

EXPANDING REGIONAL TRAIL CONNECTIVITY IN NILES CANYON

Alameda County, California

Project Study Report

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This Project Study Report has been prepared under the direction of the following registered engineer. The registered engineer attests to the technical information contained herein and the engineering data upon which recommendations, conclusions, and decisions are based.



4.20.2017

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1.0 INTRODUCTION

Niles Canyon is located in an unincorporated area of Alameda County lying between the Niles district of the City of Fremont and the Town of Sunol as shown in Figure 11-1. Formed by Alameda Creek, the Canyon's steep slopes, stunning vistas, dense vegetation, and wildlife have made it a destination for visitors for more than 100 years. Current images within the Canyon are depicted in Figure 11-2.

In the early part of the last century, trains operated by the Southern Pacific Railroad brought residents of San Francisco and Oakland to recreational destinations within the Canyon. As the road network improved, State Route 84, which runs through the Canyon, became a popular route to visit the Canyon.

With an increased awareness in protecting water resources of Alameda Creek, regional planners have decreased public access to the Canyon from Highway 84. This coupled with an increase in traffic along the highway has groups seeking to expand access for pedestrians, bicyclists, and equestrians within the Canyon.

The effort to expand non-motorized access to the Canyon has at least a 40-year history. A 1975 report prepared for the East Bay Regional Park district entitled, "Niles Canyon Bike Trail Study" offered options to construct a trail adjacent to the State Highway. Subsequent studies developed in the 1980's and 1990's advanced the concept while evaluating potential environmental impacts.

The East Bay Regional Park District's Master Plan defines the goal of establishing a trail through the Canyon, known as segment 8A as illustrated in Figure 11-3. The District, working in collaboration with its project partners including Alameda County, Alameda County Water District, and San Francisco Public Utility Commission embarked on a study to evaluate options to improve access within the Canyon. The effort culminated in a feasibility study entitled "Expanding Regional Trail Connectivity Trail Options in Niles Canyon" dated December 2015.

The proposed trail will meet the Department of Transportation's Class 1 trail standard providing a 10 foot wide accessible and all weather surface linking the Niles district of Fremont with the Town of Sunol. This Project Study Report summarizes the opportunities and constraints in developing the trail as well as presents the currently preferred trail alternative.

2.0 BACKGROUND

2.1 History

The first known human settlers within Niles Canyon were the Ohlone people; researchers theorize Native Americans used the Canyon as a corridor between the Bay and inland valleys. While the first documented contact between the Ohlone and Europeans occurred in 1769, it was not until 1797 that colonists established Mission San Jose about five miles southeast and Niles Canyon became part of Mission lands.

In 1835, the Mission Period ended and the Canyon became part of a land grant to Jose de Jesus Vallejo of Rancho Arroyo de la Alameda who constructed a trail linking Livermore Rancho and the Mission San Jose. Two years later, Vallejo constructed an ox driven mill at the western mouth of Niles Canyon, which he replaced in 1841 with a grain and gristmill powered by a waterwheel from water diverted from Alameda Creek in an aqueduct.

At the time of California's statehood in 1850, there were only two counties in the East Bay, Contra Costa and Santa Clara with the boundary described as the center of Alameda Creek. Given the land area and disparate population density, planners formed Alameda County in 1853. During this period, the Vallejo mill prospered becoming one of the most efficient in the region. Vallejo encouraged settlement and farming within the region currently known as Niles. In late 1856, Vallejo constructed a new mill, but the investment was too great and he lost much of the property.

In 1864, the Western Pacific Railroad contracted with Cox and Meyers to construct a rail line through Niles Canyon to connect with other lines serving the Livermore and San Joaquin Valleys bringing farm produce directly to the Bay Area. Alameda County condemned land for the railroad's right of way and construction began. Central Pacific Railroad, who was constructing a portion of the transcontinental railroad from Sacramento east, recognized the need for direct access to San Francisco and purchased the right of way from the Western Pacific. After improving the rail line constructed by the Western Pacific Railroad, the Central Pacific Railroad opened the railroad through Niles Canyon by 1869 along the alignment shown in Figure 11-6.

In coordination with the rail construction, Alameda County constructed a, "wagon road" through Niles Canyon to support agriculture development at Dresser and Brightside. As a dirt road, it was often impassible in wet weather. By 1928, the State of California assumed operation of the road and it became known as State Route 84. The state paved the road, built three bridges, and constructed retaining walls along the creek. In the west section of the Canyon, the road's original alignment was on the south side of Alameda Creek until 1958 when the State constructed its current configuration as shown in Figure 11-7. Sections of the original roadway remain today.

In the early 1870's the Spring Valley Water Company, recognized that its Peninsula water supply was inadequate to serve growing potable water demand of San Francisco and began buying water rights in Sunol and Niles Valleys. They constructed a concrete aqueduct through the Canyon commencing near the Sunol Water Temple and ending at a reservoir near the Canyon's western extent.

The San Francisco Water Department took possession of the aqueduct in the early 1920's and operated it until 1995. Locals now know the aqueduct as the "secret sidewalk." Figure 11-8 illustrates the alignment of the aqueduct.

The Southern Pacific (SP) purchased the rail corridor from the Central Pacific in 1869. The SP completed bridges crossing Alameda Creek at Farwell and Dresser in 1896 and 1906 respectively; these bridges remain today. Through the Canyon, SP established three low speed track sections to the mainline at Dresser, Farewell, and Brightside as well as a depot at Brightside. In addition to freight, the Southern Pacific operated two 15-car trains leaving from stations in Oakland and San Francisco bringing about 6,000 visitors to the Canyon between 1878 and 1971. The picnic area near the Farwell stop was the largest and most successful, which operated until 1956. SP operated the line until 1984, when it ceased operation in the Canyon, removed the tracks, and dedicated the land to Alameda County. In 1987, the Pacific Locomotive Associate leased the property from Alameda County and began reconstructing the tracks to operate the Niles Canyon Railway as a railroad history museum.

In 1909, the Western Pacific Railroad began construction of a line parallel to SP on the south side of the Canyon, which required construction of two tunnels of almost a mile in length. In 1984, Union Pacific (UP) bought the line, which it currently uses for freight traffic as well as leases capacity to the Altamont Commuter Express who offers passenger service between the Central Valley and South Bay. Figure 11-9 illustrates the alignment of the UP railway.

Niles Canyon is the setting for several films produced in the early 20th century. In 1912, George Spoor and Gilbert "Bronco Bill" Anderson established the Essanay Film Company in Niles. While many of the films were western themed, in 1915, Essanay hired Charlie Chaplin, a popular comedic actor of the time. Chaplin shot the movie, "The Tramp" in the canyon using various locations including the hobo camp at Farwell.

2.2 Geology

Alameda County is located at the northern end of the Diablo Range of Central California, with Niles Canyon located within the Coast Range Geomorphic Province of Central California. Sedimentary rocks of the Upper Cretaceous Panoche Formation characterize the Canyon, which is part of a thick sequence of the Great Valley Sequence. Quaternary surficial deposits overlay Panoche Formation rocks in and adjacent to the present-day channel of Alameda Creek.

The walls of Niles Canyon expose the Panoche Formation as well-bedded and composed predominately of micaceous shale, with minor interbedded sandstone and local conglomerates. The Formation's fold axes and faults strike parallel to the bedding in a northwest direction. Figure 11-10 illustrates general geologic conditions within the Canyon.

Alameda Creek carved the canyon prior to the uplift of the Diablo Range. The uplift was slow enough and the creek had enough downward erosive strength to maintain its mature meanders

through the rising range. This action is responsible for the deeply incised and steep canyon walls that rise approximately 800 to 1,300 feet on both sides of the creek. Over the course of millions of years, Alameda Creek deposit clay, silt, sand, and gravel known as native alluvium throughout the Canyon.

2.3 Biological Resources

The California Natural Diversity Database (CNDDDB; CDFW 2014) was contracted for species records within a 10-mile radius using Geographic Information Systems (GIS) software (Esri ArcGIS 10.2). Subsequently, a wildlife biologist and botanist/arborist visited select locations within the study area on December 12, 2014 and on February 18, 2015 to identify site-specific biological resources, considerations where trails may cross stream or require significant excavation.

Land cover types found along the proposed trail alignment include mixed evergreen forest/oak woodland, mixed riparian forest/woodland, sycamore alluvial woodland, and scattered stands of northern coastal scrub/Diablan sage scrub.

Mixed evergreen forest/oak woodland is found along much of the proposed trail alignment and is dominated by coast live oak (*Quercus agrifolia*) and California bay (*Umbellularia californica*). Plants in the understory include variety of ferns such as California maidenhair (*Adiantum jordanii*), California wood fern (*Dryopteris arguta*), goldenback fern (*Pentagramma triangularis*), and California polypody (*Polypodium californicum*).

Mixed riparian forest/woodland is found within the floodplain of Alameda Creek and is characterized by coast live oak, California bay, big leaf maple (*Acer macrophyllum*), red alder (*Alnus rubra*), Fremont cottonwood (*Populus fremontii*), and red willow (*Salix laevigata*). Plants in the understory include Himalayan blackberry (*Rubus armeniacus*) and California blackberry (*Rubus ursinus*).

Sycamore alluvial woodland is found at the eastern end of the proposed alignment and is dominated by an overstory of large western sycamore (*Platanus racemosa*). Subdominant tree species include California buckeye (*Aesculus californica*), California black walnut (*Juglans hindsii*), coast live oak, California bay, valley oak (*Quercus lobata*), and arroyo willow (*Salix lasiolepis*). Plants in the understory include coyote brush (*Baccharis pilularis*), American dogwood (*Cornus sericea*), California blackberry, and black elderberry (*Sambucus nigra*).

Northern coastal scrub/Diablan sage scrub occurs in scattered locations along the proposed trail alignment, principally along the railroad right-of-way. The dominant species in this habitat are primarily shrub species and include California sagebrush (*Artemisia californica*), coyote brush, golden yarrow (*Eriophyllum confertiflorum*), sticky monkey flower (*Mimulus aurantiacus*), and poison oak (*Toxicodendron diversilobum*).

Jurisdictional Waters. Alameda Creek as shown in Figure 11-11 and tributaries are subject to U.S. Army Corps of Engineers (Corps) and San Francisco Bay Regional Water Quality Control Board (RWQCB) jurisdiction under Sections 404 and 401 of the Clean Water Act (CWA) and the Porter-

Cologne Act, respectively. The creek, tributaries, and associated riparian communities also fall under the jurisdiction of the California Department of Fish and Wildlife (CDFW) under Section 1602 of the California Fish and Wildlife Code. The team did not observe any seasonal wetlands/depressions, ditches, ponds, or other features potentially subject to Corps, RWQCB, or CDFW jurisdiction.

Special-Status Species. The project vicinity includes habitat for the following special-status plant and animal species:

- Chaparral harebell (*Campanula exigua*). Chaparral harebell is generally found on rocky sites within chaparral habitats and is often associated with serpentine soils. Chaparral harebell has a California Rare Plant Rank of 1B.2 (rare, threatened, or endangered in California and elsewhere). This species is known to occur in close proximity to the proposed trail alignment in the Sunol Valley.
- Congdon's tarplant (*Centromadia parryi* ssp. *congdonii*). Congdon's tarplant is found in grazed and ungrazed annual grassland and is often associated with alkaline or saline soils. Congdon's tarplant has a California Rare Plant Rank of 1B.1. This species is known to occur in the project vicinity and may occur within the project boundaries if there are areas of mesic grassland along the proposed trail alignment.
- Santa Clara Red Ribbons (*Clarkia concinna* ssp. *automixa*). Santa Clara red ribbons occurs in chaparral and woodland habitats. Santa Clara red ribbons has a California Rare Plant Rank of 4.3 (limited distribution). The species is known to occur in close proximity to the proposed trail alignment.
- Steelhead (*Oncorhynchus mykiss*). Steelhead are anadromous fish that spend most of their lives in the Pacific Ocean and return to freshwater streams to spawn. The Central California Coast steelhead population is federally threatened. Central California Coast steelhead are known to occur in the lower reaches of Alameda Creek, but are currently prevented from accessing upper Alameda Creek by the BART Weir and rubber dams downstream of the project site. However, efforts are underway to provide fish ladders over those obstacles in order to allow steelhead to move upstream to spawn. These projects are expected to be completed by 2017.
- California Tiger Salamander (*Ambystoma californiense*). California tiger salamanders occur in grassland, oak woodland, and coastal scrub/chaparral habitats that contain small mammal burrows for dry-season retreats and seasonal ponds and pools for breeding during the rainy season. California tiger salamanders are federally and state threatened. Suitable breeding habitat does not occur along the proposed trail alignment. However, they are known to breed in several seasonal ponds within 1.3 miles of the study area. The CDFW and the United States Fish and Wildlife Service (USFWS) generally consider 1.3 miles to be the normal maximum dispersal distance for this species from a breeding site. As such, both agencies are likely to consider areas along the proposed trail alignment as movement/dispersal habitat for this species.
- Foothill Yellow-legged Frog (*Rana boylei*). Foothill yellow-legged frogs occur in streams and rivers with rocky substrates and open, sunny banks. Foothill yellow-legged frogs are

a California Species of Special Concern and a petition to list this species under the federal Endangered Species Act has been recently accepted. There are no records of yellow-legged frogs in the study area. However, the species is known to occur farther upstream in the upper reaches of Alameda Creek.

- California Red-legged Frog (*Rana draytonii*). California red-legged frogs occur in ponds, streams, drainages, and associated uplands; they require areas of deep, still, and/or slow-moving water for breeding. California red-legged frogs are federally threatened and are a California Species of Special Concern. Red-legged frogs are known to occur in the project vicinity but are unlikely to breed in Alameda Creek due to the presence of bullfrogs and predatory fish. The creek and adjacent riparian and woodland habitats do provide potential foraging and movement habitat for red-legged frogs. Freshwater ponds in the vicinity may support breeding populations.
- Western Pond Turtle (*Actinemys marmorata*). Western pond turtles occur in ponds, streams, drainages, and associated uplands. Western pond turtles are a California Species of Special Concern. Pond turtles are known to occur in Alameda Creek and ponds in the nearby vicinity.
- Alameda Whipsnake (*Masticophis lateralis euryxanthus*). Alameda whipsnakes are found in chaparral and sage scrub with rock outcrops and an abundance of prey species such as western fence lizards (*Sceloporus occidentalis*). Alameda whipsnakes are federally and state threatened. Whipsnakes are known to occur north and south of Highway 84 and may use habitats within the proposed trail alignment as movement corridors.
- Burrowing Owl (*Athene cunicularia*). Burrowing owls are found in open habitats (e.g., grasslands, agricultural areas) with mammal burrows or other features such as culverts, pipes, or debris piles suitable for nesting and roosting. Burrowing owls are a California Species of Special Concern. Suitable habitat is present at Vallejo Mill Park and Sunol Water Temple.
- Tricolored Blackbird (*Agelaius tricolor*). Tricolored blackbirds historically nested in freshwater marshes dominated by cattails and bulrushes, but now commonly nest in areas dominated by blackberries, mustards, thistles, or mallows. Large colonies also occur in grain fields in the Central Valley. Tricolored blackbirds are a California Species of Special Concern and have been known to nest in the project vicinity, at the junction of Alameda Creek and Highway 680.
- San Francisco Dusky-footed Woodrat (*Neotoma fuscipes annectens*). Woodrats occur in forested habitats with moderate canopy and moderate to dense understory. San Francisco dusky-footed woodrats are a California Species of Special Concern. No nests were observed during the reconnaissance surveys, but suitable habitat is present along most of the proposed trail alignment.
- Roosting Bats. Several special-status bat species, including Townsend's big-eared bat, (*Corynorhinus townsendii*), may occur in the project area. Potential bat roosting habitat includes caves, mines, human structures, and hollows in large trees. Some bat species also nest in foliage or under loose bark. The team did not see potential roosting habitat or evidence of roosting bats during survey of the site.

2.4 Cultural Resources

To complete a preliminary review of cultural resources within Niles Canyon, the team conducted a records search of the study area on December 15, 2014, at the Northwest Information Center (NWIC) of the California Historical Resources Information System, Sonoma State University, Rohnert Park. The NWIC, an affiliate of the State of California Office of Historic Preservation, is the official State repository of cultural resource records and reports for Alameda County. As part of the records search, the team also reviewed the following State inventories for cultural resources in and adjacent to the study area:

- *California Inventory of Historic Resources* (California Department of Parks and Recreation 1976);
- *Five Views: An Ethnic Historic Site Survey for California* (California Office of Historic Preservation 1988);
- *California Points of Historical Interest* (California Office of Historic Preservation 1992);
- *California Historical Landmarks* (California Office of Historic Preservation 1996);
- *Directory of Properties in the Historic Property Data File* (California Office of Historic Preservation April 5, 2012). The directory includes the listings of the National Register of Historic Places (NRHP), National Historic Landmarks, and the California Register of Historical Resources (CRHR); and
- *Caltrans Historic Bridge Inventory* (California Department of Transportation July 2015).

Existing Conditions. The record search found that previous groups completed 37 studies within the Canyon that found ten cultural resources. Of the resources found, five are archaeological sites and 14 are built-environment resources. Of the built-environment resources, ten are eligible for listing on the NRHP and the CRHR. One built-environment resource is P-01-011357, the NRHP-listed Niles Canyon Transcontinental Railroad Historic District and another is the California Historic Landmark #46, CA-ALA-548H/P-01-000227, the Vallejo Flour Mill.

Field Investigation. A registered professional archaeologist conducted a limited field review of the study area on December 17, 2014 to identify site-specific cultural constraints where the trail construction may create ground disturbance. This was not a formal cultural resources pedestrian survey. Specific areas investigated included:

- The Sunol Water Temple and adjacent riparian woodland next to Alameda Creek
- Vallejo Mill City Park in Fremont
- The Niles Canyon Railway from the historic Farwell Bridge southwest to Mission Clay
- The original Highway 84 bridge abutment south of Niles Canyon Road across from Brightside
- The first 800 feet of the former Mission Clay access road at the end of Old Canyon Road.

The team also completed a focused geoarchaeological assessment for field review areas to assess the sensitivity for buried archaeological resources. Generally, Holocene-age (11,500 cal. B.P. to present) landforms have a potential for containing buried prehistoric archaeological deposits as

these contain surfaces that were available for occupation and use during prehistory. Holocene-age landforms in the vicinity of a natural water source such as Alameda Creek have an elevated sensitivity for buried archaeological deposits (Rosenthal et al. 2003:72-76)

The following summarizes the results of the field review and geoarchaeological sensitivity assessment.

Sunol Water Temple. The proposed creek crossing is located adjacent to riparian woodlands near the confluence of Alameda Creek and Arroyo de la Laguna creeks. According to the California Department of Conservation (CDC) 2010 Geologica Map of California, the area consists of Holocene-age alluvium deposits (Qhaf). We observed no archaeological deposits at this location; however, the records search identified CA-ALA-565H/P-01-000015, a prehistoric and historic-period archaeological site, near the proposed creek crossing.

The proximity to watercourses, Holocene-age landforms, and the presence of a previously recorded resource suggests ground disturbance at this location and in the vicinity has a high potential to encounter archaeological deposits, including subsurface archaeological remains, during construction (Luby 1993).

Vallejo Mill City Park. This proposed crossing area is within Vallejo Mill City Park in Fremont. The park lies along a terrace of Alameda Creek and consists of grasslands and a few oaks. Geologically, the area consists of older Holocene alluvium deposits (Qhaf) (CDC 2010). The records search identified CA-ALA-548H/ P-01-000227, a prehistoric and historic-period archaeological site that includes exposed foundations of an 1856 mill, within the proposed crossing area (Baker 1990). The exposed foundations of the mill are listed as California Historical Landmark #46.

Based on the Holocene-age landforms, proximity to Alameda Creek, and the confirmed and recorded archaeological site, ground disturbance at this location and in the vicinity has a high potential to encounter archaeological deposits, including the exposed mill remains and potential subsurface archaeological remains, during construction.

Farwell Bridge Southwest to Mission Clay. This portion of the study area is along Alameda Creek and parallel to the Niles Canyon Transcontinental Railroad Historic District tracks. Geologically, this area consists of older Pleistocene-age alluvium deposits (Qpaf) and younger Holocene-age deposits (Qhaf) (CDC2010). The records search identified two previously recorded built-environment resources at this location, consisting of: (1) P-01-008189/Caltrans Bridge # 33-0035, Farwell Bridge, a railroad bridge constructed in 1932; and (2) P-01-011357, the Niles Canyon Transcontinental Railroad Historic District, a historic district listed in the NRHP and CRHR (Scantlebury 2004a; 2004b).

The geological deposits in this study area range in age from the older, Pleistocene deposits to younger Holocene-age, which are archaeologically sensitive. It is likely that the area is generally sensitive for buried archaeological deposits.

Original Highway 84 Bridge Abutment. This portion of the study area lies south of Niles Canyon Road across from the unincorporated community of Brightside. Geologically, the area consists of older Holocene alluvium deposits (Qhaf). The records search identified P-01-010797, a concrete bridge abutment, on the north side of Alameda Creek (Larson 2005). Grasses and pavement obscured our ability to review the surface. Based on the Holocene-age landforms and proximity to Alameda Creek, ground disturbance at this location and in the vicinity has a high potential to encounter archaeological deposits,

Mission Clay Access Road. Given the Holocene- age landforms and proximity to Alameda Creek, ground disturbance within the first 800 feet of the former Mission Clay access road has a high potential to encounter archaeological deposits.

3.0 PURPOSE

The purpose of the multi-use trail from Niles to Sunol is to provide access for pedestrians and bicyclists to experience Niles Canyon as well as serve as an alternative to Highway 84 for commuters on bicycle. The six mile long trail will be a Class 1 facility as defined by the California Department of Transportation consisting of an all-weather surface likely of asphalt concrete that is 10 feet in width and will consist of 4 inches of asphalt concrete atop 6 inches of class II aggregate base as illustrated in Figure 11-5. The trail will have shoulders on each side that are at least two feet wide, composed of decomposed granite. Additionally, the trail will meet accessibility guidelines meaning the grade in the direction of travel will be less than 5% and the cross slope will be no more than 2%.

4.0 NEED STATEMENT

The effort to expand non-motorized access to the Canyon has at least a 40-year history. A 1975 report prepared for the East Bay Regional Park district entitled, "Niles Canyon Bike Trail Study" offered options to construct a trail adjacent to the State Highway. Subsequent studies developed in the 1980's and 1990's advanced the concept while evaluating potential environmental impacts.

The East Bay Regional Park District's Master Plan defines the goal of establishing a trail through the Canyon, known as segment 8A. The District, working in collaboration with its project partners including Alameda County, Alameda County Water District, and San Francisco Public Utility Commission embarked on a study to evaluate options to improve access within the Canyon.

Accessing Niles Canyon is difficult for pedestrians and bicyclists given steep topography, dense vegetation, and private property. While both the right of way of Niles Canyon and Union Pacific Railroads are physically accessible to hikers, the property owners do not allow access for safety reasons. Highway 84 permits both bicyclist and pedestrians, but limited shoulders, narrow bridges, and high traffic volumes and speeds discourage use. Given these constraints, the Town of Sunol, which has a population of 913 (2010-census) residents essentially, have no non-motorized access

to destinations to the west.

5.0 COORDINATION WITH OTHER PLANS

Local governing agencies support the development of facilities to support non-motorized uses within Niles Canyon Trail including:

- The East Bay Regional Park District's 2013 Master plan identifies trail segment 8A as a linkage from Niles to Sunol as illustrated in Figure 11-3. It further integrates segment 3A to connect to the Vargas Plateau and 3B linking Vallejo Mills the Bay Area Ridge trail.
- The 2012 Alameda Countywide Bicycle Plan identifies Highway 84 as a bicycle route. The plan notes that, "Alameda County is a community that inspires people of all ages and abilities to bicycle for everyday transportation, recreation and health, with an extensive network of safe, convenient and interconnected facilities linked to transit and other major destinations."
- The 2012 City of Fremont Bicycle Master Plan identifies Highway 84 as a bicycle route. The plan further notes that, "Niles Canyon Road is an important route for recreational bicycling."

6.0 TRAIL ALTERNATIVES

6.1 Project Goals

In developing trail options, the team established the following goals:

1. Establish a safe and functional class 1 trail;
2. Minimize impacts to environmental resources;
3. Enhance or maintain stakeholder access to infrastructure;
4. Develop trail alignments with a realistic cost that can be implemented in a reasonable time frame; and
5. Identify and preserve the historic water and rail infrastructure within Niles Canyon.

After walking the Canyon from Sunol to Niles several times, the team concluded that given the steep topography present between Vallejo Mill Park and west of Brightside, there is only one feasible trail option located on the south side of the Canyon. However, at Brightside, there are options available to locate the trail on either the north or south side of the Canyon. Figure 11-12 illustrates these proposed options for the Canyon Trail. A third option includes sharing the existing Alameda County right of way with both a trail and the Niles Canyon Railway.

6.2 Canyon Trail

The west section of the trail begins as shown in Figure 11-13 at the end of Old Canyon Road, where the SFPUC has a gate and maintains a service road that leads to the Mission Clay property. While this roadway will require re-surfacing, installation of retaining walls,

and fencing, there is sufficient width to construct a trail.

As a private group owns the former Mission Clay property, the trail will need to shift from the service road to parallel the Niles Canyon Railway within the Alameda County right of way as shown in Figure 11-14. To maintain safety, the project will vertically separate the trail from the railroad's operations illustrated in Figure 11-15, which will include a fence allowing for wildlife passage. To construct the trail along the steep slope near the Farwell Bridge, the project will need to grade and install retaining walls. However, east of the Farwell Bridge, the Sunol Aqueduct emerges from the hillside as shown in Figure 11-16.

The aqueduct makes an excellent path for pedestrian traffic; it is level and in amazingly good condition for being almost 100 years old. To make it safe for trail users, the project will need to reinforce and widen it including adding fall protection as illustrated in Figure 11-17. Given the steep topography and need to accommodate equestrian users, we recommend including widened areas where possible.

The aqueduct gradually merges and is level with the elevation of Highway 84 at Dead Cow curve as shown in Figure 11-18. As illustrated in Figure 11-19, the project will need to install a barrier, grade the existing slope, and potentially add a wall to provide the width necessary for a Class 1 trail. However, as we understand that CALTRANS is studying options to improve safety at this curve, we recommend reserving area for the trail in any future improvements within this area.

Just to the east of Dead Cow curve, the trail will use a remnant of the Old Highway 84, which is currently an access road used by Union Pacific Railroad. As shown in Figure 11-20, this roadway is in good condition requiring only maintenance for re-use as a trail. At this location, there is an option to locate the trail as it travels to Sunol on either the north or south side of the Canyon. The need to cross railroad right of way, Highway 84, and Alameda Creek complicate the options.

6.3 Option 1 – North Canyon Trail

As illustrated in Figure 11-21, the trail will follow an alignment along the north face of Niles Canyon. For the trail to shift from the south to north side of the Canyon, the project will construct a bridge crossing Alameda Creek, Highway 84, and the Niles Canyon Railroad as illustrated in Figure 11-22. The project could locate the bridge near the remnants of the old highway bridge crossing. Given the length, the bridge will require multiple piers as well as extensive grading at the southerly abutment to create sufficient elevation to cross the highway.

Once on the north side of the Canyon, the trail will run upslope of the Niles Canyon Railway as shown in Figure 11-23. This will require the construction of walls to maintain vertical separation for the tracks as shown in Figure 11-24. As the trail enters Brightside as shown in Figure 11-25, it could potentially be located on the north side of Niles Canyon Railway's

maintenance facility. The location of the trail requires coordination with PLA to ensure the security of their equipment. The final segment as depicted in Figure 11-26 uses portions of Old Canyon Road and Foothill Boulevard to reach the Sunol train station.

6.4 Option 2 – South Canyon Trail

The second trail alternative, as illustrated in Figure 11-27, travels along the south side of Niles Canyon. To continue the trail, it must cross UP railroad near the location of the existing grade crossing panel. Due to limited sight distance as well as high train volume and speed, we recommend constructing a grade separation to cross the tracks. To provide for 23 feet of clearance, this will require extensive grading on both ends of the bridge.

Once on the east side of the tracks as shown in Figure 11-28, the project will construct the trail through unimproved lands. In this area, the topography is steep and vegetation dense; the trail will require two bridges to cross Alameda Creek. The trail will end at the Sunol Water Temple.

6.5 Option 3 – Rails with Trails

Along segments of Niles Canyon Railway, there is adequate area available to install a class 1 trail. While operating trails near active rail lines can present challenges, the volume and speed of the Niles Canyon Railway is small providing an opportunity for a parallel trail. To achieve a trail, the project would maximize horizontal separation, create a vertical separation where possible, and install a fence separating the uses.

Because of the limited operations of Niles Canyon Railway, the project could relocate the tracks, tightening curve radii especially in constrained sections to provide additional trail area. Since the tracks are in their historical alignment, adjustments are an impact under CEQA. Furthermore, this option requires coordination with the Pacific Locomotive Association to ensure reliable operation. This option could be a major benefit to the PLA as the improvements could reduce maintenance related to landslides and provide new tracks and ties.

Potentially, this could occur along the entire length from Sunol to Niles, but given that the westerly segment to Mission Clay is not complicated, the project could implement this alternative at Dresser Bridge as shown in Figure 11-29.

In May 2016, the San Joaquin Regional Rail Commission issued a supplemental Notice of Preparation of an Environmental Impact Report for the ACEforward project. The project proposes improvements within the ACE corridor connecting the southern Bay Area with the San Joaquin Valley. Based upon the project description, the ACEforward will study upgrades to the Niles Canyon Railway corridor to accommodate Union Pacific freight traffic. This would allow Union Pacific to use rail corridors on either the north or south side of Niles Canyon allowing for additional passenger rail trips through the existing corridor. Any improvements to the Niles Canyon Railway alignment would require approval by Alameda

County as they possess the right of way.

Should the ACEforward project make improvements within Niles Canyon, we recommend reserving adequate right of way to accommodate the class 1 trail as illustrated in this project study report.

6.6 Preferred Alternative

The team ranked each trail option in reference to the project goals by asking the following series of questions:

- Does the trail option provide a good user experience?
- How significant will the trail's construction impact environmental resources?
- Will the trail disrupt historical resources within the Canyon?
- What is the cost to implement the trail?

At this time, the team selects the North Canyon Trail (Option 1) as preferred and illustrated in Figure 11-31 given the following:

- The South Canyon Trail has potentially significant impact on environmental resources due to potential tree removal and grading within area previously undisturbed.
- The South Canyon Trail does not directly connect to Sunol
- The North Canyon Trail requires only one major bridge to complete the alignment while the South Canyon has three.
- The South Canyon Trail requires a bridge across UP right of way which can be costly to permit
- The Rails to Trails option will require a major adjustment to the existing tracks, which could affect Niles Canyon Railway's operations as well as create a potential environmental impact.

6.7 Minimum Build

Due to the cost and complexity of completing the trail, it might require development in a series of phases as shown in Figure 11-32. Each phase would be independent of the next in service and function. The recommended phasing strategy includes:

- Phase 1 – Vallejo Mill to Palomares Road
- Phase 2 – Palomares Road to Brightside Railroad yard
- Phase 3 – Brightside to Sunol.

The first phase would complete the connection from Vallejo Mill to Palomares Road. Based on discussions with bicycle groups, there is a large interest in linking Palomares Road to the Class 1 trail. To provide independent utility, the project would need to create a new crossing of Highway 84 parallel to the Farwell Bridge, as shown in Figure 11-32.

The second phase begins at Palomares Road and ends at the Brightside Railroad yard. As the Niles Canyon Railway plans to transform the Brightside Yard into a museum, it provide an attractive destination for the Class 1 trail.

The final phase travels completes the trail between Niles and Sunol.

Subsequent to the initial planning effort detailed in the Feasibility Report, the project team evaluated options to provide a pedestrian connection between the trail entrance and the existing Niles Canyon Staging Area. Figure 11-33 illustrates the construction of a sidewalk and curb and gutter along Old Canyon Road. These improvements are located within the City of Fremont.

6.8 No Build

Not building the project would be inconsistent with regional trail planning efforts.

7.0 COMMUNITY INVOLVEMENT

Not only is there general public interest in Niles Canyon, but there are several agencies that own property and manage resources within the Canyon. In preparation of this report, the team conducted several technical advisory committee (TAC) meetings to review concepts and obtain feedback. The TAC met in July and December 2014 as well as March 2015; members included:

Dawn Argula – Alameda County
Doug Chun – Alameda County Water District (ACWD)
Neal Fujita - San Francisco Public Utilities Commission (SFPUC)
Christopher Miley – Alameda County
Beth Perrill – Alameda County
Carla Schultheis – San Francisco Public Utilities Commission (SFPUC)
Elizabeth White – State of California Department of Transportation (CALTRANS)
Suzanne Wilson – East Bay Regional Park District (EBRPD)

To help the TAC as well as community leaders understand the challenges developing trails within the Canyon, the team completed a field walk in November 2014 illustrated in Figure 11-4. The walk began in the westerly segment at the extension of Old Canyon Road where we investigated the Sunol Aqueduct as well as the Niles Canyon Railway corridor. The visit also included a review of the Highway 84 near Dead Cow Curve and near the remains of bridge abutments where Old Canyon Road formerly crossed Alameda Creek.

To obtain feedback regarding trail feasibility study, the team presented concepts to the public at the following meetings:

October 14, 2014 – Community Meeting 1 in Sunol to present the overall goals of the study
January 27, 2015 – Community Meeting 2 in Niles to present potential trail options

April 14, 2015 – Fremont City Council Meeting to present the overall goals and potential options

May 12, 2015 – Union City Council Meeting to present overall goals and potential options

June 18, 2015 – Community Meeting 3 in Niles to present recommended options and next steps

As illustrated in Figure 11-4, on October 11, 2015, the team attended the Niles Canyon Stroll and Roll event to discuss and receive comment on the multi-use trail. The event was a unique opportunity as CALTRANS closed State Route 84 to vehicle traffic allowing community members to walk or bicycle through Canyon. Team members setup stations at Palomares Road and Brightside to discuss trail options with over 400 community members.

Through this process, we heard the following comments from the community and stakeholders:

- Develop a trail that serves equestrians, bicyclists, strollers, and pedestrians equally.
- In developing the trail, address safety issues such as rockslides and emergency vehicle access.
- Promote connections to Alameda Creek and Palomares Road.
- Tell the history of the Canyon.
- Provide train stops for the Niles Canyon Railway along the way.
- Provide adequate parking with restrooms at staging areas to prevent impact to neighborhoods.
- Limit walls and pavement to maintain a natural feel in the Canyon.
- There is a tradeoff between the north and south side of the Canyon with the former being sunny and latter is shaded.
- Close Highway 84 for a day annually to allow for a walk through the Canyon.

8.0 ENVIRONMENTAL STATUS

8.1 California Environmental Quality Act

This project will likely require an environmental impact report completed pursuant to the California Environmental Quality Act (CEQA) guidelines. This process has not yet begun.

8.2 Regulatory Agency Permitting

To complete the work adjacent to Alameda Creek, the project will require permits from several federal and state regulatory agencies. This will require evaluation of impact to habitat of federally protected species. The following are the likely permits necessary to construct the improvements:

- U.S. Army Corps of Engineers (ACOE) – Section 402 and 404 of the Clean Water Act
- U.S. Fish and Wildlife Service (USFWS) – Section 404 Permit
- California Department of Fish and Game (CDFG) – Streambed Alteration Permit Section 1600

- San Francisco Bay Regional Water Quality Control Board (Water Board) – Section 401 Certification of the Clean Water Act and Waste Discharge Requirements under the State of California's Porter-Cologne Water Quality Control Act
- San Francisco Bay Regional Water Quality Control Board – Stormwater Pollution Prevention Plan and Provision C.3 of the Municipal Regional Permit

9.0 PROJECT COSTS

The total cost to plan, design, permit and construct the North Canyon Trail (Option 1) is approximately \$93,000,000 using 2017 unit rates. The estimate that follows summarizes the potential quantities of work derived from the Niles Canyon Concept Plan dated March 3, 2017. Note that future project costs assume a 4% annual inflation rate.

NILES CANYON TRAIL
ENGINEER'S ESTIMATE OF CONSTRUCTION COST
BASED ON CONCEPTUAL DESIGN

Date: 03.03.17

ITEM	DESCRIPTION	UNITS	UNIT COST	CONT.	QTY	COST
Section 1 - General Specifications						
101	MOBILIZATION	LS	\$ 6,140,000	0%	1	\$ 6,140,000
102	LAYOUT AND STAKING	LS	\$ 65,000.00	15%	1	\$ 74,750
103	WATER POLLUTION CONTROL	LS	\$ 150,000.00	15%	1	\$ 172,500
104	TRAFFIC CONTROL	LS	\$ 125,000.00	15%	1	\$ 143,750
105	HYDROSEED	SF	\$ 0.25	15%	340,000	\$ 97,750
106	REPLACE TREE/ VEGETATION	SF	\$ 0.85	20%	240,000	\$ 244,800
Section 2 - Demolition						
200	CLEARING AND GRUBBING	SF	\$ 0.50	15%	767,000	\$ 441,025
201	TREE REMOVAL	EA	\$ 1,200.00	15%	100	\$ 138,000
202	TREE TRIMMING	LS	\$ 25,000.00	10%	1	\$ 27,500
Section 3 - Earthwork						
300	EARTHWORK - CUTS AND FILLS	CY	\$ 15	20%	481,000	\$ 8,658,000
301	EARTHWORK - IMPORT/ EXPORT	CY	\$ 40	20%	462,000	\$22,176,000
302	EARTHWORK - FINE GRADE	SF	\$ 5	20%	340,000	\$ 2,040,000
Section 4 - Trail Construction						
400	AGGREGATE BASE	TON	\$ 35	15%	11,110	\$ 447,178
401	ASPHALT CONCRETE PAVING	TON	\$ 125	20%	7,660	\$ 1,149,000
402	DECOMPOSED GRANITE	SF	\$ 5.00	15%	8,900	\$ 51,175
403	CONCRETE SIDEWALK/ CURB AND GUTTER	SF	\$ 15.00	15%	12,500	\$ 215,625
Section 5 - Structural Improvements						
500	PEDESTRIAN BRIDGE AT PALOMARES ROAD	LF	\$ 10,000	25%	700	\$ 8,750,000
501	PEDESTRIAN BRIDGE AT BRIGHTSIDE	LF	\$ 10,000	25%	550	\$ 6,875,000
502	SOIL NAIL RETAINING WALL	SF	\$ 70	20%	6,000	\$ 504,000
503	MSE RETAINING WALL	SF	\$ 125	20%	3,350	\$ 502,500
504	AQUEDUCT MODIFICATION	LF	\$ 1,000	25%	4,300	\$ 5,375,000
505	MINOR BRIDGE CREEK CROSSING	EA	\$ 55,000	15%	13	\$ 822,250
Section 6 - Additional Site Improvements						
600	PAVEMENT STRIPING	LF	\$ 2.00	15%	92,000	\$ 211,600
601	SIGNAGE	LS	\$ 25,000	10%	1	\$ 27,500
602	FENCING	LF	\$ 45	15%	31,000	\$ 1,604,250
602	RESTROOMS	EA	\$ 130,000	15%	4	\$ 598,000
603	PARK BENCHES	EA	\$ 3,000	15%	5	\$ 17,250
SUBTOTAL						\$67,504,403
TOTAL CONSTRUCTION COST (2017):						\$67,500,000
PERMITTING AND ENVIRONMENTAL:						\$6,750,000
FINAL DESIGN:						\$8,100,000
CONSTRUCTION MANAGEMENT:						\$10,125,000
TOTAL PROJECT COST (2017):						\$92,475,000
TOTAL PROJECT COST (2025):						\$127,000,000
TOTAL PROJECT COST (2035):						\$187,000,000

10.0 DEVELOPMENT SCHEDULE

A summary of the project schedule includes the following:

Task	Duration	Completion
Project Refinement and Preliminary Engineering	6 months	Mid 2018
Environmental Document	12 months	End 2019
Environmental Permitting	24 months	End 2020
Project Design	12 months	End 2020
Phase 1 Construction	12 months	Mid 2021
Phase 2 Construction	36 months	
Phase 3 Construction	36 months	

11.0 ATTACHMENTS

The following attachments are included in this Project Study Report:

- Figure 11-1 Vicinity Map
- Figure 11-2 Images from Niles Canyon
- Figure 11-3 East Bay Regional Parks District Master Plan within Niles Canyon
- Figure 11-4 East Bay Regional Parks District Master Plan within Niles Canyon
- Figure 11-5 East Bay Regional Parks District Master Plan within Niles Canyon
- Figure 11-6 Niles Canyon Railway
- Figure 11-7 State Route 84
- Figure 11-8 Sunol Aqueduct
- Figure 11-9 Union Pacific Rail Right of Way
- Figure 11-10 Niles Canyon Geology
- Figure 11-11 Alameda Creek
- Figure 11-12 - Canyon Trail
- Figure 11-13 - Canyon Trail to Mission Clay Property
- Figure 11-14 - Canyon Trail to Farwell Bridge
- Figure 11-15 - Canyon Trail to Farwell Bridge
- Figure 11-16 - Canyon Trail along Sunol Aqueduct
- Figure 11-17 - Canyon Trail to Farwell Bridge
- Figure 11-18 - Canyon Trail along State Route 84
- Figure 11-19 - Canyon Trail along State Route 84
- Figure 11-20 - Canyon Trail along Union Pacific
- Figure 11-21 – Option 1 – North Canyon Trail
- Figure 11-22 – Option 1 – North Canyon Bridge
- Figure 11-23 – Option 1 – North Canyon Trail
- Figure 11-24 – Option 1 - North Canyon Trail
- Figure 11-25 – Option 1 North Canyon Trail
- Figure 11-26 – Option 1 North Canyon Trail

Figure 11-27 - Option 2 South Canyon Trail
Figure 11-28 - Option 2 South Canyon Trail
Figure 11-29 - Option 3 Rails with Trails
Figure 11-30 Connection to Palomares Road
Figure 11-31 Preferred Option Plan and Profile
Figure 11-32 Phasing
Figure 11-33 Niles Canyon Staging Area to the SFPUC Gate

Project Conceptual Plans for the North Canyon Trail are available under separate cover.

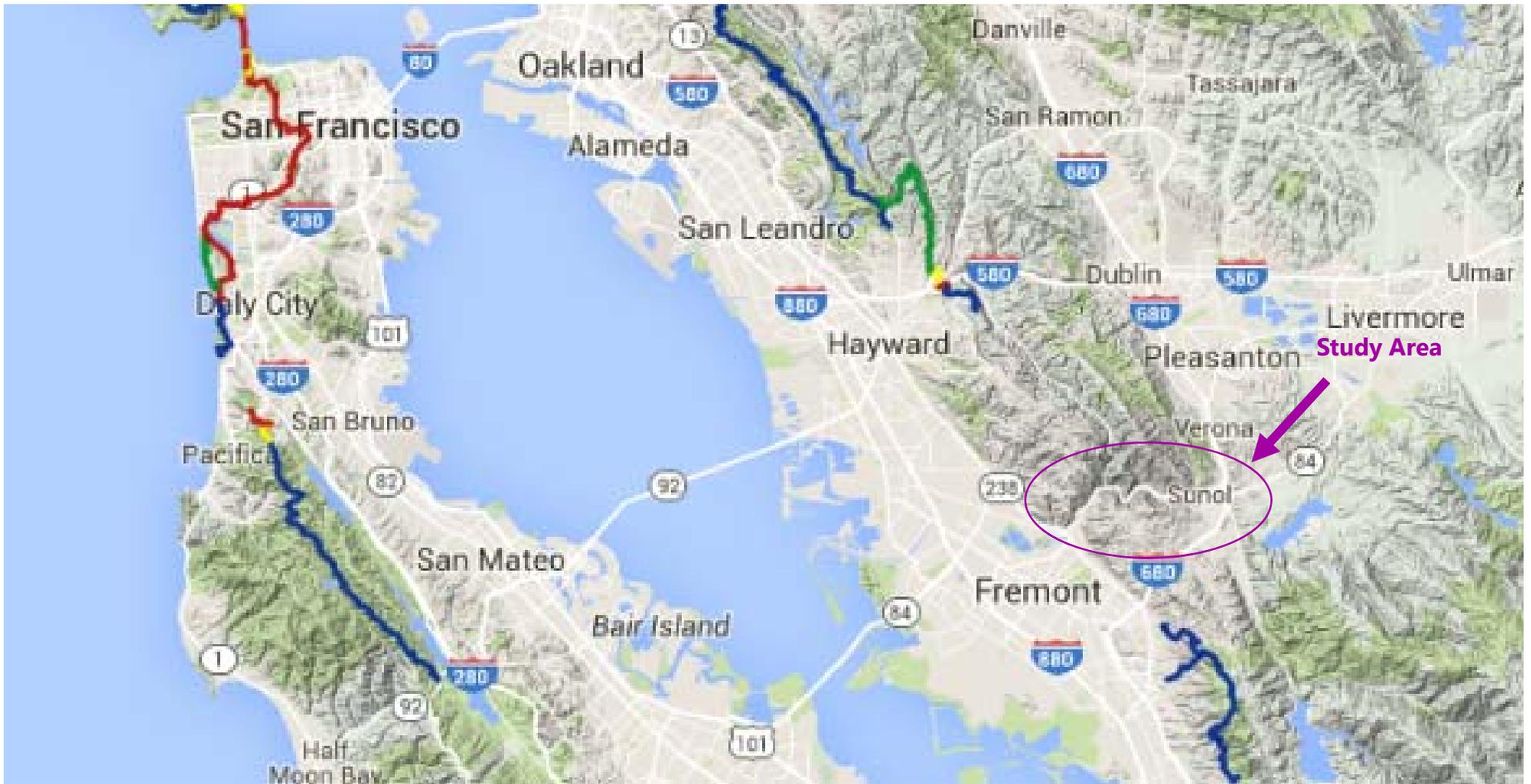


Figure 11-1 Vicinity Map



The deactivated Sunol Aqueduct runs above ground providing an accessible path through portions of the Canyon. The aqueduct is popular destination for locals who now know it as the "secret sidewalk."



Alameda Creek originally formed Niles Canyon.

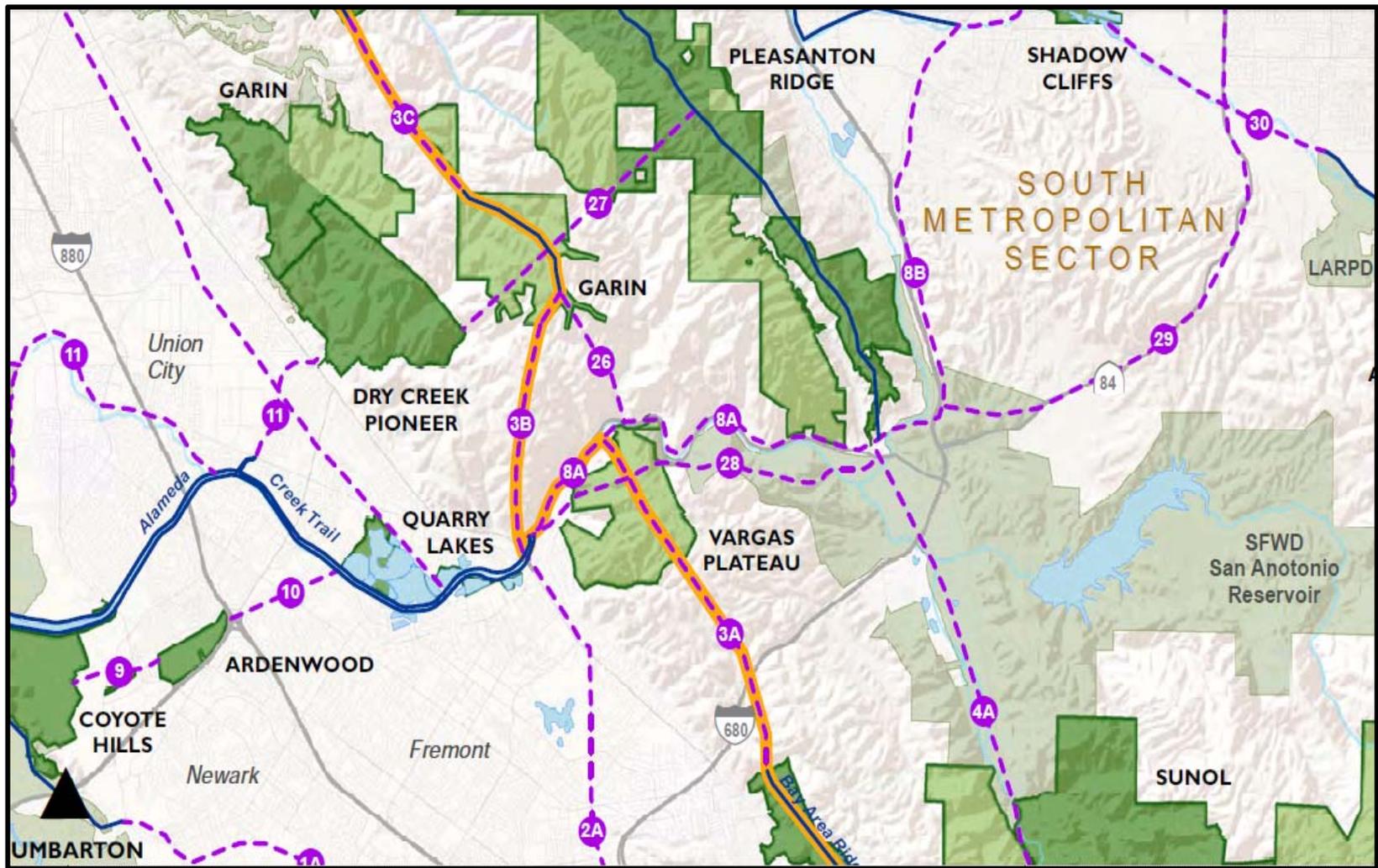


An original segment of the transcontinental railway runs through Niles Canyon. Operated by Southern Pacific, the railroad brought visitors to Niles Canyon in the early part of the 20th century. The Pacific Locomotive Association now operates the Niles Canyon Railway along the tracks.



Historic steam engine of the Niles Canyon Railway operates along the original transcontinental rail alignment.

Figure 11-2 Images from Niles Canyon



A map from the EBRPD's master plan identifies a trail segment through Niles Canyon.

Figure 11-3 East Bay Regional Parks District Master Plan within Niles Canyon

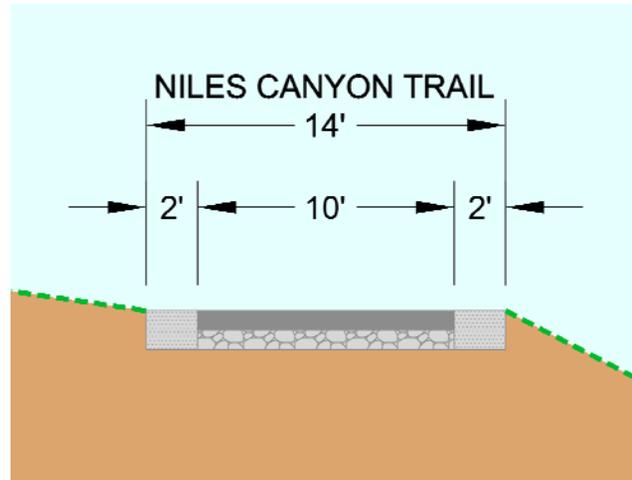


November 2014 field walk helped participants understand constraints and opportunities in developing a trail within the Canyon.



The October 11, 2015 Niles Canyon Stroll and Roll event was extremely popular. East Bay Regional Parks District setup two information stations along Highway 84 to receive feedback regarding expanding trail options in Niles Canyon.

Figure 11-4 East Bay Regional Parks District Master Plan within Niles Canyon



Niles Canyon Trail will meet the Department of Transportation's Class 1 Trail Standard; the trail will be both accessible and have all weather access.

Figure 11-5 East Bay Regional Parks District Master Plan within Niles Canyon

Constructed:
1866
Number of bridges:
3
At-grade crossings:
4

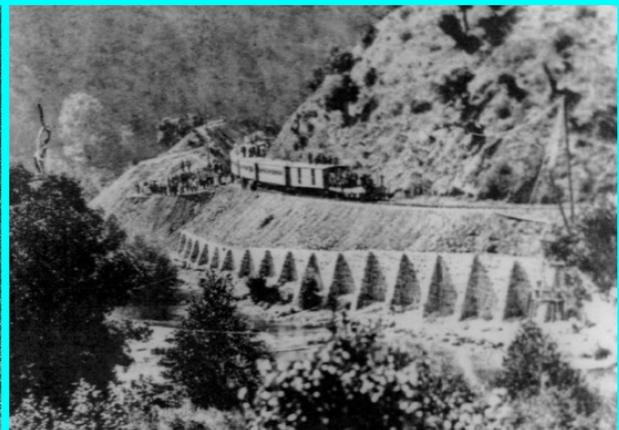
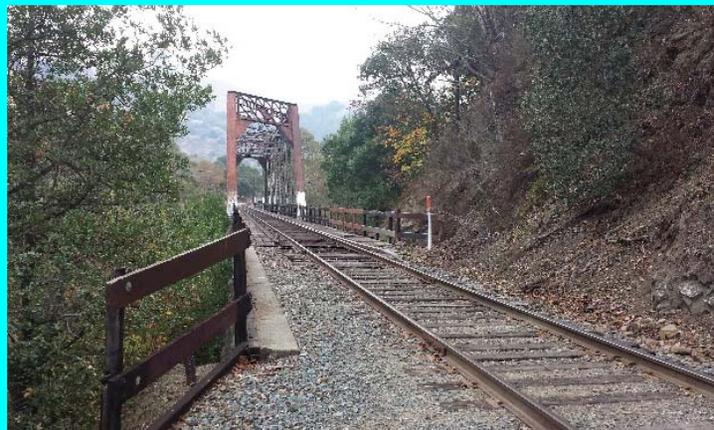


Figure 11-6 Niles Canyon Railway

Official California State

Route:

1935

Number of bridges:

2

Number of under crossings:

2

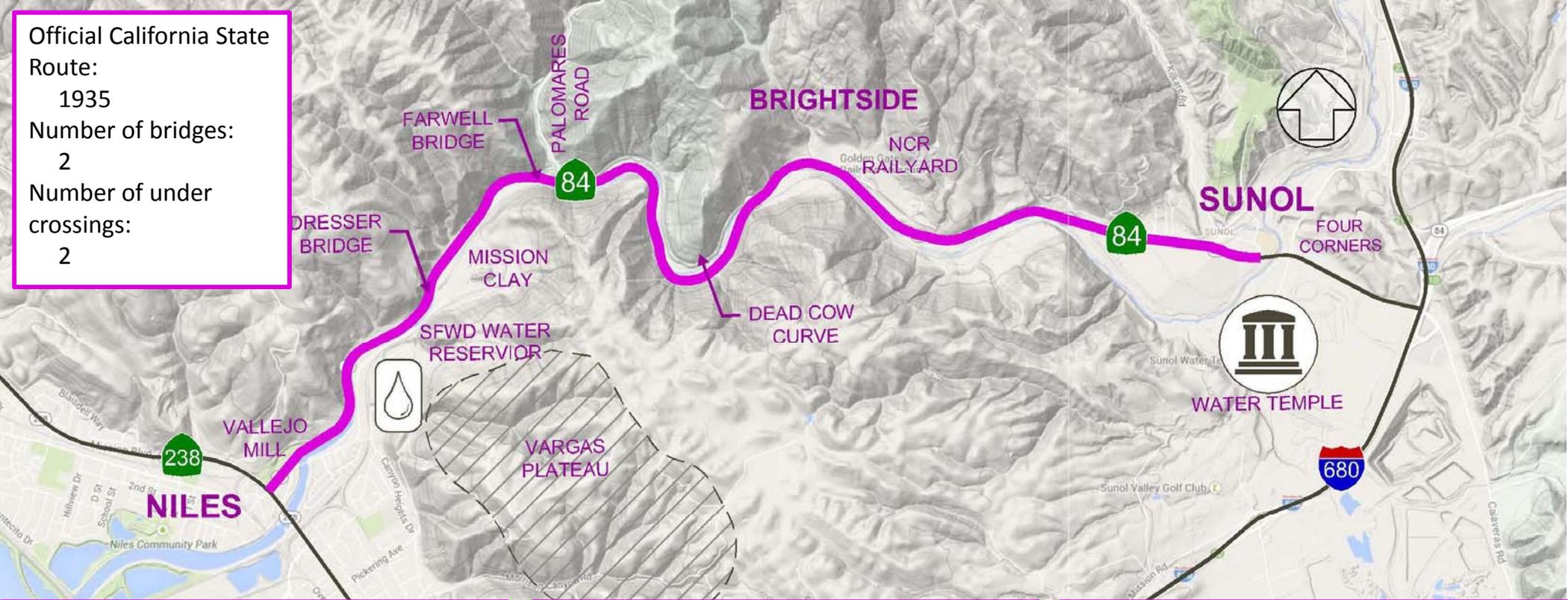


Figure 11-7 State Route 84

Constructed:
1923
Length above ground:
1.9 miles
Length below ground:
5.6 miles

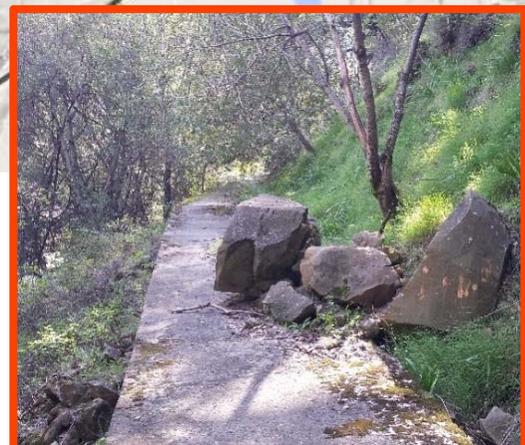


Figure 11-8 Sunol Aqueduct

Constructed:
1909
Length Tunnel 1:
0.8 miles
Length Tunnel 2:
0.1 miles

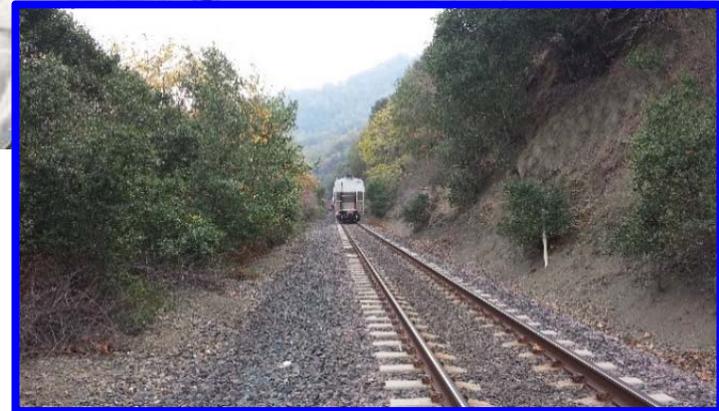
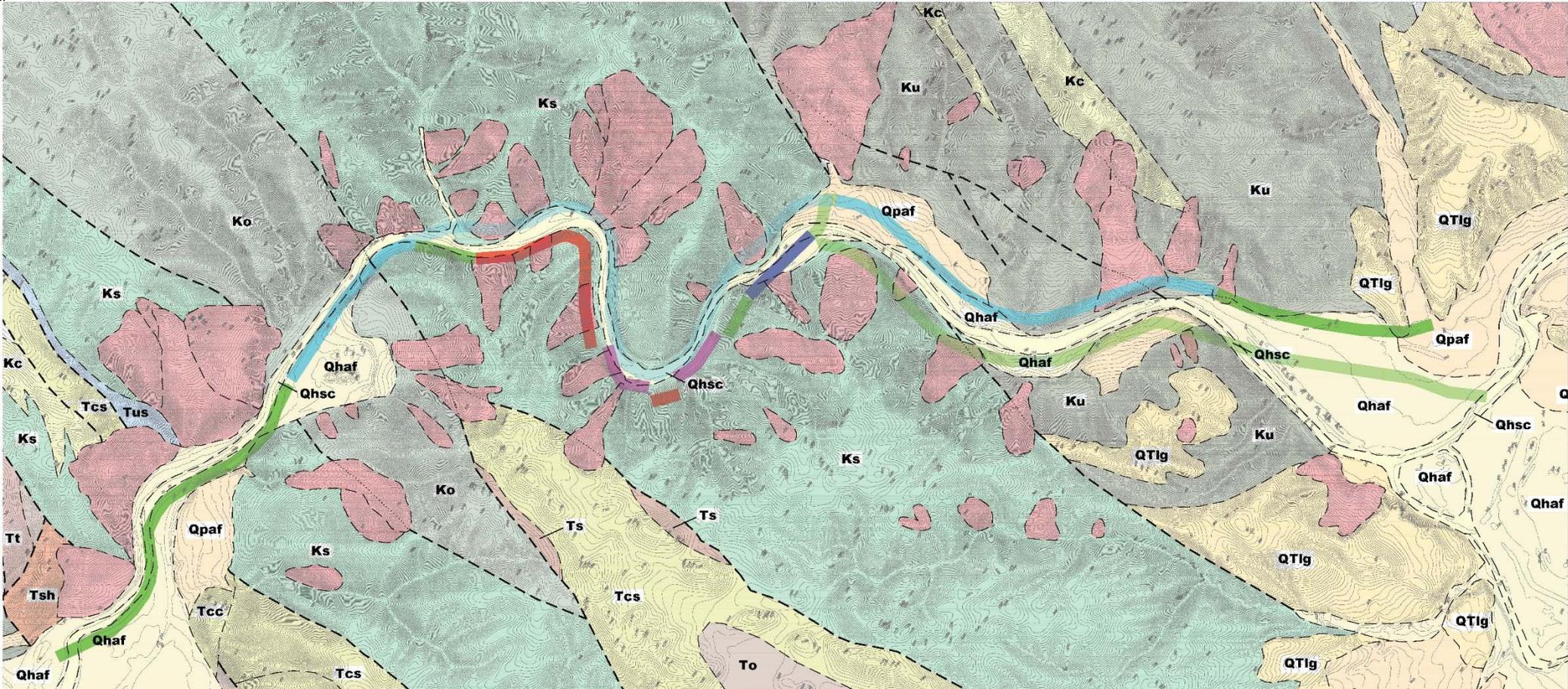


Figure 11-9 Union Pacific Rail Right of Way



EXPLANATION

ALL LOCATIONS ARE APPROXIMATE

- LANDSLIDE DEPOSITS
- Qhsc SIKAM CHANNEL DEPOSITS (CENEZOIC)
- Qhaf ALLUVIAL FAN AND FLUVIAL DEPOSITS (HOLOCENE)
- Qpaf CLUSTAL ALLUVIAL FAN AND FLUVIAL DEPOSITS (PLEISTOCENE)
- QTlg LIVERMORE GRAVELS (ELOCENE AND PLEISTOCENE)
- Tt UNNAMED SHALE (EARLY MIOCENE)
- To OAKLAND SANDSTONE (EARLY MIOCENE)
- Tcs CLAREMONT FORMATION (EARLY MIOCENE)
- Ts SERRANO SANDSTONE (EARLY MIOCENE)
- Tsh UNNAMED SHALE AND SANDSTONE (EARLY MIOCENE)
- Tus UNNAMED SHALE AND CLAUCONITE SANDSTONE (PALEOCENE)
- Ks UNNAMED SANDSTONE AND SHALE (LATE CRETACEOUS)
- Ku UNNAMED SANDSTONE AND SHALE (LATE CRETACEOUS)
- Kc UNNAMED CONGLOMERATE (LATE CRETACEOUS)
- Ko OAKLAND CONGLOMERATE (LATE CRETACEOUS)
- GEOLOGIC CONTACT
- TUMBLE

TRAIL ALIGNMENT OPTIONS (BK19)

ALL LOCATIONS ARE APPROXIMATE

- ADJACENT TO HWY 91
- ADJACENT TO EXISTING NILES CANYON RAILWAY
- ADJACENT TO EXISTING UNION PACIFIC RAILWAY
- UTILIZING EXISTING ACQUEDUCT
- PRELIMINARY TRAIL ALIGNMENT

COMPILED MAP BASED ON PUBLISHED MATERIAL AND REVIEW OF STEREO PAIRED HISTORIC AERIAL PHOTOGRAPHS (see references below).

REFERENCES:

Grayson, R. W., Jones, D.L., and Brabb, E.E., 1996. Preliminary geologic map emphasizing bedrock formations in Alameda County, California. A flight database. U.S. Geological Survey Open-File Report 96-152.

Grayson, R.W., Jones, D.L., and Brabb, E.E., and Valley, G.L., 1994. Preliminary geologic map of the Niles 7.5 Minute Quadrangle, Alameda County, California. U.S. Geological Survey Open-File Report 94-132.

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Marc O. Wiggins, 2011. Landslide Inventory Map of the Niles Quadrangle, Alameda County, California. California Geological Survey, June 2011.

Geomatics, 2008. Geology of Niles Canyon Area. Draft Report Conceptual Engineering for Removal of Bend and Niles Dam, July 2008.

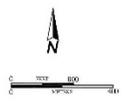


Figure 11-10 Niles Canyon Geology

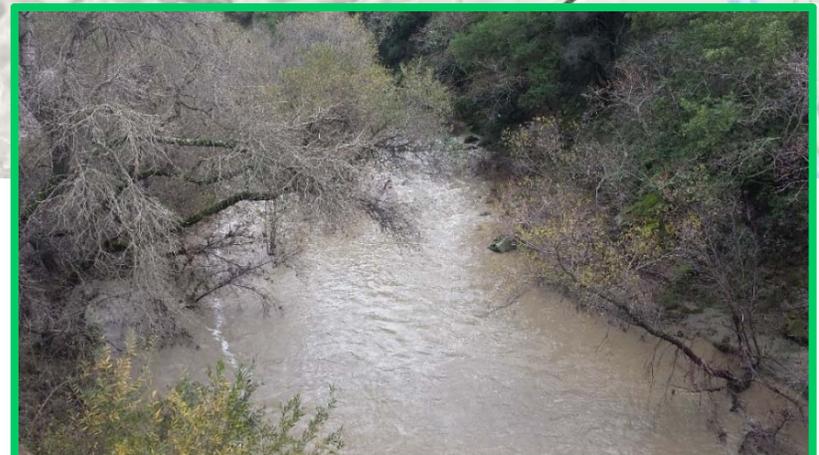
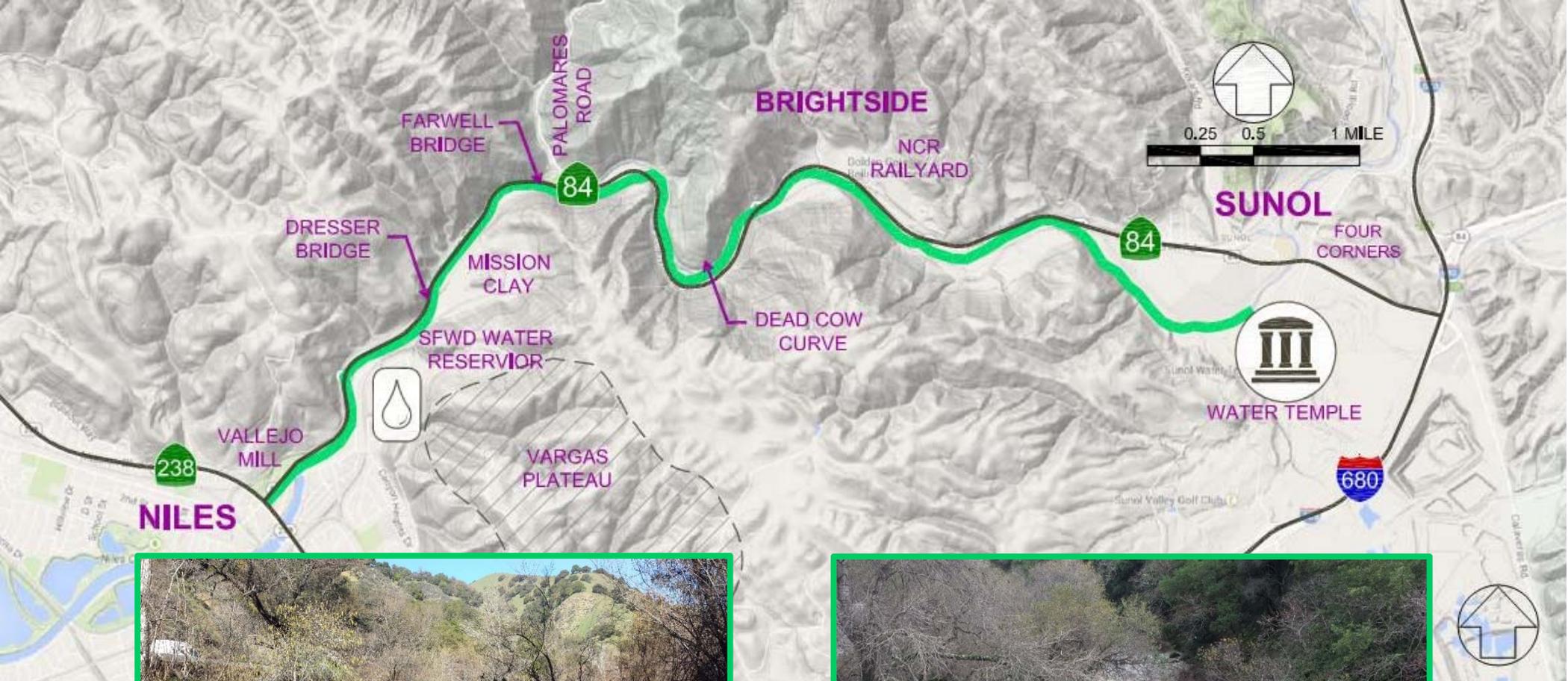


Figure 11-11 Alameda Creek

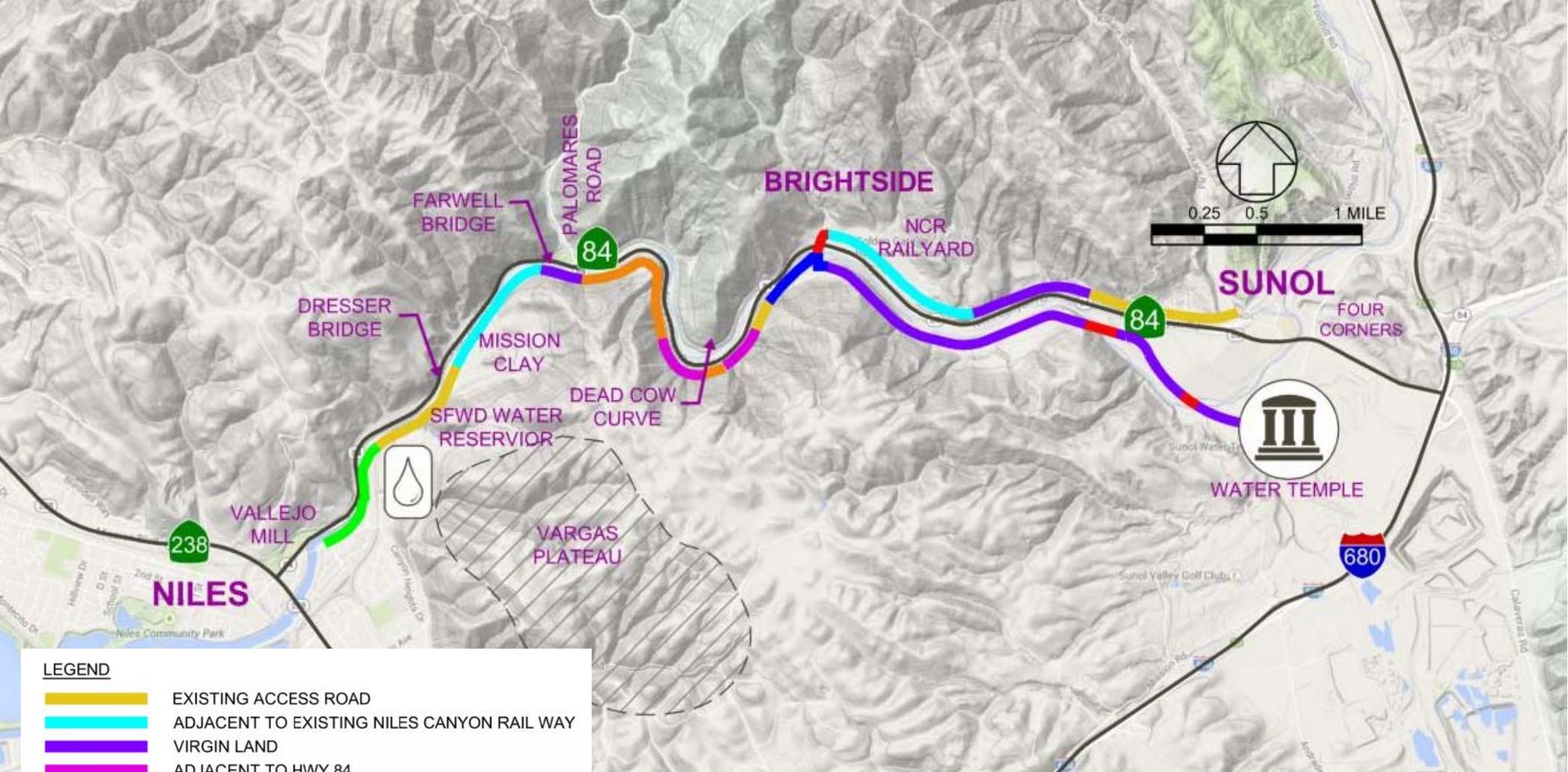


Figure 11-12 - Canyon Trail

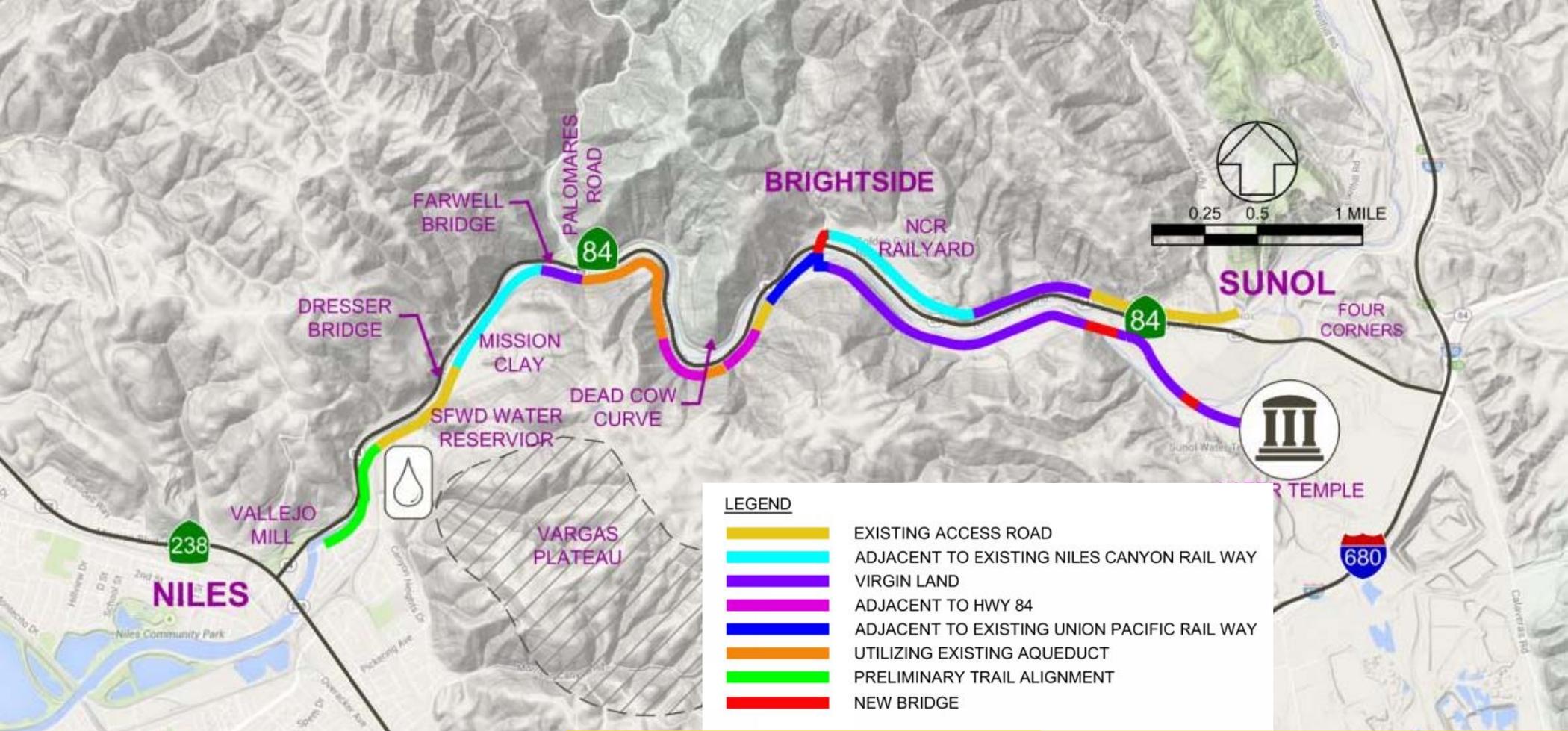


Figure 11-13 - Canyon Trail to Mission Clay Property

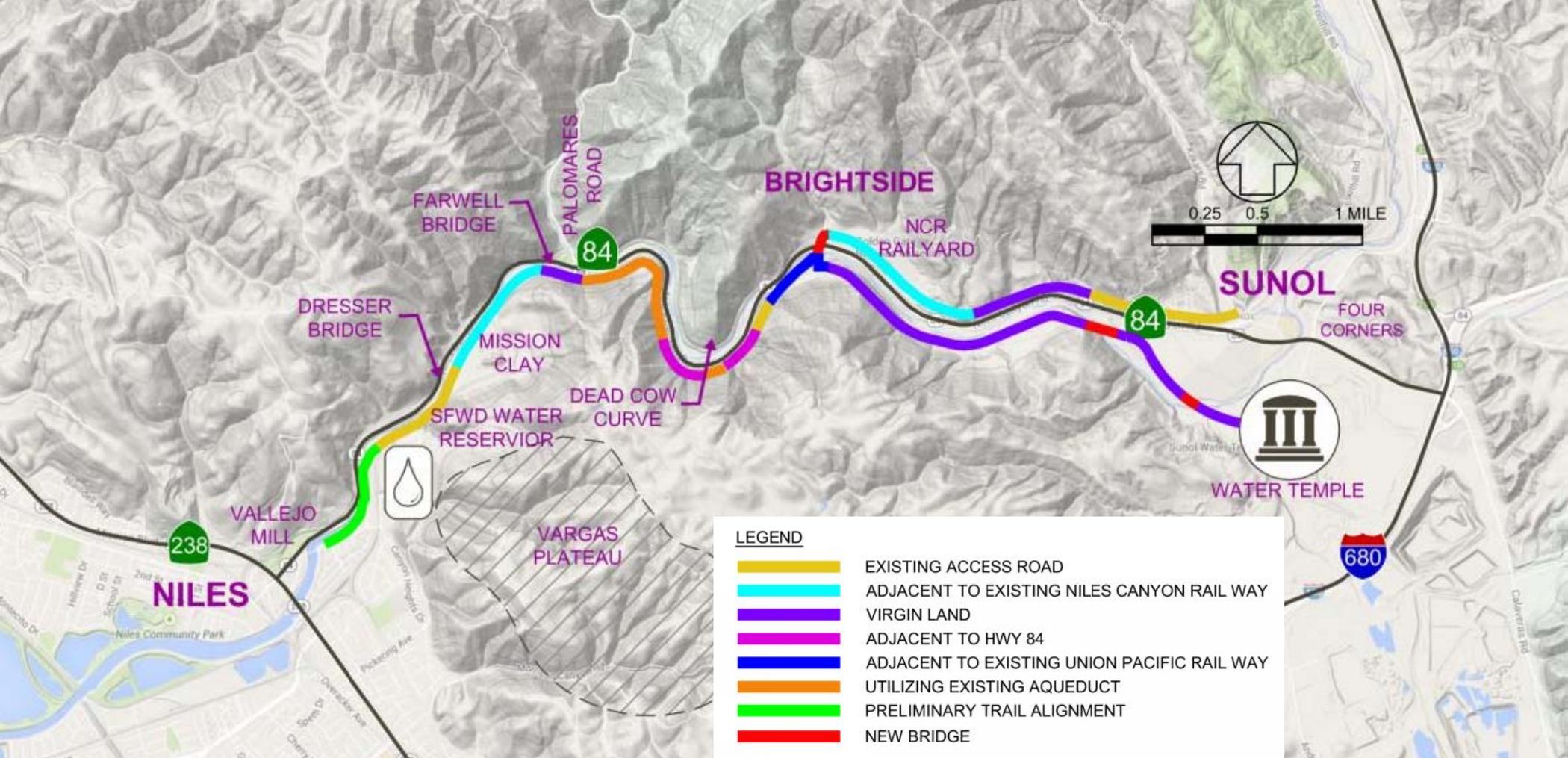
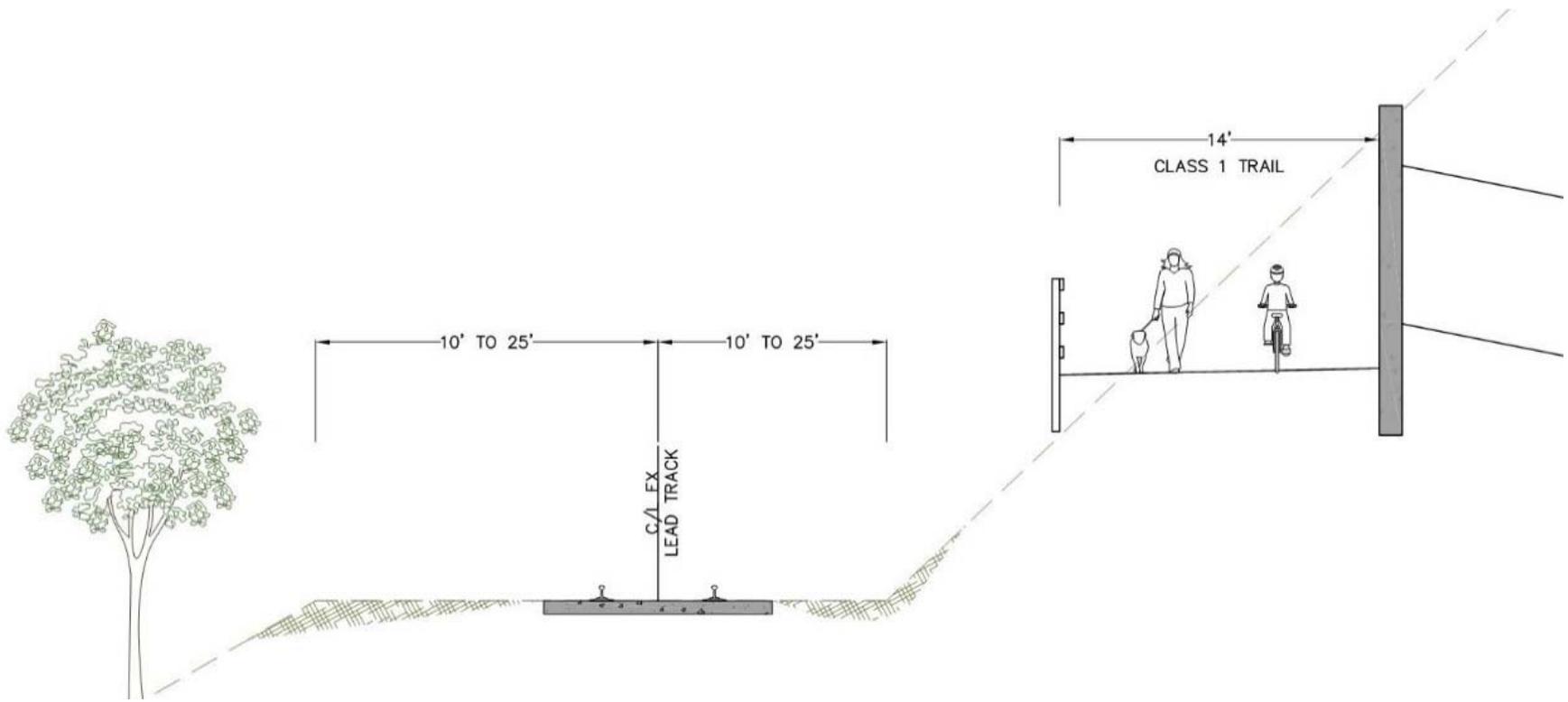


Figure 11-14 - Canyon Trail to Farwell Bridge



The trail located adjacent to but vertically separated from the Niles Canyon Railway west of the Farwell Bridge.

Figure 11-15 - Canyon Trail to Farwell Bridge

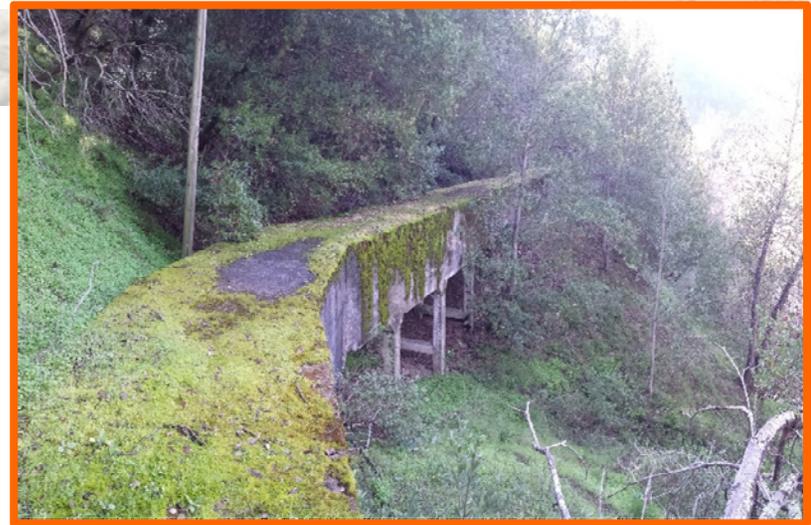
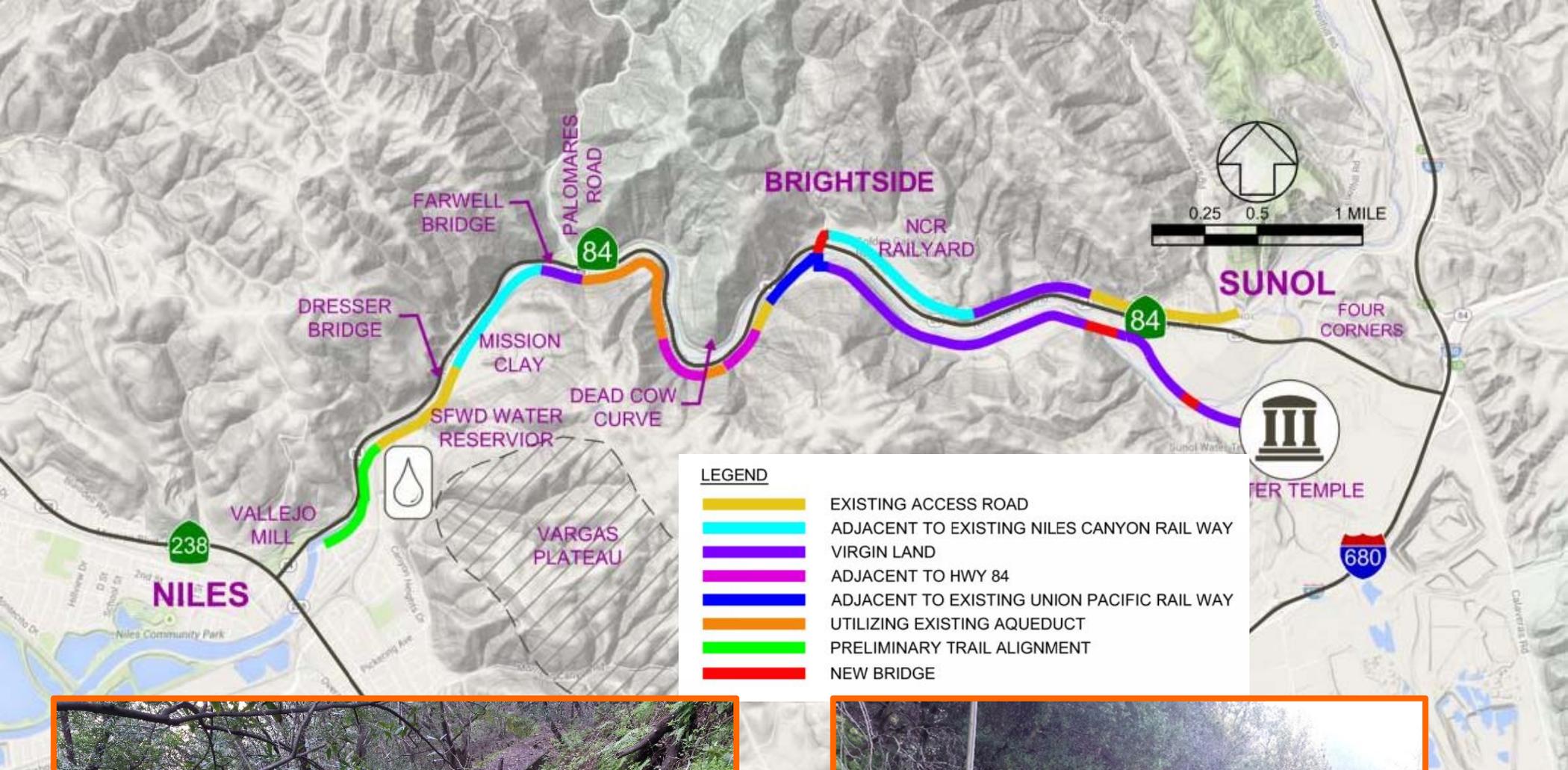
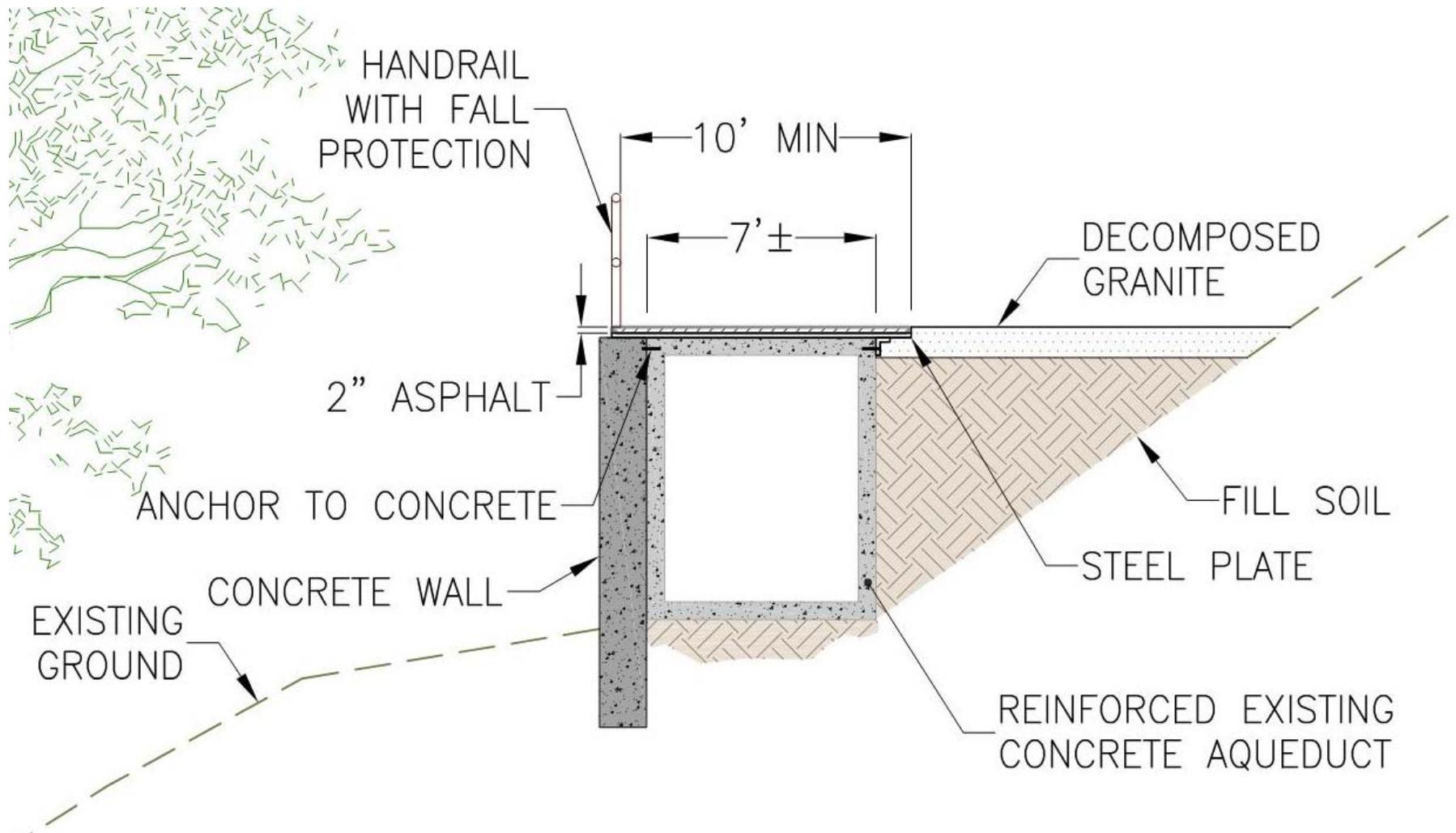


Figure 11-16 - Canyon Trail along Sunol Aqueduct



The project will need to reinforce and widen the aqueduct for use as a trail.

Figure 11-17 - Canyon Trail to Farwell Bridge

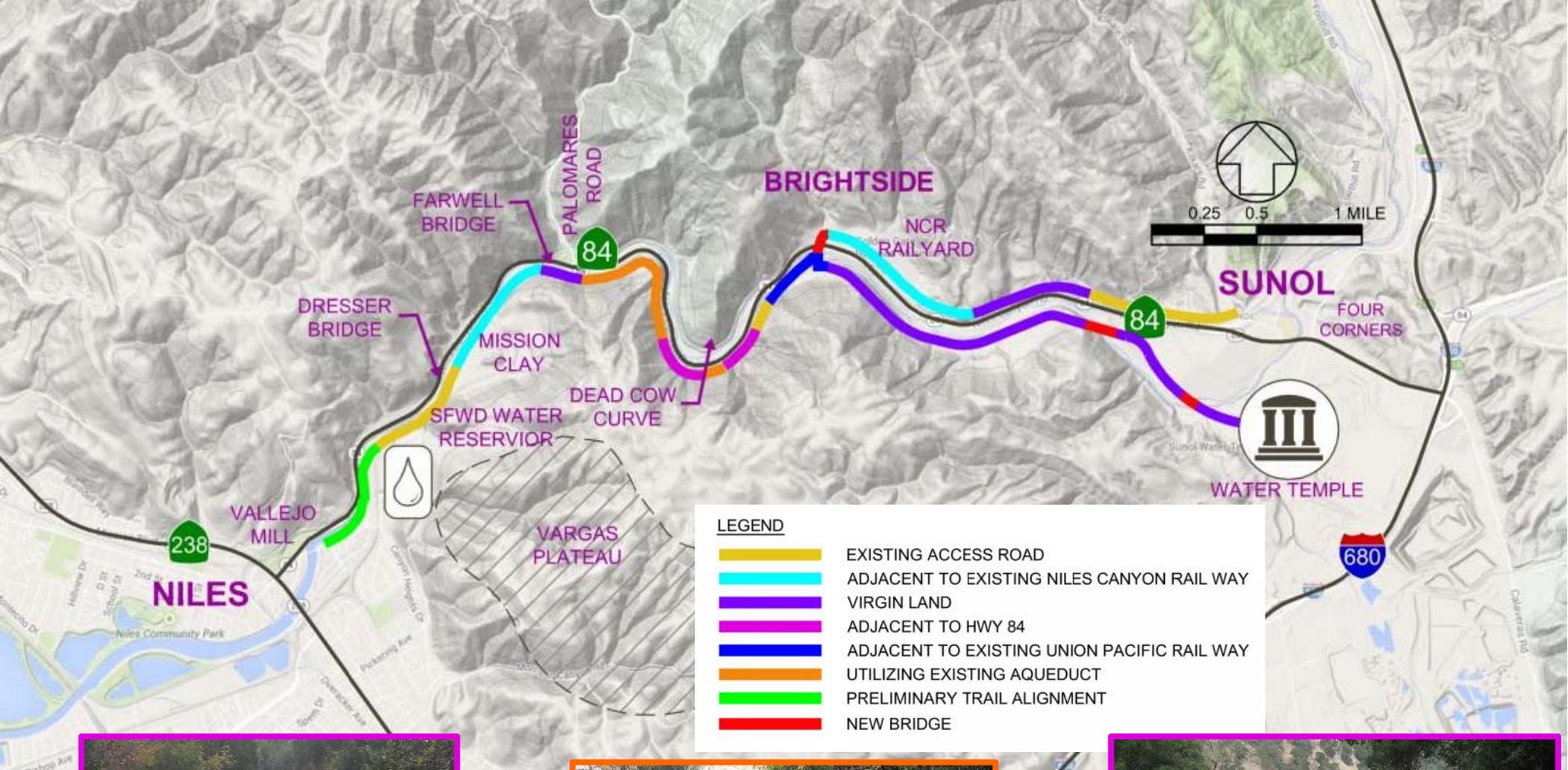
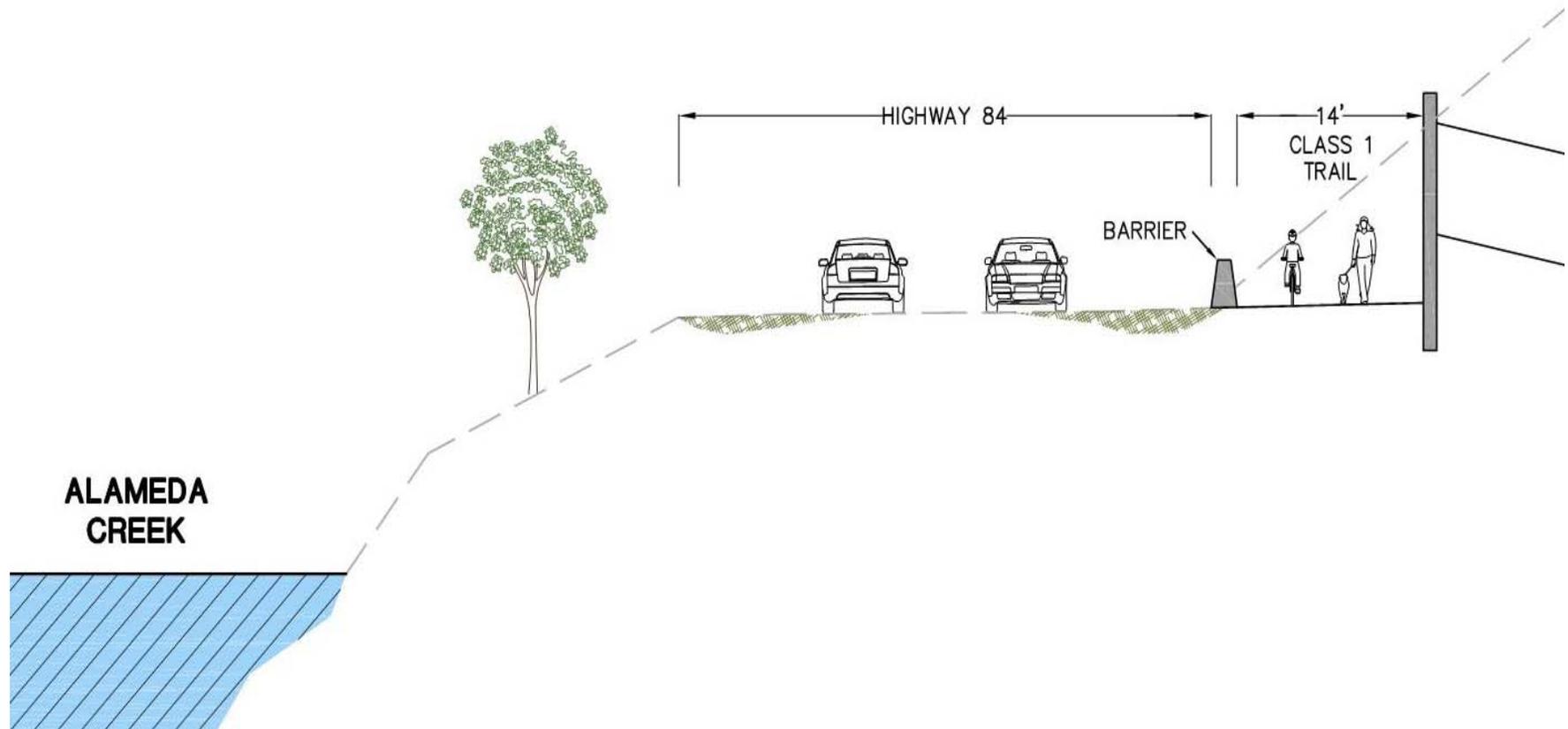


Figure 11-18 Canyon Trail along State Route 84



At Dead Cow curve, the trail will be adjacent to the Highway 84 requiring a barrier.

Figure 11-19 - Canyon Trail along State Route 84

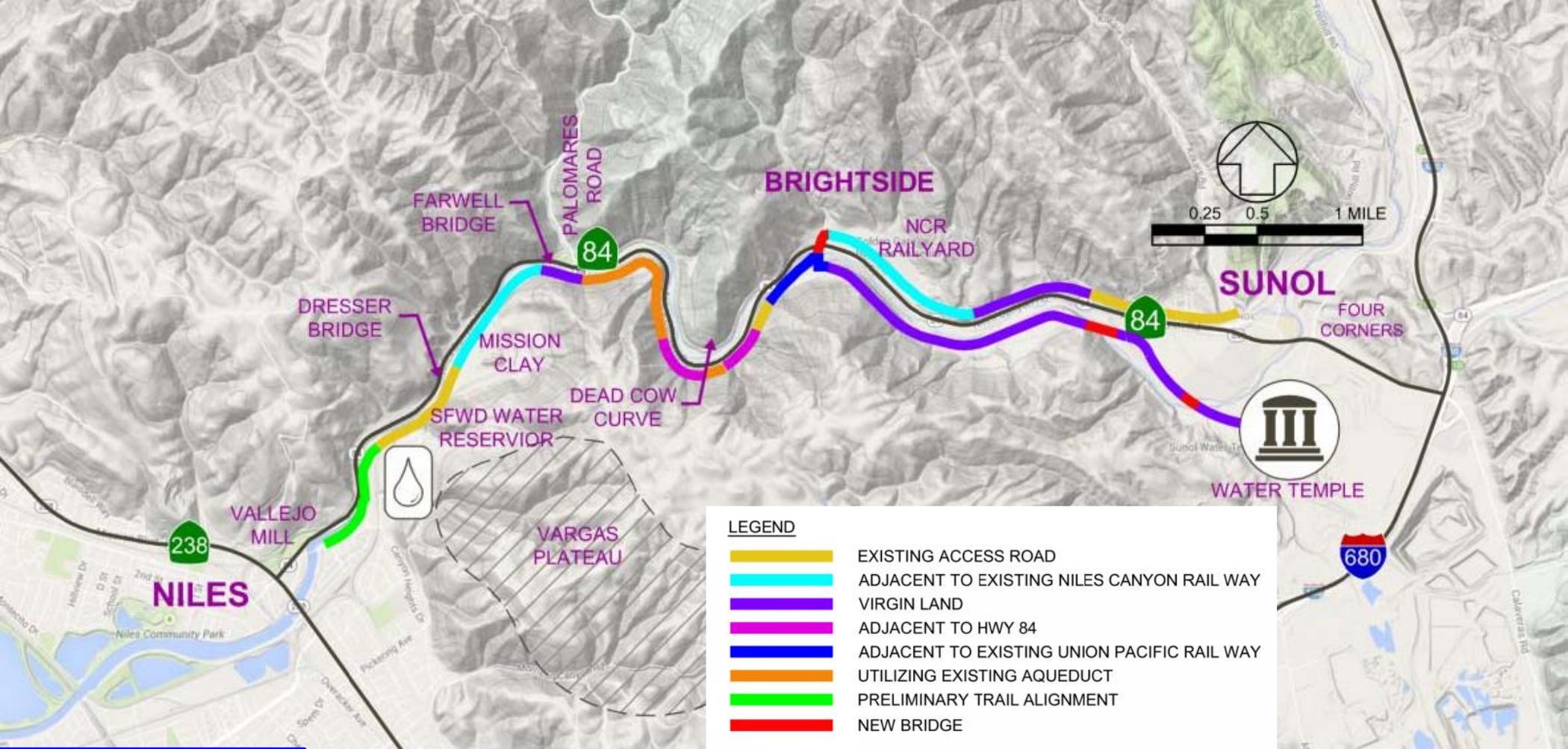


Figure 11-20 Canyon Trail along Union Pacific

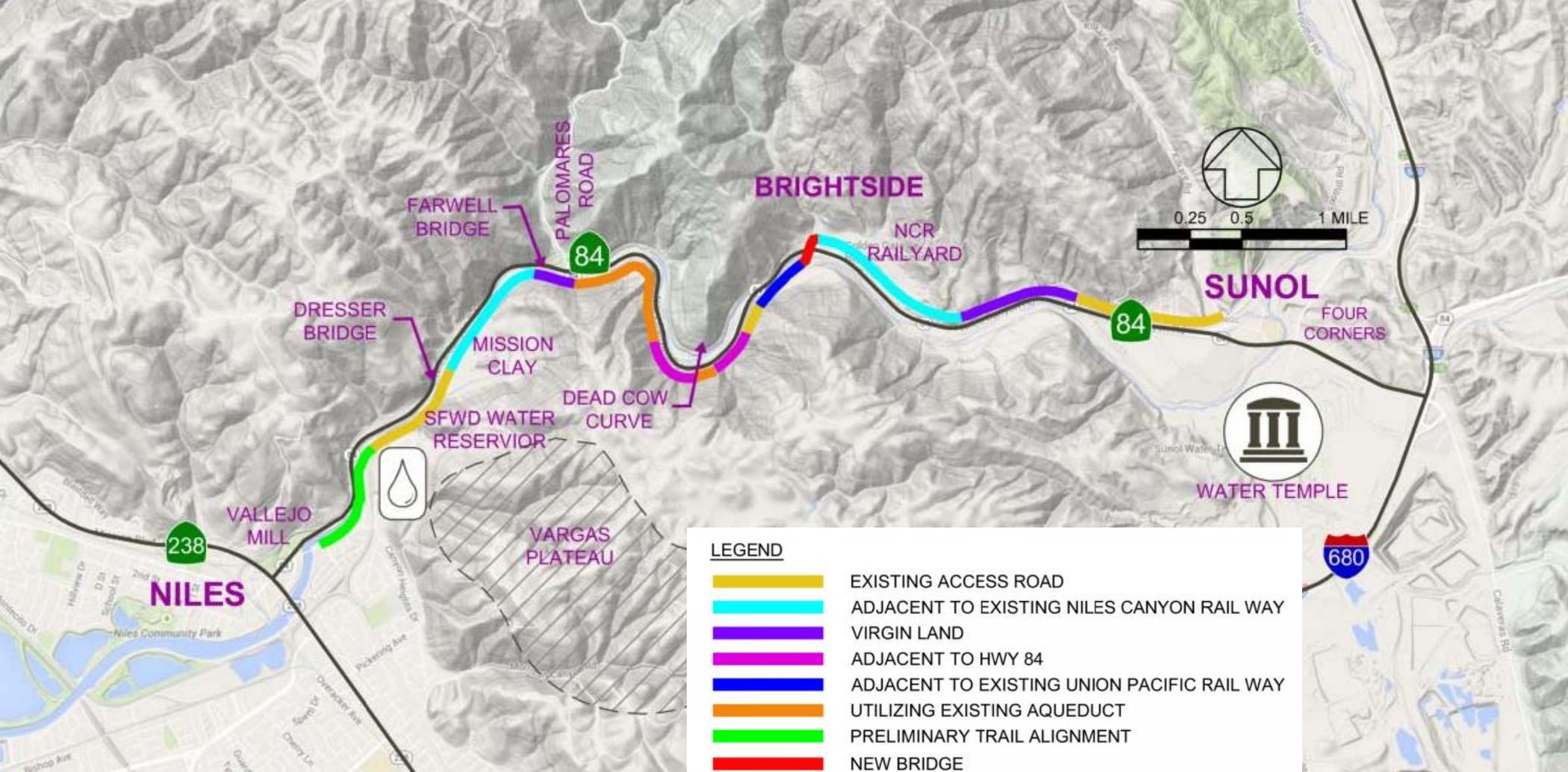


Figure 11-21 – Option 1 – North Canyon Trail

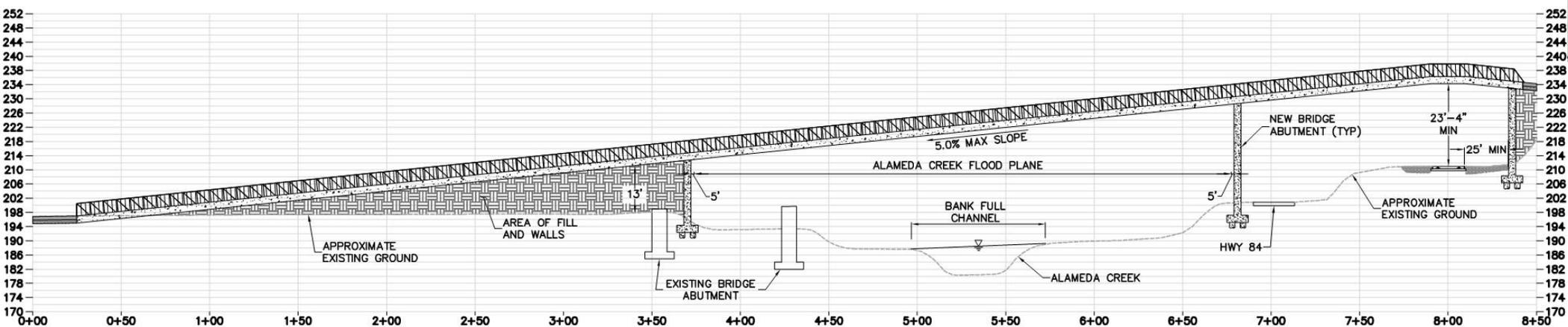
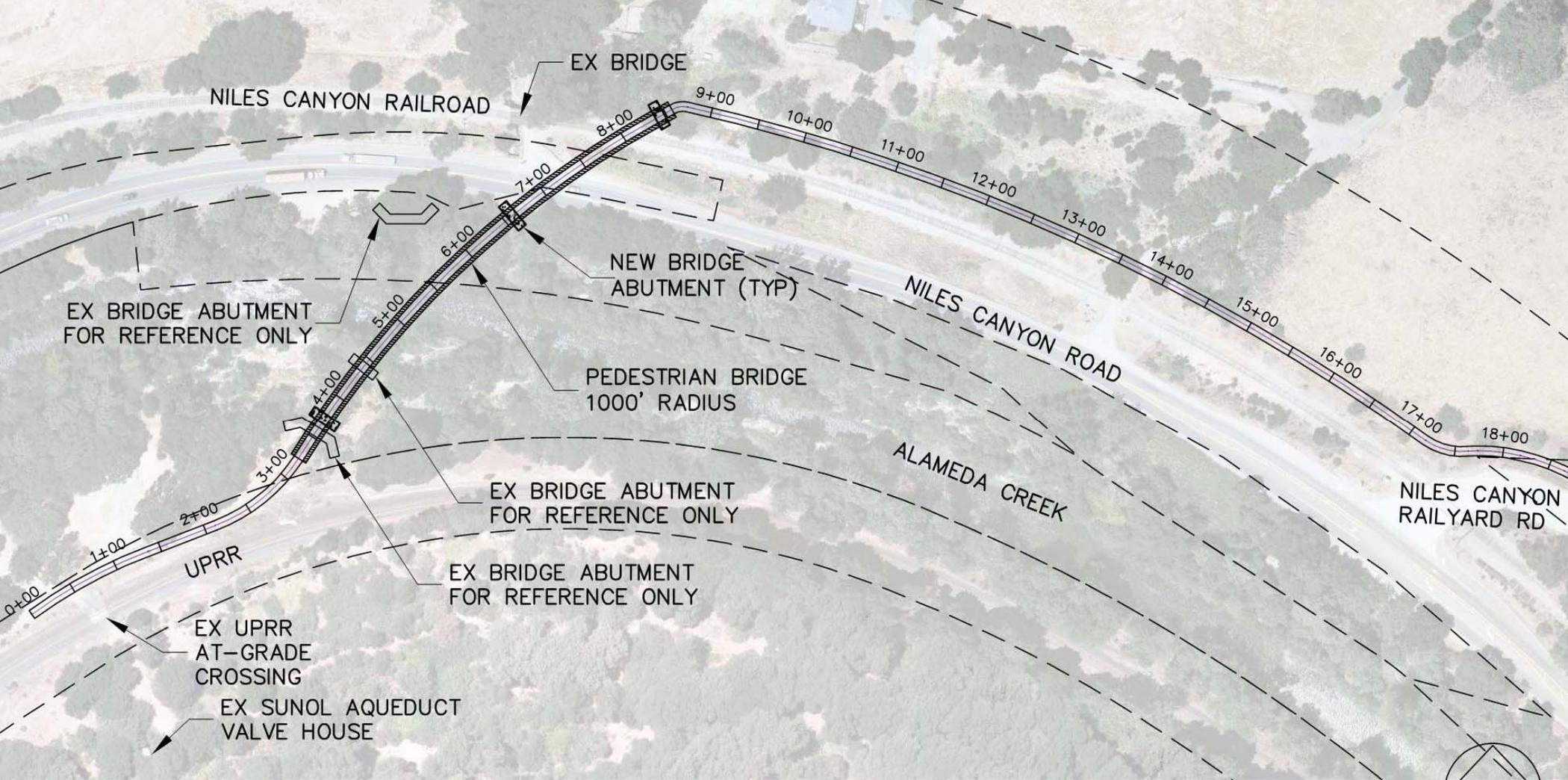


Figure 11-22 – Option 1 – North Canyon Bridge

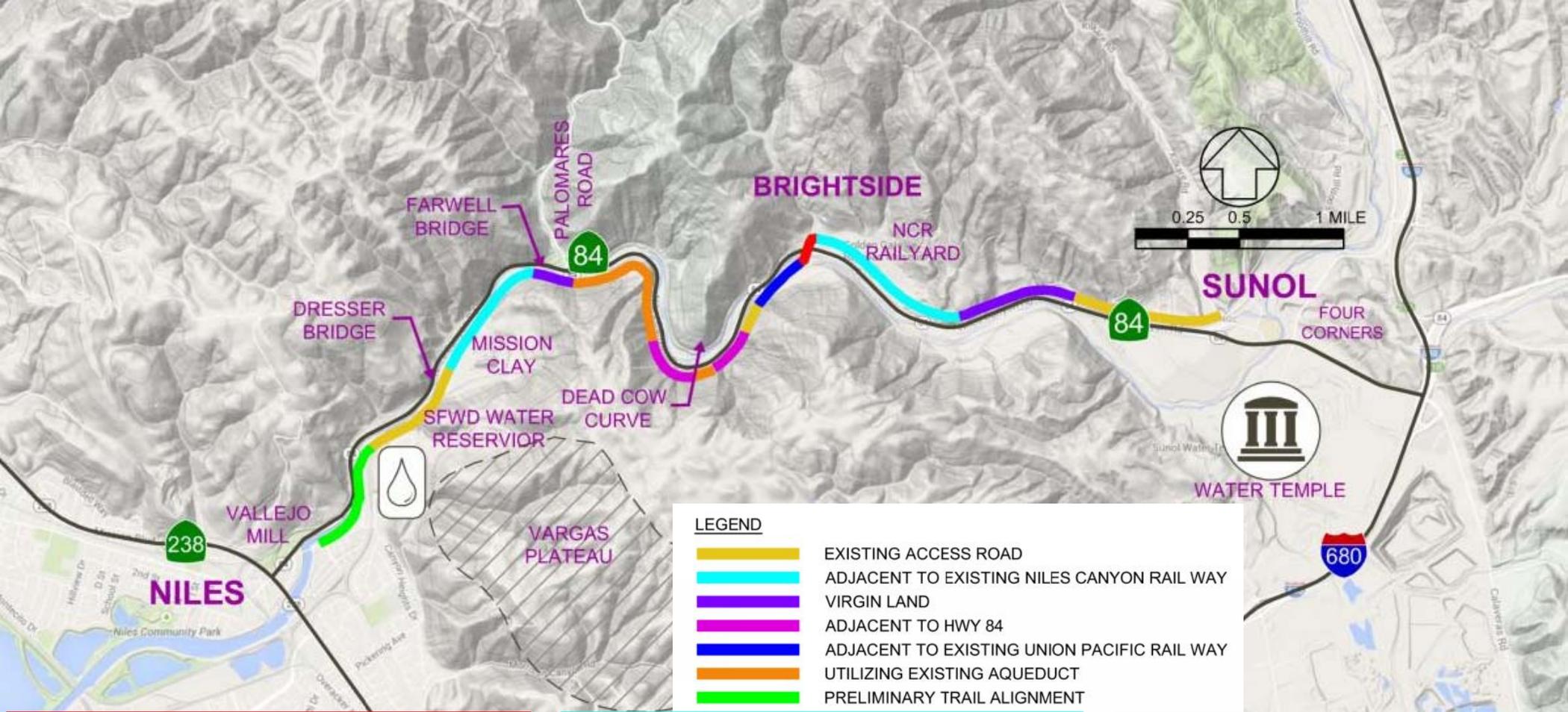
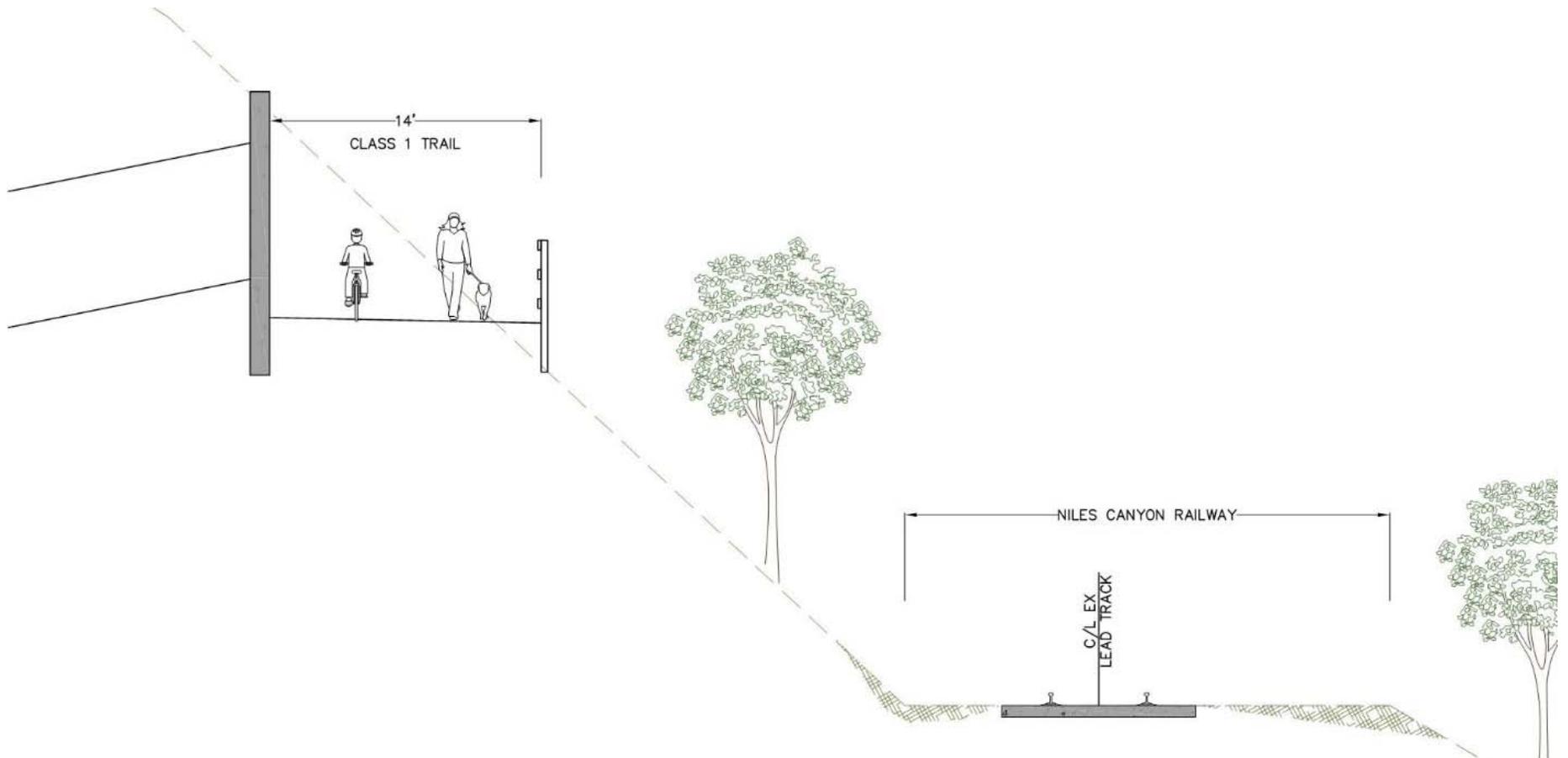


Figure 11-23 – Option 1 North Canyon Trail



Retaining walls are required on the north side of Canyon to install the trail east of Brightside.

Figure 11-24 – Option 1 - North Side of Canyon Trail

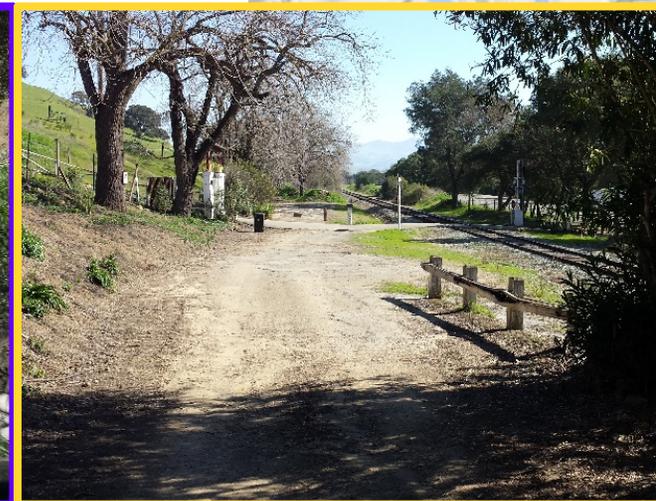
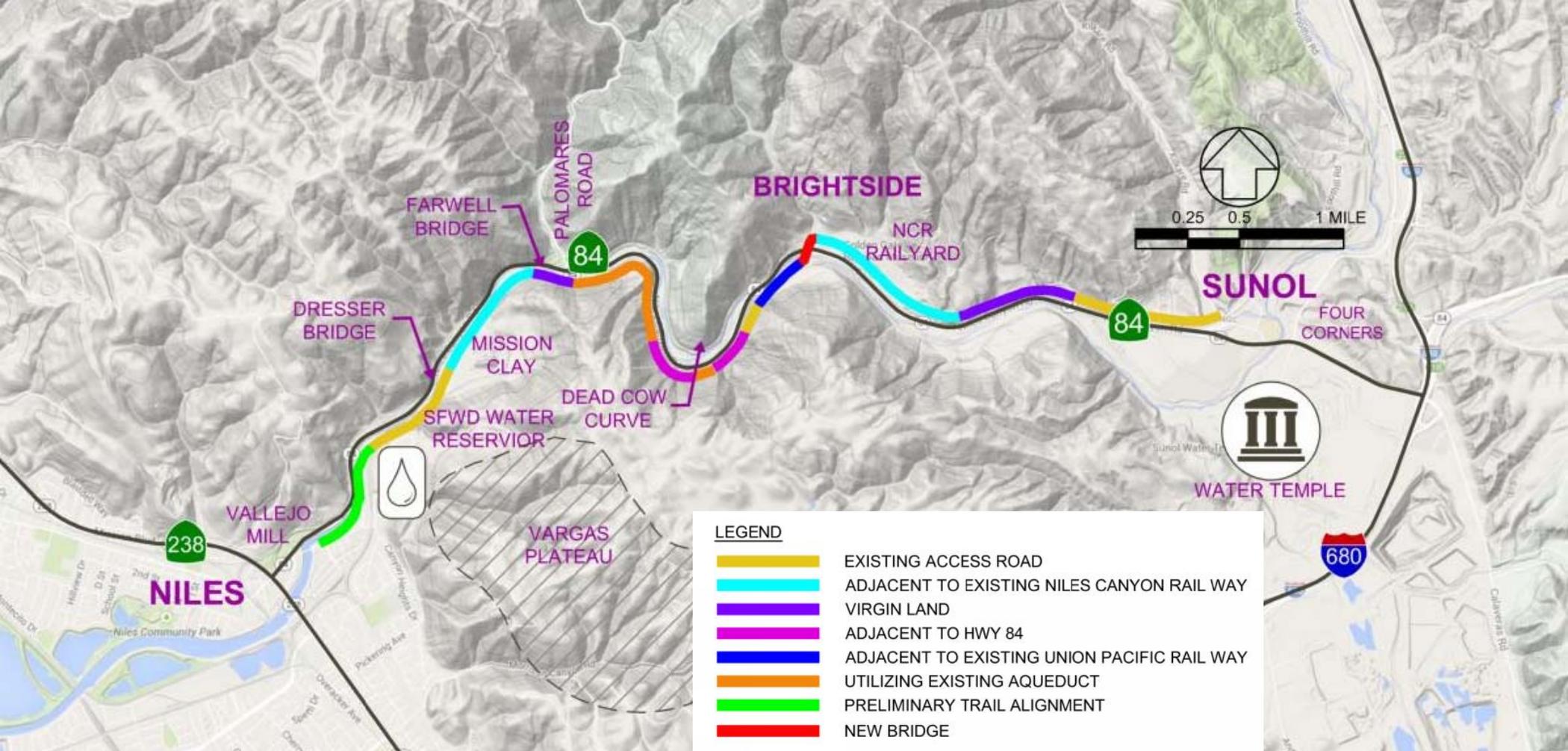


Figure 11-25 – Option 1 North Canyon Trail

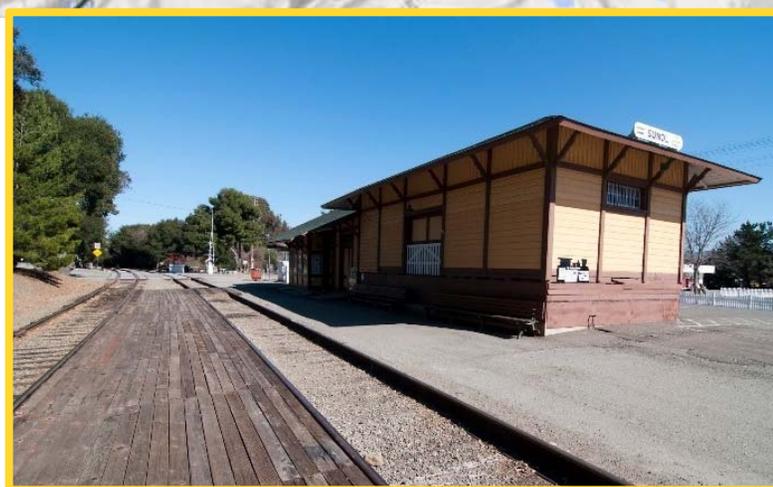
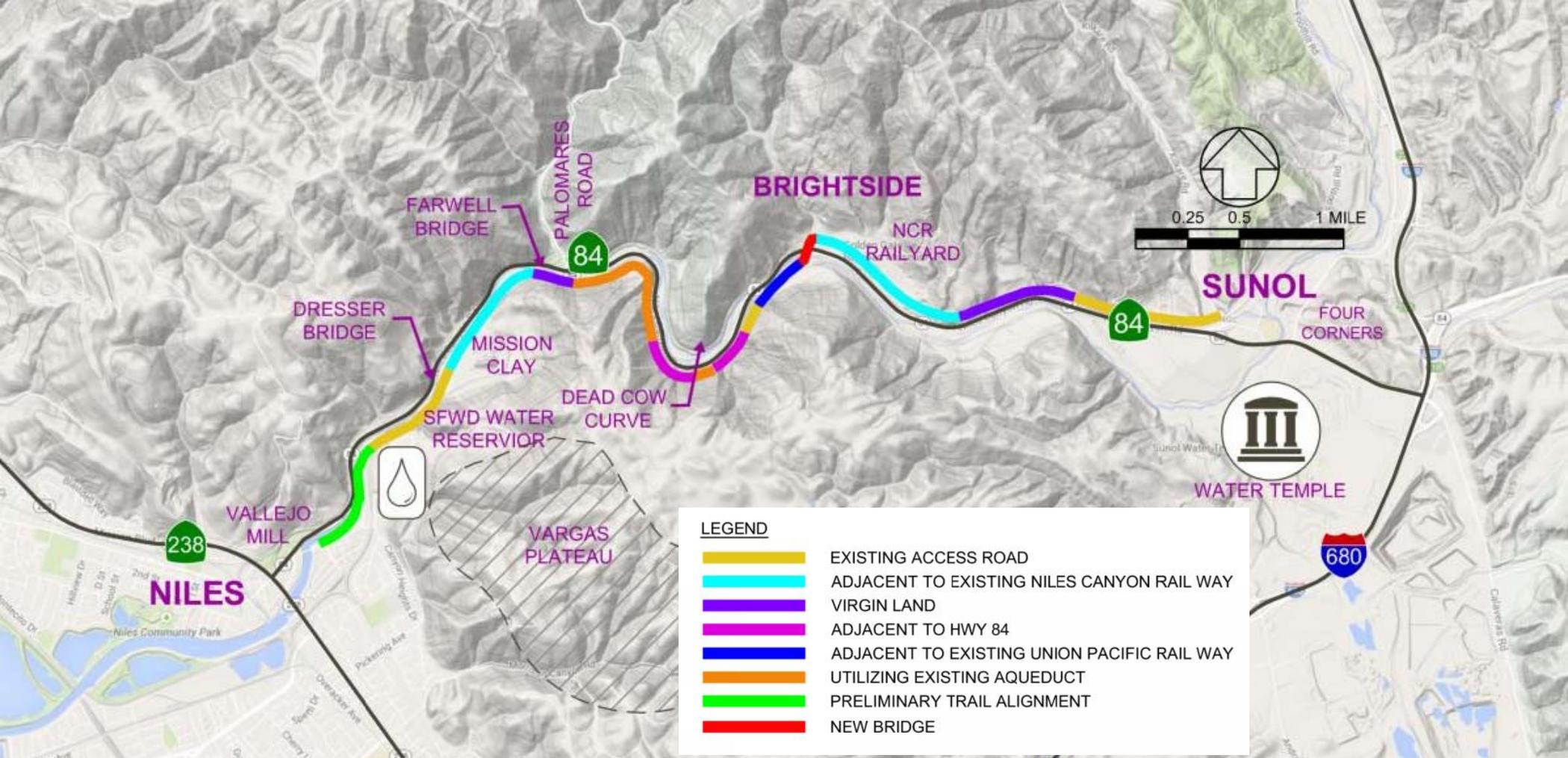


Figure 11-26 – Option 1 North Canyon Trail

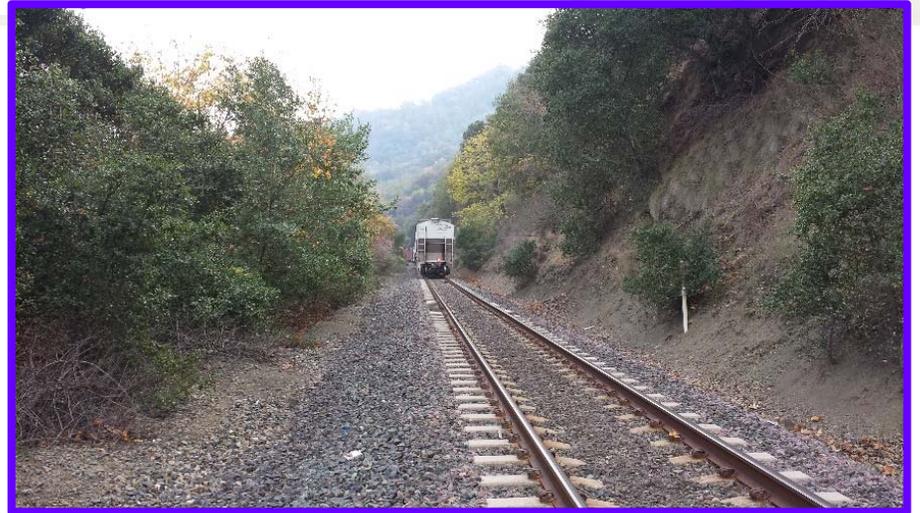
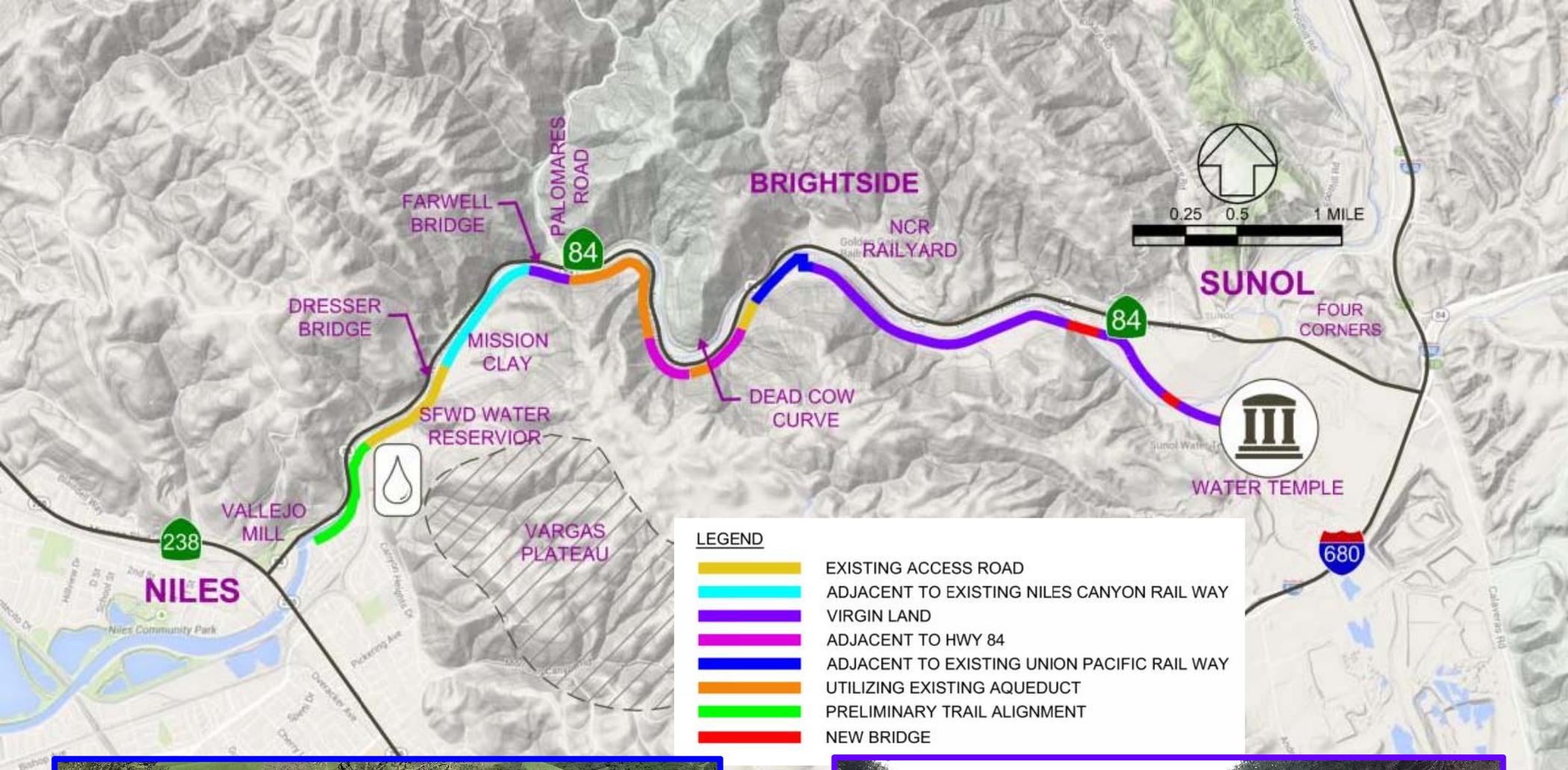


Figure 11-27 Option 2 South Canyon Trail

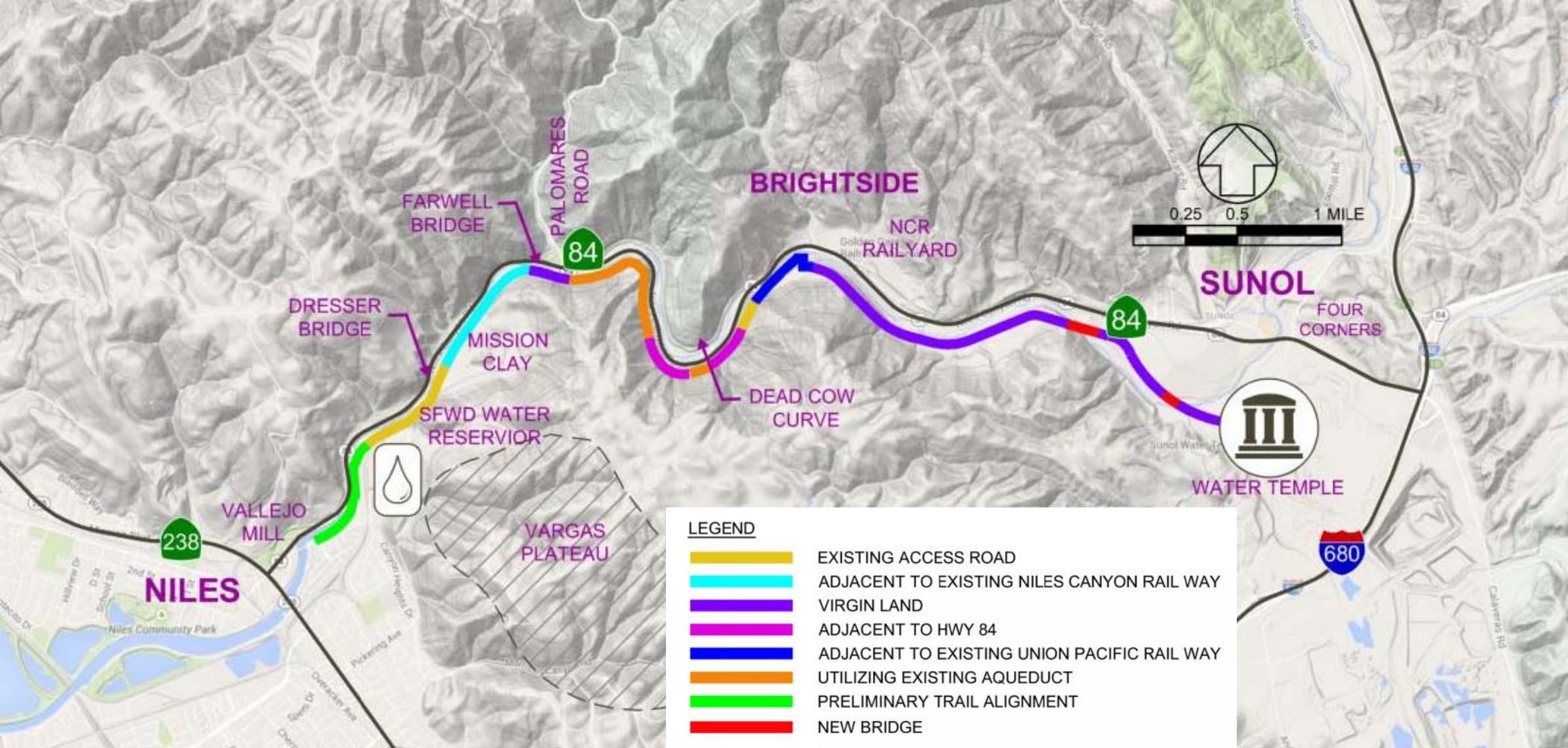


Figure 11-28 Option 2 South Canyon Trail

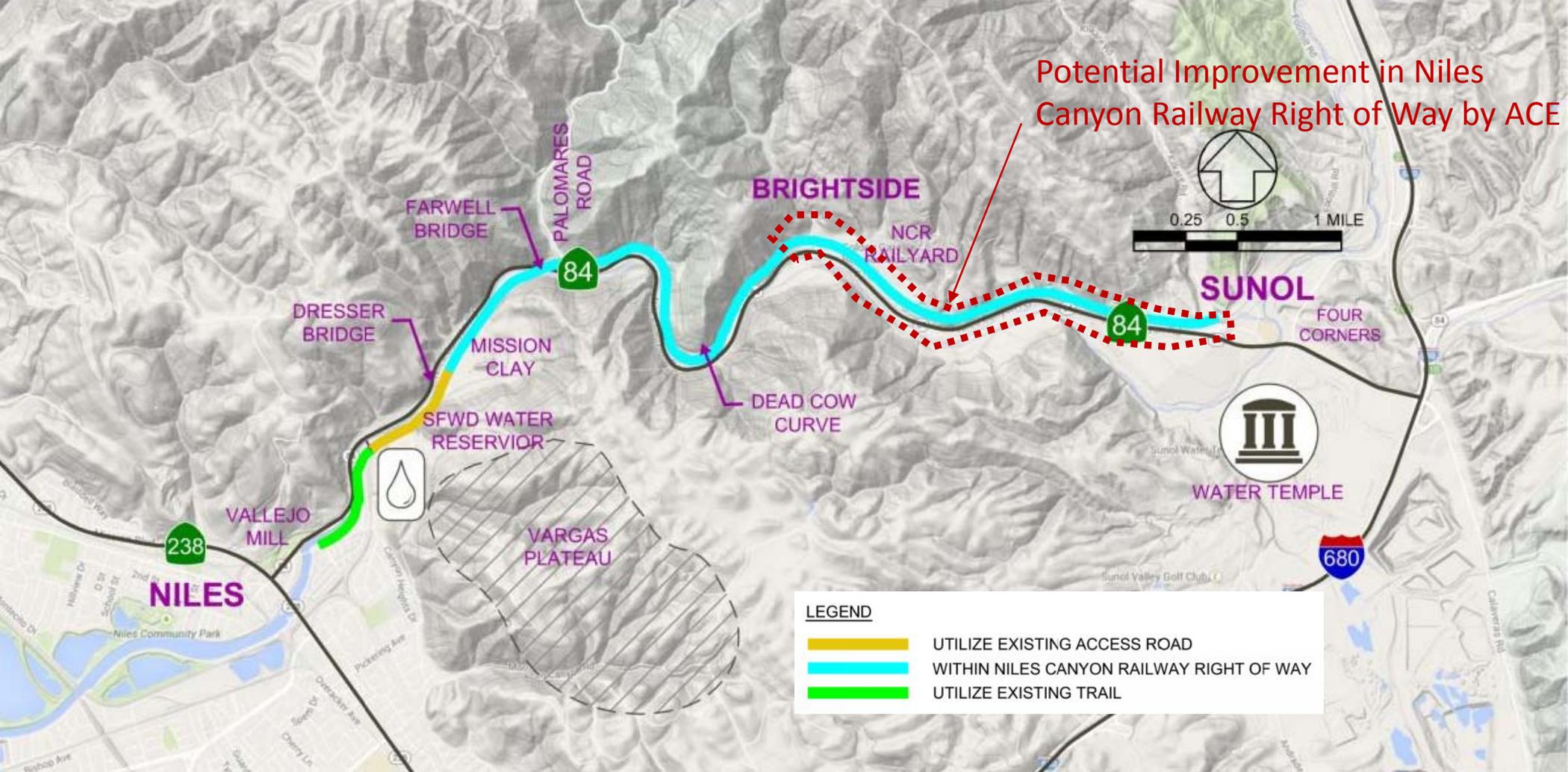
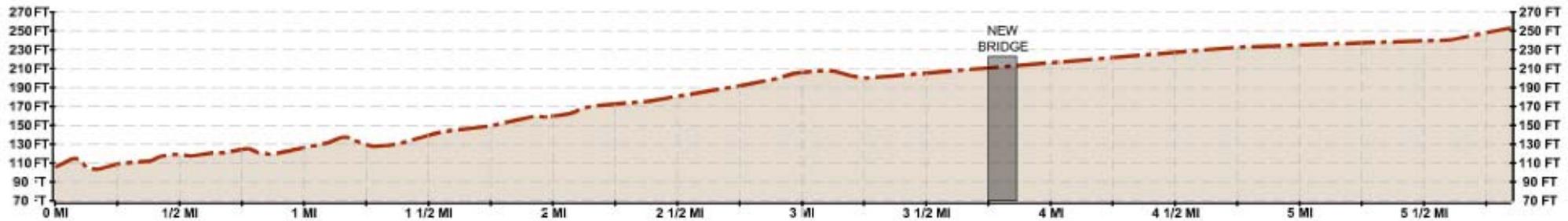


Figure 11-29 Option 3 Rails with Trails



--- Proposed Trail Alignment



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Option 1 - North Canyon Trail
 Plan and Profile

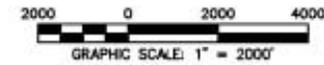


Figure 11-31 Preferred Option Plan and Profile



Figure 11-32 Phasing

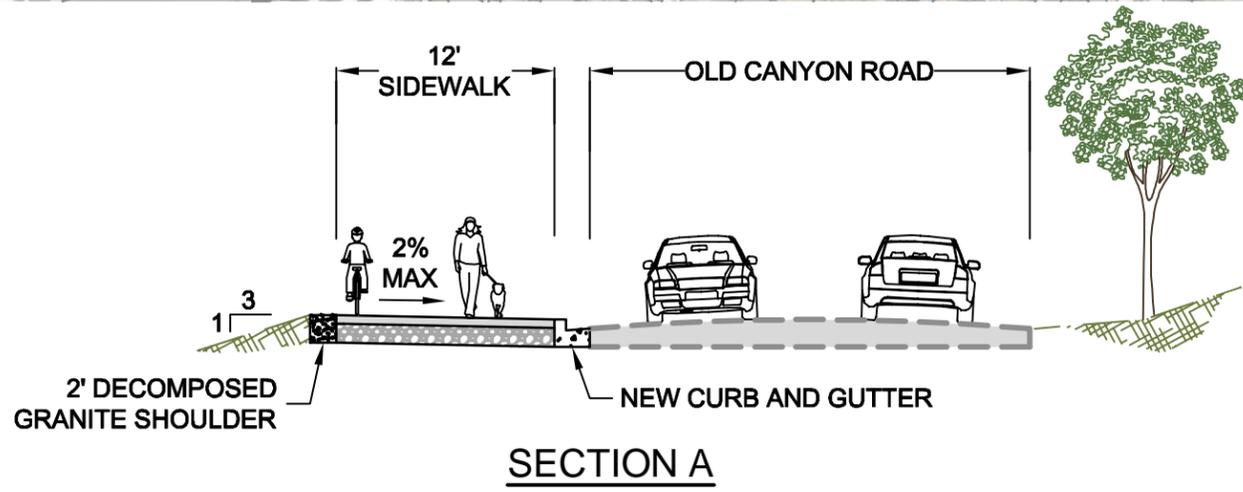


Figure 11-33
 Niles Canyon Staging Area to the SFPUC Gate

- TRAIL
- APPROX. LIMIT OF GRADING
- POTENTIAL JURISDICTIONAL WATER
- RETAINING WALL
- PROPERTY LINE

