria lanceolata</i> var. <i>tristulis</i> (Marin checker lily) | --/--/1B.1 | Coastal bluff scrub, Coastal prairie, Coastal scrub; 15-150 meters | Feb-May | Suitable habitat present but not observed during 2016 surveys. |

| <i>Scientific Name</i> (Common Name) | Status Federal/State/ CNPS Listing** | Preferred Habitat; Elevation Range | Bloom Period | Habitat Suitability/ Occurrence on Site |
|--|--|--|--------------------------|---|
| <i>Fritillaria liliacea</i> (fragrant fritillary) | --/--/1B.2 | Cismontane woodland, Coastal prairie, Coastal scrub, Valley and foothill grassland/often serpentinite; 3-410 meters | Feb-Apr | Suitable habitat present but not known from general vicinity and not observed during 2016 surveys. |
| <i>Gilia capitata</i> ssp. <i>chamissonis</i> (blue coast gilia) | --/--/1B.1 | Coastal dunes, Coastal scrub; 2-200 meters | Apr-Jul | Marginal habitat present. Occurs mostly below elevation range of study area and in more coastal habitats. |
| <i>Gilia capitata</i> ssp. <i>tomentosa</i> (woolly-headed gilia) | --/--/1B.1 | Coastal bluff scrub (rocky, outcrops); 15-155 meters | May-Jul | No suitable habitat present. No coastal bluff scrub. |
| <i>Grindelia hirsutula</i> var. <i>maritima</i> (San Francisco gumplant) | --/--/1B.2 | Coastal bluff scrub, Coastal scrub, Valley and foothill grassland/sandy or serpentinite; 15-400 meters | Jun-Sep | Marginal habitat present. No sand. |
| <i>Helianthella castanea</i> (Diablo Helianthella) | --/--/1B.2 | Broadleafed upland forest, Chaparral, Cismontane woodland, Coastal scrub, Riparian woodland, Valley and foothill grassland; 60-1,300 meters | Mar- June | Suitable habitat present but not observed during 2016 surveys. |
| <i>Hemizonia congesta</i> ssp. <i>congesta</i> (pale yellow hayfield tarplant) | --/--/1B.2 | Valley and foothill grassland/sometimes roadsides; 20-560 meters | Apr-Nov | Suitable habitat present but not observed during 2016 surveys. |
| <i>Hesperolinon congestum</i> (Marin western flax) | T/T/1B.1 | Chaparral, Valley and foothill grassland/serpentinite; 5-370 meters | Apr-Jul | Documented in the study area during 2016 surveys. |
| <i>Horkelia tenuiloba</i> (thin-lobed horkelia) | --/--/1B.2 | Broadleafed upland forest, Chaparral, Valley and foothill grassland/mesic openings, sandy; 50-500 meters | May-July | Marginal habitat present. Not mesic, not sandy. |
| <i>Kopsiopsis hookeri</i> (small groundcone) | --/--/2.3 | North Coast coniferous forest; 90-885 meters | Apr-Aug | No suitable habitat present. No North Coast coniferous forest. |
| <i>Lessingia hololeuca</i> (woolly-headed lessingia) | --/--/3 | Broadleafed upland forest, Coastal scrub, Lower montane coniferous forest, Valley and foothill grassland/clay, serpentinite; 15-305 meters | Jun-Oct | Marginal habitat present. No clay. |
| <i>Lessingia micradenia</i> var. <i>micradenia</i> (Tamalpais lessingia) | --/--/1B.2 | Chaparral, Valley and foothill grassland/usually serpentinite, often roadsides; 100-500 meters | (Jun)Jul- Oct | Observed in the study area during 2016 surveys. |
| <i>Micropus amphibolus</i> (Mt. Diablo cottonweed) | --/--/3.2 | Broadleafed upland forest, Chaparral, Cismontane woodland, Valley and foothill grassland/rocky; 45-825 meters | Mar-May | Suitable habitat present but not observed during 2016 surveys. |
| <i>Microseris paludosa</i> (marsh microseris) | --/--/1B.2 | Closed-cone coniferous forest, Cismontane woodland, Coastal scrub, Valley and foothill grassland; 5-300 meters | Apr-Jun (Jul) | Suitable habitat present but not observed during 2016 surveys. |

| Scientific Name (Common Name) | Status Federal/State/ CNPS Listing** | Preferred Habitat; Elevation Range | Bloom Period | Habitat Suitability/ Occurrence on Site |
|--|--|--|---------------------|---|
| <i>Navarretia leucocephala</i> ssp. <i>bakeri</i> (Baker's navarretia) | --/--/1B.1 | Cismontane woodland, Lower montane coniferous forest, Meadows and seeps, Valley and foothill grassland, Vernal pools/Mesic; 5-1,740 meters | Apr-Jul | Marginal habitat present. No vernal pools or swales. |
| <i>Navarretia rosulata</i> (Marin County navarretia) | --/--/1B.2 | Closed-cone coniferous forest, Chaparral/serpentine, rocky; 200-635 meters | May-Jul | Observed in the study area during 2016 surveys. |
| <i>Pleuropogon hooverianus</i> (North Coast semaphore grass) | --/T/1B.1 | Broadleafed upland forest, Meadows and seeps, North Coast coniferous forest/open areas, mesic; 10-670 meters | Apr-Jun | Suitable habitat present but not observed during 2016 surveys. |
| <i>Streptanthus batrachopus</i> (Tamalpais jewel-flower) | --/--/1B.3 | Closed-cone coniferous forest, Chaparral/serpentine; 305-650 meters | Apr-Jul | Suitable habitat present but not observed during 2016 surveys. |
| <i>Streptanthus glandulosus</i> ssp. <i>pulchellus</i> (Mount Tamalpais bristly jewel-flower) | --/--/1B.2 | Chaparral, Valley and foothill grassland/serpentine; 150-800 meters | May-Jul(Aug) | Observed in the project vicinity but not the study area during 2016 surveys. |

* Taxa with higher potential to occur in the project vicinity, based on presence of habitat, are shaded in gray. Bold font taxa are present within or adjacent to the study area

Note: Bloom Periods in Parentheses indicate that the species *occasionally* blooms during that period.

Surveys conducted within the study area by the Marin Municipal Water District in May and June, 2016.

****Rarity Status Codes:**

E = Federally or State listed as Endangered

T = Federally or State listed as Threatened

R = State listed as Rare

CNPS Codes

1A = CNPS List 1A: Plants presumed extinct in California.

1B.1 = CNPS List 1B.1: Plants rare, threatened or endangered in California and elsewhere; plant seriously threatened in California.

1B.2 = CNPS List 1B.2: Plants rare, threatened or endangered in California and elsewhere; plant fairly threatened in California.

1B.3 = CNPS List 1B.3: Plants rare, threatened or endangered in California and elsewhere; plant not very threatened in California.

2.1 = CNPS List 2.1: Plants rare, threatened or endangered in California, more common elsewhere; plant seriously threatened in California.

2.2 = CNPS List 2.2: Plants rare, threatened or endangered in California, more common elsewhere; plant fairly threatened in California.

2.3 = CNPS List 2.3: Plants rare, threatened or endangered in California, more common elsewhere; plant not very threatened in California.

3 = CNPS List 3: Plants in California which need more information-a review list.

3.1 = CNPS List 3.1: Plants in California which need more information-a review list; plant seriously threatened in California.

3.2 = CNPS List 3.2: Plants about which we need more information – a review list; plant fairly threatened in California.

Excludes List 4 plants - Plants of limited distribution – a watch list; plant fairly threatened in California (not included in CNPS quad searches).

Habitat Modifiers

"(descriptor)" pertains only to the habitat type immediately preceding

"/ descriptor" pertains to *all* habitat

Appendix E – Jurisdictional Delineation Maps

FIGURE 3
Potential Jurisdictional Waters
Project Overview Map
 Azalea Hill Restoration Project
 Marin County, California



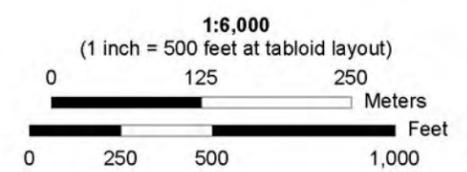
Legend

- Delineation Data Point
- Spring or Seep¹
- Project Area Road
- Project Area Trail
- Other Road
- Trail Section to be Decommissioned by Hand²
- Previously Mapped Drainage
- Project Boundary (roads and trails buffer)²
- Water Body
- Soil Unit Boundary

Potential Jurisdictional Waters³

- Wetland
- Other Waters (channel)
- Swale (no bed/bank topography)
- Seep
- Gully Channel

1. All springs support wetlands and thus are mapped as wetland polygons as well. Seeps mapped as polygons only along Liberty Gulch Road, where primary project disturbance areas will occur.
 2. Roads are buffered by 25 feet and trails are buffered by 10 feet.
 3. See also Appendix A (large-scale maps) and Table 1



Data Sources: Vollmar Natural Lands Consulting, 2016
 USDA, 2012 (photo) | MMWD, 2017
 SFEI BAARI Streams Database, 2012
 GIS/Cartography by: Jake Schweitzer, Aug. 2017
 Map File: Locus_233-15_B-L_2017-0824.mxd



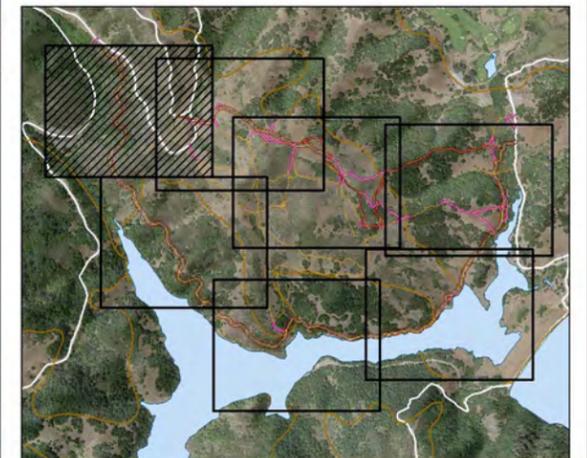
APPENDIX A-1 Potential Jurisdictional Waters

Azalea Hill Restoration Project
Marin County, California

Legend

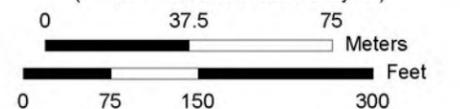
- Delineation Data Point
 - ⊙ Spring or Seep
 - ▬ Project Area Road
 - ▬ Project Area Trail
 - ▬ Other Road
 - ▬ Trail Section to be Decommissioned by Hand¹
 - ▬ Previously Mapped Drainage
 - ▭ Project Boundary (roads and trails buffer)²
 - ▭ Soil Unit Boundary
- Potential Jurisdictional Waters³**
- Wetland
 - Other Waters (channel)
 - Swale (no bed/bank topography)
 - Seep
 - Gully Channel

1. Not surveyed during delineation due to minimal project impacts
 2. Roads are buffered by 25 feet and trails are buffered by 10 feet
 3. See also Figure 3 (overview map) and Table 1



1:1,800

(1 inch = 150 feet at tabloid layout)



Data Sources: Vollmar Natural Lands Consulting, 2016
 USDA, 2012 (photo) | MMWD, 2017
 SFEI BAARI Streams Database, 2012
 GIS/Cartography by: Jake Schweitzer, Jan. 2017
 Map File: WD_233-15_B-L_2017-0824.mxd

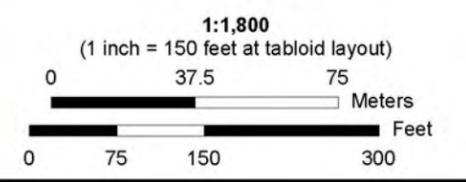
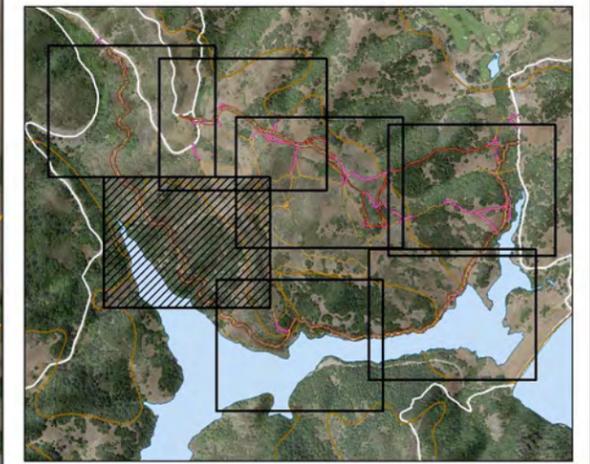


APPENDIX A-2
Potential Jurisdictional Waters
 Azalea Hill Restoration Project
 Marin County, California

Legend

- Delineation Data Point
- ⊙ Spring or Seep
- ▬ Project Area Road
- ▬ Project Area Trail
- ▬ Other Road
- ▬ Trail Section to be Decommissioned by Hand¹
- ▬ Previously Mapped Drainage
- ▭ Project Boundary (roads and trails buffer)²
- ▭ Soil Unit Boundary
- Potential Jurisdictional Waters³**
- Wetland
- Other Waters (channel)
- Swale (no bed/bank topography)
- Seep
- Gully Channel

1. Not surveyed during delineation due to minimal project impacts
 2. Roads are buffered by 25 feet and trails are buffered by 10 feet
 3. See also Figure 3 (overview map) and Table 1



Data Sources: Vollmar Natural Lands Consulting, 2016
 USDA, 2012 (photo) | MMWD, 2017
 SFEI BAARI Streams Database, 2012
 GIS/Cartography by: Jake Schweitzer, Jan. 2017
 Map File: WD_233-15_B-L_2017-0824.mxd



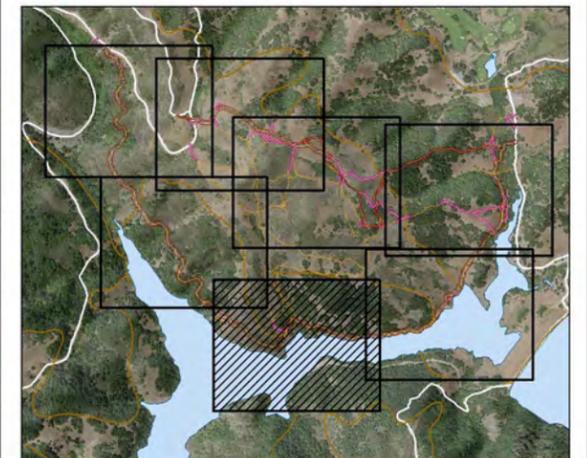
APPENDIX A-3 Potential Jurisdictional Waters

Azalea Hill Restoration Project
Marin County, California

Legend

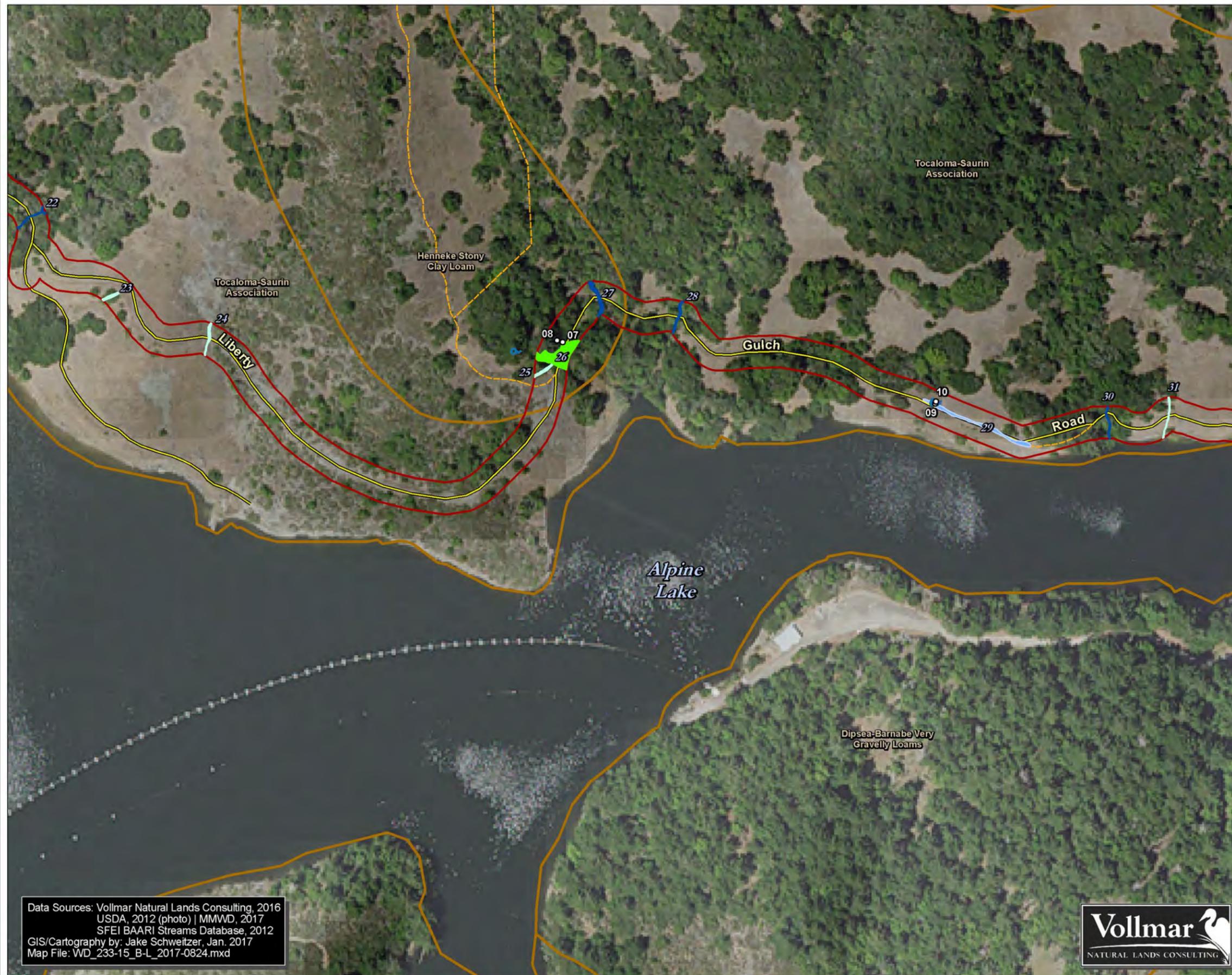
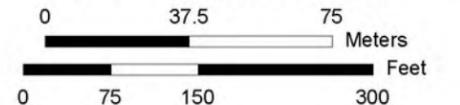
- Delineation Data Point
- ⊕ Spring or Seep
- Project Area Road
- Project Area Trail
- Other Road
- Trail Section to be Decommissioned by Hand¹
- Previously Mapped Drainage
- Project Boundary (roads and trails buffer)²
- Soil Unit Boundary
- Potential Jurisdictional Waters³**
- Wetland
- Other Waters (channel)
- Swale (no bed/bank topography)
- Seep
- Gully Channel

1. Not surveyed during delineation due to minimal project impacts
 2. Roads are buffered by 25 feet and trails are buffered by 10 feet
 3. See also Figure 3 (overview map) and Table 1



1:1,800

(1 inch = 150 feet at tabloid layout)



Data Sources: Vollmar Natural Lands Consulting, 2016
 USDA, 2012 (photo) | MMWD, 2017
 SFEI BAARI Streams Database, 2012
 GIS/Cartography by: Jake Schweitzer, Jan. 2017
 Map File: WD_233-15_B-L_2017-0824.mxd



APPENDIX A-4
Potential Jurisdictional Waters
 Azalea Hill Restoration Project
 Marin County, California

Legend

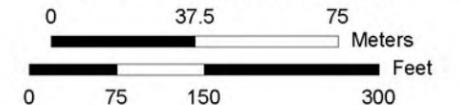
- Delineation Data Point
- ⊕ Spring or Seep
- Project Area Road
- Project Area Trail
- Other Road
- Trail Section to be Decommissioned by Hand¹
- Previously Mapped Drainage
- Project Boundary (roads and trails buffer)²
- Soil Unit Boundary
- Potential Jurisdictional Waters³**
- Wetland
- Other Waters (channel)
- Swale (no bed/bank topography)
- Seep
- Gully Channel

1. Not surveyed during delineation due to minimal project impacts
 2. Roads are buffered by 25 feet and trails are buffered by 10 feet
 3. See also Figure 3 (overview map) and Table 1



1:1,800

(1 inch = 150 feet at tabloid layout)



Data Sources: Vollmar Natural Lands Consulting, 2016
 USDA, 2012 (photo) | MMVD, 2017
 SFEI BAARI Streams Database, 2012
 GIS/Cartography by: Jake Schweitzer, Jan. 2017
 Map File: WD_233-15_B-L_2017-0824.mxd

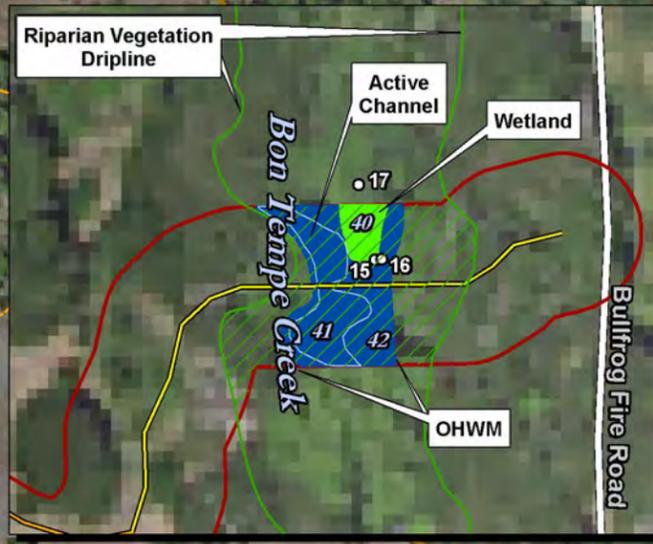
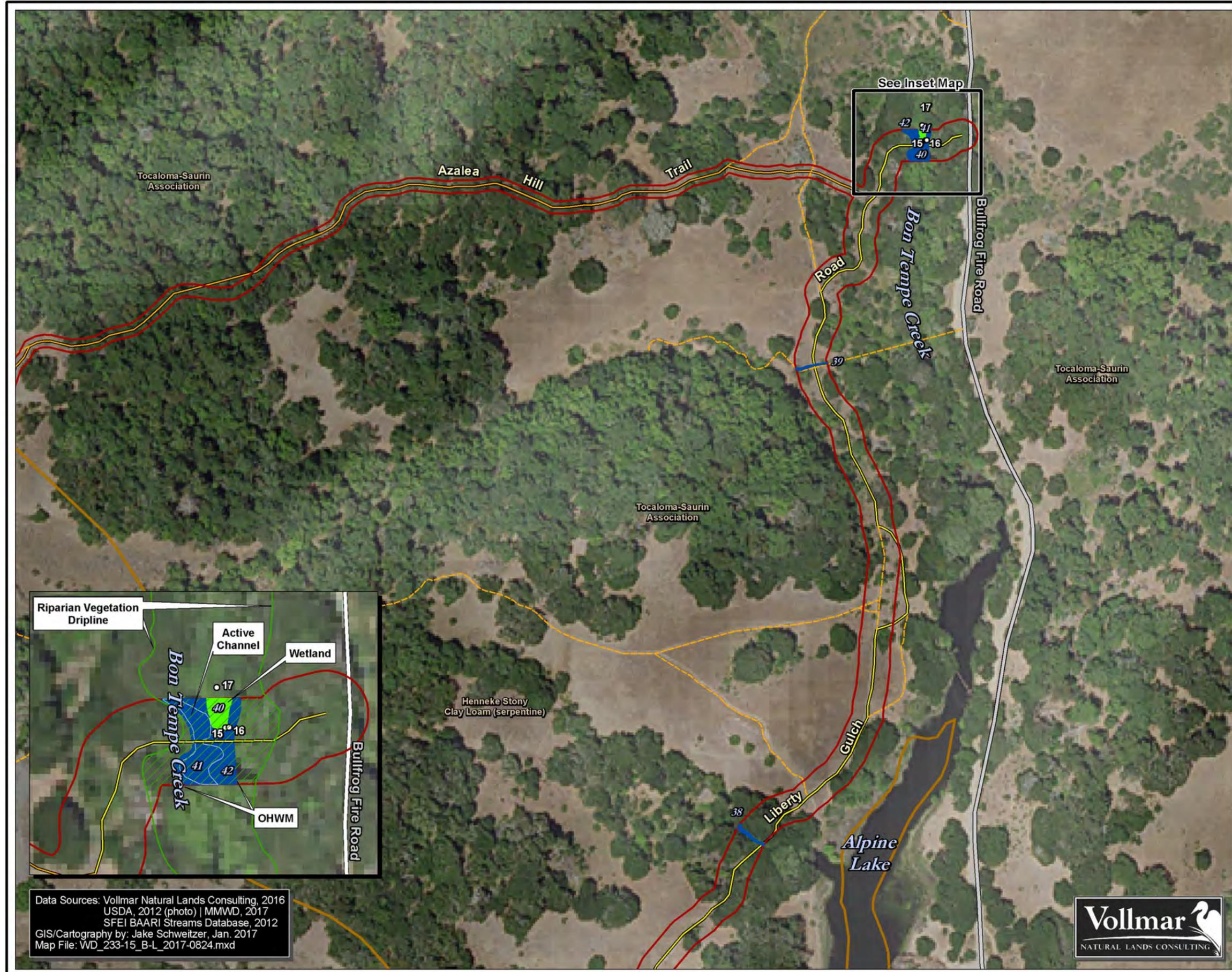
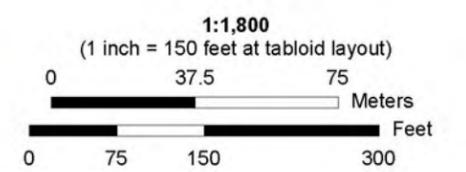
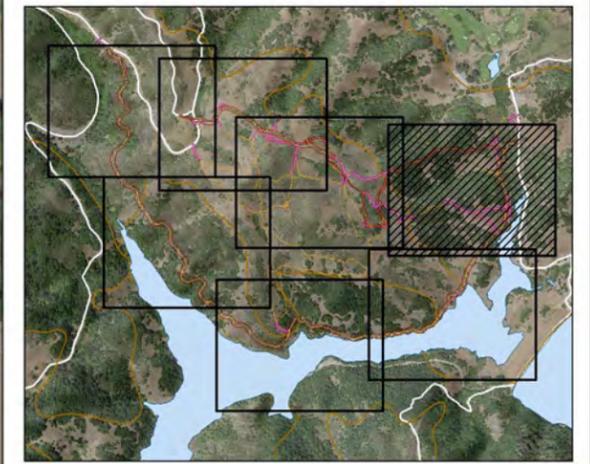


APPENDIX A-5
Potential Jurisdictional Waters
 Azalea Hill Restoration Project
 Marin County, California

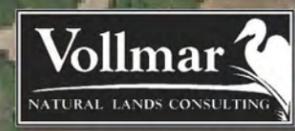
Legend

- Delineation Data Point
 - ⊕ Spring or Seep
 - Project Area Road
 - Project Area Trail
 - Other Road
 - Trail Section to be Decommissioned by Hand¹
 - Previously Mapped Drainage
 - Project Boundary (roads and trails buffer)²
 - Soil Unit Boundary
- Potential Jurisdictional Waters³**
- Wetland
 - Other Waters (channel)
 - Swale (no bed/bank topography)
 - Seep
 - Gully Channel

1. Not surveyed during delineation due to minimal project impacts
 2. Roads are buffered by 25 feet and trails are buffered by 10 feet
 3. See also Figure 3 (overview map) and Table 1



Data Sources: Vollmar Natural Lands Consulting, 2016
 USDA, 2012 (photo) | MMWD, 2017
 SFEI BAARI Streams Database, 2012
 GIS/Cartography by: Jake Schweitzer, Jan. 2017
 Map File: WD_233-15_B-L_2017-0824.mxd

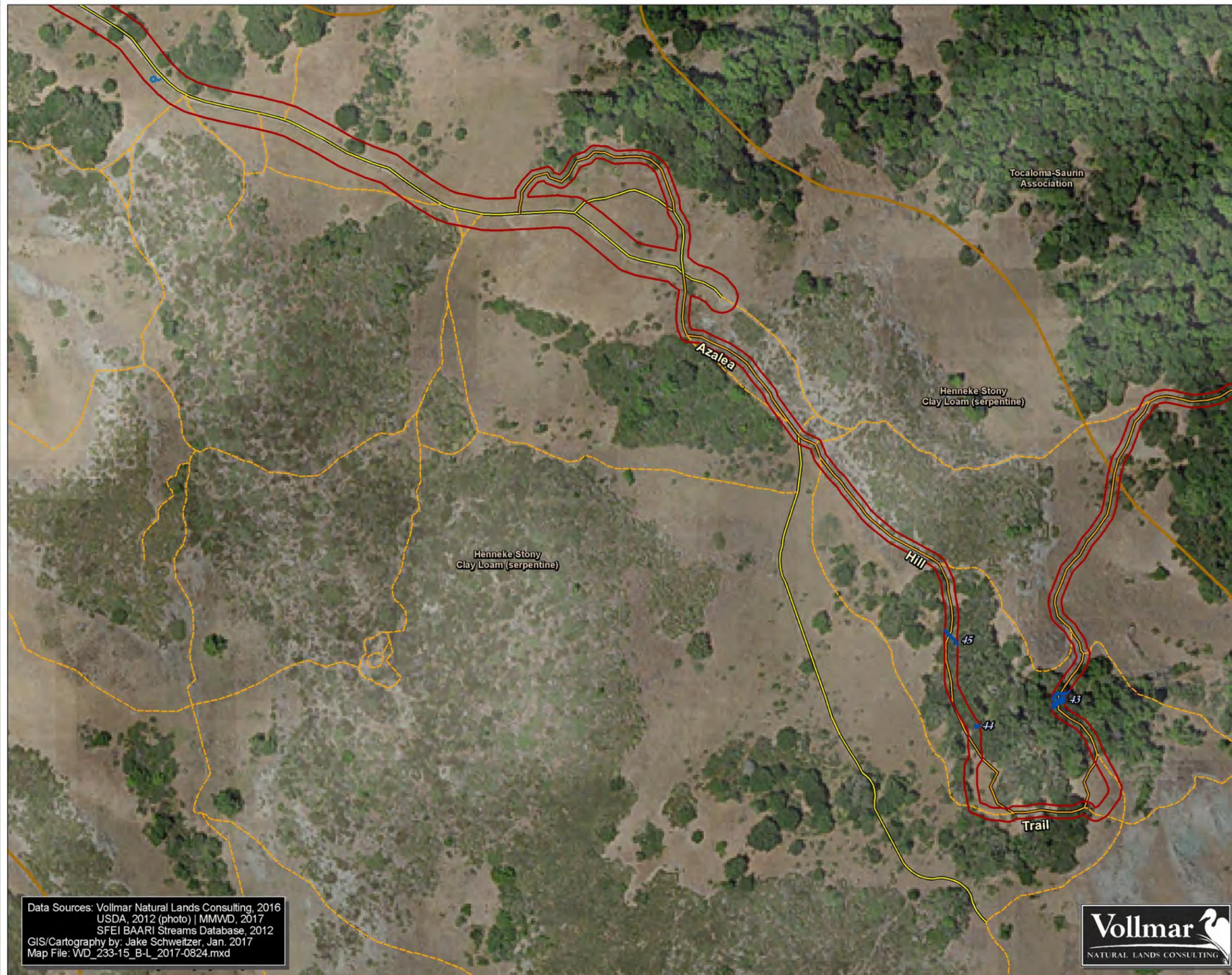
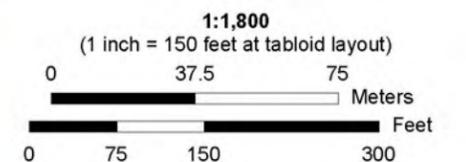
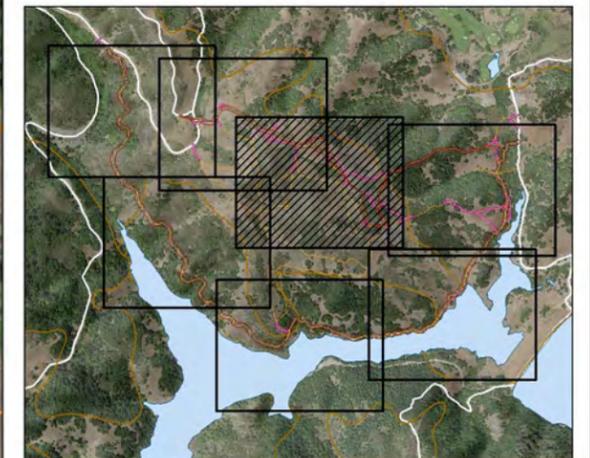


APPENDIX A-6
Potential Jurisdictional Waters
 Azalea Hill Restoration Project
 Marin County, California

Legend

- Delineation Data Point
- ⊙ Spring or Seep
- Project Area Road
- Project Area Trail
- Other Road
- Trail Section to be Decommissioned by Hand¹
- Previously Mapped Drainage
- Project Boundary (roads and trails buffer)²
- Soil Unit Boundary
- Potential Jurisdictional Waters³**
- Wetland
- Other Waters (channel)
- Swale (no bed/bank topography)
- Seep
- Gully Channel

1. Not surveyed during delineation due to minimal project impacts
 2. Roads are buffered by 25 feet and trails are buffered by 10 feet
 3. See also Figure 3 (overview map) and Table 1



Data Sources: Vollmar Natural Lands Consulting, 2016
 USDA, 2012 (photo) | MMWD, 2017
 SFEI BAARI Streams Database, 2012
 GIS/Cartography by: Jake Schweitzer, Jan. 2017
 Map File: WD_233-15_B-L_2017-0824.mxd

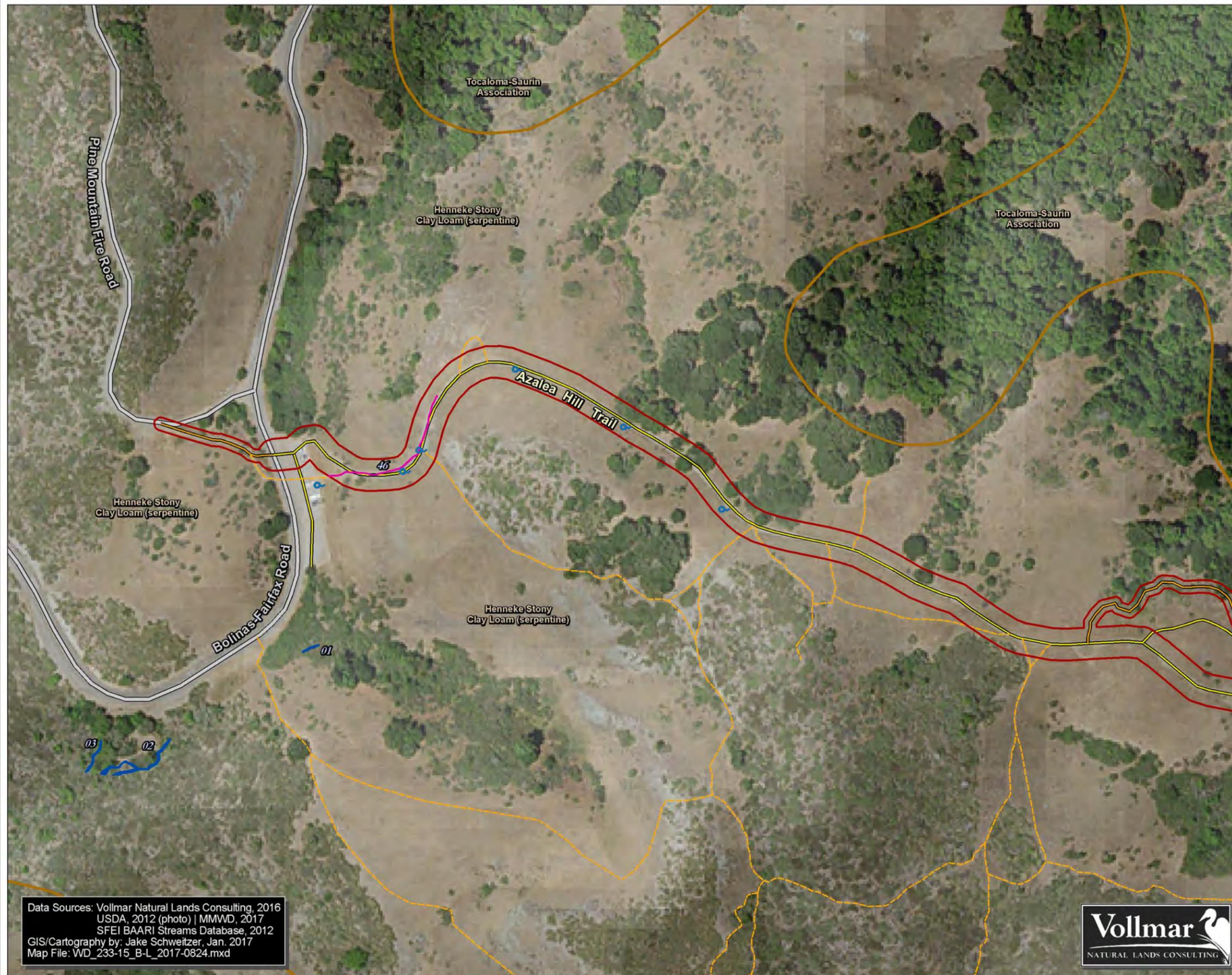
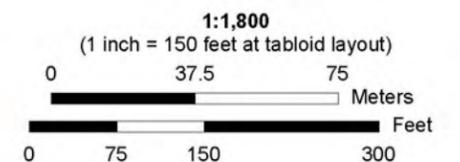
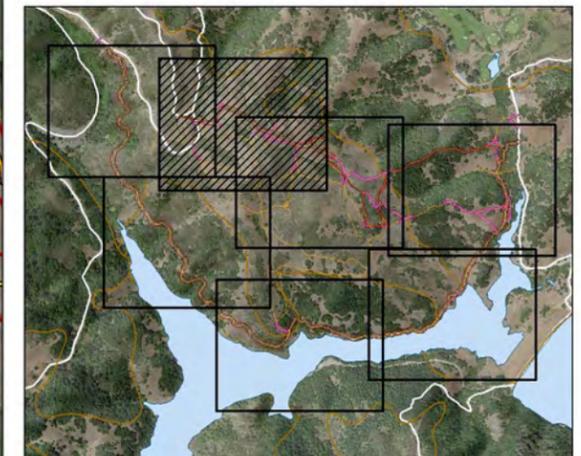


APPENDIX A-7
Potential Jurisdictional Waters
 Azalea Hill Restoration Project
 Marin County, California

Legend

-  Delineation Data Point
-  Spring or Seep
-  Project Area Road
-  Project Area Trail
-  Other Road
-  Trail Section to be Decommissioned by Hand¹
-  Previously Mapped Drainage
-  Project Boundary (roads and trails buffer)²
-  Soil Unit Boundary
- Potential Jurisdictional Waters³**
-  Wetland
-  Other Waters (channel)
-  Swale (no bed/bank topography)
-  Seep
-  Gully Channel

1. Not surveyed during delineation due to minimal project impacts
 2. Roads are buffered by 25 feet and trails are buffered by 10 feet
 3. See also Figure 3 (overview map) and Table 1



Data Sources: Vollmar Natural Lands Consulting, 2016
 USDA, 2012 (photo) | MMWD, 2017
 SFEI BAARI Streams Database, 2012
 GIS/Cartography by: Jake Schweitzer, Jan. 2017
 Map File: WD_233-15_B-L_2017-0824.mxd



Amendment of the Mt. Tamalpais Watershed Road and Trail Management Plan – Restoration of Azalea Hill

MMWD Mt. Tamalpais Watershed, Unincorporated Marin County

Initial Study/Mitigated Negative Declaration – Appendix C

Cultural Resources Inventory and Evaluation Report

The Cultural Resources Inventory and Evaluation Report for the Marin Municipal Water District *Mt. Tamalpais Watershed Road and Trail Management Plan – Restoration of Azalea Hill* identifies the locations of cultural resources, which are confidential. As nonrenewable resources, archaeological sites can be significantly impacted by disturbances that can affect their cultural, scientific, and artistic values. Disclosure of this information to the public may be in violation of both federal and state laws. To discourage damage resulting from vandalism and artifact looting, cultural resources locations are kept confidential and the report's distribution restricted. Applicable U.S. laws include, but are not be limited to, Section 304 of the National Historic Preservation Act (16 USC 470w-3) and California state laws that apply include, but are not be limited to, Government Code Sections 6250 et seq. and 6254 et seq.