
Marsh Creek Trail

Preliminary Engineering and Environmental Study



East Bay Regional Park District

Submitted by:

Questa Engineering Corporation

December 2020



LSA 2M Associates

***Preliminary Engineering and Environmental Study
Marsh Creek Trail
Contra Costa County, California***

Submitted to

East Bay Regional Park District
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EXECUTIVE SUMMARY

The Marsh Creek Trail Preliminary Engineering and Environmental Feasibility Study (Study) is a long range planning study to evaluate options to close an approximately 2.5-mile gap in the Marsh Creek Trail between Vineyards Parkway and the East Bay Regional Park District (EBRPD) Round Valley Regional Preserve trailhead.

This Feasibility Study evaluates existing conditions within the Study Area (**Figure 1.1, Location Map**) that affect trail siting, identifies potential primary trail alignments and connecting trails, discusses issues and challenges associated with trail implementation, and explores potential options for connecting to existing and planned trail networks. The Study also identifies restoration and enhancement opportunities that could improve watershed habitat, support open space access and protection, and potentially be implemented as part of trail implementation. The proposed design guidelines, costs, and permitting requirements and strategies will provide a blueprint for future trail design and implementation.

A CEQA document on the Study will be presented separately.

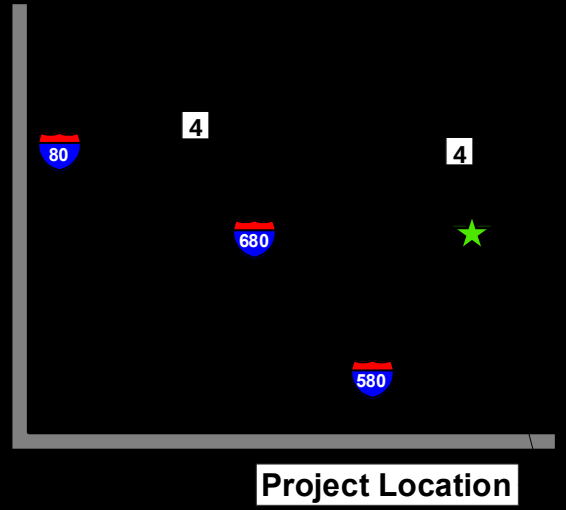
Study Area and Land Ownership. The Study Area consists of parcels owned by Contra Costa County, City of Brentwood and California State Parks. The Study Area includes lands within John Marsh State Historic Park and Contra Costa County Flood Control District. EBRPD manages the Round Valley Regional Preserve staging area that is within State Parks lands.

Environmental and Engineering Challenges. The Study provides information on environmental and engineering constraints that affect trail location and design and construction costs, and that may require mitigation. These include trail segments that cross near or through seasonal wetlands, creeks, and habitat for sensitive wildlife or plant species. Prior to trail implementation, additional detailed biological studies may be needed to more fully document their locations and habitat areas, and to develop avoidance, minimization, and mitigation measures as part of environmental analysis and regulatory permitting.

Engineering constraints that will need to be further investigated and accounted for during follow-up and more precise trail alignment planning and design include crossing of Marsh Creek Road, cultural resource avoidance, creek and drainage crossings, trail alignment options on steep slopes near potentially landslide deposits, reservoir and floodplain issues, and design to complement existing and future use, including ongoing cattle ranching.

Trail implementation may include resource management and habitat restoration. Repair of erosion and sediment sites in the watershed, especially where the trail crosses drainages at grade, and fence construction and repair, may also be important components of trail construction. The responsible agency for implementation and management of the trail system will also need to be addressed.

Preferred Trail Alignment. The Study identifies primary alignments and connecting trail segments that would complete this gap in the Marsh Creek Regional Trail. It is likely that the trail, when implemented, may utilize a combination of the identified feasible alignments/routes to make a complete connection and provide trail access via existing parking/staging areas. A precise alignment would be confirmed as part of discussions with landowners, trail operators, and community outreach, and as part of comprehensive environmental review and regulatory permitting.



Study Area

Trail Design. The Study goal is the identification of a safe and continuous route. The trail may be designed to accommodate pedestrian, bicycle, and equestrian use and has the goal of meeting trail accessibility standards to the maximum extent feasible.

Staging Areas. Potential trailhead improvements such as parking, benches, waste disposal, and interpretive elements could be provided at designated staging areas.

Preliminary Costs. Planning level construction cost estimates were developed for each of the trail segments. A potential new undercrossing of Marsh Creek is estimated to cost at least \$600,000, with a pedestrian bridge crossing of Marsh Creek costing over \$150,000.00. As such, preliminary implementation costs vary widely from approximately \$2M to over \$3.5M. These initial planning level cost estimates will be updated as this Study proceeds.

The Draft Study should be considered a flexible, living document, and as such, its recommendations are subject to further analysis and possible revision as a result of stakeholder input, environmental review, permitting and community consensus.

1. INTRODUCTION

This preliminary engineering and environmental study explores the feasibility and design alternatives for extending the Marsh Creek Trail south from Vineyards Parkway in Brentwood to the Round Valley Regional Preserve trailhead on Marsh Creek Road. To the east it would connect to the existing Marsh Creek Regional Trail that currently terminates to the immediate northeast in Brentwood. To the west it would connect to the Marsh Creek Trail currently being planned by Contra Costa County.

1.1 Background

East Bay Regional Park District operates the Marsh Creek Regional Trail, a paved, multiuse path extending nearly ten miles from the Delta shoreline in Oakley at Big Break Regional Shoreline to Concord Avenue in Brentwood. The City of Brentwood, in cooperation with California State Parks and a local developer are currently working to extend the trail from Concord Avenue to Vineyard Parkway in Brentwood. The District seeks to explore the feasibility of extending the trail from Vineyard Parkway to EBRPD's Round Valley Regional Preserve, located on Marsh Creek Road in unincorporated Contra Costa County. This will close an approximate three mile gap between the trail at Vineyards Parkway in Brentwood and the Round Valley Regional Preserve trailhead on Marsh Creek Road.

The overall goal of the Marsh Creek Trail is to provide an interconnected regional network of trails fostering a physical and visual connection to the parks and open space lands within eastern Contra Costa County.

1.2 Public Outreach

Project Partners and Stakeholders include East Bay Regional Park District (EBRPD), in cooperation with the California Department of Parks and Recreation, Contra Costa County, Contra Costa County Flood Control and Water Conservation District and the City of Brentwood. Input from community members and local non-governmental organizations included the John Marsh Historic Trust, equestrian interest groups and local homeowner associations.

Public Meetings and workshops include:

- Community Workshop 1, March 28, 2019
- Community Workshop 2, August 14, 2019
- Meeting notes and materials are included in **Appendix A**.

2. OWNERSHIP, LAND USE AND PLANNING FRAMEWORK

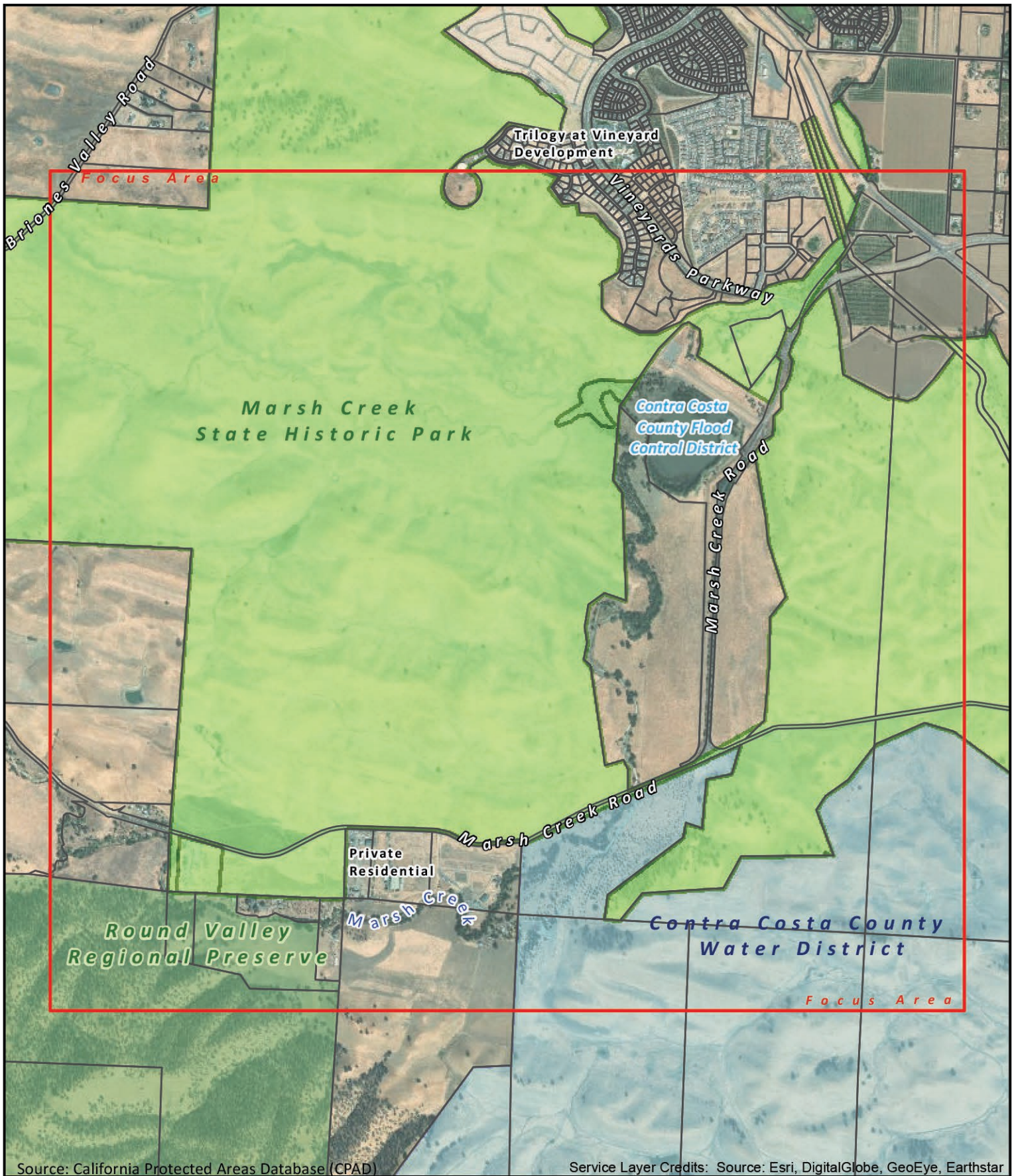
The Study Area is within the ownership and jurisdiction of multiple agencies with regulatory authority and interest in the project. Within the regional context (**Figure 2-1**), the trail is identified as part of the Marsh Creek Regional Trail with some of the primary agencies with applicable plans and policies guiding public access in this area including EBRPD, Contra Costa County, the City of Brentwood, and California State Parks.

2.1 Ownership and Land Use Plans and Policies

The site is located in eastern Contra Costa County, bordering the city of Brentwood, and includes unincorporated lands. Property owners within the general vicinity of the Study Area are shown below. Land use within this overall area includes residential housing (Trilogy subdivision) and Los Medanos Community College within the City of Brentwood. South of the City limits, primary property owners include California State Parks, Contra Costa County Flood Control District, and Contra Costa County (road right of way). Other property owners in the area included private ranches and lands owned by Contra Costa Water District, part of the Los Vaqueros Reservoir watershed. These lands are leased for grazing. In addition, there are several private properties adjoining the Study Area, including the Skylark Equestrian facility the south side of Marsh Creek Road and just west of the Marsh Creek drainage crossing

Agencies and stakeholders with planning and policy documents in this project include:

- East Bay Regional Park District
- EBRPD Master Plan
- State of California
- California State Parks
- Department of Water Resources – Division of Dam Safety
- East Contra Costa County Habitat Conservancy
- Contra Costa County
- Contra Costa County General Plan
- Contra Costa County Flood Control and Water Conservation District Projects
- Contra Costa County Public Works Department Projects
- Contra Costa County Community Development/Transportation Planning Projects
- Contra Costa County Transportation Authority
- Contra Costa Countywide Bicycle and Pedestrian Master Plan
- City of Brentwood
- City of Brentwood General Plan
- City of Brentwood Parks Trails and Recreation Master Plan
- US Bureau of Reclamation Central Valley Project Conservation Program



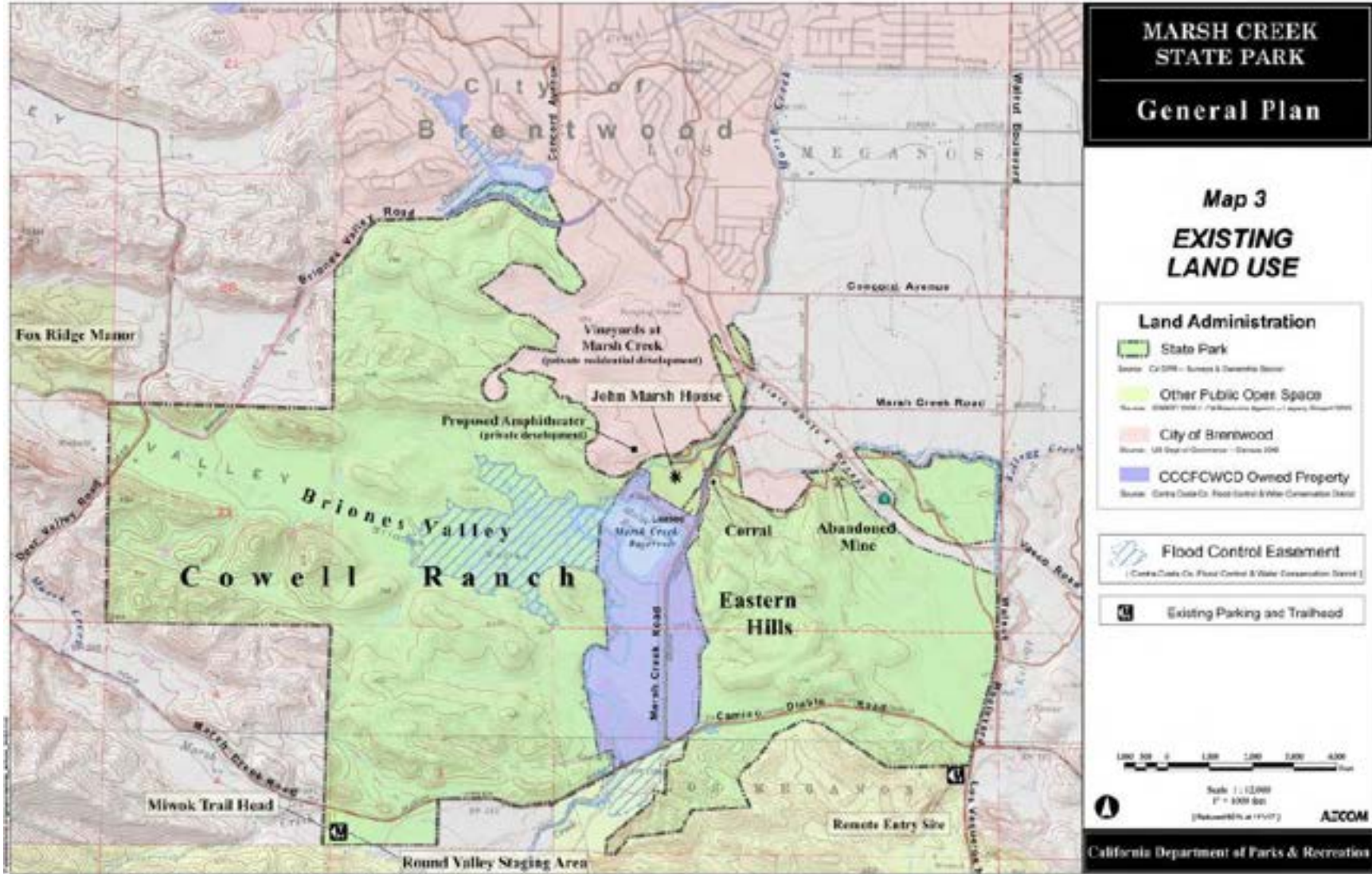
Marsh Creek Trail Feasibility Study

Regional Context



Figure 2-1 0 0.25 0.5 1 Miles







2.2 East Bay Regional Park District (District)

The District is the lead partner for completion of this Feasibility Study.

EBRPD Round Valley Staging Area

The District leases and manages a portion of the Marsh Creek State Park along Marsh Creek Road for the Round Valley Regional Preserve staging area. The trailhead contains parking for vehicles and horse trailers, vault toilet facilities, and a trailhead (Miwok Trailhead) providing access to the Round Valley Preserve.

East Bay Regional Park District Master Plan, 2013

The 2013 District Master Plan is a policy document that guides the District in future development and expansion of parks, trails, and services. The District provides and manages regional parks for Alameda and Contra Costa counties, including 65 regional parks, over 100,000 acres of open space, and 1,100 miles of trails. The Marsh Creek Regional Trail originates at Big Break Regional Shoreline and Dutch Slough, and has been implemented in segments in cooperation with stakeholders such as the City of Brentwood.

The Master Plan helps guide the stewardship and development of current and future parks to maintain a careful balance between the need to protect and conserve natural resources while offering recreational use of parklands for all to enjoy now and in the future.

Priorities identified in the Master Plan include completion of key park and trail projects in the eastern portion of the District, where the Study Area is located, and enhancing facilities, services and programs provided by other agencies; as well as completing missing sections of Regional Trail systems.

This trail segment will be part of the Marsh Creek Regional Trail. The District's commitment to trail implementation is described in the Recreational Facilities and Areas chapter, including provision of a trail network that serves many types of users, as well as completion of a regional trail network that serves non-motorized circulation and transportation needs. This trail, as part of the regional transportation system, is intended to connect to public transportation hubs, employment and retail centers and other destinations as part of the shift to more sustainable communities. Master Plan policies that focus on trail implementation include:

RFA 2: "The District will provide a diverse system of non-motorized trails to accommodate a variety of recreational users including hikers, joggers, people with dogs, bicyclists, and equestrians. Both wide and narrow trails will be designed and designated to accommodate both single or multiple users based on location, recreational intensity, environmental and safety considerations. The District will focus on appropriate trail planning and design, signage and trail user education to promote safety and minimize conflicts between users."

RFA3: "The District will continue to plan for and expand the system of paved, multi-use regional trails connecting parklands and major population centers."

The Master Plan defines a process for planning new facilities prior to implementation. As described in the *Planning for Regional Parks and Trails (PRPT)* chapter, park planning includes classification of parkland and preparation of a plan for resource management and proposed development, which is the focus of this Feasibility Study. Regional trails are a priority for the District to provide links and connections that encourage alternate forms of transportation. Completion of this segment of the Marsh

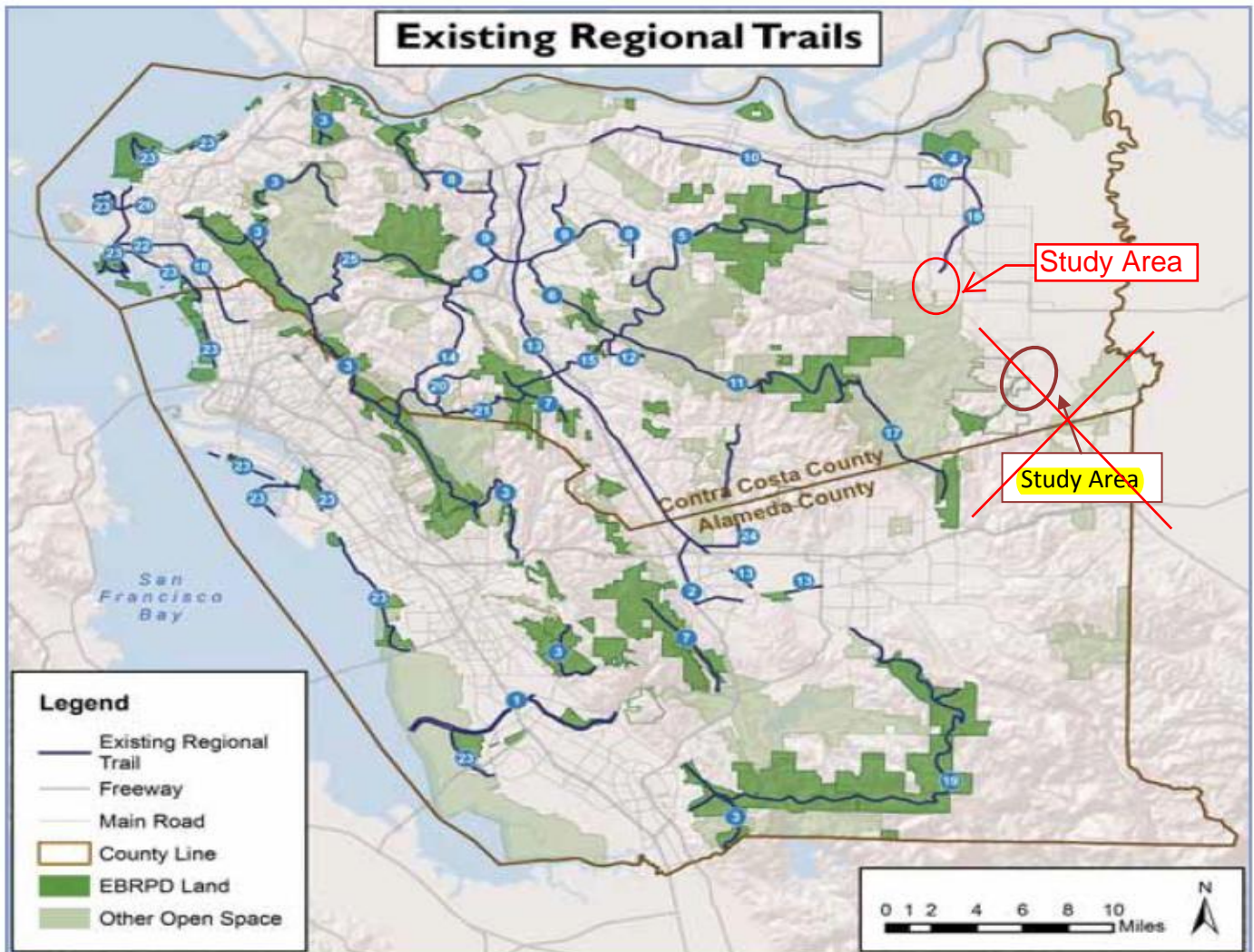


Creek Trail will help link with the Morgan Territory to Brushy Peak and Diablo Trails, with improved access to the Round Valley and Morgan Territory Regional Preserves as well as State Parks in the region, and to Contra Costa County Water District Los Vaqueros Watershed lands. Master Plan policies related to regional trails include:

PRPT 9: “Regional trails will connect regional parks or trails to each other, to park and trails of other agencies, or to areas of unusual scenic beauty; vista points, San Francisco Bay, Delta or lake shoreline, natural or historic resources, or similar areas of regional significance. Regional trails may also connect regional parks and trails to important destinations such as transit centers, schools, colleges, civic centers, other major institutions, employment centers, large commercial complexes, or residential areas.”

PRPT 10: “The District encourages the creation of local trail networks that provide additional access points to the regional system to the community. The District will support other agencies in completing local trail networks that complement the Regional Trail system and will coordinate with local agencies to incorporate local trail connections into District brochures.”

PRPT 11: “Regional trails may be part of a national, state, or Bay Area regional trail system. The District will cooperate with other agencies and organizations to implement these multi-jurisdictional efforts.”



- | | |
|---|--|
| 1. Alameda Creek Trail | 14. Lafayette-Moraga Trail |
| 2. Alamo Canal Trail | 15. Las Trampas to Mt. Diablo Trail |
| 3. Bay Area Ridge Trail | 16. Marsh Creek Trail |
| 4. Big Break Shoreline | 17. Morgan Territory to Brushy Peak (CCWD) |
| 5. Black Diamond Mines to Mt. Diablo Trail | 18. Ohlone Greenway Trail |
| 6. Briones to Mt. Diablo Trail | 19. Ohlone Wilderness Trail |
| 7. Calaveras Ridge Trail | 20. Old Moraga Ranch Trail |
| 8. California State Riding and Hiking Trail | 21. Redwood/Las Trampas Trail |
| 9. Contra Costa Canal Trail | 22. Richmond Greenway |
| 10. Delta de Anza Trail | 23. San Francisco Bay Trail |
| 11. Diablo Trail | 24. Tassajara Creek |
| 12. Green Valley Trail | 25. Tilden to Briones Trail |
| 13. Iron Horse Trail | 26. Wildcat Creek |



2.3 California State Parks

Marsh Creek State Park General Plan and Program Environmental Impact Report

California State Parks and the City of Brentwood approved the Marsh Creek General Plan and EIR in January 2012. The General Plan sets forth

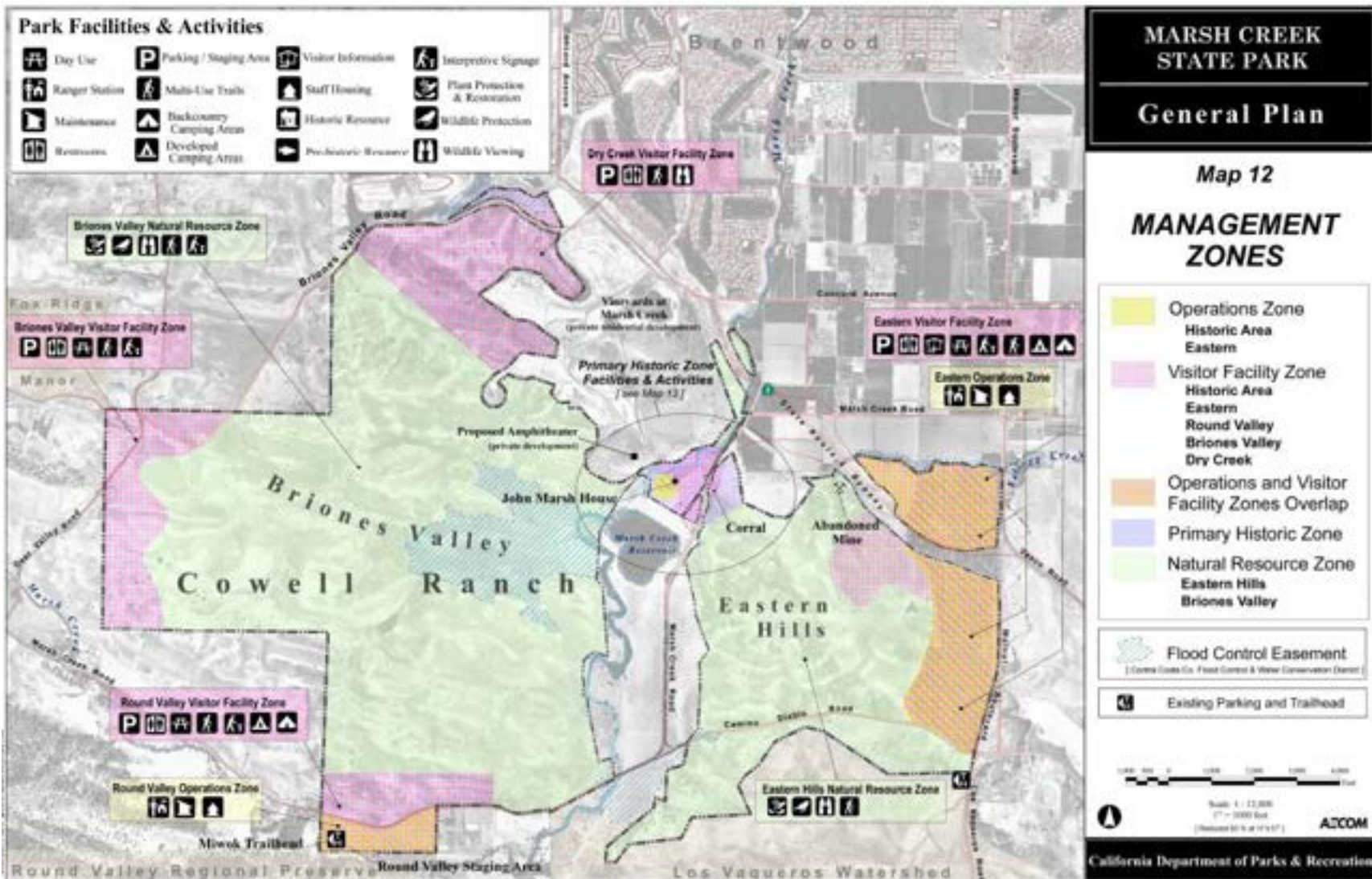
The Cowell Foundation sold approximately 3,647 acres of land to The Trust for Public Land in November of 2002. The state Coastal Conservancy, California Department of Fish and Game, Caltrans, the Wildlife Conservation Board, and U.S. Department of the Interior Bureau of Reclamation provided funding for the purchase to ensure long term resource and open space preservation. The Trust for Public Land subsequently transferred the property to California State Parks for ownership and management of the land. This land is in addition to the John Marsh homestead lands consisting of 16.4 acres, which have been in State Parks ownership since 1981. The City of Brentwood is providing financial and technical support to California State Parks to prepare a General Plan for long term management and visitor use at the Park.

An important feature of the Park is the 16.4-acre historic John Marsh ranch complex (residence, tankhouse, pumphouse, bunkhouses, horse stable/tack room, granary, barn, corrals, and two vehicle sheds). The most dominant element of the ranch is the stone house that was completed in 1856. A more detailed description of this complex is provided subsequently in this chapter. Currently, the land around the historic house is grazed. A corral area used for the ranching operations exists across from the main entrance along Marsh Creek Road and is accessed by cattle via an underground culvert near the entry gate. There is historical evidence of previous sand mining activity in the northern portion of the eastern hills where an abandoned mine is present. Previously, a portion of the Park in the east was farmed; crops included an apple orchard and corn. The property is not currently open to the public, except for occasional guided tours of the John Marsh House and adjacent areas. Currently, no public use facilities exist on the property. The following map, taken from the State Parks Master Plan, shows the Park boundary, along with the property's existing land uses and features and proposed management zones.

Marsh Creek Restoration and Instream Dam Improvement Project

As described in the Draft Initial Study –Mitigated Negative Declaration (July 2015) for this project, State Parks intends to restore a portion of Marsh Creek immediately northwest of the John Marsh House (just downstream of the dam spillway) to a more naturalized form to protect existing archaeological and biotic resources. The Project entails partial removal of a small, inoperative dam and access causeway (built in the 1920's) and fill placement to prevent further erosion of an important archaeological site located on the channel banks. Proposed Project improvements include cutting and removing four large sections of the concrete dam, filling and reshaping the eroded plunge pool and adjacent northern upstream (west of the dam) and northern downstream (east of the dam) banks to focus streamflow back towards the centerline of the stream channel and through the newly cut dam sections. The southern bank on the downstream side of the dam would be filled with soil and reinforced to protect archaeological/cultural resources. The rebuilt and reshaped banks would be lined with rock and riparian plantings.

According to this report, the dam served as a crossing of Marsh Creek when it was operated as a ranch, until the bridge structure was damaged. .





2.4 California Department of Water Resources Division of Safety of Dams

Since August 14, 1929, the State of California has regulated dams to prevent failure, safeguard life, and protect property. The California Water Code entrusts dam safety regulatory power to DWR, Division of Safety of Dams (DSOD). This agency provides oversight to the design, construction, and maintenance of jurisdictional sized dams in California. The agency is responsible for:

- Reviewing and approving dam enlargements, repairs, alterations, and removals to ensure that the dam appurtenant structures are designed to meet minimum requirements.
- Performing independent analyses to understand dam and appurtenant structures performance. These analyses can include structural, hydrologic, hydraulic, and geotechnical evaluations.
- Overseeing construction to ensure work is being done in accordance with the approved plans and specifications.
- Inspecting each dam on an annual basis to ensure it is safe, performing as intended, and is not developing issues. Roughly 1/3 of these inspections include in-depth instrumentation reviews of the dam surveillance network data.
- Periodically reviewing the stability of dams and their major appurtenances in light of improved design approaches and requirements, as well as new findings regarding earthquake hazards and hydrologic estimates in California.

In the Study Area, the Marsh Creek Dam (CA00809) is subject to State jurisdiction. The dam, built in 1963, is listed with a 59-ft. high earthen dam height and 1,540 ft. crest length. The dam is certified and has a downstream hazard rated as “high”. It should be noted that the downstream hazard classification is based on the size of the reservoir and the number of people who live downstream of a dam, not the actual condition of the dam or its critical structures. The latest condition assessment is satisfactory, with no reservoir restrictions.

Flood Control District staff indicated that retrofit work on the dam spillway, as well as work to improve and restore hydrologic function and habitat value of the reservoir and Marsh Creek corridor are planned for the future, pending funding allocations. Placement of trail facilities on the dam or reservoir levees would require review and approval from the DSOD as well as the Flood Control District.

2.5 East Contra Costa County Habitat Conservancy

The East Contra Costa County Habitat Conservancy is a joint exercise of powers authority formed by the Cities of Brentwood, Clayton, Oakley and Pittsburg and Contra Costa County to implement the East Contra Costa County Habitat Conservation Plan / Natural Community Conservation Plan (HCP/NCCP). The HCP/NCCP provides a framework to protect natural resources in eastern Contra Costa County, while improving and streamlining the environmental permitting process for impacts on endangered species. The Plan allows entities including East Bay Regional Park District and State Parks to streamline endangered species permitting for their activities and projects. The HCP also provides for comprehensive species, wetlands, and ecosystem conservation and coordinated and biological mitigation. The Study Area is within the inventory area of the HCP.

The HCP supports the establishment of recreational trails as a useful feature incorporated into the urban-wildland interface:



A recreational trail along an urban boundary provides public access to open space while minimizing the adverse effects of this access on sensitive biological resources that might occur nearby. Recreational trails can easily be combined with other interface elements such as wildlife-exclusion fencing, drainage controls, and firebreaks. Interpretive signs placed along recreational trails can inform the public about the adjacent preserve and create a sense of ownership and stewardship among local residents. These residents can then serve as informal patrols for the Implementing Entity to help ensure that resources within the preserves are protected.

Paved trails may be preferable to gravel or dirt trails because paved trails require less long-term maintenance than unsurfaced trails. Paved trails also reduce the amount of runoff or erosion that occurs as a result of the trail itself. However, paved trails attract basking reptiles, increasing their risk of injury or death from bicycles or pedestrians. Trails through particularly sensitive areas can be designed to minimize impacts through the use of boardwalks, bridges, or raised platforms.

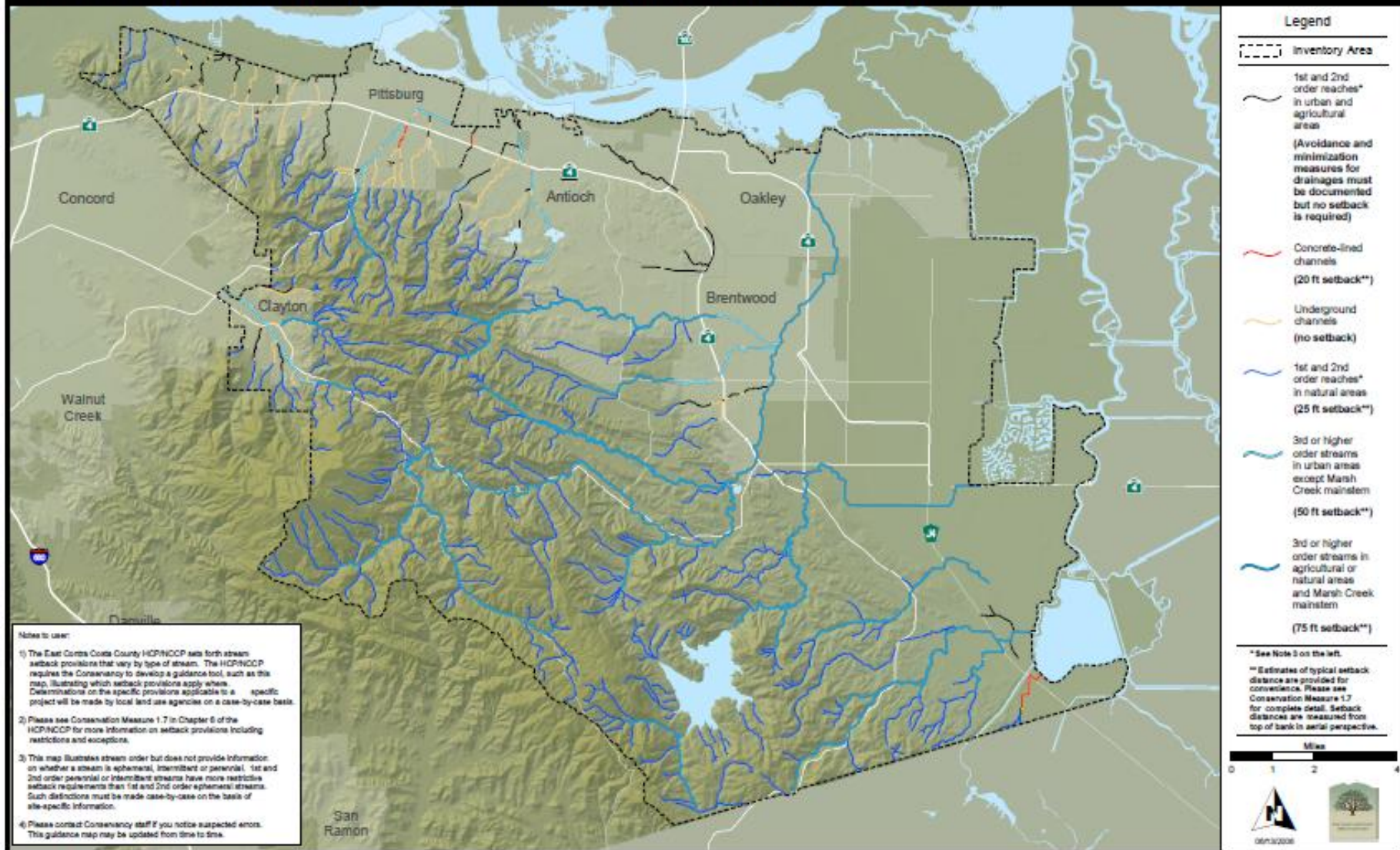
Buffering vegetation can be effectively used adjacent to trails to serve as a physical and visual barrier between the trail and the preserve. For example, native drought-tolerant and fire-resistant shrubs could be planted between a trail and a low barrier fence to discourage entry into sensitive areas of the preserve.

East Contra Costa County Habitat Conservation Plan/Natural Community Conservation Plan (HCP/NCCP)

The HCP/NCCP is the Habitat Conservancy's planning document that prescribes a coordinated, regional approach to conservation and regulation, including permitting of new projects. (See figure next page). This segment of the Marsh Creek Trail is included in the HCP/NCCP, and would be regulated under these guidelines. The HCP/NCCP also covers the construction and maintenance of recreational facilities "such as trails, parking lots, restrooms, wildlife observation platforms, and educational kiosks that are built and/or used in accordance with the guidelines in this Plan. This category also includes construction, maintenance, and use of facilities needed to manage the Preserves, including but not limited to preserve field offices, maintenance sheds, carpools, roads, bridges, fences, gates, wells, stock tanks, and stock ponds...Low intensity recreational use of HCP/NCCP preserves is permitted under the guidelines of this Plan... Any incidental take of covered species resulting from public use of trails and parking lots will be covered under the ESA and NCCPA permits, provided that usage is consistent with the guidelines in this Plan."

The HCP/NCCP also includes Marsh Creek Reservoir expansion that is proposed by the CCC Flood Control District. The HCP/NCCP prescribes a streamlined process for implementation of projects, also provided they are consistent with siting guidelines and applicable species protection protocols. Specific protocols applicable to this project are contained in **Section 6.0 - Design Guidelines**.

Map of Streams Illustrating Applicability of the East Contra Costa County HCP/NCCP Stream Setback Provisions





2.6 Contra Costa County

Most of the Study Area is within unincorporated Contra Costa County. The county provides public services for residents and businesses within the County. The County's Conservation and Development Department, Public Works and the Flood Control and Water Conservation District have guiding documents as well as planned projects that relate to planning and implementation of the Marsh Creek Trail to the west.

Contra Costa County General Plan (2005)

The purpose of the Contra Costa County General Plan is to express the broad goals and policies, and specific implementation measures, which will guide decisions on future growth, development, and the conservation of resources through the year 2020.

The Contra Costa County General Plan identifies recreational opportunities in the County. The Plan calls for coordination between jurisdictions, including school districts, utilities, EBRPD and others to complete a comprehensive network for bicyclists and pedestrians.

In the Transportation Element, Marsh Creek Road is a designated Scenic Route, and the following goals and policies apply:

GOAL 5-P: To identify, preserve and enhance scenic routes in the County.

POLICIES

5-47. Scenic corridors shall be maintained with the intent of protecting attractive natural qualities adjacent to various roads throughout the county.

5-48. The planning of scenic corridors shall be coordinated with and maximize access to public parks, recreation areas, bike trails, cultural attractions, and other related public developments.

5-51. Multiple recreation use, including trails, observation points, and picnicking spots, where appropriate, shall be encouraged along scenic routes.

The Open Space Element recommends providing opportunities for regional-scale public access to scenic area, and incorporating trails into design of flood control facilities. Bicycle and pedestrian trails are shown along Marsh Creek Road, and an equestrian route is shown bisecting State Park lands. Parks and Recreation Facilities Goals and policies that support implementation of trails include:

Goal 9-I. To develop a system of interconnected bicycle, pedestrian, and riding trails and paths suitable for both active recreational use and transportation/circulation.

Goal 9-J. To promote active and passive recreational enjoyment of the county's physical amenities for the continued health, safety, and welfare of the citizens of the county.

Policy 9-38. Public trail facilities shall be integrated into the design of flood control facilities and other public works whenever possible.

9-u. Coordinate funds and programs administered by County government and other agencies, such as the East Bay Regional Park District, to obtain optimum recreation facilities development.

9-v. Develop a comprehensive and interconnected series of bicycle, pedestrian, and riding trails in conjunction with cities, special districts, public utilities, and County Service Areas.



Contra Costa County Flood Control and Water Conservation District (CCFCWCD)

The Contra Costa County Flood Control and Water Conservation District covers all of Contra Costa County, including its cities, and owns property throughout the county for the purpose of constructing and maintaining regional flood control basins, channels, and creeks.

The District offers regional flood protection, creek and resource stewardship, and also provides technical information and education to cities and residents. Its operations are primarily funded through property taxes and developer fees. In the Study Area, the District owns and maintains the Marsh Creek Reservoir and Dam.

Restoration and expansion of the reservoir's flood carrying capacity is planned as a future project. The design capacity of the Marsh Creek Reservoir has diminished substantially due to silting and vegetation growth since it was built in the 1960s. Dredging and vegetation removal is no longer an option to restore this capacity because the reservoir's high habitat value and the need to minimize disturbing sediment contaminated with mercury. Mercury mines active in upper Marsh Creek from the 1860s to 1950s increased the deposition of mercury into Marsh Creek, and some of this mercury-laden sediment has accumulated in the Marsh Creek reservoir behind the dam¹.

The CCFCWCD plans to restore and expand the reservoir's flood storage capacity to accommodate the 100-year flood event, and acquired a flood or flowage easement over approximately 200 acres south of the reservoir on both sides of Marsh Creek Road (152 acres on the west side of the road and 59 acres on the east side) to temporarily detain or shallow pond additional water during high flow events. The wet pool would not be expanded so that mercury laden sediment in the reservoir would not be disturbed. Funding has not been allocated for the project.

The land is currently grazed by cattle and would continue to be grazed even during use as a dry detention basin. The new or expanded basin may need to be dredged periodically to remove accumulated sediment.

The project would likely include restoration of riparian habitat along Marsh Creek. According to the HCP/NCCP, the creek and adjacent area provides restoration opportunities such as native grassland, valley oak savanna, cottonwood-willow forest, or a combination of these land-cover types. Habitat on this site could also be improved or enhanced for San Joaquin kit fox, and other protected species such as California red legged frog, California tiger salamander fairy shrimp.

This project is included in the HCP/NCCP, provided that habitat restoration is considered in project design and there is no change in the potential exposure of sensitive species to biologically available mercury as a result of the project.

In addition to expansion of the detention basin, CCFCWCD plans to reconstruct the dam spillway at some time in the future.


Contra Costa County Public Works Department

Contra Costa County Public Works is responsible for construction and maintenance of the County's infrastructure. The County has implemented several shoulder widening and resurfacing projects along Marsh Creek Road, including roads and bridges in the Project vicinity.

¹ East Contra Costa County Habitat Conservation Plan



Within the Study Area, the County is in the process of designing and constructing replacement of the existing Marsh Creek Bridge. The planned replacement structure will be located slightly north of the existing bridge. This is the approximate location of an earlier historic bridge and portions of the concrete bridge abutments remain. The current bridge configuration is two 12 ft. wide lanes with shoulders varying from 4 to 8 feet. The new bridge configuration will include two 12 ft. lanes with 8 ft. shoulders.

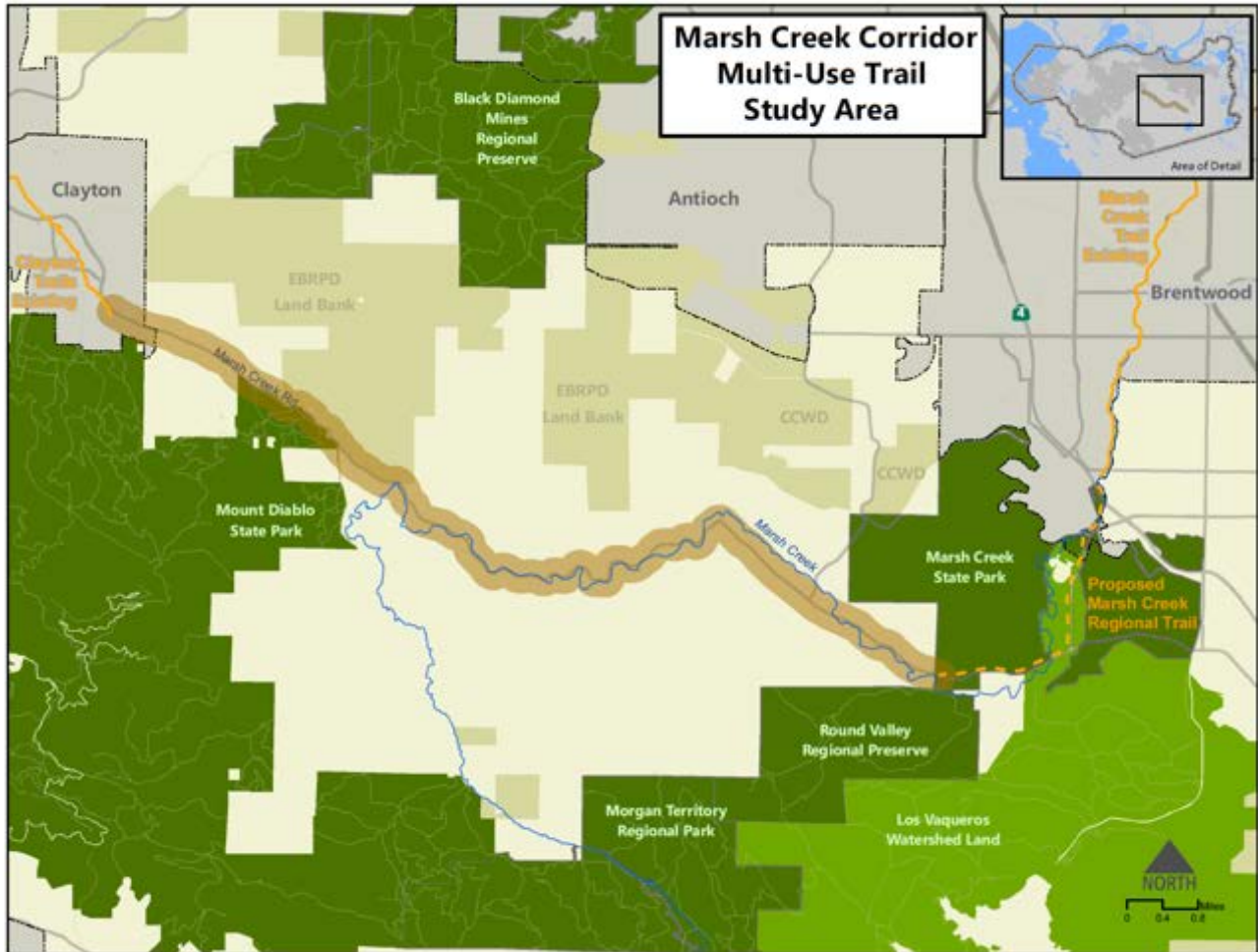
No bicycle or pedestrian facilities will be provided as part of the project. 

Contra Costa County Marsh Creek Corridor Multi-Use Trail Feasibility Study

The Contra Costa County Department of Conservation and Development and Public Works Department is conducting a transportation planning/traffic engineering study for a 13-mile long Marsh Creek Corridor along Marsh Creek Road between the City of Clayton and the Round Valley Regional Preserve. The Marsh Creek Corridor Multi-Use Trail Feasibility Study will focus on bicycle and pedestrian facilities along Marsh Creek Road from Clayton to Round Valley Regional Preserve.

The proposed Marsh Creek multi-use trail would create a new major non-motorized east-west thoroughfare for expanded commuting or recreational opportunities. It would provide nonmotorized access to Downtown Clayton, Diablo View Middle School, Mount Diablo, Round Valley Regional Preserve, and the existing Marsh Creek Trail through Brentwood and Oakley. The purpose of the path would be to provide a safe, useful and enjoyable transportation corridor for various forms of non-motorized travel, including pedestrian, equestrian and bicycle users (including serious bicycle enthusiasts), and the trail is proposed to be sized and designed to encourage use by these various sectors. Once this path and adjacent paths are completed, there will be one continuous non-motorized path from Downtown Concord to Oakley. The trail could possibly be located on the opposite side of the creek from the road, immediately adjacent to the road itself, or some distance from the creek or the road in constrained areas.

A goal of the Study is to provide a separate trail facility for non-motorized travel along the Marsh Creek Corridor that would decrease non-motorized traveler exposure to pollution from sharing the roadway with vehicles. This project is consistent with the County's Complete Streets Policies including the 2016 Complete Streets Resolution and General Plan amendment of 2008 (Promotion of Bicycle/Pedestrian Facilities). Bicycle trips take place on Marsh Creek Road, in spite of the lack of a bicycle path or designated lane. Marsh Creek Road within Clayton has an existing Class II bicycle lane, which connects to Clayton's extensive trail network.





2.7 Contra Costa Transportation Authority (CCTA)

The Contra Costa Transportation Authority is a public agency formed by Contra Costa voters in 1988 to manage the county's transportation sales tax program and to do countywide transportation planning, including bicycle and pedestrian facilities. The CCTA helps plan, fund, and implement transit programs including countywide bicycle and pedestrian planning.

Contra Costa Countywide Bicycle and Pedestrian Master Plan (CBPP) July 2018

The 2018 CBPP has the following goals:

1. *Encourage more people to walk and bicycle*
2. *Increase safety and security for pedestrians and bicyclists*
3. *Create a safe, connected, and comfortable network of bikeways and walkways for all ages and abilities*
4. *Increase the livability and attractiveness of Contra Costa's communities and districts*
5. *Equitably serve all of Contra Costa's communities while ensuring that public investments are focused on projects with the greatest benefits*

The focus of the CBPP is on the “interested but concerned segments of the bicycling community, based on the concept of Level of Traffic Stress (LTS)². LTS is a ranking system with four categories:

LTS 1: Low traffic stress suitable for almost all cyclists, including children trained to safely cross intersections. Cyclists are either physically separated from traffic, or are in an exclusive bicycling zone next to a slow traffic stream. Intersections are easy to approach and cross.

LTS 2: Low traffic stress suitable for adult cyclists but demanding more attention from children. Cyclists are either physically separated from traffic or are in an exclusive bicycling zone with occasional traffic and low speed differential.

LTS 3: Cycling either in a separated lane adjacent to moderate speed traffic or shared lanes with moderately low speed. Crossings are not difficult for adults.

LTS 4: Cycling on high speed roads with limited facilities for cyclists and long intersection crossing distances.

The CBPP focuses on the 60% of the cycling population that is represented by LTS2. Completion of the Marsh Creek Trail between Vineyards Parkway and Round Valley Regional Preserve is shown as Proposed Low Stress Bikeway as part of a Countywide Bikeway Network (CBN). These facilities would be either LTS 1 or 2, and would include a full range of facility types, including:

- Multi-use Trails
- Buffered Bike Lanes
- Bike Boulevards
- Separated Bikeways
- Improve Across Barrier Connections at interchanges and other locations

² Mineta Transportation Institute, Low Stress Bicycling and Network Connectivity, <https://transweb.sjsu.edu/research/low-stress-bicycling-and-network-connectivity>



2.8 City of Brentwood

Lands in the northern portion of the Study Area are within the City of Brentwood. Primary land use within the City in this area is Los Medanos College campus, and the Trilogy residential development. The Marsh Creek Trail will be extended to Vineyards Parkway at Marsh Creek Road, with the intended trail crossing of Vineyards Parkway at Miwok Avenue. Concrete sidewalks in this area are approximately ten feet wide with landscaping on each side of the sidewalk.

City of Brentwood General Plan (July 22, 2014)

The northern portion of the Study Area is within the City of Brentwood city limits and sphere of influence. This includes the John Marsh Historic Trust site and a portion of the State Park. These lands are designated as Parks, while the lands owned by Contra Costa Flood Control District are designated Public Facilities. All of the lands north of Marsh Creek Road are within the *Brentwood Planning Area*, where the City has an interest in reviewing development proposals to ensure that they are compatible with surrounding land uses, and do not result in adverse impacts to Brentwood. Goals, policies and actions that relate to the implementation of trails within the planning area include:

Circulation Action 1a: Coordinate with neighboring agencies in efforts to expand regional bicycle, pedestrian and equestrian networks to meet anticipated demands.

Goal and Policy Circulation 2: Proactively support and encourage travel by non- automobile modes by maintaining and expanding safe and efficient pedestrian, bicycle, equestrian and transit networks.

Policy CIR 2-1: Establish and maintain a system of interconnected bicycle, pedestrian, and equestrian facilities that facilitate commuter and recreational travel, and that are consistent with the City's parks, trails and recreation goals and policies in this General Plan and the Contra Costa County Countywide Bicycle and Pedestrian Plan.

Policy CIR 2-3: Require development projects to construct on-site sidewalks, paths and trails in a manner that is consistent with the City's parks, trails and recreation goals and policies in the General Plan and the Contra Costa Countywide Bicycle and Pedestrian Plan, and as dictated by the location of transit stops and common pedestrian destinations.

Policy CIR 2-11: Design safe crossings where trails and roads meet.

Goal CIR3: Coordinate circulation facilities with land use and development patterns to create an environment that encourages walking, bicycling and transit use.

Policy CIR3-1: Recognize the role of streets not only as vehicle routes but also as parts of a system of public spaces, with quality landscaping, street trees, and bicycle and pedestrian paths.

Community Services and Facilities (CSF) Goal CSF2: Maintain a diverse and comprehensive system of high quality parks, trails, recreation facilities, and recreational programs and services that meets the needs of all segments of the community.

Policy CSF 2-1: Ensure the provision of sufficient land that is well distributed and interconnected throughout the community for parks, trails, and recreation facilities.

Policy CSF 2-7: Expand, renovate and maintain high quality parks, trails, and recreation facilities, programs and services to accommodate existing and future needs that address traditional and non-traditional recreation, active, and passive recreation, wellness, historical, cultural arts, environmental education, conservation, accessibility, inclusion, diversity, safety, and new technology.



Policy CSF 2-10: Actively promote and participate in regional coordination and planning efforts to provide quality parks, trails and recreation facilities throughout Brentwood and the surrounding areas. The City should emphasize regional coordination to leverage funding, maintenance, and/or resources to develop a range of regional recreational opportunities.

Policy CSF 2-13: Promote the development of a diverse network of parks, trails, and recreation facilities that support traditional and non

– traditional recreational uses.

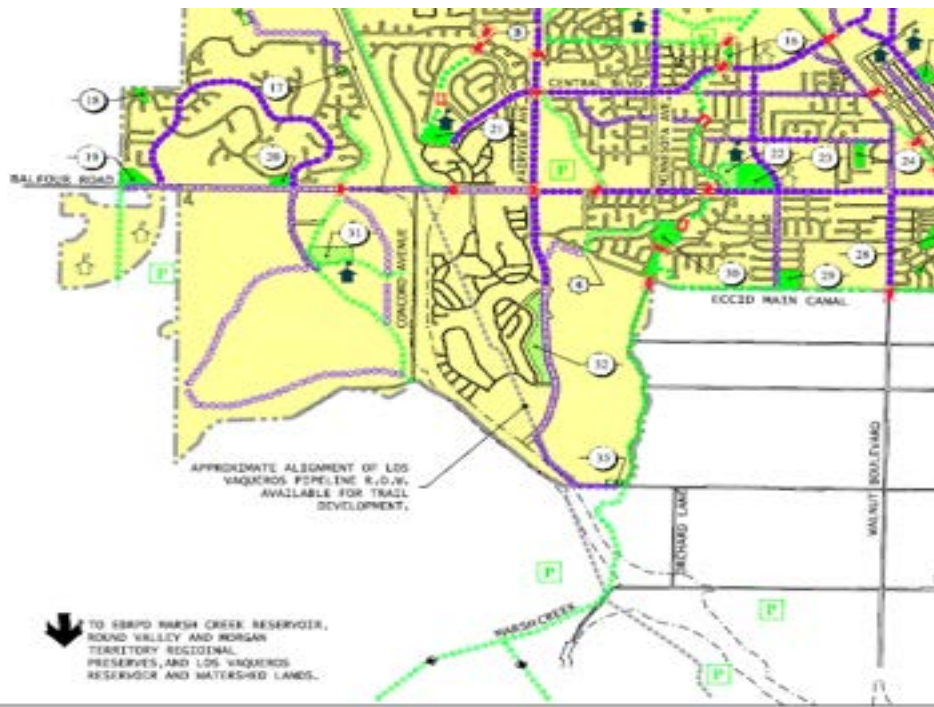
Policy CSF 2-14: Emphasize and prioritize public outreach and educational programs that inform the community of available parks, trails and recreation facilities programs, and services available in order to increase and enhance community use of these facilities, programs and services.

Policy CSF 2-16: Encourage community and volunteer efforts to assist in the maintenance and beautification of parks, trails, and recreation facilities in Brentwood.

Policy CSF 2-17: Encourage and maintain diverse public access to parks, trails, and recreation facilities to the greatest extent feasible.

Conservation and Open Space (COS) Policy 1-4: Where possible, integrate open space and stream corridors with trails and other recreational open space in an environmentally sustainable manner.

Action COS 4a: Coordinate with interested public and private entities to create new and expanded public access trails along creeks and streams that connect to parks and open space areas within Brentwood’s Planning Area.



City of Brentwood Parks, Trails & Recreation Master Plan Update

The City of Brentwood Parks, Trails and Recreation Master Plan (February 2019) outlines specific programs for the implementation of a trail system to serve the Brentwood community. The Plan indicates a proposed Class I Bikeway/trail along Marsh Creek and Marsh Creek Road, with a notation “to



EBRPD Marsh Creek Reservoir, Round Valley and Morgan Territory Regional Preserves, and Los Vaqueros Reservoir and Watershed Lands.”

Implementation of the trail alignment within this Study is consistent with these City guiding documents.

Brentwood Center Los Medanos College

The Brentwood Center is a satellite site of Los Medanos College that will serve a maximum of 5,000 full- and part-time students. The Center is on the north side of Vineyards Parkway at Miwok Avenue. The Marsh Creek Trail north to Highway 4 will be built as part of this project, and will cross Vineyards parkway at the Miwok/Vineyards intersection. The campus is currently under construction, with approximately 88,000 square feet of classroom/office space and approximately 1400 parking spaces.

Trail users will be expected to cross to the south side of Vineyards Parkway at the existing signalized intersection. The project developers are anticipated to complete an on-street trail connection on the south side of Vineyards Parkway and on the west side of Marsh Creek Road to connect with the existing State Park entrance road.

US Bureau of Reclamation Central Valley Project Conservation Program (CVPCP)

The CVPCP provided funding to support the acquisition of MCSHP in 2002, and maintains an interest in the management and conservation of natural resources within the Park, particularly federally listed species and habitats that may be affected by the federal Central Valley Project. These resources include vernal pools, riparian, oak woodlands, valley sink/alkali scrub and grasslands supporting listed species such as California tiger salamander and others. The Bureau of Reclamation has indicated that projects within the State Park must protect these habitats to be in keeping with the original funding intent.



3. ENVIRONMENTAL RESOURCES

This Study and Concept Plan is intended to determine the issues associated with implementing the final segment of the Marsh Creek Regional Trail, and is subject to environmental review under the provisions of the California Environmental Quality Act (CEQA).

This section provides a description of key environmental issues, including constraints and challenges that were evaluated and used in preliminary trail alignment planning. Some of these issues will be evaluated in more detail during final project design.

3.1 Land Use, Ownership and Right of Way

Existing Conditions

Lands within the Study Area are owned by City of Brentwood, Contra Costa County, and California State Parks (see **Section 2**). Most of these lands are leased for agricultural use. EBRPD leases and operates the staging area at Round Valley Preserve from State Parks.

Constraints and Challenges

Since the trail will likely be on lands under different ownership, an agreement will likely be needed to implement and manage the trail by one entity. EBRPD operates the Round Valley Trailhead and portions of the Marsh Creek Trail under agreement with underlying landowners.

Design Considerations

Design of facilities should facilitate management by the entity that will maintain the trail. Each potential management entity (CA State Parks, Contra Costa County, EBRPD) has unique design and management standards to be considered in project design. These guidelines are discussed in Section 6.

Additional Studies That May Be Needed

Depending on the management entity for the trail, a formal agreement may be needed by the underlying property owner for construction, use and ongoing management of trail facilities.

3.2 Aesthetics

Existing Conditions

The scenic characteristics of this portion of eastern Contra Costa County include views of grasslands and wooded hills, with views of the Marsh Creek Reservoir and the upstream riparian creek corridor. The hills with the State Park are predominantly grasslands with scattered valley oak, while the Regional Preserve hills are oak woodland, providing a verdant focal point.

Constraints and Challenges

Implementation of a trail may have aesthetic impacts, depending on whether there will be extensive vegetation removal or placement of built elements such as small structures (shade structures/kiosks), pavement, fences, walls, and other structures that affect scenic views. Construction of a trail along Marsh Creek Road is not anticipated to require extensive grading, walls or other vertical elements in this area.



Design Considerations

The following design guidelines should be considered when designing the trail:

- To avoid unnecessary impairment of scenic character, retaining walls, fences and barriers along the trail corridor should be limited to areas where they are required to resolve engineering constraints, provide resource and agricultural land use protection, and/or facilitate safe trail use.
- Natural topography, vegetation, and scenic features of the area should be retained to the maximum extent possible.
- Utilize an underpass to provide grade separation for safety at Marsh Creek Road to minimize visual impacts (**Section 6**).
- Signage should be minimized and focused at existing developed area or at staging areas.
- Concrete retaining walls, if needed, should be colored and/or textured to minimize their contrast with the surrounding landscape.

3.3 Agricultural Resources

Existing Conditions

The majority of the Study Area has soil and topographic conditions suitable only for livestock grazing, and the area has been historically and primarily used for beef cattle grazing. There may have historically been a small acreage devoted to corn, fruit trees, or vegetable crops primarily for on-farm use in the vicinity of the John Marsh House and along Marsh Creek, as well as the flat lands on the south side of Marsh Creek Road in the vicinity of the Round Valley Preserve. See **Figure 3.3-1, USDA Prime Farmland**.

There is one historical and functional well on the property, located near the John Marsh House. There is no developed irrigation water supply or distribution system.

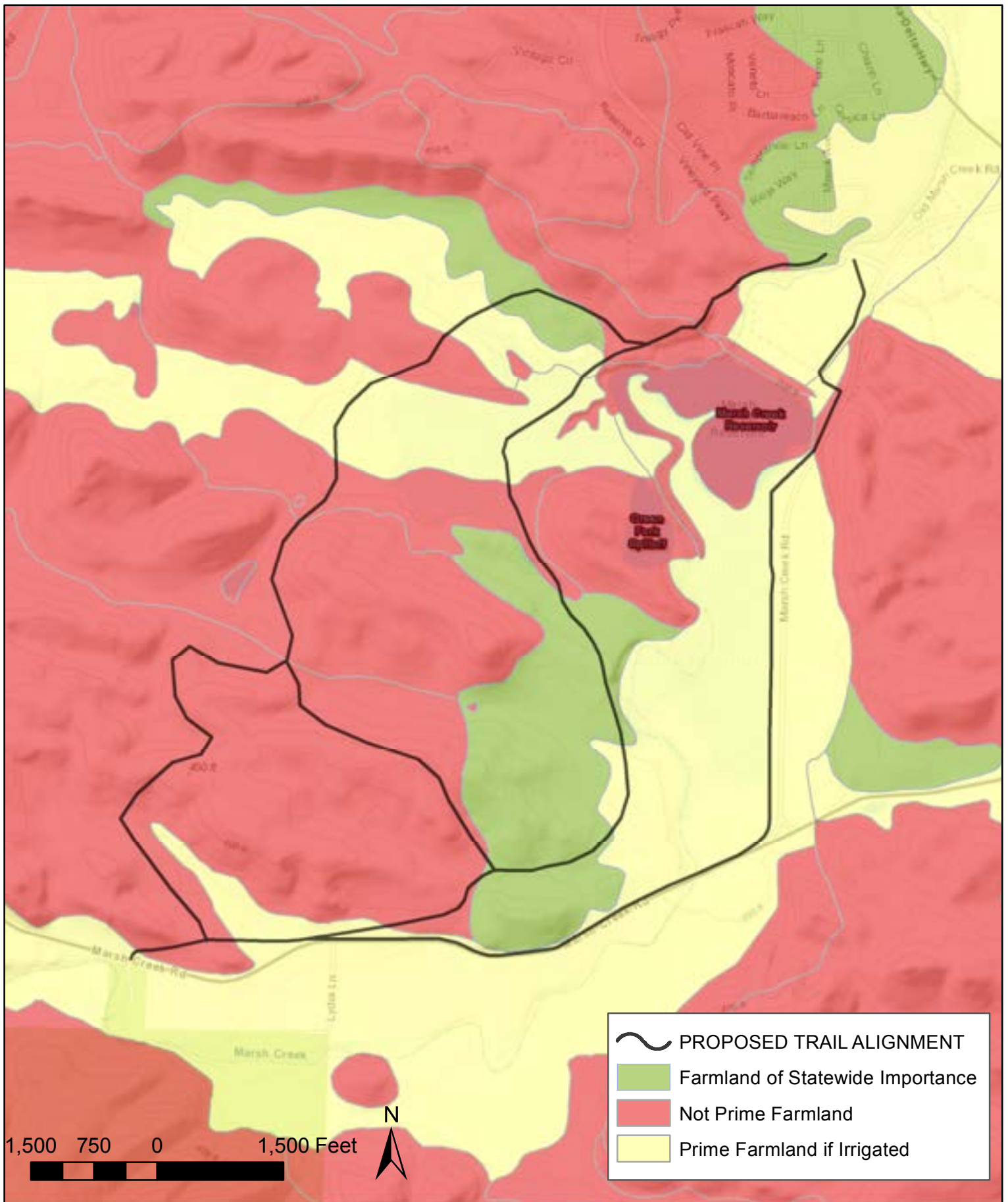
Prime and Important Farmland

The hillside soils are non-prime farmland soils, and the definition of *prime farmland* requires the existence of a developed and dependable irrigation water supply system, as well as a recent history of irrigated cropping. Although the alluvial soils on the south side of Marsh Creek Road, in the vicinity of the Round **Creek** Preserve staging area may qualify as prime farmland, the lack of a developed and dependable irrigation water supply and the absence of a cropping history preclude these areas from being considered prime farmland.

Constraints and Challenges

Operation of the trail could result in land use conflicts between trail users and neighboring agricultural operations. Typical conflicts include potential exposure of trail users to pesticides sprayed nearby and trespassing on adjacent rangeland/farmland. Pesticide exposure (rarely used on site), exposure of trail users to farm animals (aggressive bulls), and the risk of starting wildfires are all trail management considerations that both State Parks and EBRPD have extensive experience with. The use of fencing, vegetative screens, and no trespass signs can discourage trespassing.

Trail use in agricultural areas also could interfere with the movement of agricultural vehicles.



USDA PRIME FARMLAND

CONTRA COSTA COUNTY, CALIFORNIA Description of Soil Survey Geographic Database, USDA, NRCS policy and procedures on prime and unique farmlands are published in the "Federal Register," Vol. 43, No. 21, January 31, 1978. Retrieved 7/24/2019.



FIGURE
3.3-1



Design Considerations

- Trail facilities, including staging areas, should be located to minimize conflicts with agricultural and ranching operations production, as well as provide opportunities for showcasing the site's agricultural history, if desired.
- Fencing or vegetative screening should be located to facilitate accessibility for agricultural operations (e.g., allowing turning radius area for farm equipment) to the greatest extent feasible.
- Fencing or trail boundary signs can be incorporated into the design in agricultural/ranching areas when necessary to deter potential trespass from trail users.
- Provide signage at trailheads regarding agricultural activities.
- Signage would address the existence of neighboring agricultural operations, potential odors, and pesticide hazards that are sometimes issues in such operations.
- During construction of the trail, excess dust emissions can be controlled by regular watering, paving, construction roads, or other preventive measures.
- Education and monitoring regarding enforcement of State Parks and EBRPD policies on dogs on trails should be included in trail implementation and adaptive management.

3.4 Biological Resources

LSA assessed biological resources known to occur in the project vicinity and potential constraints to trail construction, identified any special-status plant and/or animal species, sensitive natural communities, and/or jurisdictional features (e.g., wetlands or other waters of the United States) that may be affected by the proposed project. In addition to identifying biological resources within the potential trail alignments, LSA identified regulatory permits that may potentially be required (e.g., Clean Water Act Section 404, Section 401 water quality certification, Fish and Game Code Section 1602 Streambed Alteration Agreement). **Figure 3.4-1** depicts the approximate locations of sensitive biological resources, special-status species occurrences, streams/creeks, wetlands, ponds, and other potentially jurisdictional features identified near the proposed trail alignments.

LSA searched the California Department of Fish and Wildlife's (CDFW) California Natural Diversity Database (CNDDDB; CDFW 2019), California Native Plant Society Inventory of Rare and Endangered Plants (CNPS 2019), and U.S. Fish and Wildlife Service's (USFWS) Information for Planning and Consultation on-line database (USFWS 2019) in order to compile a list of special-status plants and animals that could occur in the project vicinity.

The project lies within the East Contra Costa County Habitat Conservation Plan/Natural Community Conservation Plan (HCP/NCCP) Inventory Area (Jones and Stokes 2006). The HCP/NCCP protects and enhances ecological diversity and function within eastern Contra Costa County, and provides measures to avoid, minimize, and mitigate impacts on covered species and their habitats, while allowing for expansion of urban infrastructure. Activities covered under the HCP/NCCP are considered to have received Incidental Take authorization from the USFWS and CDFW. As required under the HCP/NCCP, species-specific planning surveys would need to be conducted for all covered species and other special-status species potentially affected by the project. Compensatory mitigation for impacts to listed species and their habitats (as well as other HCP/NCCP-covered species) may be required through payment of the appropriate fees required under the HCP/NCCP.

Prior to conducting the field survey, LSA reviewed aerial photography of the Marsh Creek corridor to identify habitat features that may be suitable for special-status species (e.g., chaparral for Alameda

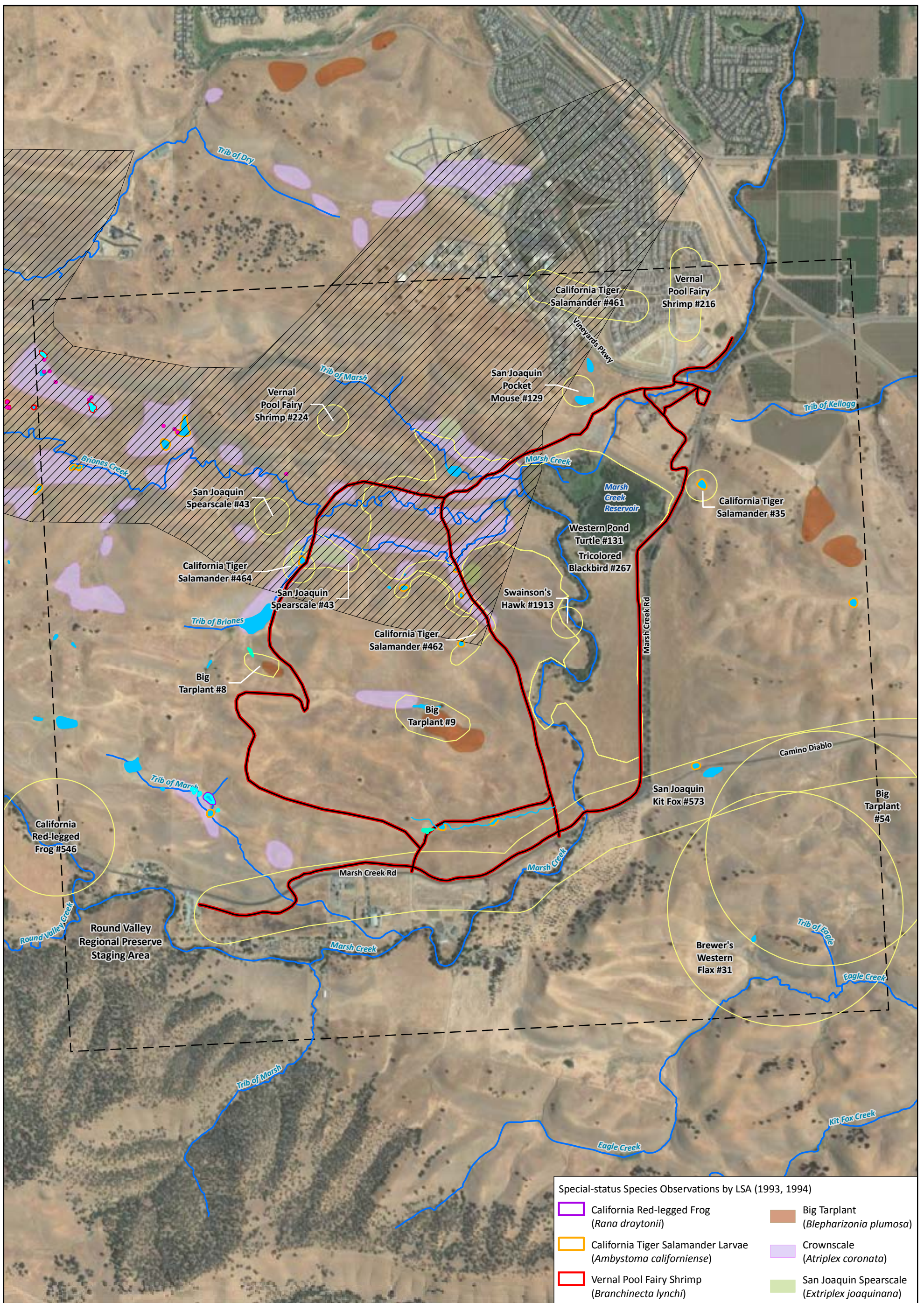


FIGURE 3.4-1

BIOLOGICAL CONSTRAINTS

LSA

LEGEND

- Survey Area
- Proposed Trail Alignment
- CNDDDB Occurrence
- Contra Costa County Creeks/Drainages
- Pond
- Seasonal Wetland

0 750 1500
FEET

- Vernal Pool Fairy Shrimp (*Branchinecta lynchi*) (LSA 02/2010)
- Vernal Pool Fairy Shrimp (*Branchinecta lynchi*) Critical Habitat Unit VERFS 19A

Marsh Creek Regional Trail: Vineyard Parkway to Round Valley Regional Preserve
Contra Costa County, California
Biological Constraints

SOURCE: LSA (1993, 1994, 2010); CDFW CNDDDB (02/2019); USFWS (02/2006); Google Maps (c)2019.
I:\QEN1801\GIS\Maps\Biological Constraints\Figure 3.4-1_Biological Constraints.mxd (8/12/2019)



whipsnake, ponds suitable for California red-legged frog or California tiger salamander breeding, wetlands suitable for fairy shrimp) and/or under regulatory jurisdiction (e.g., streams, drainages, ponds). LSA also reviewed the 2012 Marsh Creek State Park General Plan/Program Environmental Impact Report (EIR) to gather information on biological resources in the project vicinity, and also reviewed previous biological resources constraints maps prepared for the project site.

LSA senior wildlife biologist Dan Sidle and botanist Talaya Rachels conducted a reconnaissance field survey on July 24, 2019 to ground-truth the habitat features identified during the photography review, to collect additional information on these features, and to map other biological resources present.

Existing Conditions

Vegetation and land cover types in the project site consist of non-native (ruderal) annual grassland, blue oak savannah, Great Valley cottonwood riparian forest, ponds/seasonal wetlands, creeks/drainages, and developed lands.

Ruderal Non-Native Annual Grassland

The majority of the project site supports non-native annual grassland, which includes a combination of Wild Oats Grassland [*Avena (barbata, fatua)* Semi-Natural Herbaceous Stands] and Annual Brome Grasslands [*Bromus (diandrus, hordeaceus) - Brachypodium distachyon* Semi-Natural Herbaceous Stands]), both of which have been colonized by the invasive weed species, yellow starthistle (*Centaurea solstitialis*). Plant species observed in the annual grassland are almost exclusively non-native grasses and forbs, including yellow starthistle, wild oat (*Avena* sp.), ripgut brome (*Bromus diandrus*), foxtail chess (*B. madritensis*), hare barley (*Hordeum murinum* subsp. *leporinum*), Italian thistle (*Carduus pycnocephalus*), Italian ryegrass (*Festuca perennis*), shortpod mustard (*Hirschfeldia incana*), wild radish (*Raphanus sativa*), bristly ox-tongue (*Helminthotheca echioides*), tarweed (*Holocarpha* sp.), turkey-mullein (*Croton setiger*), and field bindweed (*Convolvulus arvensis*).

Alkali Grassland

Alkali grassland is typically a plant community consisting of relatively few, low-growing plant species. Plant species observed in the alkali grasslands during the field survey consist of saltgrass (*Distichlis spicata*), alkali heath (*Frankenia salina*), alkali-mallow (*Malvella leprosa*), and iodine bush (*Allenrolfea occidentalis*). Several species of saltbush and orache (*Atriplex, Extriplex*), including special-status species occur within this habitat type. San Joaquin sparscale (*Extriplex joaquinana*) and crownscale (*Atriplex coronata* var. *coronata*), both special-status plants, have been observed at the project site in the past (LSA pers. obs., CDFW 2019).

Blue Oak Savannah

Blue oak savannah consists of grasslands containing scattered blue oak (*Quercus douglasii*) and other associated trees that typically are characterized by an open canopy with a tree canopy cover of 5 to 10 percent. On the project site, the blue oak savannah is characterized by scattered mature blue oaks and valley oaks (*Quercus lobata*), located near the trail alignments. The proposed trail alignments, however, will avoid impacts to the oak savannah trees.



Great Valley Cottonwood Riparian Forest

Great Valley cottonwood riparian forest occurs along the banks of Marsh Creek. This cover type is characterized by a dense, broad-leafed, winter deciduous riparian forest dominated by Fremont cottonwood (*Populus fremontii*). Plant species growing along Marsh Creek include Fremont cottonwood, valley oak, western sycamore (*Platanus racemosa*), red willow (*Salix laevigata*), arroyo willow (*Salix lasiolepis*), California black walnut (*Juglans californica* var. *hindsii*), Himalayan blackberry (*Rubus armeniacus*), California sagebrush (*Artemisia californica*), mugwort (*A. douglasiana*), mule fat (*Baccharis salicifolia*), blue elderberry (*Sambucus nigra* ssp. *caerulea*), umbrella sedge (*Cyperus eragrostis*), and rush (*Juncus* spp.). Great Valley cottonwood riparian forest is considered a sensitive natural community by CDFW.

Ponds and Seasonal Wetlands

Several stock ponds and seasonal wetlands are situated near the proposed trail alignments. The stock ponds range from approximately 760 to 125,000 square feet in size and appear to be range from 3 to 6 feet in depth. The seasonal wetlands occur in shallow natural depression areas in the grasslands, typically less than 3-feet deep. Many of these ponds and wetlands support alkaline substrates and alkaline vegetation. Plant species observed in these features include salt grass, alkali heath, alkali mallow, bristly ox-tongue, annual beard grass (*Polypogon monspeliensis*), swamp pricklegress (*Crypsis schoenoides*), fascicled tarplant (*Deinandra fasciculatum*), common spikerush (*Eleocharis macrostachya*), Italian rye grass (*Festuca perennis*), rough cocklebur (*Xanthium strumarium*), bird's foot trefoil (*Lotus corniculatus*), salt heliotrope (*Heliotropium curassavicum*), common gumplant (*Grindelia camporum*), perennial pepperweed (*Lepidium latifolium*), and curly dock (*Rumex crispus*).

Creeks and Drainages

The proposed trail alignments will cross nine creeks or drainages (**Figure 3.4-1**). Marsh Creek, a perennial or near perennial stream, is the largest one of these creeks or drainages and supports riparian woodland habitat. Trees and woody shrubs observed along Marsh Creek include Fremont cottonwood, willow (*Salix* spp.), western sycamore, blue elderberry, and tree tobacco (*Nicotiana glauca*). Other wetland vegetation observed in Marsh Creek include cattails (*Typha* sp.), fiddle dock (*Rumex pulcher*), perennial pepperweed, rough cocklebur, annual beard grass, salt grass, Italian thistle (*Carduus pycnocephalus*), and prickly wild lettuce (*Lactuca serriola*). Briones Creek and its tributaries as well as tributaries to Marsh Creek are narrower in width and provide less woody riparian vegetation than Marsh Creek. Briones Creek is an intermittent stream that flows into Marsh Creek at the Marsh Creek Reservoir. Vegetation in Briones Creek and these tributaries include alkaline plants and other wetland forbs and grasses, such as sea barley (*Hordeum marinum*), salt grass, alkali heath, alkali mallow, swamp pricklegress, annual beard grass, Italian rye grass, rough cocklebur, and common gumplant. Upland plants, such as yellow starthistle and iodine bush were observed at some of these small creek/tributary crossings.

Marsh Creek Reservoir

The Marsh Creek Reservoir is a large open water pond that is hydrologically connected to Marsh Creek. The reservoir supports riparian and wetland vegetation, such as cattail, willow, and blue oak, and valley oak. The outer fringes of the reservoir supports riparian woodland habitat and seasonal wetlands while the center of the reservoir supports open water habitat and emergent wetland vegetation, such as cattails.



Developed

Developed areas within or adjacent to the project site includes the existing roads and ranch buildings and structures.

Wildlife

Wildlife that inhabit the site include grassland, oak savannah, riparian woodland, and wetland species that have adapted to a rural environment. Wildlife observed within the grasslands during LSA's survey consist of northern harrier (*Circus hudsonius*), red-tailed hawk (*Buteo jamaicensis*), turkey vulture (*Cathartes aura*), wild turkey (*Meleagris gallopavo*), tree swallow (*Tachycineta bicolor*), barn swallow (*Hirundo rustica*), western meadowlark (*Sturnella neglecta*), California ground squirrel (*Otospermophilus beecheyi*), Botta's pocket gopher (*Thomomys bottae*) burrows, and coyote (*Canis latrans*). Wildlife observed in the oak savannah consist of mourning dove (*Zenaida macroura*), Eurasian collared dove (*Streptopelia decaocto*), California scrub jay (*Aphelocoma californica*), white-breasted nuthatch (*Sitta carolinensis*), northern mockingbird (*Mimus polyglottos*), western bluebird (*Sialia mexicana*), house finch (*Haemorhous mexicanus*), and lesser goldfinch (*Spinus psaltria*). Wildlife observed in the riparian woodland consist of western fence lizard (*Sceloporus occidentalis*), red-shouldered hawk (*B. lineatus*), great horned owl (*Bubo virginianus*), California quail (*Callipepla californica*), Nuttall's woodpecker (*Dryobates nuttallii*), ash-throated flycatcher (*Myiarchus cinerascens*), and Audubon's cottontail (*Sylvilagus audubonii*). Wildlife observed in the wetlands/ponds and reservoir during the survey consist of American coot (*Fulica americana*), mallard (*Anas platyrhynchos*), killdeer (*Charadrius vociferus*), great egret (*Ardea alba*), and snowy egret (*Egretta thula*).

Constraints and Challenges

Special-Status Species

Based on the results of the database searches, observed habitat conditions, and LSA's knowledge of biological resources in the region, LSA evaluated 80 special-status species (46 plants, 34 wildlife species) as potentially occurring on or in the vicinity of the project site (see **Table 3.4-1**). The CNDDDB (CDFW 2019) and CNPS Inventory (CNPS 2019) listed additional special-status plants or wildlife as occurring within 5 miles of the project site or within the Byron Hot Springs and Brentwood USGS quadrangle searches, but these species were eliminated from consideration based on the lack of suitable habitat (e.g., chaparral, salt marsh, serpentine rock outcrops, etc.) in the vicinity of the site. The HCP/NCCP includes measures to avoid and minimize take of covered special-status species.

Special-Status Plants

Based on the results of the literature review, LSA developed a list of 46 special-status plant species that may occur in the vicinity of the project site. Of these 46 species, 17 were determined to have no potential to occur due to a total lack of suitable habitat within the site (e.g., serpentine, coastal habitats, rocky outcrops), or because they have not been found within the past 50 years and are therefore considered no longer present in Contra Costa County. Potentially suitable habitat is present for 29 special-status plant species. Most of these species are associated with the alkali seasonal wetlands or alkali grassland areas found on site. Rare plant surveys conducted by LSA documented the following three special-status plant species at the project site: the San Joaquin sparscale, crownscale, and big tarplant (*Blepharizonia plumosa*) (**Table 3.4-1**).



Table 3.4-1: Special-status Plant Species Potentially Occurring in the Project Vicinity

Scientific Name	Common Name	Status (F/S/CRPR, HCP/NCCP)*	General Habitat Description	Rationale
<i>Amsinckia grandiflora</i>	Large-flowered fiddleneck	FE/SE/1B, HCP/NCCP-no take	Grassy openings in cismontane woodland, valley and foothill grassland, cannot occur in dense grass. Elevation: 275-550 m. Blooms: April-May.	This species may occur within the project site. The closest CNDDDB occurrence (# 10) is from extirpated or presumed extirpated populations approximately 4.1 miles from the site. Close to these historic native occurrences, an experimental population was initiated in the early 1990s near the Judsonville site (Lougher Ridge). This population is reportedly in decline (Carlsen et. al. 2012).
<i>Anomobryum julaceum</i>	Slender silver moss	--/--/4	Broadleafed upland forest, lower montane coniferous forest, North Coast coniferous forest /damp rock and soil on outcrops, usually on roadcuts. Elevation: 100-1,000 m. Blooms: N/A	This species may occur in seasonally damp soils at the site. The closest CNDDDB occurrence (# 7) is from a presumed extant population on Mt. Diablo. This occurrence has non-specific location information.
<i>Arctostaphylos auriculata</i>	Mt. Diablo manzanita	--/--/1B, HCP/NCCP-covered	Chaparral (sandstone), cismontane woodland. Elevation: 135-650 m. Blooms: January-March.	No suitable chaparral/scrub present. The closest CNDDDB occurrence (# 12) is from a presumed extant population located approximately 2.7 miles from the site. No manzanita species were observed during LSA's field survey.
<i>Arctostaphylos manzanita ssp. laevigata</i>	Contra Costa manzanita	--/--/1B	Chaparral (rocky). Elevation: 500-1,100 m. Blooms: January-April	No suitable chaparral/scrub present. The closest CNDDDB occurrence (# 10) is from a 1932 record at unknown location approximately 1 mile east of Round Valley. No manzanita species were observed during LSA's field survey.
<i>Astragalus tener var. tener</i>	Alkali milk-vetch	--/--/1B	Mesic alkaline and adobe clay soils in valley and foothill grassland, adjacent to vernal pools. Elevation: 1-60 m. Blooms: March-June.	Suitable habitat present in grasslands near vernal pools at the site, but the elevation range associated with this species is more typical of delta grasslands. Project site is above known elevation range for species.



Scientific Name	Common Name	Status (F/S/CRPR, HCP/NCCP)*	General Habitat Description	Rationale
<i>Atriplex cordulata</i> var. <i>cordulata</i>	Heartscale	--/--/1B	Saline or alkaline soils in chenopod scrub, meadows, and seeps. Sandy soils in valley and foothill grassland. Elevation: 0-560 m. Blooms: April-October	Could occur within the alkaline grasslands or wetlands at the site.
<i>Atriplex coronata</i> var. <i>coronata</i>	Crownscale	--/--/4	Alkaline, often clay soils in chenopod scrub, valley and foothill grassland, and vernal pools. Elevation: 1-590 m. Blooms: March-October	Known to occur at the northern end of the project site (LSA pers. obs., EIR).
<i>Atriplex depressa</i>	Brittlescale	--/--/1B, HCP/NCCP-covered	Wet, alkaline grassland, chenopod scrub, alkali scalded areas, and/or vernal pools. Elevation: 1-320 m. Blooms: April-October.	Could occur within the alkaline grasslands or wetlands at the site. Closest CNDDDB occurrence is approximately 0.7 mile from the site.
<i>Atriplex minuscula</i>	Lesser saltscale	--/--/1B	Alkaline, sandy in chenopod scrub, playas, and valley and foothill grassland. Elevation: 15-200 m. Blooms: May-October.	Could occur within the alkaline grasslands or wetlands at the site.
<i>Blepharizonia plumosa</i>	Big tarplant	--/--/1B, HCP/NCCP-covered	Valley and foothill grassland with clay to clay loam soils. Elevation: 50-505 m. Blooms: July-October.	Species recorded at the project site in 1994 where approximately 2,500 plants were observed along the grassy hillside adjacent to a creek channel (CDFW 2019). Could also occur within the annual grasslands.
<i>California macrophylla</i> (syn. = <i>Erodium macrophyllum</i>)	Round-leaved filaree	--/--/1B, HCP/NCCP-covered	Grassy openings in cismontane woodland, valley and foothill grassland with clay soils. Elevation: 15-1,200 m. Blooms: March-May	Potential to occur within the oak savannah understory and annual grassland.
<i>Calochortus pulchellus</i>	Mt. Diablo fairy-lantern	--/--/1B, HCP/NCCP-covered	Chaparral, cismontane woodland, riparian woodland, valley and foothill grassland, on wooded and brushy slopes. Elevation: 30-840 m. Blooms: April-June.	Potential to occur within the oak savannah understory and annual grassland. The closest CNDDDB occurrence (# 1) is located approximately 2.3 miles from the site.



Scientific Name	Common Name	Status (F/S/CRPR, HCP/NCCP)*	General Habitat Description	Rationale
<i>Campanula exigua</i>	Chaparral harebell	--/--/1B	Chaparral (rocky, usually serpentine). Elevation: 275-1,250 m. Blooms: May-June.	No suitable chaparral or serpentine habitat present. It also has more of an affinity for the serpentine slopes of Mt. Diablo.
<i>Centromadia parryi</i> subsp. <i>congdonii</i>	Congdon's tarplant	--/--/1B	Grazed and un-grazed annual grassland. Alkaline or saline soils sometimes described as heavy white clay (saline clay soil). Elevation: 1-230 m. Blooms: May-October (Nov.).	Suitable habitat may be present in grasslands on the site.
<i>Cordylanthus nidularius</i>	Mt. Diablo bird's-beak	--/SR/1B	Chaparral (serpentine). Elevation: 600-800 meters. Blooms: July-August.	No suitable chaparral or serpentine habitat present.
<i>Cryptantha hooveri</i>	Hoover's cryptantha	--/--/1A	Inland dunes, sandy soils in valley and foothill grassland. Elevation: 9-150 m. Blooms: April-May	The habitat conditions of the site are generally unlike those required for this species.
<i>Delphinium californicum</i> ssp. <i>interius</i>	Hospital Canyon larkspur	--/--/1B	Within and beside chaparral, grassy openings of cismontane woodland, sometimes mesic areas in above habitats. Elevation: 230-1,095 m. Blooms: April-June.	Potential to occur within the oak savannah.
<i>Delphinium recurvatum</i>	Recurved larkspur	--/--/1B, HCP/NCCP-covered	Wet, alkaline areas, chenopod scrub. Elevation: 3-750 m. Blooms: March- June.	Suitable habitat may be present in alkaline grasslands on the site.
<i>Didymodon norrisii</i>	Norris' beard moss	--/--/2B	Cismontane woodland, lower montane coniferous forest/intermittently mesic, rock. Elevation: 600-1,973 m. Blooms: N/A	The habitat conditions of the site are unlike those required for this species. The site's elevation is below the range associated with this species.
<i>Dirca occidentalis</i>	Western leatherwood	--/--/1B	Broadleaved upland forest, chaparral, closed-cone coniferous forest, cismontane woodland, north coast coniferous forest, riparian forest, and riparian woodland on	Potential habitat present in the riparian woodland along Marsh Creek, but the species is not known to occur east of the Berkeley Hills.

Scientific Name	Common Name	Status (F/S/CRPR, HCP/NCCP)*	General Habitat Description	Rationale
<i>Eriogonum truncatum</i>	Mt. Diablo buckwheat	--/--/1B, no-take	brushy slopes, mesic sites. Elevation: 30-395 m. Blooms: January-March (April) Openings with bare soil in chaparral, coastal scrub, or valley and foothill grassland with dry exposed clay or sandy substrates. Elevation: 3-350 m. Blooms: April-November.	Could occur along rocky banks of Marsh Creek. Closest CNDDDB occurrence is a 1934/1862/1903 record at an unknown location approximately 1.5 miles from the site.
<i>Eschscholzia rhombipetala</i>	Diamond-petaled California poppy	--/--/1B	Alkaline or clay soils in valley and foothill grassland. Elevation: 0-975 m. Blooms: March-April.	Could occur within the alkaline grasslands or wetlands on the site. Closest CNDDDB occurrence (# 4) is a possibly extirpated record north of the 1.1 miles north of Marsh Creek Reservoir.
<i>Extriplex joaquinana</i>	San Joaquin spearscale	--/--/1B, HCP/NCCP-covered	Wet, alkaline sparse grassland areas, alkaline pools. Elevation: 1-835 m. Blooms: April-October.	Known to occur at the project site (LSA pers. obs., EIR). The closest CNDDDB occurrence (# 43) is approximately 0.2 mile from the site.
<i>Fritillaria agrestis</i>	Stinkbells	--/--/4	Clay, sometimes serpentinite in chaparral, cismontane woodland, pinyon and juniper woodland, and valley and foothill grassland. Elevation: 10-1555 m. Blooms: March-June.	Could occur within grasslands on the site. The closest CNDDDB occurrence (# 8) is at an unknown location mapped approximately 0.7 mile from the site.
<i>Fritillaria liliacea</i>	Fragrant fritillary	--/--/1B	Coastal scrub, valley and foothill grassland, and coastal prairie. Often on serpentine soils. Other various soils reported, though usually clay. Elevation: 3-410 m. Blooms: February-April.	Potential to occur within the oak savannah understory and annual grasslands on the site.
<i>Helianthella castanea</i>	Diablo helianthella	--/--/1B, HCP/NCCP-covered	Broadleaved upland forest, chaparral, cismontane woodland, coastal scrub, riparian woodland, valley and foothill grassland, usually within rocky azonal soils. Elevation: 60-300 m. Blooms: April-June.	Potential to occur within the riparian woodland, oak savannah, and grasslands. The closest CNDDDB occurrence (# 14) is located approximately 2.7 miles from the site.



Scientific Name	Common Name	Status (F/S/CRPR, HCP/NCCP)*	General Habitat Description	Rationale
<i>Hesperevax caulescens</i>	Hogwallow starfish	--/--/4	Sometimes alkaline in valley and foothill grassland (mesic, clay) and vernal pools (shallow). Elevation: 0–505 m. Blooms: March-June.	Could occur in the alkaline grasslands and wetlands on the site.
<i>Hesperolinon breweri</i>	Brewer's western flax	--/--/1B, HCP/NCCP-covered	Serpentine chaparral, cismontane woodland, and valley and foothill grassland. Elevation: 30-900 m. Blooms: May-July.	Could occur in the alkaline grasslands on the site. It has an affinity for the serpentine slopes on Mt. Diablo and no serpentine present, but could also occur in alkaline habitat. The closest CNDDDB occurrence (# 31) is approximately 0.2 mile from the site.
<i>Hibiscus lasiocarpus</i> var. <i>occidentalis</i>	Woolly rose-mallow	--/--/1B	Freshwater marshes and swamps, riprap on sides of levees. Elevation: 0-120 m. Blooms: June-September.	The habitat conditions of the site are unlike those required for this species. The geographic range associated with this species relates to those of delta marshlands.
<i>Lasthenia conjugens</i>	Contra Costa goldfields	FE/--/1B, no-take	Valley and foothill grassland and cismontane woodland in vernal pools, swales, and moist depressions (alkaline). Extirpated from most of its range; extremely endangered. Elevation: 0-470 m. Blooms: March-June.	Could occur within alkaline seasonal wetlands and depressions on the site, but no CNDDDB occurrences recorded within 5 miles of the site.
<i>Madia radiata</i>	Showy madia	--/--/1B, HCP/NCCP-covered	Valley and foothill grassland and openings in cismontane woodland. Elevation: 25-1,215 m. Blooms: March-May.	Potential to occur within grasslands and oak savannah. The closest CNDDDB occurrence (# 25) is located approximately 3.6 miles from the site.
<i>Malacothamnus hallii</i>	Hall's bush-mallow	--/--/1B	Chaparral, coastal scrub. Some populations on serpentine. Elevation: 10-760 m. Blooms: May-September (October).	Chaparral and scrub land cover type is not present on the site. This species has an affinity for the serpentine slopes of Mt. Diablo. There is no serpentine on the site.
<i>Monolopia gracilens</i>	Woodland woollythreads	--/--/1B	Openings in broadleaf upland forest, chaparral, cismontane woodland, North Coast coniferous forest, and valley and foothill grassland/serpentine. Elevation: 100-1,200 m.	This species has an affinity for serpentine soils in grasslands and within openings in chaparral and oak woodland. There is no serpentine on the site.



Scientific Name	Common Name	Status (F/S/CRPR, HCP/NCCP)*	General Habitat Description	Rationale
			Blooms: March-July.	
<i>Navarretia gowenii</i>	Lime Ridge navarretia	--/--/1B	Chaparral, clay and serpentine soils. Elevation: 180-305. Blooms: May-June	This species has an affinity for clay and serpentine soils in grasslands and chaparral. There is no serpentine on the site.
<i>Navarretia nigelliformis</i> subsp. <i>radians</i>	Shining navarretia	--/--/1B, HCP/NCCP-covered	Valley and foothill grassland. Elevation: 100-1,000 m. Blooms: April-June.	Potential to occur within grasslands on site. Closest CNDDDB occurrence (# 81) is located approximately 4.6 miles from the site.
<i>Oenothera deltooides</i> ssp. <i>howellii</i>	Antioch Dunes evening-primrose	FE/CE/1B	Interior sand dunes. Elevation: 0-30 m. Blooms: March – September.	No suitable sand dune habitat present. The geographic range associated with this species relates to the unique sand dune habitat near the city of Antioch.
<i>Phacelia phacelioides</i>	Mt. Diablo phacelia	--/--/1B	Chaparral and cismontane woodland/rocky; strong indicator of serpentine soils. Elevation: 500-1,370 m. Blooms: April-May.	The habitat conditions of the site are unlike those required for this species. The geographic range associated with this species relates to open rocky slopes at an elevation much higher than the site.
<i>Puccinellia simplex</i>	California alkali grass	--/--/1B	Alkaline, vernal mesic; sinks, flats, and lake margins in chenopod scrub, meadows and seeps, valley and foothill grassland, and vernal pools. Elevation: 2-930 m. Blooms: March-May.	Potential to occur in alkaline grasslands and wetlands at the site. Closest CNDDDB occurrence (# 46) is a possibly extirpated record located approximately 2.3 miles from the site.
<i>Sanicula saxatilis</i>	Rock sanicle	--/SR/1B	Rocky ridges or tallus, broadleaved upland forest, chaparral, valley and foothill grassland. Elevation: 620-1,175 m. Blooms: April-May.	The habitat conditions at the site are unlike those required for this species. The geographic range associated with this species relates to open rocky slopes at an elevation higher than the site.
<i>Senecio aphanactis</i>	Chaparral ragwort	--/--/2B	Drying alkaline flats in cismontane woodland and coastal scrub. Elevation: 20-575 m. Blooms: January-April.	Potential to occur in alkaline flats on the site. Closest CNDDDB occurrence (# 16) is approximately 4.9 miles from the site.
<i>Spergularia macrotheca</i> var. <i>longistyla</i>	Long-styled sand-spurrey	--/--/1B	Alkaline in meadows and seeps and marshes and swamps. Elevation: 0-255 m. Blooms: February-May (June).	Potential to occur in alkaline grasslands and wetlands at the site. Closest CNDDDB occurrence (# 12) is approximately 2.4 miles from the site.



Scientific Name	Common Name	Status (F/S/CRPR, HCP/NCCP)*	General Habitat Description	Rationale
<i>Streptanthus albidus ssp. peramoenus</i>	Most beautiful jewel-flower	--/--/1B	Chaparral, cismontane woodland, valley and foothill grassland, serpentine soils. Elevation: 95-1,000 m. Blooms: March-October.	This species has an affinity for serpentine soils in grasslands and within openings in chaparral and oak woodland. There is no serpentine at the site.
<i>Streptanthus hispidus</i>	Mt. Diablo jewel-flower	--/--/1B	Chaparral, valley and foothill grassland/rocky. Elevation: 365-1,200 m. Blooms: March-June.	This species has an affinity for serpentine soils in grasslands and within openings in chaparral and oak woodland. There is no serpentine at the site.
<i>Triquetrella californica</i>	Coastal triquetrella	--/--/1B	Coastal bluff scrub, coastal scrub/soil. Elevation: 10-100 m. Blooms: N/A	This species may occur in seasonally damp soils and rocks adjacent to Marsh Creek and Marsh Creek Road at the site.
<i>Tropidocarpum capparideum</i>	Caper-fruited tropidocarpum	--/--/1B, no-take	Alkaline clay soils in grassland and oak woodland (valley and foothill grassland). Elevation: 1-455 m. Blooms March-April.	Potential to occur in alkaline grasslands on the site. Closest CNDDDB occurrence (# 6) is possibly extirpated record approximately 3.7 miles from the site.
<i>Viburnum ellipticum</i>	Oval-leaved viburnum	--/--/2B	Chaparral, cismontane woodland, and lower montane coniferous forest. Elevation: 215-1,400 m. Blooms May-June.	Potential to occur within the oak savannah at the site.

*** Status Codes**

FE = Federally listed as endangered

FT = Federally listed as threatened

FSC = Federal Species of Concern

SE = State-listed as endangered

ST = State Threatened

SR = State Rare

SSC = State Species of Special Concern

HCP/NCCP-covered = species is covered by the HCP/NCCP

no-take = no-take species under the HCP/NCCP

CRPR = California Rare Plant Rank



California Rare Plant Ranks

1A = California Rare Plant Rank 1A: Plants presumed extirpated in California and either rare or extinct elsewhere.

1B = California Rare Plant Rank 1B: Plants rare, threatened, or endangered in California and elsewhere

2B = California Rare Plant Rank 2B: Plants rare, threatened or endangered in California but more common elsewhere

3 = California Rare Plant Rank 3: Plants about which more information is needed – a review list

4 = Plants of Limited Distribution - A Watch List



Table 3.4-2: Special-status Wildlife Species Potentially Occurring in the Project Site

Scientific Name	Common Name	Status (F/S/CDFW, HCP/NCCP)	General Habitat Description	Rationale
<i>Branchinecta conservatio</i>	Conservancy fairy shrimp	FE/--/--	Large, steep-sided, alkali playa-type pools with moderately turbid water.	Suitable playa pools may be present in project vicinity. Not identified in the pools at the site (LSA pers. obs., CDFW 2019).
<i>Branchinecta longiantenna</i>	Longhorn fairy shrimp	FE/--/--, HCP/NCCP- covered	Vernal pools, seasonal ponds, sometimes constructed features that hold water. Ponding duration can be as little as 6-7 weeks in winter or 3 weeks in spring.	Suitable vernal pools may be present in project vicinity. Not identified in the pools at the site (LSA pers. obs., CDFW 2019).
<i>Branchinecta lynchi</i>	Vernal pool fairy shrimp	FT/--/--, HCP/NCCP- covered	Vernal pools, alkali pools, stock ponds, ponds in vernal swales. Ponding duration can be as little as 6-7 weeks in winter or 3 weeks in spring.	Suitable vernal pools present in project vicinity. Species known to occur in pools north of trail alignments (CDFW 2019).
<i>Brachinecta mesovallensis</i>	Midvalley fairy shrimp	--/--/--, HCP/NCCP- covered	Vernal pools and a variety of constructed features. Often ponding is of shallow duration, but can occur in long-duration ponds.	Suitable vernal pools may be present in project vicinity. Not identified in the pools at the site (LSA pers. obs., CDFW 2019).
<i>Callophrys mossii bayensis</i>	San Bruno elfin butterfly	FE/--/--	Coastal mountainous areas with grassy ground cover within fog belt. Associated with host plant <i>Sedum spathulifolium</i> .	The project site is not located within the fog belt and is not known for supporting the host plant of this species.
<i>Desmocerus californicus dimorphus</i>	Valley elderberry longhorn beetle	FT/--/--	Riparian habitat. Adults feed and lay eggs on blue elderberry (<i>Sambucus mexicana</i>) shrubs. Prefers to lay eggs in elderberries 2-8 inches in diameter; some preference shown for stressed elderberries. Occurs only in the Central Valley of California.	Project site supports blue elderberry, but the site is west of the known range of the species.



Scientific Name	Common Name	Status (F/S/CDFW, HCP/NCCP)	General Habitat Description	Rationale
<i>Lepidurus packardii</i>	Vernal pool tadpole shrimp	FE/--/--, HCP/NCCP- covered	Large or small, clear or turbid, alkali or fresh water vernal pools, clay flats, alkaline pools, ephemeral stock tanks, roadside ditches, and road ruts.	Suitable vernal pools may be present in project vicinity. Not identified in the pools at the site (LSA pers. obs., CDFW 2019).
<i>Hypomesus transpacificus</i>	Delta smelt	FT/SE/--	Sacramento-San Joaquin Delta at salinities less than 2 ppm. Generally not found in smaller freshwater streams.	Suitable habitat not present.
<i>Oncorhynchus mykiss</i>	Central California Coast steelhead	FT/--/--	Clear, cool riffles with gravel or cobble substrate for spawning; clear, cool riffles and pools as rearing habitat.	The project site and project vicinity are outside the known range of this species. The dam at Marsh Creek Reservoir prohibits salmonids from moving upstream into Marsh Creek. May briefly occur downstream of Marsh Creek Reservoir during high flows.
<i>Oncorhynchus mykiss</i>	Central Valley steelhead	FT/--/--	Clear, cool riffles with gravel or cobble substrate for spawning; clear, cool riffles and pools as rearing habitat.	The project site and project vicinity are outside the known range of this species. The dam at Marsh Creek Reservoir prohibits salmonids from moving upstream into Marsh Creek. May briefly occur downstream of Marsh Creek Reservoir during high flows.



Scientific Name	Common Name	Status (F/S/CDFW, HCP/NCCP)	General Habitat Description	Rationale
<i>Oncorhynchus tshawytscha</i>	Central Valley spring-run Chinook salmon	FT/ST/--	Clear, cool riffles with gravel or cobble substrate for spawning; clear, cool riffles and pools as rearing habitat.	The project site and project vicinity are outside the known range of this species. The dam at Marsh Creek Reservoir prohibits salmonids from moving upstream into Marsh Creek. May briefly occur downstream of Marsh Creek Reservoir during high flows.
<i>Oncorhynchus tshawytscha</i>	Central Valley winter-run Chinook salmon	FE/SE/--	Clear, cool riffles with gravel or cobble substrate for spawning; clear, cool riffles and pools as rearing habitat.	The project site and project vicinity are outside the known range of this species. The dam at Marsh Creek Reservoir prohibits salmonids from moving upstream into Marsh Creek. May briefly occur downstream of Marsh Creek Reservoir during high flows.
<i>Ambystoma californiense</i>	California tiger salamander – Central Valley DPS	FT/ST/SSC, HCP/NCCP- covered	Grassland, oak woodland, ruderal, and seasonal pool habitats. Seasonal ponds and vernal pools are necessary for breeding. Adults use mammal burrows and other underground retreats as aestivation habitat.	Known to breed in ponds in the project area (CDFW 2019). Suitable upland habitat present in grasslands at the site.
<i>Rana boylei</i>	Foothill yellow-legged frog	--/CST/SSC, HCP/NCCP- covered	Streams with rocky or cobbly substrate that flow at least to May.	No suitable habitat present. Species has not been found in recent surveys of the area and is considered extirpated from Contra Costa County (D. Muth, LSA). The nearest known population is in the upper Alameda Creek watershed in

Scientific Name	Common Name	Status (F/S/CDFW, HCP/NCCP)	General Habitat Description	Rationale
				southern Alameda County.
<i>Rana draytonii</i>	California red-legged frog	FT/--/SSC, HCP/NCCP- covered	Creeks, ponds, marshes. Prefers aquatic habitat with deep (2 feet or deeper) areas and undercut banks, emergent aquatic vegetation, and bank cover. Does not occur in brackish water.	Potential breeding habitat present in stock ponds and Marsh Creek and suitable movement and upland habitat present within riparian habitat, grasslands, and creeks/drainages. Closest CNDDDB occurrence (# 546) is approximately 0.2 mile west of the project site in Marsh Creek.
<i>Emys marmorata</i>	Western pond turtle	--/--/SSC, HCP/NCCP- covered	Ponds, marshes, rivers, streams, and irrigation ditches with aquatic vegetation.	Known to occur in Marsh Creek Reservoir and at the mouth of Marsh Creek (CDFW 2019). May move through other creeks and drainages on the site when water is present.
<i>Anniella pulchra pulchra</i>	Silvery legless lizard	--/--/SSC, HCP/NCCP- covered	Sandy or loose loamy soils with sparse vegetation and high moisture content.	The project site does not support sandy or loose loamy soils suitable for this species.
<i>Masticophis lateralis euryxanthus</i>	Alameda whipsnake (= striped racer)	FT/ST/--, HCP/NCCP- covered	Chaparral, rocky outcrops, south facing slopes and ravines within valley-foothill grassland with shrubs and oak trees in Alameda and Contra Costa counties.	Although no rocky outcrops or chaparral habitat are near the trail alignments, the oak savannah, grasslands, and riparian habitats at the site support suitable movement and foraging habitat.
<i>Phrynosoma blainvillii</i>	Coast horned lizard	--/--/SSC	Chaparral, oak savannah, and grassland habitat types with loose soils. Also in lowlands, along sandy washes with scattered low bushes.	The project vicinity supports suitable habitat for this species. Closest CNDDDB occurrence (# 613) is approximately 3.4 miles from the site.
<i>Thamnophis gigas</i>	Giant garter snake	FT/ST/--, HCP/NCCP-	Agricultural wetlands and other waterways such as irrigation and	The project vicinity is outside the known range of this species.



Scientific Name	Common Name	Status (F/S/CDFW, HCP/NCCP)	General Habitat Description	Rationale
		covered	drainage canals, sloughs, ponds, small lakes, low gradient streams, and adjacent uplands primarily within the Sacramento Valley.	Suitable habitat may be present in the creeks and drainages on the site, but species not known to occur in the project vicinity.
<i>Agelaius tricolor</i>	Tricolored blackbird	--/CSE/SSC, HCP/NCCP-covered (nesting colonies)	Nesting usually occurs in areas of dense cattails and/or tall bulrushes in creeks or ponds, tall mustard (<i>Brassica</i> sp.), grain stalks in fields, or Himalayan blackberry (<i>Rubus discolor</i>).	Suitable large patches of cattails and emergent wetland vegetation present in Marsh Creek Reservoir and along portions of Marsh Creek. Known to occur at the Marsh Creek Reservoir in 1989, 1992, and 2008, but nesting not confirmed (CDFW 2019).
<i>Aquila chrysaetos</i>	Golden Eagle	--/--/FP, HCP/NCCP-covered	Forests, canyons, shrub lands, grasslands, and oak woodlands. Large trees or cliffs for nesting. Open grasslands for foraging.	The project vicinity provides potential nesting habitat for this species. Oak savannah and native grassland provides suitable foraging habitat. Closest CNDDDB occurrence (# 145) is approximately 1 mile from the site.
<i>Athene cucularia</i>	Burrowing owl	--/--/SSC, HCP/NCCP-covered	Open habitats (e.g., grasslands, agricultural areas) with mammal burrows or other features (e.g., culverts, pipes, and debris piles) suitable for nesting and roosting.	Suitable ground squirrel burrows observed near the trail alignment. Could breed, winter, and/or forage in the grasslands on the site. Closest CNDDDB occurrence (# 244) is approximately 1.8 miles from the site.
<i>Buteo swainsoni</i>	Swainson's hawk	--/ST/--, HCP/NCCP-covered	Open grasslands and agricultural fields. Nests in large trees such as valley oak, cottonwood, or eucalyptus.	Project site provides suitable nesting habitat for this species. Known to nest in 2012 in an oak tree along Marsh Creek within the project site (CDFW 2019).



Scientific Name	Common Name	Status (F/S/CDFW, HCP/NCCP)	General Habitat Description	Rationale
<i>Elanus leucurus</i>	White-tailed kite	--/--/FP, HCP/NCCP- covered no-take	Grassland and savannah for foraging. Large trees for roosting and nesting.	Project site provides suitable nesting habitat and the oak savannah, riparian habitat, and grassland provide suitable foraging habitat.
<i>Falco peregrinus anatum</i>	Peregrine falcon	--/--/FP, HCP/NCCP- covered no-take	Nests on cliffs, transmission towers, skyscrapers.	Suitable nesting habitat (cliffs, skyscrapers, transmission towers) is absent from the site. Could forage on the site.
<i>Rallus longirostris obsoletus</i>	California clapper rail	FE/SE/FP	Saltwater and brackish marshes often crossed by tidal sloughs in the San Francisco Bay. Closely associated with pickleweed.	No suitable habitat present within the project vicinity.
<i>Sternula antillarum browni</i>	California least tern	FE/SE/FP	Coastal estuaries, lagoons, tidal flats, salt flats.	No suitable habitat present within the project vicinity.
<i>Ammodramus savannarum</i>	Grasshopper sparrow	--/--/SSC	Grasslands with coyote brush and other shrubs.	Suitable habitat present within grasslands on the site.
<i>Antrozous pallidus</i>	Pallid bat	--/--/SSC	Usually maternity roosts occur in enclosed areas of buildings, caves, and mines. Forages in a wide variety of open habitats.	Project vicinity may provide suitable roosting habitat for this species within the buildings and large trees. Suitable foraging habitat present.
<i>Brassariscus astutus</i>	Ringtail	--/--/FP, HCP/NCCP- covered no-take	Mixture of forest and scrub in close association with rocky or riparian areas. Nests in rocky areas and hollow trees and logs.	Project site supports suitable foraging areas and potentially supports denning areas in hollow trees and logs along Marsh Creek or at the Marsh Creek Reservoir.
<i>Corynorhinus townsendii townsendii</i>	Townsend's big-eared bat	--/--/SSC, HCP/NCCP- covered	Usually maternity roosts occur in enclosed areas of buildings, caves, and mines. Forages along habitat edges, often gleaning insects from trees or shrubs.	Buildings in the project vicinity may provide suitable roosting habitat. Suitable foraging habitat present.



Scientific Name	Common Name	Status (F/S/CDFW, HCP/NCCP)	General Habitat Description	Rationale
<i>Taxidea taxus</i>	American badger	--/--/SSC	Open grassland areas with plentiful prey such as pocket gophers and ground squirrels.	Suitable denning, foraging, and movement habitat present. No dens were observed during LSA's survey. Closest CNDDDB occurrence (# 182) is approximately 1.7 miles from the site.
<i>Vulpes macrotis mutica</i>	San Joaquin kit fox	FE/ST/--, HCP/NCCP- covered	Annual grasslands including grasslands with vernal pools, or grassy open stages with scattered shrubby vegetation. Need loose-textured sandy soils for burrowing, and suitable prey base.	Marginally suitable denning, foraging, and movement habitat present. Suitable ground squirrel burrows observed along the trail alignment during LSA's survey. Closest CNDDDB occurrence (# 573) is 1978 record is from near the site at Marsh Creek Road and Camino Diablo Road. Species rare in region.

Status: FE = federally endangered; FT = federally threatened; ST = State threatened; FP = State fully protected; CSE = Candidate State Endangered, CST = Candidate State Threatened; SSC = State species of special concern; HCP/NCCP-covered = species is covered by the HCP/NCCP; no-take = no-take species under the HCP/NCCP



Special-Status Wildlife

Of the 34 special-status wildlife species evaluated for the project suitable habitat is present within or adjacent to the project site for 22 species as listed in **Table 3.4-2**: Conservancy fairy shrimp (*Branchinecta conservatio*), Longhorn fairy shrimp (*Branchinecta longiantenna*), vernal pool tadpole shrimp (*Lepidurus packardii*), Midvalley fairy shrimp (*Branchinecta mesovallensis*), Central California Coast steelhead (*Oncorhynchus mykiss*), California red-legged frog (*Rana draytonii*), California tiger salamander (*Ambystoma californiense*) Alameda striped racer (*Masticophis lateralis euryxanthus*), western pond turtle (*Emys marmorata*), coast horned lizard (*Phrynosoma blainvillii*), golden eagle (*Aquila chrysaetos*), white-tailed kite (*Elanus leucurus*), loggerhead shrike (*Lanius ludovicianus*), northern harrier (*Circus hudsonius*), burrowing owl (*Athene cunicularia*), grasshopper sparrow (*Ammodramus savannarum*), tricolored blackbird (*Agelaius tricolor*), ringtail (*Brassariscus astutus*), American badger (*Taxidea taxus*), Townsend's big-eared bat (*Corynorhinus townsendii townsendii*), and pallid bat (*Antrozous pallidus*).

All special-status animal species that are covered under the HCP/NCCP and may be affected by the project have impact avoidance, minimization, and mitigation measures that have already been determined through prior consultation with the USFWS and the CDFW under the HCP/NCCP. Those measures applicable to the project, as well as any other necessary avoidance or minimization efforts for non-HCP/NCCP species are provided below.

Vernal Pool Fairy Shrimp and Other Special-status Vernal Pool Crustaceans. Seasonal wetlands north of the proposed trail alignment are known to support vernal pool fairy shrimp (*Branchinecta lynchi*). Critical Habitat for Vernal Pool Fairy Shrimp Critical Habitat (Unit 19A) has been designated in the northern portion of the park. Although not found during previous surveys conducted on the site (LSA pers. obs., EIR), other special-status vernal pool crustaceans (Conservancy fairy shrimp, Longhorn fairy shrimp, vernal pool tadpole shrimp, and Midvalley fairy shrimp) could potentially occur in the seasonal wetlands on the site. The HCP/NCCP requires the identification, presence/absence surveys, and mapping of potential habitat for covered shrimp species. The HCP/NCCP requires a 50-foot non-disturbance buffer from seasonal wetlands that may be occupied by covered shrimp and requires the implementation of several avoidance measures.

California Tiger Salamander. Several vernal pools that are known or could provide suitable breeding California tiger salamander (*Ambystoma californiense*) habitat are present within the project site. The U.S. Fish and Wildlife Service and the California Department of Fish and Wildlife may require more detailed information, such as protocol-level surveys, to support the assertion that California tiger salamanders are absent from the vicinity of the proposed trail, and may recommend preparation of a formal site assessment in accordance with U.S. Fish and Wildlife Service guidelines (USFWS 2005). Avoidance measures should be implemented to avoid potential impacts to the California tiger salamander during construction of the trails. The HCP/NCCP requires written notification to USFWS, CDFW, and the Implementing Entity (County and/or City), including photos and breeding habitat assessment, prior to disturbance of any suitable breeding habitat.

California Red-legged Frog. Several stock ponds that are known or could support California red-legged frog (*Rana draytonii*) are present within the project site. The regulatory agencies may require more detailed information to support the assertion that California red-legged frogs are absent from the vicinity of the proposed trail, and may recommend preparation of a formal site assessment in accordance with U.S. Fish and Wildlife Service guidelines (USFWS 2005). Avoidance measures should be



implemented to avoid potential impacts to the California red-legged frog during construction of the trails. The HCP/NCCP requires written notification to USFWS, CDFW, and the Implementing Entity, including photos and habitat assessment, prior to disturbance of any suitable breeding habitat

Alameda Striped Racer. Although the Alameda striped racer is known to occur in the vicinity, no large patches of scrub habitat occur within or immediately adjacent to the project site. Since suitable habitat is present in the vicinity, the Alameda striped racer could disperse through the project site, especially along the Marsh Creek riparian corridor. Avoidance measures should be implemented to avoid potential impacts to the Alameda striped racer during construction of the trails.

Western Pond Turtle. Western pond turtle could occur within the drainage channels and larger ponds within the Park. This turtle is known to occur in the Marsh Creek Reservoir and the mouth of Marsh Creek (CDFW 2019). Several plunge pools within Marsh Creek also provide suitable habitat for western pond turtles. Measures should be implemented to avoid potential impacts to the western pond turtle during construction of the trails.

Golden Eagle, Swainson's hawk, White-tailed Kite, Northern Harrier, Loggerhead Shrike, Grasshopper Sparrow, and Tricolored Blackbird. Golden eagles, Swainson's hawks, white-tailed kites, northern harriers, loggerhead shrikes, grasshopper sparrows, and tricolored blackbirds could nest on and/or adjacent to the project site. The only one of these species observed during LSA's 2019 field survey was a northern harrier. White-tailed kites and loggerhead shrikes could nest in the large shrubs or trees on or adjacent to the trails. Northern harriers and grasshopper sparrows could nest in the grasslands on or adjacent to the trails. Tricolored blackbirds could nest at the Marsh Creek Reservoir, where they have been observed in the past (CDFW 2019). If construction or vegetation removal begins during the nesting bird season (February 1 to August 31), a pre-construction nesting bird survey should be conducted within and adjacent to the work area to avoid potential impacts to these and other nesting birds. The HCP/NCCP requires pre-construction surveys for Swainson's hawk and golden eagle.

Burrowing Owl. Burrowing owls could nest or winter within the project site due to the presence of suitable small mammal burrows or burrow surrogates (e.g., culverts, debris piles). To confirm the absence of burrowing owls prior to development, LSA recommends that a burrowing owl take avoidance survey in accordance with CDFW guidelines (CDFG 2012) be conducted prior to construction. The HCP/NCCP requires pre-construction surveys and the implementation of avoidance measures for this species.

San Joaquin Kit Fox. The San Joaquin kit fox, although rare in the region could occur within the project site due to the presence of suitable grassland habitat. Potential kit fox dens were observed in the larger ground squirrel burrows adjacent to the trail alignment. The HCP/NCCP requires pre-construction surveys and the implementation of avoidance measures for this species.

Ringtail. Ringtails could occur within the riparian woodland along Marsh Creek within the project site. They are known to use tree hollows as dens. A pre-construction survey for ringtail dens should be conducted within any riparian trees within or adjacent to the project site.

American Badger. No badger burrows or large mammal burrows were observed during LSA's survey. American badgers, however, could forage and den on the site due to the presence of suitable grassland habitat. A pre-construction survey for American badger burrows should be conducted within the grasslands on and adjacent to the project site to avoid potential impacts American badgers.



Pallid Bat and Townsend's Big-eared Bat. Pallid bats, Townsend's big-eared bat, and other bat species could roost in the buildings and large trees near the trail alignments, but no sign of roosting bats was observed in the buildings or trees during LSA's reconnaissance survey. The buildings are likely situated far away enough from the trails, that the potential roost sites would not be impacted, but large trees adjacent to the trails could provide suitable habitat for roosting bats. A pre-construction survey for bat roosts should be conducted within work areas that are adjacent buildings and large trees to avoid potential impacts roosting bats. The HCP/NCCP requires pre-construction surveys and the implementation of avoidance measures for Townsend's big-eared bat.

Jurisdictional Waters

Several creeks, streams, drainages, seasonal wetlands, ponds, and other potential wetland features subject to U.S. Army Corps of Engineers (Corps) jurisdiction pursuant to Section 404 of the federal Clean Water Act occur within the project site (**Figure 3.7-1**). The proposed trails will avoid these features. Free-spanning bridges will be constructed where trails need to cross jurisdictional creeks and drainages. Implementation of standard Best Management Practices (BMPs) and project-design features are expected to avoid potential erosion and other potential impacts to water quality of the adjacent wetlands and drainages both during and after construction. The HCP/NCCP requires implementation of avoidance and minimization measures to protect the portions of the streams occurring along the project site.

Sensitive Natural Communities

The CDFW tracks the occurrences of natural plant communities that are of limited distribution statewide or within a county or region and are often vulnerable to environmental effects of projects. A Manual of California Vegetation, Second Edition (Sawyer et al. 2009), lists vegetation alliances with State rarity rankings of S1-S3 as considered "highly imperiled" and project impacts to "high-quality occurrences" of these alliances could be considered significant under the California Environmental Quality Act (CEQA). Most types of wetlands and riparian communities are also considered sensitive natural communities due to their limited distribution in California. The CNDDDB does not identify any sensitive natural communities on the site (CDFW 2019).

Salt grass flats (*Distichlis spicata* Herbaceous Alliance) was observed along the drainage and creek channels and within the seasonal wetlands. This plant community has a G5 S4 ranking, which means globally this community is secure due to its worldwide abundance and statewide there are more than 100 viable occurrences, so it is not a rare community, but should be avoided.

Protected Trees

Several trees are growing on the project site, but most of which are situated along Marsh Creek. Most of these trees are considered protected trees as defined by Contra Costa County's Protected Tree Ordinance (Contra Costa County Code [CCCC] Title 8, Chapter 816-6)³. As currently proposed, construction of project site will not impact any protected trees. If protected trees are impacted, such as the proposed crossing at Marsh Creek, a tree removal permit will be needed from the County. Additional

³ Trees protected by ordinance - CCCC Title 8, Chapter 816-6 defines a protected tree as any native tree measuring 6.5 inches or greater diameter at breast height (DBH), any multi-stemmed tree with the sum of the circumferences measuring 13 inches or greater in diameter at DBH, or any significant grouping of trees, including groves of four or more trees.



impacts to the trees along Marsh Creek would also need a CDFW Streambed Alteration Agreement permit and possibly a permit from the Regional Water Quality Control Board.

Nesting Birds

Nests of all native bird species are protected under Section 3503 of the California Fish and Game Code, which prohibits the take, possession, or needless destruction of the nest or eggs of any bird. The trees and shrubs on the site provide nesting habitat for resident bird species such as white-tailed kite (a California Fully Protected Species), California scrub jay, and mourning dove, among others, while the grasslands provide nesting habitat for northern harrier, western meadowlark, and other ground-nesting birds. If conducted during the nesting season (typically defined by CDFW as February 1 to August 31), project activities could impact nesting birds by removing vegetation containing active nests and/or causing nest abandonment and subsequent reproductive failure due to prolonged loud construction noise. Potential impacts to nesting birds are typically addressed under CEQA with preconstruction nest surveys and avoidance (activity outside the breeding season or establishment of buffers) of active nests incorporated into the project description or as a mitigation measure in a project's CEQA document (e.g., Initial Study or Environmental Impact Report).

Design Considerations

The primary biological constraints to the development of the proposed trails includes; 1) potential impacts to wetlands and creeks; 2) the presence of suitable habitat for special-status species mentioned above; 3) the presence of sensitive natural communities within or immediately adjacent to the trail alignments; 4) the potential presence of nesting birds (including nesting special-status birds) protected under the California Fish and Game Code; and 5) the potential presence of roosting bats (including special-status bats). Lists of recommendations for additional surveys/studies and potential regulatory permits are also provided.

The following measures should be incorporated into the project to avoid potential impacts to jurisdictional waters, special-status plants, California tiger salamander, California red-legged frog, Alameda striped racer, western pond turtle, San Joaquin kit fox, nesting special-status and common birds, and roosting bats.

Jurisdictional Waters. Several ponds, wetlands, and creek/drainage channels are located near the trail alignments. The ponds and wetlands can likely be avoided, but up to nine creek/drainage crossings are proposed. Where possible, the crossings should completely span the creek/drainages without having an abutments constructed within or along the banks of the channels. Also, the crossings should avoid impacts to riparian vegetation that may be present along the creeks/drainages. Impacts to the creeks, drainages, and riparian vegetation would like require a Corps 404 nationwide permit, Regional Water Quality Control Board 401 Water Quality Certification, and CDFW 1602 Streambed Alteration Agreement.

Special-Status Plants. Prior to the initiation of construction, protocol-level surveys should be conducted to verify the absence of special-status plants. The surveys should be conducted in accordance with the CDFW's *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities* (CDFW 2018).

California Tiger Salamander, California Red-legged Frog, Alameda Striped Racer, Western Pond Turtle, San Joaquin Kit Fox, and American Badger. Prior to construction, a qualified biologist should survey the construction footprint and suitable habitat within 300 feet of the project site for California tiger



salamander, California red-legged frog, Alameda striped racer, western pond turtle, San Joaquin kit fox, and American badger. An exclusion (silt or equivalent) fence should be placed around the perimeter of the construction area to avoid potential impacts to these species, which may try to disperse through the area. The fence may also serve to prevent sediment from entering the wetlands and drainages adjacent to the project site. A qualified biologist should monitor the initial habitat disturbance during construction (e.g., grading, grubbing) to ensure no special-status species are affected.

USFWS and/or CDFW may recommend preparation of a formal California red-legged frog site assessment in accordance with USFWS guidelines (USFWS 2005) and California tiger salamander site assessment.

Nesting Birds. If any construction activities (e.g., grubbing, grading, vegetation/tree removal) are scheduled during the bird nesting season (typically defined by CDFW as February 1 to August 31), a qualified biologist should conduct a preconstruction survey for nesting birds no more than 14 days prior to the start of work. If the survey indicates the presence of nesting birds, the biologist should delineate a buffer zone where no construction will occur until the biologist has determined that all young have successfully fledged. The size of the buffer(s) should be determined by the project biologist and be based on the nesting species and its sensitivity to disturbance. Typical buffer zones are 50 feet for passerines and up to 300 feet for raptors. Nests should be monitored regularly to determine if construction activities are affecting the nesting activities and when young birds have fledged.

Burrowing Owl. Construction of the trails could impact breeding or wintering burrowing owls through general disturbance if work is conducted near an occupied burrow. A qualified biologist should conduct a pre-construction/take avoidance survey for burrowing owls using the methods described in the CDFW 2012 Staff Report on Burrowing Owl Mitigation (Staff Report). If no burrowing owls are detected during the initial take avoidance survey, a final survey should be conducted within 24 hours prior to ground disturbance to confirm that owls are still absent.

Roosting Bats. A qualified biologist should conduct a pre-construction survey for roosting pallid bats and other bat species at all suitable at roosting habitat at the buildings or trees adjacent to the trail alignment within 14 days prior to the beginning of construction. If active bat roosts are discovered or if evidence of recent prior occupation is established, a buffer should be established around the roost site until the roost site is no longer active.

Goal (Trail 1): Design trails and manage use to preserve natural and cultural resources and provide for optimum visitor experiences.

Guidelines

- Develop a maintenance plan for trails to ensure minimal operations efforts, minimization of erosion, and implementation of best management practices in keeping with resource management goals.
- Map wildlife corridors to minimize or avoid developing trails that bisect these corridors or fragment habitats.
- Locate trails where they will not damage cultural resources or wetlands, vernal pools, or other environmentally sensitive habitats and resources.
- Establish a trail monitoring program to ensure that resources are not being damaged from trail use.



Goal (Trail 3): Provide an appropriate amount of trails in a variety of locations throughout the Park.

Guidelines

- Use old ranch roads as trails as an alternative to building new trails and/or reducing the amount of new trails required, if these can be designed sustainably and according to California State Parks trail requirements.

Goal (VEG 1): Protect, maintain, and where appropriate, restore locally and regionally important native plant communities.

Guidelines

- Prepare a vegetation management plan and associated maps that will, where feasible, approximate the landscape as it was when Native California Indians lived here and that is linked to the Park's cultural resource goals.
- Identify tools and techniques, such as prescribed fire, to manage unique communities, including vernal pools, alkali sink scrub, and native grasslands.
- Restore native plant communities, including oak woodland/savannah, native grasslands, and riparian forest along Marsh Creek and other drainages.
- Cooperate with regional conservation plans and policies, including the East Contra Costa County HCP/NCCP, so long as such programs are consistent with the Park's natural resources goals.
- Encourage interested parties, such as local groups and university researchers, to study and monitor native plant communities in the Park.

Goal (VEG 2); Manage special-status plants and sensitive plant communities for habitat enhancement and protection of special-status species.

Guidelines

- Comply with the State and Federal Endangered Species Acts and other applicable regulations aimed at the protection of special-status plant species and sensitive communities when planning and implementing park projects or management programs.
- Update existing inventories to further document and map locations of special-status species and their habitats.
- Maintain a GIS-based sensitive species database for the Park, including mapped locations of occurrences and specialized habitats, listing status, and current population trends.
- Encourage the continuation of research in the Park and promote partnerships with research institutions and regulatory agencies to protect and enhance special-status species.
- Conduct a feasibility analysis for reintroduction of extirpated species that historically occurred at the Park.
- Minimize conflicts between special-status species management and public use.



Goal (VEG 3): Protect native plant communities and special-status plants, and effectively manage invasive and non-native species.

Guidelines

- When implementing habitat restoration projects and landscaping around facilities outside the Primary Historic Zone, use native species that are appropriate to the site and that are obtained from native plant species within Park boundaries or closely surrounding areas. This includes transplanted cuttings and rootstocks or seedlings and saplings grown from collected seed that are genetically compatible. Ensure that all mulches are free of foreign seed.
- Identify invasive and non-native species at the Park and prepare a management plan to manage and remove these species over time. Priority for control efforts should be given to those species that are most invasive, ecologically detrimental, and/or conspicuous at the Park. Maintain a database on distribution and abundance of target populations. Coordinate with the Bay Area Early Detection Network (BAEDN) and use the BAEDN target weed list as a resource for regional invasive species information. State Parks Weed Information Mapping System (WIMS) is an appropriate protocol to use for weed mapping.
- Avoid fragmentation of large intact habitat areas when constructing new facilities and siting trails.
- Provide visitors with information about invasive species damage to native communities and control efforts.
- Coordinate with adjacent park and open space management agencies to facilitate management of invasive species.

Goal (VEG 4): Preserve the diversity of the Park's native grasslands.

Guidelines

- Identify stands of native grasslands and develop a plan to restore this habitat to appropriate locations within the Park.
- Consult with experts and review existing reports on grasslands and other California State Parks policies for current information on preservation and management of native grasslands.
- Evaluate the use of native grassland management tools and their beneficial or detrimental effects to native species and wetland resources as part of an overall Park vegetation management plan. Potential grassland management tools could include, but are not limited to, the use of prescribed burning, grazing, mowing, and herbicides.
- If the vegetation management plan identifies grazing as an appropriate grassland ecosystem management tool for the Park, develop a grazing management plan to ensure proper grazing management for the benefit of resources.

Goal (WLIFE 1): Protect, conserve, and enhance existing native wildlife populations and their habitats.

Guidelines

- Conduct additional wildlife inventory and mapping efforts to supplement on-site species surveys.
- Reduce wildlife access to human food and garbage by using wildlife-proof trash containers throughout the Park, including administration, camping, day use, and lodging areas.



- Control exotic animal populations (e.g., bullfrogs, predatory fish) in areas where they threaten native populations.
- Monitor populations of pest animals such as feral cats, wild dogs, and feral pigs to evaluate the effect on native populations and to provide information for developing control programs.
- Encourage and allow investigations of wildlife in the Park, including the distribution and occurrence of special-status species and their habitats, to further understanding of wildlife resources and their condition.

Goal (WLIFE 2): Protect, conserve, and enhance ecosystems that provide important wildlife habitat values.

Guidelines

- Protect, preserve, and monitor important habitat features such as riparian trees, mature trees with cavities, downed trees, and snags, where they do not conflict with health and safety issues.
- Promote ground squirrel populations in order to support predator populations and other burrow-associated wildlife species, where compatible with other management goals.
- Avoid disturbance to important wildlife habitats including oak woodland/savannah, native grasslands, vernal pools, wetlands, and riparian forest.
- Enhance areas that support or potentially support special-status species or other important wildlife species.
- Assess stock ponds and other artificial aquatic habitats in the Park to determine their importance to native species. Develop a pond maintenance/removal plan that balances the preservation of special-status wildlife populations in ponds with the prevention of downstream erosion.
- Work with stakeholders in the vicinity of the Park to coordinate efforts to restore habitats and preserve habitat linkages.

Goal (WLIFE 3): Manage the Park's wildlife habitats for the protection and perpetuation of special-status wildlife species.

Guidelines

- Develop a comprehensive management plan for special-status species in the Park, with recommendations for maintaining self-sustaining populations.
- Protect special-status wildlife species occurring within the Park. Establish a monitoring program for known special-status wildlife locations on a long-term basis to develop baseline data, assess the health of the populations for future management, and take corrective actions, if necessary.
- Maintain a GIS-based sensitive species database for the Park, including mapped locations of occurrences and specialized habitats, listing status, and current population trends.
- Before construction of facilities and trails, survey site-specific areas of potential impact for the presence of special-status species to avoid and minimize adverse impacts to wildlife, their movement, and habitat.
- Institute seasonal prohibition of activities during breeding periods and enact appropriate mitigation measures if needed (e.g., buffer zones, restricted access) to adequately protect special-status species during critical times of the year (e.g., breeding season, dispersal).



Goal (WLIFE 4): Preserve the biodiversity and genetic integrity of local wildlife populations, where possible.

Guidelines

- Utilize the East Contra Costa County HCP/NCCP to assist in identification and mapping of existing wildlife corridors and explore opportunities to enhance wildlife corridors.
- Ensure that new facilities, land uses, and management activities avoid habitat fragmentation and comply with local, State, and federal regulations when applicable.
- Cooperate with regional conservation plans and policies, including the East Contra Costa County HCP/NCCP when such programs are consistent with Park’s natural resources goals.

3.5 Cultural Resources

Cultural resources consist of sites, buildings, structures, objects, and districts that may have traditional or cultural value for their historical significance. Examples of cultural resources include precontact (Native American) and historic-period archaeological sites, and historic buildings, dams, and roads of architectural or engineering significance.

Existing Conditions

A records search and a cultural resources field review were done to identify the existing conditions for cultural resources in the study area. The records search was done at the Northwest Information Center (NWIC) at Sonoma State University on February 22, 2019. The NWIC is the state’s regional repository for cultural resource records and reports for Contra Costa County. A Registered Professional Archaeologist conducted the cultural resources field review on July 24, 2019. The field review was done to confirm the baseline conditions of previously recorded cultural resources within the proposed trail alignments. The results of these tasks are summarized below.

Northwest Information Center Records Search. The records search identified 23 recorded cultural resources within approximately 0.1 miles of the proposed trail alignments. These resources are briefly summarized below in **Table 3.5**. Previous determinations for listing in either the National Register of Historic Places (NRHP) or California Register of Historical Resources (CRHR) by consultants or the California Office of Historic Preservation are noted in the table. The locations of cultural resources have been provided to project engineers and other project decision-making staff to disclose the project’s potential impacts to cultural resources. Locational information regarding archaeological cultural resources is not publically accessible to prevent unauthorized collection and vandalism of significant resources.

The proposed trail alignments have been subject to previous cultural resource surveys, including in the early 1990s for the Cowell Ranch Project (Samuelson et al. 1993), in 2009 for the Marsh Creek Dam Rehabilitation Project (Rosenthal and Meyer 2009), and in 2010 for the Marsh Creek Road Shoulder Widening Project (Strother 2010). At precontact and historic-period cultural resource P-07-000037 (CA-CCO-18/548/H), which is within the proposed trail alignments, extensive archaeological excavations and geoarchaeological explorations have occurred over the past 25 years (Harrington et al. 1995; Meyer 2015; Rosenthal and Meyer 2009; Wiberg 2010). These studies have confirmed the presence of an extensive, highly significant cultural resource. CA-CCO-18/548/H is described in more detail in the Constraints and Challenges section below.



Cultural Resources Field Review. The field review confirmed the presence of cultural resources at and adjacent to the proposed trail alignments. Photographs and notes were taken to document the conditions of the resources at the time of the field review. Cultural resources recorded in or immediately adjacent to the proposed trail alignments are described below.

Note that the field review conducted for this study was limited in scope and does not fully account for potential, previously unrecorded cultural resources within the proposed trail alignments. Please see the Design Considerations section below for recommendations regarding additional study of cultural resources.

Table3.5: Cultural Resources within 0.1 Mile of Trail Alignments

Resource Identification	Resource Type	Description	Comments
P-07-000037 (CA-CCO-18/548/H)	Precontact/Historic-Period site	Native American habitation site with human burials; Historic features and artifacts	NRHP Listed
P-07-000045 (CA-CCO-27)	Precontact site	Bedrock mortar	Presumed destroyed
P-07-000417 (CA-CCO-660)	Precontact site	Possible house pit depressions	Does not appear NRHP/CRHR eligible
P-07-000418 (CA-CCO-661)	Precontact site	Habitation site	Resource could not be relocated during 2008 survey
P-07-000420 (CA-CCO-663H)	Historic site	Ranch remains	Does not appear NRHP/CRHR eligible
P-07-000428 (CA-CCO-671H)	Historic site	Ranch remains	Does not appear NRHP/CRHR eligible
P-07-000429 (CA-CCO-672H)	Historic site	Ranch remains, water conveyance	Does not appear NRHP/CRHR eligible
P-07-000434 (CA-CCO-677H)	Historic site	Farmstead	Does not appear NRHP/CRHR eligible
P-07-000479 (CA-CCO-700)	Precontact site	Lithic scatter with possible fire-affected rock	N/A
P-07-000758	Historic site	Ranch complex	Does not appear NRHP eligible
P-07-000759	Historic site	Dam	N/A
P-07-002928	Historic site	Ranch remains	N/A
P-07-002929	Historic site	Structural remains	N/A
P-07-002930	Historic site	Structural remains	N/A
P-07-002931	Historic site	Structural remains	N/A
P-07-002936 (CA-CCO-800)	Precontact site	Buried deposit with fire-affected rock	N/A
P-07-002938	Historic site	Stock pond and dam	N/A



Resource Identification	Resource Type	Description	Comments
P-07-002939 (CA-CCO-802)	Precontact site	Buried deposit with fire-affected rock, charcoal, and soil	N/A
P-07-002951	Historic structure	Transmission line	Does not appear NRHP eligible
P-07-002956	Historic district	Transmission line	Appears NRHP eligible
P-07-002991	Historic structure	Dam	Does not appear NRHP/CRHR eligible
P-07-003120	Precontact isolate	Chert artifact	Does not appear NRHP/CRHR eligible
P-07-004697	Precontact/Historic district	Los Vaqueros District	Eligible for NRHP; listed in CRHR

Source: Northwest Information Center

Note: Cultural resources have not been field checked for the current project.

NRHP = National Register of Historic Places

CRHR = California Register of Historical Resources

Constraints and Challenges

The proposed trail alignments are near several recorded cultural resources. Project construction, including equipment staging, could potentially impact significant cultural resources, resulting in a substantial adverse change in the significance of a historical resource under CEQA and an adverse effect on a historic property under Section 106 of the National Historic Preservation Act. These impacts could result from the physical demolition, destruction, relocation, or alteration of a cultural resource or its immediate surroundings such that the significance of a historical resource would be materially impaired from due to a loss of integrity. A loss of integrity could potentially occur from project ground disturbance or from unauthorized collection of archaeological materials due to public access to archaeologically sensitive areas.

Based on the NWIC records search, numerous cultural resources are recorded near the proposed trail alignments (**Table 3.5**). Seven of these cultural resources are within or adjacent to the proposed trail alignments and are described below.

P-07-000037. This resource consists of an extensive Native American occupation site, characterized by midden, hundreds of human burials, and scattered artifacts. Although possibly best known for its Early Period—or Middle Archaic—assemblage, Middle Period and Late Period components have also been identified.

On August 8, 2012, the California State Historic Preservation Officer submitted a nomination for this resource to the Keeper of the NRHP, stating the following:



“CA-CCO-548/H⁴ has yielded a prehistoric burial population of over 480 individuals, providing a rare opportunity to research into site structure, cultural chronology, and subsistence and settlement data. In addition, the site offers researchers a rich opportunity to conduct studies on the regional and interregional exchange networks, and mortuary treatments and human osteological data that a site of this magnitude can provide. The prehistoric burial population represents the largest known interment of human remains for the Middle Archaic Period (7500-2500 BP) in California and will likely provide data that will expand and enrich our knowledge for this and subsequent time periods in the Central Valley and San Joaquin/Sacramento Delta regions.”

The site was formally listed to the NRHP on September 25, 2012 under Criterion D for its ability to yield information important in prehistory. The site is also listed in the CRHR.

P-07-000417. This resource consists of four possible precontact housepit depressions on a ridgeline. The depressions measure approximately 3 to 5 meters in diameter and range from 20 to 50 centimeters deep. No artifacts were observed on the surface of the site when recorded in 1993 (Samuelson et al. 1993).

Samuelson et al. (1993) document four 50 cm x 50 cm test pits that were excavated at the site: one in the center of each housepit, and two shovel probes between the housepits. The test pit excavations extended from 40 to 60 cm below surface; the shovel probes were approximately 30 cm deep. A possible flake and charcoal were observed during the excavation. The classification of these features as housepits was questioned based on the absence of artifacts at the site, and the resource does not appear eligible for listing in the NRHP (Samuelson et al. 1993:81-82).

The field review identified this resource on a ridgeline that roughly parallels Marsh Creek Road to the south. Grasses and forbs, ranging from 1 to 2 feet tall, obscured much of the native ground surface, although the general depressions that Samuelson et al. (1993) noted were observed. The lack of artifacts observed at this location and the distance to a water source—approximately 750 feet to the north down a moderately steep slope to access an ephemeral stream—suggest that the depressions may not be housepits.

P-07-000428. This resource consists of a circa 1940s fenced area with a cattle corral, chute, and pens that were originally recorded by Samuelson et al. in 1993. Rosenthal prepared an updated record of the site in 2008, describing it as “dilapidated” with most of the horizontal boards missing (Rosenthal 1993).

This resource likely does not meet any of the criteria for listing in the NRHP and CRHR, as noted by Samuelson et al. (1993:80):

“Although additional archival research or oral history might shed light on its age and construction, it is doubtful that it would prove to be associated with persons important in history, or the work of a master. The information gathered during site recording comprises the available data at the site.”

⁴ P-07-000037 is also referenced in the literature according to its State trinomials: CA-CCO-548/H and CA-CCO-18.



The field review identified this resource on the eastern terrace of Marsh Creek, near the proposed “C-7” trail crossing to the north of Marsh Creek Road. Remnant components of this resource still exist, as previously described in 1993 and 2008 resource records. The cattle chute, however, is in a greater state of disrepair since last recorded in 2008, and the overall condition of the resource is poor.

P-07-002930. This resource consists of a 2.1 m x 1.4 m diameter pile of locally available, water-rounded cobbles. The age of this feature is not known, but it is speculated to be an isolated historic-period ranching feature created when rocks were emplaced to fill a hole to prevent injury to cattle (Rosenthal 2008). A formal evaluation of this resource to determine its eligibility for listing in either the NRHP or CRHR has not been completed.

The field review identified the location of this resource as approximately 200 feet to the east of an existing ranch road and a proposed trail alignment. No changes to the condition of this resource since last recorded in 2008 were observed.

P-07-002991. This resource consists of the Marsh Creek Dam and was constructed in 1962. As recorded, this resource encompasses approximately 375 acres and consists of the Marsh Creek Dam and reservoir, south to Marsh Creek Road/Camino Diablo Road, and approximately 500 meters west and 250 meters east of either side of Marsh Creek Road.

In 2007, JRP Historical Consulting evaluated Marsh Creek Dam for its eligibility for listing in the NRHP and CRHR (Beason and Jones 2007). That evaluation determined Marsh Creek Dam is not eligible for either the NRHP or CRHR due to a lack of historical significance. As noted in the evaluation, Marsh Creek Dam is not important for its association with flood control measures in regional, state, or national history. Research did not indicate a significant association with a historically significant engineer or master builder. The resource does not embody distinctive characteristics of a type, period, or method of construction as it is of a common design and represents no particular engineering achievement within the context of late 20th-century dam construction. Finally, the dam has not yielded, and does not have the potential to yield, information important in history.

As the Marsh Creek Dam is not eligible for listing in either the NRHP or CRHR, it warrants no specific protections from project construction within the regulatory contexts of CEQA or the NHPA.

The field review identified the location of Marsh Creek Dam and its associated elements, as recorded in 2007. No changes to the condition of this resource were observed since last recorded in 2007.

P-07-003120. This resource consists of an isolated chert scraper tool. Isolated artifacts are typically not considered eligible for listing in either the NRHP or CRHR.

The field review did not identify this resource.

P-07-004697. This resource consists of the Los Vaqueros/Upper Kellogg Creek Historic District. This historic district was proposed as part of the Los Vaqueros Reservoir Project and was described as encompassing 77 precontact and historic-period components (Sonoma State University Academic Foundation 1992). There are no documented contributing elements of this district in the proposed trail alignments.



The California Office of Historic Preservation assigned a status code of “2S2” to this resource, indicating that the district is eligible for listing in the NRHP and is listed in the CRHR.

Design Considerations

The proposed trail as currently mapped would intersect P-07-000037, an extensive archaeological historic property that is listed in the NRHP and CRHR. Ground disturbance and increased visitation at this location have the potential to cause a substantial adverse change to a historical resource under CEQA and an adverse effect to a historic property under the Section 106 guidelines (36 CFR 800.5). Design and construction of the proposed trail should adhere to the goals and guidelines presented in the 2012 Marsh Creek State Park General Plan. Guidelines relevant to the protection of significant cultural resources from those documents are presented below.

In addition to the goals and guidelines cited below, a formal cultural resources inventory should be completed of the selected proposed trail alignment. The project proponent should also consult with the California State Parks District Archaeologist early in the planning process to identify project-specific conditions for avoiding potential impacts to P-07-000037. If the proposed project cannot avoid P-07-000037, appropriate mitigation measures and treatments to resolve adverse effects must be identified as part of the environmental review process accounted for by CEQA and Section 106 of the National Historic Preservation Act.

Goal (Trail 1): Design trails and manage use to preserve natural and cultural resources and provide for optimum visitor experiences.

Guidelines

- Develop a maintenance plan for trails to ensure minimal operations efforts, minimization of erosion, and implementation of best management practices in keeping with resource management goals.
- Locate trails where they will not damage cultural resources or wetlands, vernal pools, or other environmentally sensitive habitats and resources.
- Establish a trail monitoring program to ensure that resources are not being damaged from trail use.

Goal (Trail 3): Provide an appropriate amount of trails in a variety of locations throughout the Park.

Guidelines

- Use old ranch roads as trails as an alternative to building new trails and/or reducing the amount of new trails required, if these can be designed sustainably and according to California State Parks trail requirements.

Goal (CUL 1): Protect, stabilize, and when possible, preserve all cultural resources located within the Park in accordance with PRC Section 5019.59 pertaining to the classification of a State Historic Park, PRC Sections 5020 et seq., Executive Order W-26-92, and the Department’s Cultural Resource Management Directives.

Guidelines

- All projects or undertakings in the Park will avoid or minimize impacts to cultural resources.



- All projects or undertakings in the Primary Historic Zone that involve ground breaking will involve a qualified archaeologist and a Native California Indian monitor.
- In the case pre-historic human remains are inadvertently encountered during a Park project or undertaking, all work in the area will cease and the following procedures, as identified in the Department's Cultural Resources Handbook, will be followed: the archaeologist and monitor will contact the District Superintendent, secure the area of the find, and contact the County Coroner. The County Coroner will determine if the remains are pre-historic or not and, if they are, the Coroner has 24 hours to notify the Native American Heritage Commission.

Goal (CUL 2): Complete an inventory to identify and document all cultural resources in the Park, as well as delineate the precise boundaries of the archaeological resources within the Primary Historic Zone.

Guidelines

- Systematically survey and document (Archaeological Survey Report, DPR 523 records, etc.) all of the Park's cultural resources.
- GPS record and map all cultural resources in the Park and create a GIS layer of the information.
- Identify potential properties to the National Register, for example, the potential John Marsh Historic District and any potential cultural landscapes, traditional cultural properties, or sacred sites.
- Conduct a limited, subsurface testing program to determine the extent of CA-CCO-18/548H.

Goal (CUL 3): Prior to site-specific project implementation in the Primary Historic Zone, prepare a parkwide Cultural Resources Management Plan (CRMP), based on the findings in the inventory.

Guidelines

- The CRMP will include procedures to minimize damage to all cultural resources, both prehistoric and historic, through a review process and the application of best management practices.
- The CRMP will address Native California Indian access to the Park for ceremonial, spiritual, and gathering activities and will inform Native American groups that certain Native American practices, such as the gathering of traditional materials, require a permit when performed within State Park lands. Native American gathering permits allow for the managed gathering of materials, prevent inadvertent significant impacts to natural resources, and promote adherence to departmental mandates or policies regarding natural resources or other park procedures, facilities, or resources, while enabling State Park rangers and other staff to be aware of and supportive of such practices.
- The CRMP will provide interpretive language that addresses the history and ongoing evolution of contemporary Native California Indian people and cultures associated with the Park.
- The CRMP will identify stakeholders and/or park partners that may potentially join a park advisory group.

Goal (CUL 4): Prior to site specific project implementation in the Primary Historic Zone, establish an advisory group of partners bound by a Memorandum of Understanding (MOU) between California State Parks, the Native American Heritage Commission (NAHC), the Native California Indians identified and maintained on the Most Likely Descendants (MLD) list, and possibly the State Historic



Preservation Officer (SHPO), to work in conjunction with each other on site specific facility development plans.

Guidelines

- The District Superintendent and a Department Cultural Resource Specialist(s) will represent California State Parks.
- A designee will represent the NAHC.
- A designee will represent the Native California Indians identified on the MLD list.
- A designee may represent SHPO.
- Additional designees may be identified.

Goal (CUL 5): Prior to site specific project implementation in the Primary Historic Zone, prepare an Archaeological Resources Treatment Plan (ARTP), in accordance with the advisory group's MOU, which stipulates measures and specific procedures in the event of the discovery of significant cultural resources including artifacts, objects, features, as well as Native American human remains, during any ground disturbing projects, facility development, or other unanticipated discoveries.

Guidelines

- The ARTP will provide a framework for all future site specific development in the Primary Historic Zone.
- Preservation in place and avoidance of significant archaeological resources will be the preferred manner of mitigating impacts.
- Project managers will develop project descriptions in consultation with the advisory group during the pre-planning phase of site specific projects in the Primary Historic Zone.
- Develop an archaeological monitoring program under the direction of the advisory group to monitor all facility development and ground disturbance activity in the Primary Historic Zone.
- The ARTP will address the care of non-burial related artifacts in consultation with the advisory group.

Goal (CUL 6): Manage the use and maintenance of the National Register listed John Marsh House and the National Register nominated archaeological site CA-CCO-18/548H according to the United States Secretary of the Interior's Standards and Guidelines for the Treatment of Historic Properties.

Guidelines

- Develop a plan for pursuing stabilization and possible rehabilitation of the John Marsh House.
- Retain and protect existing design and historic fabric as much as possible.
- Explore the potential of a John Marsh Historic District to the National Register of Historic Places.
- Maintain the historic viewshed.



Goal (CUL 7): Expand the understanding of the context for the historic cultural landscape as it relates to the landholdings in the Park beyond the John Marsh House area and era.

Guidelines

- Retain a ranch-like character in the Primary Historic Zone that does not have an adverse effect on either the National Register listed or eligible cultural resources.
- Develop a 20th century historic context within which to document and evaluate the ranching complex and related historical archaeological sites.
- Document and evaluate additional elements of the cultural landscape such as features associated with ranching and agriculture and other contributors to a historic rural landscape, using the National Register and California Register criteria.
- Consult cultural landscape specialists before implementing projects that may affect or have negative impacts on cultural landscape contributing elements and features.

3.6 Geology and Soils

Existing Conditions

Regional Geology

The Trail Feasibility Study Area is located in the North Coast Ranges geomorphic province, near the transition to The Great Valley province (the Sacramento-San Joaquin Valley), which lies to the east-northeast. The Coast Ranges geomorphic province is characterized by a system of northwest trending mountain ranges and intervening generally north-west trending valleys, with the overall structure oriented sub-parallel to the major faults in northern California, including the San Andreas, Hayward, and Calaveras Faults. Tertiary and younger alluvial and estuarine sediments throughout the San Francisco Bay Area overlie two highly deformed Mesozoic basement rock complexes. These complexes consist of the Coast Range Ophiolite, the overlying Great Valley formation rock sequence, and the Franciscan Complex.

The Coast Range Ophiolite consists of serpentinite, gabbro, diabase, basalt, and chert and is characterized by obduction of oceanic crust onto continental crust along the California coast during the Middle and Late Jurassic. The Great Valley Formation is a sequence of thick accumulations of marine clastic rocks that were deposited in a forearc basin situated between the Sierran magmatic arc to the East and the Franciscan subduction complex to the west during the Late Jurassic through the Cretaceous.⁵ Portions of both the Coast Range Ophiolite and the Great Valley Sequence outcrop in the Diablo Mountain Range along the eastern edge of the Bay, to the southwest of the Study Area.

The other basement rock complex in the greater Bay Area is the Franciscan Complex. This Complex was deposited in a subduction zone that formed over one hundred million years ago when plate motions were largely convergent and the off-shore Farallon Plate was being subducted beneath the continental North American Plate. Portions of the subducted oceanic crustal material was scraped off the subducting plate and metamorphosed under low temperature and low to high pressure. The mixed and metamorphized sedimentary material has been extensively folded, faulted and deformed to create what

⁵ Department of the Interior U.S. Geological Survey, 1990. Review of the Great Valley sequence, eastern Diablo Range and northern San Joaquin Valley, central California. Open-File Report 90-226.



is called a “mélange” or rock mix. The mélange includes generally coherent blocks of greywacke sandstone, greenstone, blueschist, and eclogite in a matrix of highly sheared shale. Rocks exposed in the hills in the vicinity of the Study Area overlie these basement complexes and consist of sandstone, shale, siltstone and conglomerate of the Tertiary age Tulare, Markley and Cierbo formations.⁶

Topography

Elevations in the Study Area range from approximately 110 feet above mean sea level (msl) at the lowest point to approximately 500 feet msl at the highest location. The area is characterized by open, rolling and gently to strongly sloping, grass-covered hills, with scattered valley oak, and with seasonal wetlands occupying small valleys and swales.

Site Geology

The Study Area is underlain by Upper Cretaceous marine sedimentary rocks of the D and E Units of the Great Valley Sequence, Eocene marine sedimentary rocks of the Meganos Formation, and Quaternary alluvium along Marsh Creek and Briones Creek. **Figure 3.6-1** provides a compiled geologic map of the Study Area. More than an estimated 80 percent of the Study Area is underlain by rocks of the Great Valley Sequence. In the Study Area these rocks consist of a sandstone classified as Unit D, upper and lower sections of Unit E which consists of siltstone, and the Deer Valley Sandstone.

The Eocene-age Meganos Formation makes up the northern flank of Mount Diablo and consists of canyon-fill deposits and alluvial fan deposits. The remaining geologic unit in the map area is Quaternary-Holocene alluvium which consists of stream deposits of unconsolidated boulder, cobble, sand, and silt. The alluvium covers rocks of the Great Valley Sequence, Units D and E in the Marsh Creek and Briones Creek valleys and underlies large portions of the proposed trail pathway.

Landslides

According to the California Department of Conservation, there are no significant landslide hazards in the area surrounding the proposed trail site.⁷ Generally shallow landslides (**Figure 3.6-2**) occur on clay rich soils and steep slopes within the State Park west of Marsh Creek Reservoir. (ABAG [based on USGS data] 1998).

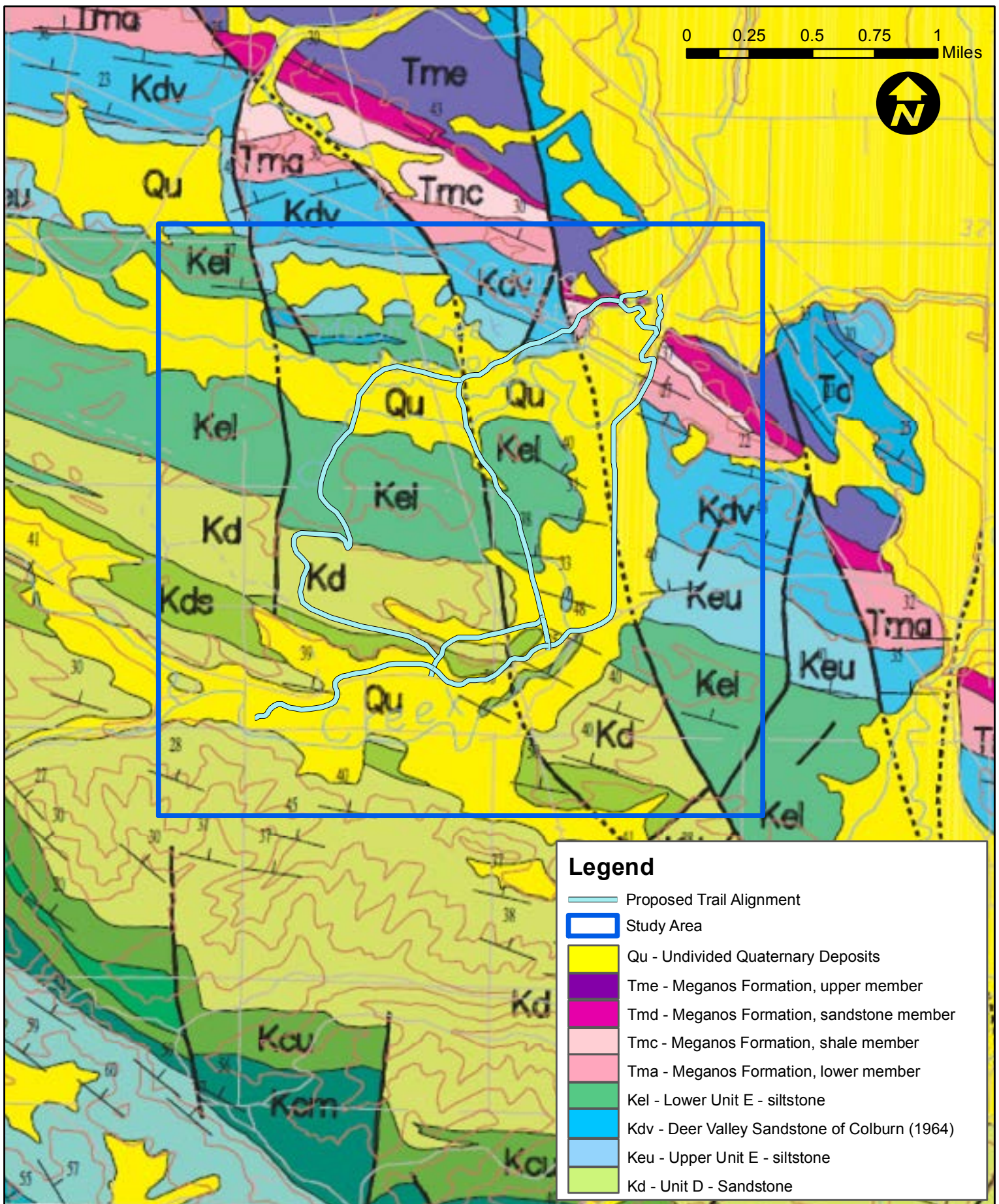
Faulting and Seismicity

Known, active earthquake faults located relatively near the Study Area include the Greenville/Marsh Creek, Calaveras, Concord, and Hayward faults (**Figure 3.6-2**). The Greenville/Marsh Creek and Calaveras faults are located about 5 miles and 15 miles, respectively, southwest of the Study Area. The Concord fault is located about 13 miles to the west, and the Hayward fault is located approximately 26 miles further west. The West Napa Fault is located 15 miles to the north. Movement on this fault was responsible for the Richter scale magnitude 6.0 August 2014 South Napa Earthquake event.

Three localized or short segment faults were identified during the preparation of the City of Brentwood’s “General Plan Update, 2001-2021”. These include the Antioch-Davis fault, the Brentwood Fault, and the Midland fault (RBF 2003). Two of these faults, the Antioch-Davis fault and the Brentwood

⁶ Graymer, R.W., Jones, D.L., and Brabb, E.E., 1994, Preliminary Geologic Map Emphasizing Bedrock Formations in Contra Costa County, California, USGS Open-File 94-622.

⁷ California Department of Conservation: The California Landslide Inventory, 2019.
<https://www.conservation.ca.gov/cgs/landslides>



GEOLOGY MAP
MARSH CREEK TRAIL FEASIBILITY STUDY

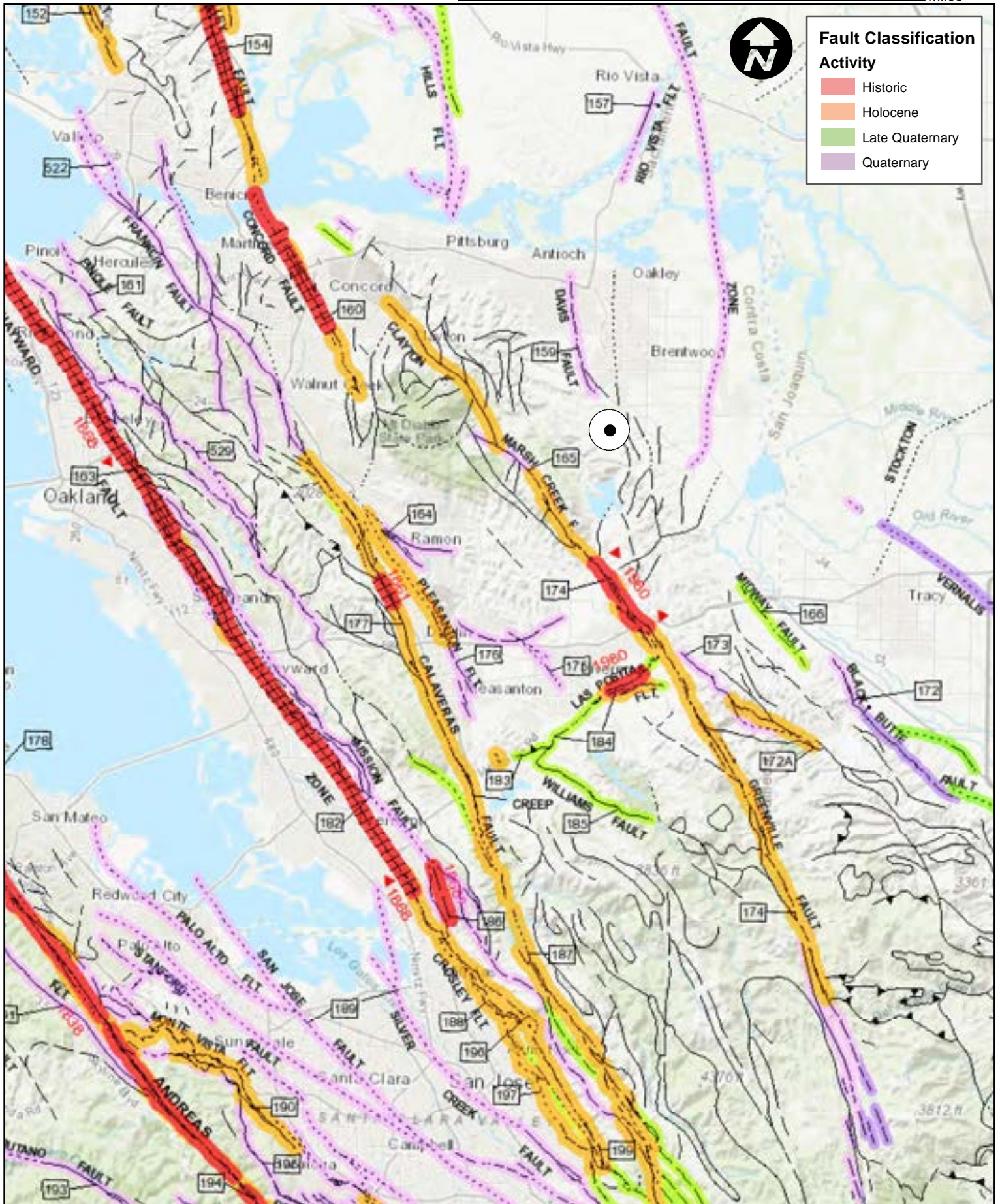
U.S. GEOLOGICAL SURVEY, 1994, PRELIMINARY GEOLOGIC MAP EMPHASIZING BEDROCK FORMATIONS IN CONTRA COSTA COUNTY, CALIFORNIA, OPEN-FILE REPORT 94-622



FIGURE
3.6-1

1 inch = 7 miles

0 6.5 13 19.5 26 Miles



FAULT ACTIVITY MAP
 MARSH CREEK TRAIL FEASIBILITY STUDY

FAULT ACTIVITY MAP OF CALIFORNIA (2010)



FIGURE
3.6-2



fault, are located within the City of Brentwood, just northeast of the Study Area. The Midland fault is located about two miles from the City of Brentwood.

The Antioch-Davis fault is a relatively short, north-northwest trending fault that is approximately 18 miles in length. The Brentwood fault trends in a true north-south direction and is located approximately two miles east of the Antioch-Davis fault. This is within the Vineyards residential subdivision immediately to the north of the Study Area. There is no evidence of recent fault activity (seismic activity in last 70,000 years) on either the Brentwood or the Antioch-Davis faults (ENGEO 2003a as cited in RBF 2003).

The Midland fault is located approximately two miles east of the City of Brentwood. This fault is also north-northwest trending, extending from the Byron area in Contra Costa County and north through Dixon (Solano County) and the Capay Valley in Yolo County. There is also no evidence of recent activity on the Midland fault, although several earthquakes that have occurred in the Vacaville-Winters area are suspected to have possibly originated on this fault.

The Study Area is not located within a mapped Alquist-Priolo Earthquake Fault Zone. A part of the Greenville-Marsh Creek Fault Zone is within a California Geological Survey recognized Alquist-Priolo Fault Zone. However, this area is more than five miles from the Study Area. The well known and regionally active San Andreas Fault is located approximately 45 miles further to the west, but is capable of generating a large, damaging earthquake that would be experienced within the Study Area.

Based on research completed by USGS after the 1989 Loma Prieta earthquake, the Working Group on Northern California Earthquake Probabilities has concluded that there is a 62% probability of at least one magnitude 6.7 or greater earthquake striking the greater San Francisco Bay area before the year 2032 (ABAG 2003). This would be a large earthquake capable of causing widespread damage and injury.

The entire San Francisco Bay Area and nearly all of northern California is a seismically active region. There have been several major earthquakes during the historic period, including the 1868 Hayward Earthquake, the 1906 San Francisco Earthquake, the 1989 Loma Prieta Earthquake, and most recently, the August 2014 magnitude 6.0 South Napa Earthquake.

The California Geological Survey (CGS) has developed probability estimates of peak ground acceleration due to earthquake ground shaking throughout California. The CGS estimated peak ground acceleration within the Study Area is 45% of the acceleration due to gravity. There is a 10% chance of this being exceeded in 50 years.⁸

A moderate to large earthquake centered on any of these faults, or a large earthquake on the more distant San Andreas Fault, would result in strong ground motion and seismic induced shaking within the Study Area of (Modified Mercalli Intensity of VII to IX - strong to violent).

To estimate future seismic events on a particular fault and the potential effect of these earthquake events, an estimate of the potential magnitude of the earthquake must be made. The Maximum Credible Earthquake (MCE) is an estimate of the potential magnitude of seismic events. It is based on the maximum event based on the current understanding of this particular fault, such as seismic history, fault length and the geologic record indicated in materials exposed in an observation trench across a

⁸ Peterson, M.D., Bryant, W.A., Cramer, C.H., Probabilistic Seismic Hazard Assessment for the State of California, California Geological Survey (formerly Division of Mines and geology) Open-File report issued jointly with U.S. Geological Survey, CDMG 96-08 and USGS 96-706, 1996.

fault, and local geology. The Maximum Probable Earthquake (MPE) is also an estimate of potential magnitude of an earthquake. The MPE is based on the maximum event that may be reasonably expected to occur within the next 100 years and therefore are of lesser magnitude and have a greater likelihood of occurrence than MCEs. The MCE and MPE for the faults thought to be active in the vicinity of the Study Area are shown in **Table 3.6-1**.

Table 3.6-1: Maximum Credible and Probable Earthquakes

Maximum Credible and Probable Earthquakes							
FAULT NAME	APPROXIMATE DISTANCE TO PARK	MAXIMUM CREDIBLE MAGNITUDE	MAXIMUM SITE ACCELERATION (G) ¹	PEAK SITE INTENSITY (MM) ²	MAXIMUM SITE ACCELERATION	MAXIMUM SITE ACCELERATION (G)	PEAK SITE INTENSITY
Antioch	1 to 2	6.5	0.36	IX	5.75	0.28	VII to IX
Calaveras	15	7.0	0.13	VIII	6.5	0.10	VII
Concord	13	6.75	0.14	VIII	6.25	0.11	VII
Greenville	5	7.0	0.22	IX	5.25	0.09	VI
Hayward	26	7.5	0.10	VII	6.75	0.07	VI
Midland	2 to 3	7.0	0.40	IX	6.25	0.30	VII to IX
San Andreas	44	8.3	0.08	VII	7.5	0.05	VI

Source: RBF 2003.

¹ G is the acceleration of gravity (9.8 m/s²) or the strength of the gravitational field. When there is an earthquake, the forces caused by the shaking can be measured as a percentage of gravity, or percent g.

² MM is the Modified Mercalli Scale, the most common intensity scale that measures an earthquake's "intensity" on people and buildings. The scale ranges from I to XII; each level corresponds to a level of damage that would be anticipated to occur.

The intensity of ground shaking depends on the distance from the earthquake epicenter to the site, the magnitude of the earthquake, site soil conditions, and the characteristic of the source. The Association of Bay Area Governments (ABAG) provides earthquake hazard maps that identify shaking intensity in the San Francisco Bay region from earthquakes along different faults. Shaking along the Greenville fault and San Andreas fault would result in the greatest intensity of shaking in the Study Area. Shaking intensity in the Study Area from an earthquake at the Greenville-Marsh Creek fault would vary from VII-Strong (nonstructural damage)⁵ to VIII-Very Strong (Moderate Damage)⁶ in the Mercalli Intensity scale (ABAG 2003). Shaking intensity in the Study Area from activity along the entire San Andreas fault would result in shaking intensities varying from V-Light (pictures move)⁷ to VII-Strong (nonstructural damage), with the majority of the area experiencing an intensity of VI-Moderate (objects fall).

Liquefaction

Liquefaction refers to the loss of soil strength resulting from seismic forces acting on loose, granular materials that are water saturated, such as stream alluvium. Earthquake-induced ground failure owing to liquefaction has caused loss of life and property and infrastructure damage in many earthquakes. Areas susceptible to liquefaction can be predicted based on their geology, geomorphology and hydrology. At the project site, the proposed trail alignment is on Holocene stream alluvium (Qha). As



such, and due to the high probability of intense seismic shaking affecting the area, the proposed trail site has a high susceptibility for liquefaction, as is depicted on **Figure 3.6-3**.

Soils

Fifteen soil types (Map units) have been mapped in the Study Area by the NRCS in the Contra Costa County Soil Survey (NRCS 1977). Capay clay, Clear Lake clay, Solano silty clay, Cropley clay, and Pescadero clay loam occur on the narrow valley bottoms. The more wide-spread soils of the hillsides or uplands in the Study Area include Los Osos clay loam, Altamont clay and Altamont-Fontana complex.

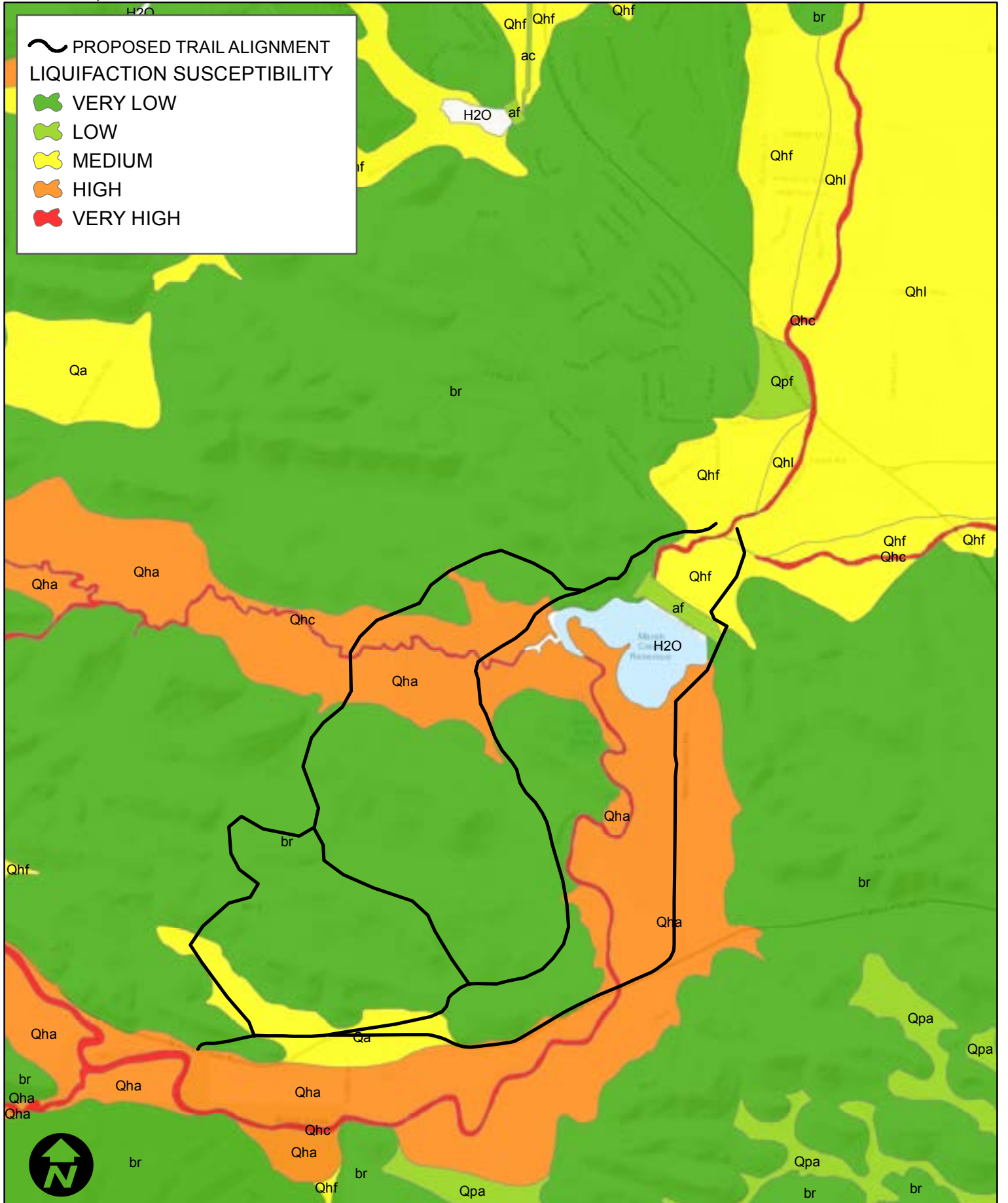
Figure 3.6-4 shows the distribution of the mapped soil types. **Table 3.6-2** summarizes the soils characteristics in the Study Area (depth, soil texture, parent material, slope range, drainage and erosion hazard). The following provides brief descriptions of the soils that occur within the Study Area.

Table 3.6-2: Soil Characteristics

Map Symbol	Soil Name	% Slope, Soil Depth/ Parent Material	Subsoil Texture	Drainage/ Erosion Hazard	Prime Farmland/ Wetland Soil	Land Capability Class
AbD	Altamont clay	9-15% , 2-4' +,sandstone/shale	clay	moderate	yes, yes	IIIe-5
AbE	Altamont clay	15-30%, 2-4', sandstone/shale	clay	well, high	no, no	VIIe-5
AcF	Altamont- Fontana	30-50%, 2-4', hard sandstone	clay	well, very high	no, no	VIe-1
Bb	Brentwood clay loam	0-2%, 6+', fine alluvium	clay loam	well, slight	yes, no	I
BdE	Briones loamy sand	5-30%, 6'+, soft sandstone	loamy sand	excessive moderate	no, no	IIIe-3
BdF	Briones loamy sand	30-50%, 6'+, soft sandstone	loamy sand	excessive, v. high	no, no	VIIe-1
CaA	Capay clay	0-2% , 6+', fine alluvium '	clay	well, low	no, no	VIIe-1
Cc	Clear Lake clay	0-15%, 6'+, fine alluvial fans	clay	poor, slight	yes, yes	IIe-5
CkB	Cropley clay	2-5%, 6'+, fine alluvial fans	clay	mod. well, slight	no, no	IIe-5
Fd	Fontaa-Altamont complex	30-50%,, 2-4', sandstone/shale	clay loam +	mod. well, v. high	no.no	Ive-5
KaC	Kimball gravelly clay loam	2-9%, 4-6',old alluvial terrace	gravelly clay	well, moderate	no, no	Ive-3
KaE	Kimball gravelly clay loam	9-30%, 4-6', old alluvial terrace	gravelly clay	well, mod.to high	no, no	VIe-1
LhF	Los Osos clay loam	30-50%, 2-4', soft sandstone	stony clay	well, mod.to high	no. no	VIe-1
Pb	Pescadero clay loam	0-6%, 6'+, saline fine alluvium	saline- alkali-clay	somewhat poor, slight no, no		IVw-6
Sm	Sorrento silty clay loam	0-5%, 6'+, alluvial fan	silty clay loam	well, slight	yes, no	I

1 inch = 2,000 feet

0 2,000 4,000 6,000 8,000 Feet

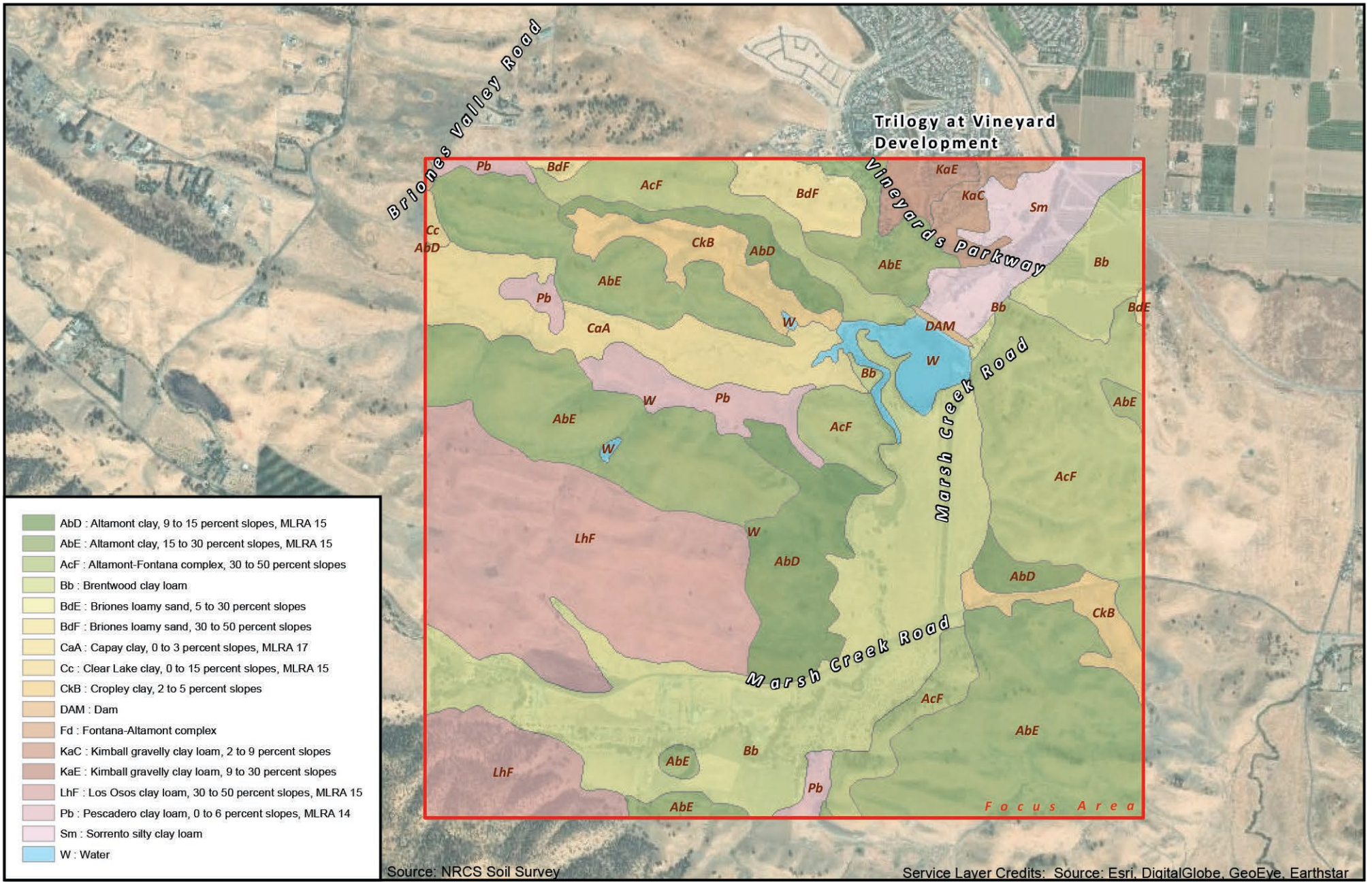


LIQUIFACTION SUSCEPTIBILITY
MARSH CREEK TRAIL FEASIBILITY STUDY

USGS, 2006, PRELIMINARY MAPS OF QUATERNARY DEPOSITS AND LIQUEFACTION SUSCEPTIBILITY, NINE-COUNTY SAN FRANCISCO BAY REGION, CALIFORNIA: A DIGITAL DATABASE



FIGURE
3.6-3

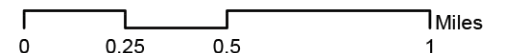


Marsh Creek Trail Feasibility Study

Site Soils



Figure 3.6-4





The Altamont series of soils consist of deep, well-drained soils that formed in material weathered from fine-grained sandstone and shale. Runoff varies from slow to rapid, and permeability is slow. These soils are located throughout the Study Area on slopes ranging from nine to 50 percent.

The Brentwood series consists of well-drained soils on valley fill with slopes between zero and two percent. These soils are formed in alluvium from sedimentary rock. Runoff and permeability is slow. Brentwood clay loam is located in the southwestern portion of the Park, north of Marsh Creek Road.

The Briones series consists of somewhat excessively drained, moderately deep soils over sandstone. Briones soils are found on strongly sloping to steep terrain. These soils have medium to rapid runoff and rapid permeability of the soil, but slow or very slow permeability in the sandstone.

Briones loamy sand is isolated in areas on the north and east side of the Park, within areas between zero and 50 percent slope. The Capay series consists of moderately well drained soils on valley margins fill and on old alluvial terraces that have been dissected. These soils formed in alluvium from sedimentary rock and have slow runoff and slow permeability. Capay clay is located along the Briones Valley on two to nine percent slopes. Clear Lake soils consists of poorly drained soils in basins in the coastal valleys. They formed in fine-textured alluvium and have very slow runoff and slow permeability. Clear Lake clay is present in an isolated patch in the eastern portion of the Study Area.

The Cropley series consists of moderately well-drained soils in small upland valleys). They formed in fine-textured alluvium from sedimentary rock. A thin finger of Cropley clay is located in the central portion of the Study Area , on slopes ranging from two to five percent. Runoff and permeability for this soil is slow. The Fontana series consists of well-drained soils underlain by fine-grained sandstone. These soils occur on uplands and have moderately slow permeability. Small areas of the Fontana-Altamont complex occur in the western portion of the Study Area, on slopes ranging from 15 to 30 percent. The Kimball series of soils consists of very deep, well-drained soils formed in alluvium from mixed sources. Kimball soils are on fan terraces and have slopes of zero to 15 percent. They formed in alluvium derived from a variety of watershed sources including sedimentary, meta-sedimentary, and meta-basic rocks. They are well drained, with slow to medium runoff, and have very slow permeability.

The Pescadero series consists of very deep, poorly drained soils that formed in alluvium from sedimentary rocks. Pescadero soils are located along Briones Creek. They are poorly drained or ponded in concave slopes; with very slow runoff and very slow permeability. They have moderately to strongly saline/alkali soils, and saltgrass and saltbush occur on the bottom of Briones Creek where these soils occur.

The Sorrento series of soils consists of very deep, well-drained soils that formed in alluvium mostly from sedimentary rocks. Sorrento soils are found on alluvial fans and stabilized floodplains downstream of the dam and have slopes of less than 9 percent. They are well drained, have slight to medium runoff, and moderate to moderately slow permeability depending upon dominant texture and amount of stratification in the lower part of the profile.

Constraints and Challenges

Potential geotechnical impacts or constraints primarily include slope instability, minor risk of landslides and potential soil erosion problems associated with trail construction and use, especially on steeper slopes. The Study Area is mostly relatively flat to gently rolling, so the risk of landsliding, soil erosion and loss of topsoil is mostly low, with localized steeper slopes that will need to be traversed, including eight gully drainages. Trails that would be located on moderate to steep slopes, as well as near or crossing



creeks or waterways have the highest potential impacts or constraints. Structures including bridges, retaining walls, and restrooms also must be designed to overcome severe ground motion and potential liquefaction.

Design Considerations

The Study Area is not within either an Alquist-Priolo Earthquake fault zone area, nor in an area included in the Seismic Hazards Zoning Act. A detailed Geotechnical Investigation would need to be completed associated with trail design, especially bridge structures, and the final design and implementation would need to be consistent with the Geotechnical Investigation recommendations, California Building Code, Caltrans Highway Design Manual, Contra Costa County Grading, Drainage and Building Codes and ordinances, and other applicable regulations. Trail design would also be consistent with the County General Plan and policies related to geologic and seismic hazards. All construction, notably grading and foundation engineering will need to be performed in accordance with the recommendations of the Geotechnical Investigation. The design plans should identify specific measures to reduce the landslide risk and erosion potential of surface soils where the trail traverses steep slopes or areas identified as having landslide hazards.

The Geotechnical Investigation should also be reviewed and approved by the by the County Engineer and/or the Project Engineer as part of civil and structural design review of trail grading and drainage and any structures, such as retaining walls, grade separation structures, bridges and/or boardwalks.

3.7 Water Resources

Existing Conditions

Marsh Creek Watershed

The Study Area is predominately located within the Marsh Creek watershed in eastern Contra Costa County (CALFED 2003). The Marsh Creek watershed drains the northern flank of Mt. Diablo and includes the cities of Brentwood and Oakley, as well as a part of the City of Antioch. The watershed drainage area is approximately 128 square miles of mostly open space grasslands and oak savannah used for dry pasture and rangeland, with some irrigated farmland, vineyards and orchards on the valley bottoms, and urban land.

Marsh Creek flows approximately 30 miles from its headwaters on Mt. Diablo to its point of discharge at Big Break in the western part of the Sacramento-San Joaquin River Delta. Marsh Creek is considered to be an ecologically important link between the Delta and the open space lands of the Diablo Range. The Marsh Creek watershed is the second largest watershed in Contra Costa County. Within the Study Area, Marsh Creek and its narrow riparian corridor, including the section through the reservoir impoundment is approximately 1-1/2 miles long to just above where the small tributary, Briones Creek, joins it.

Marsh Creek has four (4) named tributaries and several un-named, smaller tributaries. The named tributaries include Briones Creek (within the Study Area), which joins Marsh Creek near the Marsh Creek Reservoir, Dry Creek, Deer Creek to the north, and Sand Creek. All of these creeks flow in a generally south-easterly direction, draining the eastern hills of Mount Diablo State Park and the Black Diamond Mines Regional Preserve (CALFED 2003).

All of the above creeks are typically intermittent, with little or no surface flow during the late spring, summer and fall months. Flows in Marsh Creek were measured by the USGS at Marsh Creek Reservoir (



Marsh Creek at Marsh Creek Road, just upstream) from 1954 to 1983 (CALFED 2003). The mean annual runoff rate during that period was 8,525 acre-feet per year (af/y). The highest annual runoff occurred in 1983 and was 40,000 af/y. The driest year on record was 1976, where annual runoff was not accurately measureable using the gaging equipment. Stream data from 1970 (a year with both average rainfall and runoff) indicated that much of Marsh Creek upstream of the Reservoir flows only seasonally.

Marsh Creek Reservoir

Marsh Creek Reservoir is a flood detention facility located in the northwest corner of the Study Area and is owned and operated by the Contra Costa County Flood Control and Water Conservation District (CCCFCWCD). Although the Flood Control District owns the dam and reservoir in fee, they have an over-flow or flood easement over adjacent State Park bottom lands at the approximate 200-foot elevation line. Both Marsh Creek and Briones Creek flow into Marsh Creek Reservoir. The 278 surface acre reservoir has a design flood storage capacity of 4,425 acre-feet with creek out flow restricted by an earthen dam and concrete emergency spillway. (DWR Bulletin 17-88 as cited in McNulty and Wickland 2003). The reservoir was originally built to accommodate a 50-year storm event, but due to siltation, the capacity of the reservoir has been significantly reduced (DWR Bulletin 17-88).

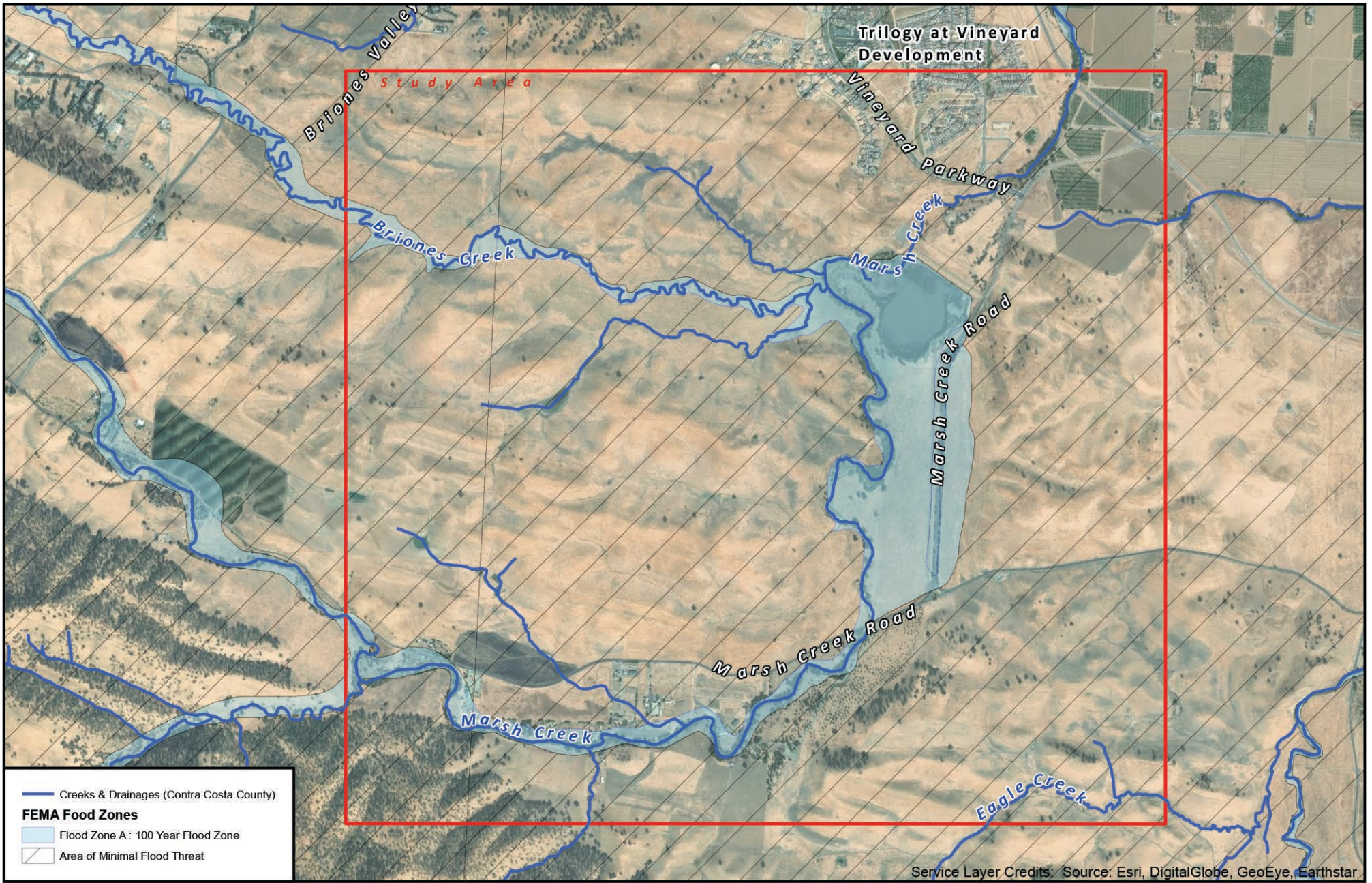
A 54-inch concrete box culvert is the main reservoir discharge outlet. High flows spill over the emergency concrete spillway when the reservoir water level reaches an elevation of 191.8 feet. Both the culvert and the emergency spillway discharge directly into the Marsh Creek channel, which flows downstream through the town of Brentwood. When the reservoir water level reaches an elevation of 193 feet, a secondary or auxiliary flood storage area located on farmlands east of Marsh Creek Road begins to fill with floodwater water. Return flow from this area drains back through an 18-inch pipe that traverses the dam and discharges back into the creek channel near the emergency spillway outlet.

A historic concrete dam, (no longer functional as of 1982) occurs just downstream of the existing spillway. The concrete structure also served as a causeway or bridge across Marsh Creek to the historic John Marsh House. Creek flows flanked both the north side and south side of the structure and its extensions, eroding the 15 to 18 foot high bank. State Parks has developed plans to refill and protect the flanked banks and re-shape and stabilize the slopes using rock rip rap, and native plant cuttings. Most of the historical concrete structure would remain in place, partially buried by fill and rock.

Flood-Prone Areas

According to FEMA FIRM (Map #06013C0365F), Marsh Creek Reservoir and the bottomlands or floodplain portion of Marsh Creek are located in Zone A. Zone A is characterized as having a 1 percent chance for an annual flood (i.e., the 100-year flood zone). Since this is a dedicated flood storage facility, purposeful flooding of this area is not a management concern, but needs to be considered in trail planning and design. The FEMA designated 100-year floodplain and the over-flow easement area is shown on **Figure 3.7-1**.

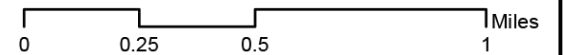
The CCCFCWCD is the agency responsible for the maintenance and operation of flood control facilities and stream channels in Contra Costa County. The CCCFCWCD prepared the Marsh Creek Regional Drainage Plan in 1990. In this Plan, County Drainage Areas 104, 105, 106, 107 and 108 were set up to plan, fund, and construct regional drainage improvements which would reduce flooding within the Marsh Creek watershed, including flood prone areas of Brentwood along Marsh Creek and Deer Creek.



Marsh Creek Trail Feasibility Study

Water Resources

Figure 3.7-1





According to the CCCFCWCD, the John Marsh Historic House site lies within Drainage Area 108. One hundred-year flood zones are located south of Marsh Creek Reservoir, along stretches of Briones Valley Creek, Deer Creek, and Sand Creek passing through the central portion of the City, and portions of Marsh Creek north of Concord Avenue. The majority of the periodic over-bank flooding downstream of the Study Area includes area where development and urbanization has occurred.

Surface Water Quality

The quality of water in Marsh Creek, Briones Creek, and the reservoir pond are under the jurisdiction of the Central Valley Regional Water Quality Control Board (CVRWQCB). The CCVRWQCB Control Plan or Basin Plan identifies uses for surface water bodies in the Sacramento and San Joaquin River basins that are important to management of water quality, including protection and enhancement of existing and potential beneficial uses, such as wildlife, agriculture, and domestic use.

Marsh Creek Reservoir was listed in 2002 by the State Water Resources Control Board as a Water Quality Limited Stream (WQLS) under Section 303(d) (Resolution No. 2003-0009). The main pollutant impairing the reservoir water quality is mercury. The reported source of contamination is from the abandoned Mount Diablo Mercury Mine. This mine is located near the headwaters of Marsh Creek (along Dunn Creek). The mine is known to contribute mercury to Marsh Creek and Marsh Creek Reservoir from the leaching of mine tailings (Slotten et al. 1996 as cited in CCCWP and EOA 2004b).

The reservoir impoundment does not meet water quality standards for mercury and the level of mercury contamination is such that fishing or water contact recreation are not allowed, and the impoundment is closed to the public. Fencing and appropriate signage will be needed to keep any future trail users out of this area.

Constraints and Challenges

Depending on the trail alignment option, approximately seven to ten creek or drainage crossings are needed to implement the Trail Plan. These would consist of 40- to 80-foot-long pre-engineered pedestrian bridges crossing Briones Creek near the reservoir, and Marsh Creek upstream of Marsh Creek Road. Culverts can be used to cross the smaller seasonal drainages. In addition to environmental sensitivity and regulatory challenges, drainage crossings can introduce a concentrated sediment load to the waterway which can cause a decrease in water quality wetlands impacts associated with bridge foundations, and increases in sediment loads to existing drainages are potentially significant concerns, and crossings should be carefully designed and constructed.

Design Considerations

In general, the following measures can be implemented to minimize water resource impacts:

- To prevent sediment from entering streams, BMPs will include at a minimum the following measures:
- Use temporary measures, such as flow diversion, temporary ditches, and silt fencing or straw wattles.
- Surface disturbance of soil and vegetation must be minimized; existing access and maintenance roads should be used wherever feasible.
- Any stockpiled soil should be placed, sloped, and covered so that it would not be subject to accelerated erosion.



- Accidental discharge of all project-related materials and fluids into local waterways should be avoided by using straw rolls or silt fences, constructing berms or barriers around construction materials, or installing geofabric in disturbed areas with long, steep slopes.
- After ground-disturbing activities are complete for each area, all graded or disturbed areas should be covered with protective material such as mulch, and/or erosion control blankets and re-seeded with native plant species.

3.8 Built Environment

Existing Conditions

Underground Utilities

John Marsh SHP in the vicinity of the residential compound is served by a 2" water line from the City Brentwood, and an underground gas line crosses the site north of the dam. There is also one functional on-site well and an on-site septic system located within the John Marsh house complex.

Overhead Utilities

Utility poles servicing the John Marsh house complex are located east of the house, crossing the field to Old Marsh Road and the west side of Marsh Creek Road. The pole line continues south to the intersection with Camino Diablo. West of Camino Diablo, poles on the north side of Marsh Creek Road carry cable and telephone lines, while the electric lines are generally on the south side of the road. For much of Marsh Creek Road west of Camino Diablo, the utilities are carried on joint poles on the south side of the road, cross to the north and back to south approximately 500 feet west of the Round Valley trailhead. All utility poles are located within county road ROW.

High voltage utility lines also bisect the site on both an east-west and north-south axis.

Roads and Paved Surfaces. Roads, paved surfaces and ranch roads in the Study Area include:

- **Vineyards Parkway** is a four lane street at the north edge of the Study Area that serves the adjacent residential area and community college. North of Vineyards Parkway, the Marsh Creek Trail is scheduled to be completed along the west side of Marsh Creek, crossing at the signalized intersection of Vineyards Parkway and Miwok Avenue, then continuing east along an existing 10 foot wide sidewalk and bike lanes on the south side of Vineyards Parkway. The Parkway crosses Marsh Creek with dual steel truss bridges. Some improvements may be needed to meet guidelines for railings where the bridge crosses the creek. This trail segment and a continuation east to the John Marsh House entrance road will be completed as a separate project.
- **Marsh Creek Road** is a two lane county road that borders the Study Area on the east and south. Portions of the road have improved gravel shoulders. In the vicinity of the John Marsh House entrance road, there is an existing 8 ft. diameter CMP culvert that serves as a livestock crossing under the road. The road changes from a north-south axis to east-west at Camino Diablo. Contra Costa County Public Works is currently finalizing plans for replacement of a two lane bridge structure over Marsh Creek. The new bridge will be located north of the existing facility, which will be demolished. No bicycle or pedestrian facilities are proposed for this structure. West of Marsh Creek, the road continues a two



- lane configuration, generally with improved shoulders. There is one 36" culvert crossing of the road approximately 500 feet east of the Round Valley Preserve staging area.
- **Old Marsh Creek Road** is a (formerly) paved road located within State Park lands that travels south from the John Marsh House entrance road towards the existing dam. The road was presumably relocated to its current alignment when the dam was built.
 - **John Marsh House** entrance road is a gravel surface road that traverses the northern Study Area and serves the Marsh House complex. All service roads and facilities in the vicinity of the Marsh House and area north of the dam must remain unpaved⁹ to avoid disturbance to underlying cultural resources.
 - **Dam Access Road** is the gravel roadway that traverses the dam crest and provides access to the spillway. The gravel surface is approximately 15 feet wide.
 - **Ranch Roads** are unpaved or gravel surface roads located throughout State Park lands. These unimproved roads are generally nearly devoid of vegetation, and some include informal crossings of wet areas and drainages.

Constraints and Challenges

- **Vineyards Parkway.** The existing widened sidewalk and bike lanes are suitable for pedestrian and bicycle use, although modifications to the existing bridge railings may be needed to meet current accessibility and safety guidelines. The route along Vineyards Parkway and Marsh Creek Road is somewhat indirect to access the John Marsh House or towards the Round Valley staging area. However, this alignment would provide an opportunity for a shorter loop trail to serve local residents. Existing landscaping along the Parkway may need to be modified to accommodate a trail into the State Park.
- **Marsh Creek Road.** Placing the trail within the Marsh Creek Road right of way would be challenging, except in limited locations
- **Old Marsh Creek Road** is a (formerly) paved road located within State Park lands that travels south from the John Marsh House entrance road towards the existing dam. The road was presumably relocated to its current alignment when the dam was built.
- **John Marsh House** entrance road is a gravel surface road that traverses the northern Study Area and serves the Marsh House complex. All service roads and facilities in the vicinity of the Marsh House and area north of the dam must remain unpaved¹⁰ to avoid disturbance to underlying cultural resources.
- **Dam Access Road** is the gravel roadway that traverses the dam crest and provides access to the spillway. The gravel surface is approximately 15 feet wide.
- **Ranch Roads** are unpaved or gravel surface roads located throughout State Park lands. These generally unimproved roads are generally devoid of vegetation, and some include informal crossings of wet areas and drainages.

⁹ Reck Lemyre, John Marsh Historic Trust, personal communication

¹⁰ Reck Lemyre, John Marsh Historic Trust, personal communication



Photo: Existing Cattle Crossing under Marsh Creek Road near Camino Diablo Road

Design Considerations

Opportunities exist for joint use of existing ranch access roads. Possible temporary closure of the trail during ranching operations, signage, and/or additional fencing may be needed.

3.9 Hazards and Hazardous Materials

Existing Conditions

Trail projects can generally result in exposure to hazardous materials in several ways. First, during site grading, construction workers can be exposed to any soil-based contaminants that are released. Any hazards discovered during site investigations at the design level or during construction would be remediated.

Second, during operation of a trail, the use of hazardous chemicals on adjacent properties can result in exposure to trail users. For example, pesticides applied on adjacent farmland may drift onto a trail corridor. This is not a significant issue within the Study Area.

The following databases were searched for known sources of hazardous materials:

- The State Water Resources Control Board (SWRCB) GeoTracker database.
- The Department of Toxic Substances Control (DTSC) EnviroStor database.
- The Cortese List. (Cal-EPA)



Constraints and Challenges

Based on the few nearby sites listed on the EnviroStor and GeoTracker databases and included on the Cortese list in the vicinity of the Study Area, and their current status, it is unlikely that already known hazardous conditions would affect the Trail.

Design Considerations

Design of the project will follow regulatory requirements to utilize Best Management Practices to ensure that the project is designed and built to minimize exposure to hazardous conditions.

If farming conditions change in the future, for instance on the potential farmable lands adjacent to the Round Valley Preserve staging area, to avoid exposure to adjacent agricultural operations regarding pesticide use, informational signage may be utilized at trailheads or temporarily in cooperation with agricultural operators. This would inform trail users about proposed operations that may affect use of the trail during any spray operations.

3.10 Traffic

Existing Conditions

This stretch of Marsh Creek Road where the Marsh Creek Trail is being evaluated receives approximately 4,000 average vehicle trips a day, with a projected increase to 5,700 ADT by 2040. The western segment of Marsh Creek Road carries a higher volume of commuters on average each day due to its proximity to the City of Clayton while the eastern segment near Round Valley Regional Preserve (Deer Valley Road) receives significantly fewer average daily vehicle trips. Marsh Creek Road is the gateway to 110,000 acres of open space and recreational areas managed by EBRPD and other local jurisdictions.

Regarding the issue of a potential at-grade trail crossing of Marsh Creek Road, even if there were sufficient gaps in traffic so that trail users could cross without undue delay, it is not clear that trail users would be able to judge rural high speed conditions. Thus, if there were an at-grade crossing, some type of traffic control device in addition to the standard trail warning signs would be indicated. The use of traffic control devices such as a traffic signal, pedestrian hybrid beacon, RRFB, or a roundabout was analyzed for their appropriateness in this application. The Traffic Memorandum is provided in **Appendix B**.

Constraints and Challenges

The single most significant traffic constraint is the needed crossing of Marsh Creek Road in the vicinity of the Round Valley Preserve. The potential crossing of Marsh Creek Road by Marsh Creek trail could either be grade separated or at-grade, as discussed further below. Other more manageable constraints are the crossing of Vineyard Drive to make the connection to the Marsh Creek Trail in Brentwood, and the crossing of Marsh Creek near the existing and to be rebuilt Marsh Creek Road bridge.

Undercrossing

Preliminary engineering analysis has determined the best location for an undercrossing to be located approximately 1,800 feet east of the driveway entry to the Round Valley Preserve staging area. This area has the most favorable topography for accommodating the tunnel. The approximate location is shown on **Figure 5-1** in the following Section 5.0 (Preferred Alignment). The specific location and engineering details will need to be developed in follow-up design studies and further civil and geotechnical analysis.



Example undercrossing photos are provided below, along with a schematic showing the tunnel dimensioning. The tunnel would serve pedestrians, bicyclists, and equestrians. Equestrians would need to dismount to travel through the tunnel. It would likely be a concrete structure.

Since the tunnel will be constructed below-grade, a gate and submersible pump system (sump-pump) will likely be needed. If the undercrossing were to be open evenings, it would need to be lighted also.

At-Grade Crossing

If at-grade, the crossing would be at the driveway of the Round Valley Regional Preserve. This location has limited stopping sight distance for westbound traffic to a trail user who may have fallen in the road due to the vertical curve and it also has limited intersection sight distance to trail users coming from the north due to the horizontal curve. Given design speeds of 60 mph and the 36-foot roadway width, both the stopping sight distance and the corner sight distances are less than recommended by the Caltrans Highway Design Manual (HDM). In addition, the collision history for the past five years reveals that two-thirds have been single vehicle crashes, which indicates inattention or bad judgment on behalf of the motorists. The alignment of Marsh Creek Road combined with the high speeds results in two-thirds of collisions either hitting a fixed object or being an overturned vehicle (see **3.10-1a** and **3.10-1b, Collision Maps**).

Design Considerations

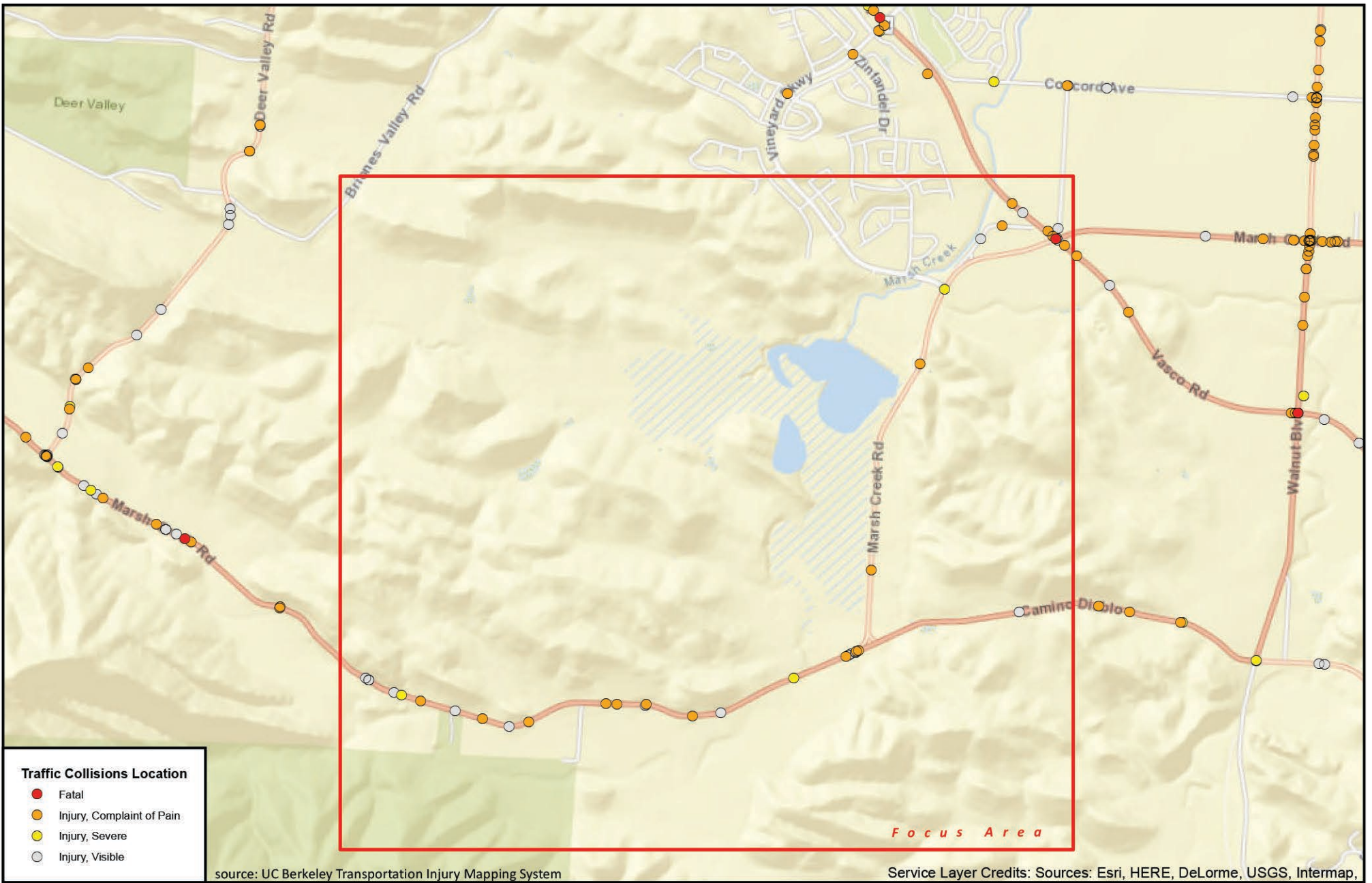
Given the limited sight distances, the rural nature of the roadway and the high speeds, compounded by 6.5% heavy vehicles, no at-grade crossings were considered ideal or recommended for this situation. , A roundabout could potentially resolve the inadequate sight distance by slowing traffic on Marsh Creek Road to less than 25 mph, but this would have traffic flow impacts. Thus, a grade-separated trail crossing is recommended. A grade separation would maximize both the safety and the quality of the trail user experience. While the State of California does not have specific guidance for public trails crossing rural roads, the State of Wisconsin does. Based on their guidelines, a grade separation is recommended for roadways with an ADT of 3,500. This corroborates the finding that a grade separation is appropriate for this location.

Undercrossings (tunnels) have significantly more advantages for trail crossings than overcrossings, including less overall grade change (ascent and descent) on the part of the pedestrians, cyclists and horses.

3.11 Other Environmental Issues

Other environmental issues that are evaluated as part of the Study are listed below. In general, implementation of the Marsh Creek Trail is not anticipated to trigger significant impacts in these categories. These issues would be evaluated further when precise plans are developed to confirm the preliminary findings.

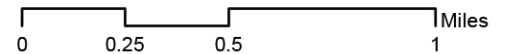
- **Air Quality.** Implementation of trail projects typically does not negatively impact air quality, and may have beneficial impacts associated with reduction in vehicle use by trail users or commuters. Temporary air quality impacts due to construction activity are regulated to minimize potential effects.
- **Greenhouse Gas (GHG).** Like air quality, implementation of trail projects typically does not negatively impact greenhouse gas emissions, and may have beneficial impacts associated with reduction in vehicle use by trail users or commuters, and may be included in regional

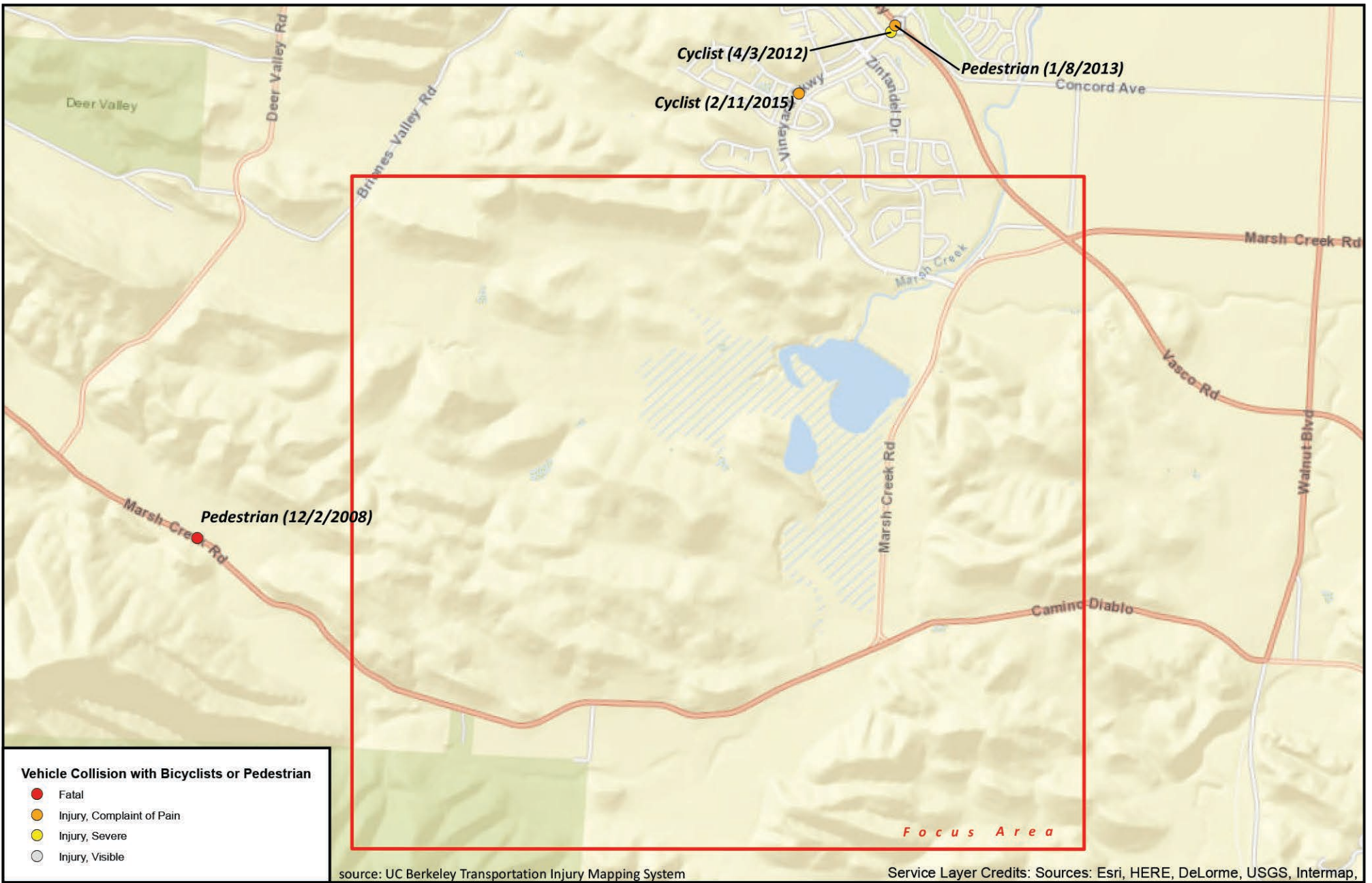


Marsh Creek Trail Feasibility Study

Traffic Incidents

Figure 3.10-1a

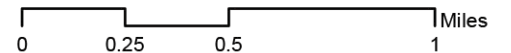




Marsh Creek Trail Feasibility Study

Bicycle & Pedestrian Traffic Incidents

Figure 3.10-1b





plans. Temporary impacts associated with project construction are analyzed as part of detailed implementation, and projects may require use of low emission equipment, minimization of off-site transport and other measures to reduce short-term effects.

- **Mineral Resources.** The trail would not affect mineral resources.
- **Noise.** The primary source of noise along the corridor is highway noise from vehicles. The trail would be unlikely to increase ambient noise levels. Temporary construction noise impacts associated with equipment use would be regulated to comply with County code requirements, and to minimize potential effects. Specific impacts associated with trail implementation would be identified when the trail project is defined.
- **Population and Housing.** The trail project would not affect population and housing, but would provide a local recreational amenity.
- **Public Services and Recreation.** The trail would fulfill a recreational purpose, as well as enhance connections to existing and planned recreational facilities, and in some cases, may be beneficial by improving access for maintenance of existing public resources. Specific impacts associated with trail implementation would be identified when the trail project is defined.
- **Utilities and Service Systems.** The Trail Project would have a very low demand for new utilities and services (water, wastewater, electricity, gas). Public safety and emergency resources, including fire fighting, would be handled cooperatively under mutual assistance agreements among EBRPD, CalFire, State Parks (Mt. Diablo), Contra Costa County, and the City of Brentwood.

3.12 Permits and Approvals Needed

Biological resources are subject to regulatory requirements as outlined in the following local, state and federal statutes and policy documents:

- California Environmental Quality Act (CEQA)
- Federal Endangered Species Act (FESA)
- California Endangered Species Act (CESA)
- Federal Clean Water Act (CWA)
- California Fish and Game Code (CFGC)
- Migratory Bird Treaty Act (MBTA)
- Porter-Cologne Water Quality Control Act
- Contra Costa County Coastal Development Permit

U.S. Army Corps of Engineers. Under Section 404 of the Clean Water Act, the U.S. Army Corps of Engineers (USACE) has authority to regulate activities that could discharge fill of material or otherwise adversely modify wetlands or other “waters of the United States.” Perennial and intermittent creeks are considered waters of the United States if they are hydrologically connected to other jurisdictional waters. The USACE also implements the federal policy embodied in Executive Order 11990, which is intended to result in no net loss of wetland value or acres. In achieving the goals of the Clean Water Act, the USACE seeks to avoid adverse impacts and offset unavoidable adverse impacts on existing aquatic resources. Any fill or adverse modification of wetlands that are hydrologically connected to jurisdictional waters would require a permit from the USACE prior to the start of work. Typically, when a project involves impacts to waters of the United States, the goal of no net loss of wetland acres or values is met through compensatory mitigation involving creation or enhancement of similar habitats.



Regional Water Quality Control Board. The State Water Resources Control Board (SWRCB) and the local Central Coast Regional Water Quality Control Board (RWQCB) have jurisdiction over “waters of the State,” pursuant to the Porter-Cologne Water Quality Control Act, which are defined as any surface water or groundwater, including saline waters, within the boundaries of the State. The SWRCB has issued general Waste Discharge Requirements (WDRs) regarding discharges to “isolated” waters of the State (Water Quality Order No. 2004-0004-DWQ, Statewide General Waste Discharge Requirements for Dredged or Fill Discharges to Waters Deemed by the U.S. Army Corps of Engineers to be Outside of Federal Jurisdiction). The San Francisco Bay RWQCB enforces actions under this general order for isolated waters not subject to federal jurisdiction, and is also responsible for the issuance of water quality certifications pursuant to Section 401 of the Clean Water Act for waters subject to federal jurisdiction.

United States Fish and Wildlife Service. The USFWS implements the Migratory Bird Treaty Act (16 United States Code [USC] Section 703-711) and the Bald and Golden Eagle Protection Act (16 USC Section 668). The USFWS and National Marine Fisheries Service (NMFS) share responsibility for implementing the Federal Endangered Species Act (FESA) (16 USC § 153 et seq.). The USFWS generally implements the FESA for terrestrial and freshwater species, while the NMFS implements the FESA for marine and anadromous species. Projects that would result in “take” of any federally listed threatened or endangered species are required to obtain permits from the USFWS or NMFS through either Section 7 (interagency consultation with a federal nexus) or Section 10 (Habitat Conservation Plan) of FESA, depending on the involvement by the federal government in permitting and/or funding of the project. The permitting process is used to determine if a project would jeopardize the continued existence of a listed species and what measures would be required to avoid jeopardizing the species. “Take” under federal definition means to harass, harm (which includes habitat modification), pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. Proposed or candidate species do not have the full protection of FESA; however, the USFWS and NMFS advise project applicants that they could be elevated to listed status at any time.

California Department of Fish and Wildlife. The California Department of Fish and Wildlife (CDFW) derives its authority from the Fish and Game Code of California. The California Endangered Species Act (CESA) (Fish and Game Code Section 2050 et. seq.) prohibits take of state listed threatened, endangered or fully protected species. Take under CESA is restricted to direct mortality of a listed species and does not prohibit indirect harm by way of habitat modification. The CDFW also prohibits take for species designated as Fully Protected under the Code.

California Fish and Game Code sections 3503, 3503.5, and 3511 describe unlawful take, possession, or destruction of birds, nests, and eggs. Fully protected birds (Section 3511) may not be taken or possessed except under specific permit. Section 3503.5 of the Code protects all birds-of-prey and their eggs and nests against take, possession, or destruction of nests or eggs.

Species of Special Concern (SSC) is a category used by the CDFW for those species which are considered to be indicators of regional habitat changes or are considered to be potential future protected species. Species of Special Concern do not have any special legal status except that which may be afforded by the Fish and Game Code as noted above. The SSC category is intended by the CDFW for use as a management tool to include these species into special consideration when decisions are made concerning the development of natural lands. The CDFW also has authority to administer the Native Plant Protection Act (NPPA) (Fish and Game Code Section 1900 et seq.). The NPPA requires the CDFW to establish criteria for determining if a species, subspecies, or variety of native plant is endangered or



rare. Under Section 1913(c) of the NPPA, the owner of land where a rare or endangered native plant is growing is required to notify the department at least 10 days in advance of changing the land use to allow for salvage of plant.

Perennial and intermittent streams and associated riparian vegetation, when present, also fall under the jurisdiction of the CDFW. Section 1600 et seq. of the Fish and Game Code (Lake and Streambed Alteration Agreements) gives the CDFW regulatory authority over work within the stream zone (which could extend to the 100-year flood plain) consisting of, but not limited to, the diversion or obstruction of the natural flow or changes in the channel, bed, or bank of any river, stream or lake.

Contra Costa County Development Permit. The Marsh Creek Trail would be designed consistent with policies outlined in the County's Building, Grading and Erosion Control Ordinances. The trail project would be subject to environmental review and permit approval by the Planning Commission with a design that minimizes impacts on wildlife species, habitat diversity, sensitive natural communities, wetlands, and wildlife movement corridors. Design would also need to be consistent with scenic resource issues, and goals of minimization of exposure to geological hazard, minimization of change to natural topography, and implementation of erosion control measures. Any structures such as bridges and undercrossings would be subject to review and approval by Planning, Engineering and Building Departments of Contra Costa County.

Table 3.12-1 summarizes permitting needs.



Table 3.12-1: Agencies with Review and/or Permitting Authority

Permitting Authority	Note	
<p>Federal</p> <p>US Army Corps of Engineers (Corps)</p> <p>US Fish and Wildlife Service (USFWS)</p> <p>National Oceanic and Atmospheric Association, National Marine Fisheries Service</p>	<p>Section 404 Clean Water Act permit: Fill of jurisdictional waters of the U.S. or wetlands fill (fill of wetlands, fill associated with bridges and boardwalks over drainages)</p> <p>Section 7 (U.S. Endangered Species Act) Consultation for effects to special status species associated with federal (Corps) permit application.</p> <p>Section 7 (U.S. Endangered Species Act) Consultation for effects to anadromous species associated with federal (Corps) permit for creek and slough crossings.</p>	<p>Permit would be required for unavoidable wetland fill and drainage crossings</p> <p>Consultation associated with Corps permit (or HCP)</p> <p>Consultation if Corps 404 permit is needed, if adjacent to water body.</p>
<p>State</p> <p>California Department of Fish and Wildlife</p> <p>California Coastal Commission</p> <p>Central Coast Regional Water Quality Control Board (RWQCB)</p>	<p>Streambed Alteration Agreement, Section 1603 Fish and Game code (alteration of wetlands, sensitive species); CCA Endangered Species Act Oversight of Sam Mateo County actions</p> <p>National Pollution Discharge Elimination System (NPDES) Permit, Waste Discharge Requirements to prevent impacts to surface water quality from construction runoff, Water Quality Waiver or Certification for any wetlands or Waters of US fill.</p>	<p>Permit may be required – bridges/culverts</p> <p>Responsible agency</p> <p>Permit may be required in association with construction activities or HCP</p>
<p>Local</p> <p>Contra Costa County</p> <ul style="list-style-type: none"> • Conservation & Development • Public Works/Engineering • Flood Control & Water Conservation District 	<p>Grading and building permits for trail and structures, including restroom, bridges, under-crossings. Floodplain Manager approval for bridges in 100-year floodplain. County Environmental Health for restroom. Right of Way and Engineering/Traffic Engineering for trail or park entry within or crossing through County lands. A trail on public access facilities located on Flood Control District lands, including their flood easement area on State Park lands, will require their Plan review and approval, in addition to a ROW easement or use agreement for trail facilities</p>	<p>Potential responsible agency under CEQA</p>



4. Issues, Opportunities & Constraints

In addition to the environmental considerations discussed in **Section 3**, project issues include consistency with applicable policies, standards and guidelines of federal, state and local entities, including CA State Parks, City of Brentwood, Contra Costa County and others.

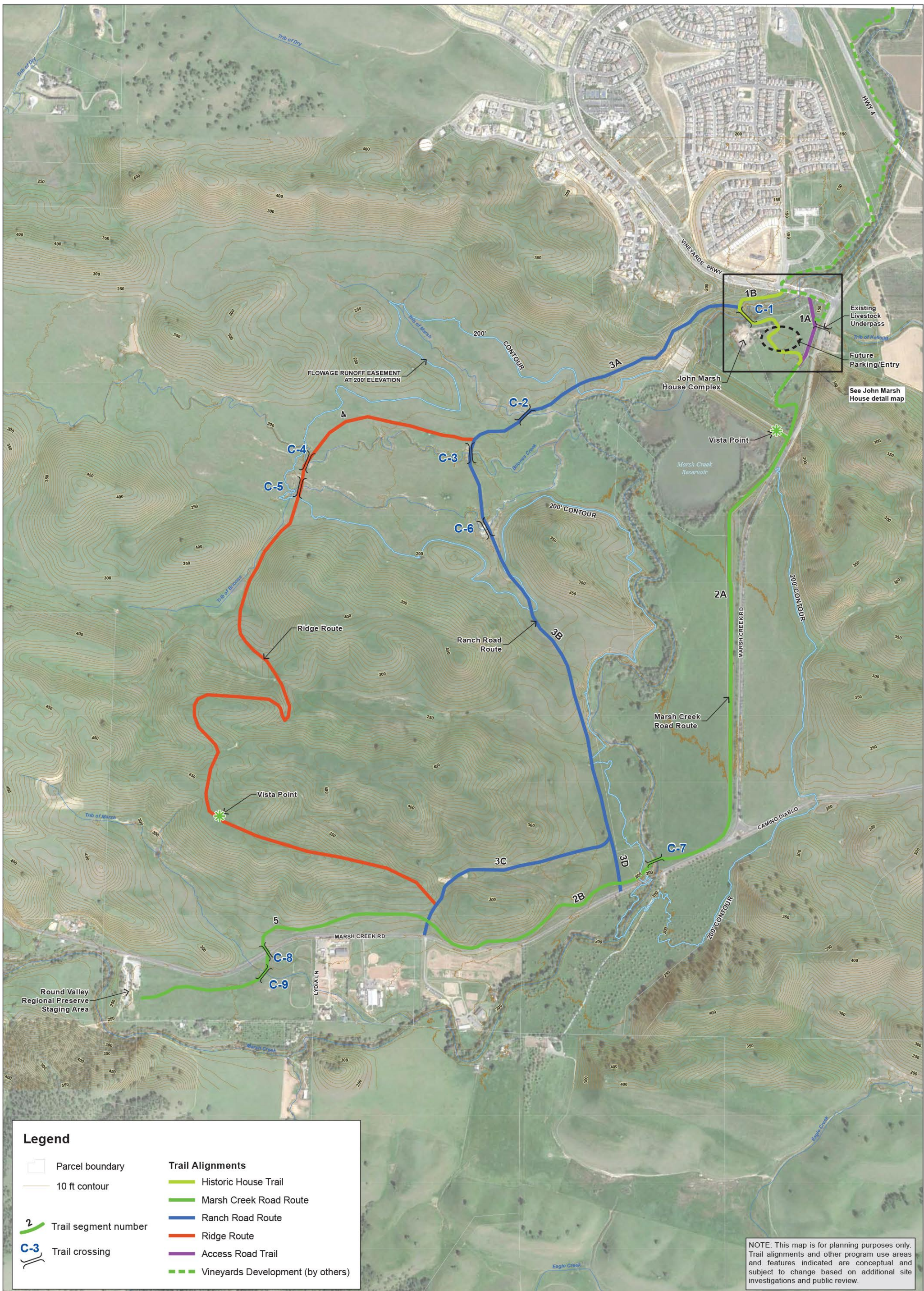
4.1 Alternatives Considered

Trail alternatives that were evaluated and screened for engineering and environmental constraints include three separate alignments as shown on **Figure 4.1-1**. These include trail alignment options: 1) near or adjacent to, and west of Marsh Creek and Marsh Creek Reservoir, 2) through State Park lands generally to the west of this, and 3) mostly within the County Marsh Creek Road ROW. Several alternatives that were considered utilized portions of existing ranch roads, existing sidewalks and other routes to connect to the Round Valley staging area. The recommended option could be a hybrid of these options, including an option that focuses on multiuse (bicycle transportation use) facilities near Marsh Creek Road and hiking and equestrian access within the State Park lands, with links to vista points and existing and planned trails.

To screen and evaluate alternatives, a comprehensive ranking methodology was developed. A decision matrix was developed, based on the following opportunities and constraints:

- Consistent with planning objectives; integrates with John Marsh House access and facilities planning
 - Avoids sensitive resources
 - Minimizes ranching conflicts
 - Minimizes flood inundation hazards; consistent with future flood control projects
 - Serves multiple user types (pedestrians, bicyclists, equestrians)
 - Complies with ADA Trail Standards and California State Parks Accessibility Guidelines
 - Provides opportunities for habitat enhancement, combining with multiple benefits for grant funding
 - Permit and engineering complexity
 - Relative project cost

Table 4-1 represents a screening of potential alignments based on the assessment of existing environmental conditions in the Study Area, as well as consistency with the HCP and State Park Master Plan. The matrix is organized by potential trail alignment, segment, and issue. **Table 4-2** analyzes issues related to creek and drainage crossings.

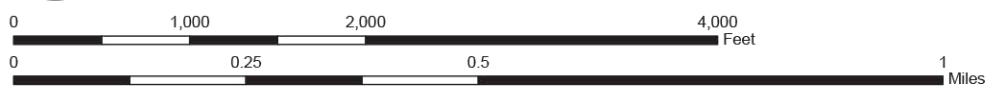


Legend

	Parcel boundary		Trail Alignments
	10 ft contour		Marsh Creek Road Route
	Trail segment number		Ranch Road Route
	Trail crossing		Ridge Route
			Access Road Trail
			Vineyards Development (by others)

NOTE: This map is for planning purposes only. Trail alignments and other program use areas and features indicated are conceptual and subject to change based on additional site investigations and public review.

Sources: Topography - derived from 2008 Contra Costa County Ortho Imagery Project, Aerial imagery - Google Earth 4-2018, Parcel data - Contra Costa County GIS



ALIGNMENT OPTIONS

Figure 4.1-1

Table 4-1: Route Opportunities and Constraints

Segment	Opportunities and Constraints									Notes
	Consistent with Planning Objectives; Integrates with JM House access	Sensitive Resource Avoidance	Minimizes Ranching Conflicts	Minimizes Flooding Conflicts	Serves Multiple User Types	ADA Accessibility	Opportunities for Habitat Enhancement	Permits and Engineering Complexity	Relative Cost	
1: John Marsh State Historic Park										
1A: North of Marsh Creek 550 LF	+	0	+	+	+	+	+	0	0	See dam removal project
1B: City of Brentwood existing sidewalk	0	+	0	+	0	0	0	+	+	Safety improvements at bridge and intersection crossing modifications needed for pedestrian use
1C: JMH Access Road 1,500 LF	0	+	+	+	0	0	0	0	+	Consider retrofit to provide loop trail when new entrance is completed
1D: JMH grounds and Old Marsh Creek Road 3,000 LF	+	0	0	+	+	+	+	0	0	Design considerations needed to avoid cultural resources; this section should be unpaved; shorten crossing of resource areas; utilize existing paved Old Marsh Road
2: Marsh Creek Road Levee and near road										
9,500 LF	+	+	+	+	+	+	0	+	+	Utilizes existing flood retention levee; multiple benefits if geotech improvements are completed as part of project
3: Ranch Road										
13,000 LF	+	0	0	0	0	0	+	0	+	Utilizes existing ranch road
4: Summit Route										
13,500 LF	+	0	0	0	0	0	0	0	+	Provides access to ridge location for user views
5: Marsh Creek Road Connector to Round Valley Trailhead										
4,500 LF	+	0	0	0	+	+	+	0	+	Provides direct access to trail staging area

Table 4-2: Creeks and Drainages Issues, Opportunities and Constraints

Length	ROW	Description	Type of Crossing Needed	Issues and Opportunities				Notes
				Resource Avoidance	Geotech. Complexity	Permitting Challenge	Relative Cost	
C-1	State Parks	Marsh Creek	Bridge	0	0	0	0	Refer to State Parks Dam Removal Project. Issues associated with type and placement of footings to avoid cultural resource disturbance
C-2	State Parks	Tributary of Marsh Creek ephemeral	Armored crossing boardwalk, culvert	0	0	0	0	Must be designed to withstand seasonal inundation in overflow basin. Currently in-channel vehicle crossing. ADA compliance and resource avoidance is challenging if in-channel crossing, per MCSHP EIR.
C-3	State Parks	Briones Creek ephemeral	Armored crossing boardwalk, culvert	0	0	0	0	Must be designed to withstand seasonal inundation in overflow basin. Currently in-channel vehicle crossing. ADA compliance and resource avoidance is challenging if in-channel crossing, per MCSHP EIR.
C-4	State Parks	Briones Creek ephemeral	Armored crossing boardwalk, culvert	0	0	0	0	Crossing located further west to minimize inundation issues. Currently in-channel vehicle crossing. ADA compliance and resource avoidance is challenging if in-channel crossing, per MCSHP EIR.
C-5	State Parks	Briones Creek ephemeral	Armored crossing boardwalk, culvert	0	0	0	0	Crossing located further west to minimize inundation issues. Currently in-channel vehicle crossing. ADA compliance and resource avoidance is challenging if in-channel crossing, per MCSHP EIR.
C-6	State Parks	Briones Creek ephemeral	Armored crossing boardwalk, culvert	0	0	0	0	Must be designed to withstand seasonal inundation in overflow basin. Currently in-channel vehicle crossing.
C-7	CCC-FCWC D	North of Marsh Creek Road	Bridge	0	0	0	0	New vehicle bridge to be located north of existing road. Placement of new pedestrian bridge for trail will require longer structure due to creek configuration.
C-8	State Parks	Marsh Creek Road	Underpass	+	0	0	0	Grade separation of trail to avoid traffic conflicts (see traffic memo). 6-8 ft. grade differential south of road may help minimize earthwork.
C-9	State Parks	Tributary of Marsh Creek ephemeral	Armored crossing, boardwalk, culvert	0	0	0	0	Ephemeral creek crossing, 36" culvert across Marsh Creek Road.

Key	
0	Minor issue or constraint
0	Moderate/Significant issue or constraint
+	Beneficial / opportunity



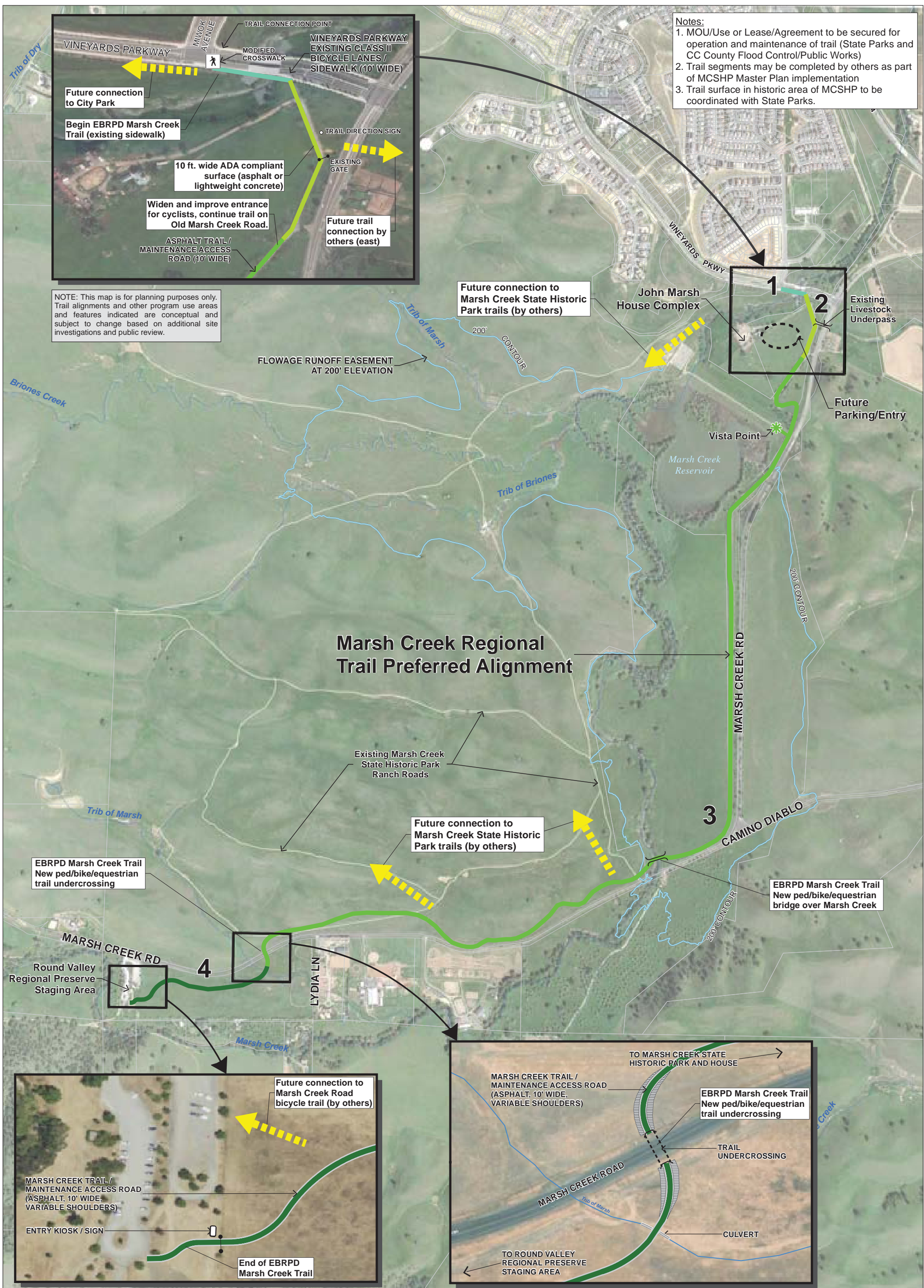
5. Preferred Alignment

Based on the alternatives screening in **Section 4**, review by project stakeholders and input from the public community outreach process, a Preferred Alignment generally paralleling Marsh Creek Road was selected. This alignment utilizes City of Brentwood right of way along Vineyards Parkway, crosses State Park lands within or along existing roads, and follows the incline of Marsh Creek Road to the Marsh Creek Dam and into CCC Flood Control District lands. The trail would then be located along an existing berm and along Marsh Creek Road with a new Marsh Creek bridge north of the road. The alignment continues west along Marsh Creek Road with an undercrossing of the road and continuation of the trail south of Marsh Creek Road, terminating at the Round Valley trailhead. This alignment was further refined at key locations to address environmental, engineering and use considerations, including:

- Utilizing existing roads (including Old Marsh Creek Road) and adjacent areas in the vicinity of the John Marsh House to minimize or avoid potential cultural resources conflicts;
- Routing the alignment along Marsh Creek Road north of the dam to address slope accessibility issues and to minimize intrusion into the dam embankment;
- Utilizing the existing berm south of the dam to provide a desirable user experience near, but not within Marsh Creek Road;
- Alignment that is set back from Marsh Creek Road but close enough to offer site visibility and management efficiency;
- Marsh Creek Bridge pedestrian crossing is set back from road for an improved user experience and sited to avoid hydraulic impacts to the new Marsh Creek Road vehicle bridge;
- Marsh Creek Road undercrossing is sited to take advantage of existing topography and road visibility. An undercrossing was preferred rather than an overcrossing for the following reasons:
 - Opportunity for unobstructed wildlife crossing consistent with the ECCHCP
 - Preferred for equestrian use as indicated during public outreach
 - Potential significant visual impacts of overcrossing and ramps needed for accessibility
 - Constructability and costs associated with bridge and ramp needs
 - Traffic engineering recommendations regarding potential use and warrants for an overpass

The Preferred Alignment (**Figure 5-1**) consists of four segments, divided according to underlying ownership and unique design and construction considerations. These include:

1. City of Brentwood. The initial segment, beginning in the City of Brentwood, would consist of signal, pavement and safety improvements to existing Vineyards Parkway to provide accommodations for pedestrians, cyclists and equestrians within City ROW. The improvements would involve signal modifications at the intersection of Vineyards Parkway and Miwok Avenue for safer pedestrian and bicycle crossing, wayfinding signage and pavement striping, railing modifications to the existing bridge across Marsh Creek, and buffer/delineation of the pathway alignment. Modifications to existing



Notes:
 1. MOU/Use or Lease/Agreement to be secured for operation and maintenance of trail (State Parks and CC County Flood Control/Public Works)
 2. Trail segments may be completed by others as part of MCSHP Master Plan implementation
 3. Trail surface in historic area of MCSHP to be coordinated with State Parks.

NOTE: This map is for planning purposes only. Trail alignments and other program use areas and features indicated are conceptual and subject to change based on additional site investigations and public review.

Marsh Creek Regional Trail Preferred Alignment



landscaping and a transition to the trail segment within MCSHP Primary Historic Zone will also be completed.

2. MCSHP Primary Historic Zone. Within this portion of the State Park, minimization of ground disturbance is critical to reduce potential impacts to existing cultural resources. As such, the trail alignment is proposed to be located within the fenced area that contains portions of the former Old Marsh Creek Road as well as the Historic House entry road. This trail segment would be constructed with a design profile to minimize ground penetration and to distribute weight across the trail. Portions of the trail would consist of re-paving former Old Marsh Creek Road sections. A separation of at least 7 feet would be provided between the Historic House gravel entry road and the new regional trail.

At the entrance to the MCSHP, entry road modifications would be constructed to guide bicyclists using Marsh Creek Road to the trail entry. This might include pavement modifications, signage, striping and buffer or landscaping to separate trail users from the vehicular path of travel.

3. Contra Costa County Flood Control District Lands. Trail construction within this segment includes lands primarily owned and managed by the Contra Costa County Flood Control District and Water Conservation District. This includes portions of the trail immediately adjacent to Marsh Creek Road right of way as well as lands that contain the Marsh Creek dam, associated levees/berms, and lands that are utilized for flood retention. From the MCSHP Primary Historic Zone, the trail would continue south along Old Marsh Creek Road, then ramp up along the edge of the dam face or along Marsh Creek Road to the dam crest. The design would need to avoid any cut into the embankment or levee. At the dam crest, a small overlook with shade structure, bench and trash receptacle would be provided.

South of the dam, the trail would transition with a ramp and retaining wall to the existing berm on the west side of Marsh Creek Road. The trail would be constructed on this berm for the remainder of the north/south portion of the trail. Near the intersection of Marsh Creek Road and Camino Diablo, the trail would transition to grade via a short causeway or series of culverts that would not obstruct seasonal stormwater flows to the flood control basin on the east side of the road.

The trail would continue through State Parks lands (Segment 4), but this segment includes an undercrossing tunnel of county-owned Marsh Creek Road approximately 1,800 feet east of the Round Valley Staging Area entrance. The undercrossing would be a minimum 10 feet wide with 10 ft. clear width and would also support grade-separated wildlife crossing of Marsh Creek Road. The undercrossing would include approach ramps and fencing to guide wildlife to the crossing location. The trail would continue westward through State Park lands, and terminate at the Round Valley trailhead.

4. MCSHP/Round Valley Regional Preserve. This segment would consist of an at-grade trail on the existing trail surface from the boundary with CCCFCWCD lands to the trail terminus at the Round Valley Staging Area. Project improvements in this segment include an at-grade trail, a culvert or puncheon crossing of an intermittent tributary of Marsh Creek, and fencing and minor staging area improvements, such as wayfinding signage. From the Camino Diablo/Marsh Creek Road intersection, the trail would continue east/west with a new separate 100-foot clear span bicycle/pedestrian bridge across Marsh Creek north of the vehicle bridge (being implemented by the County). This portion of the trail would also be within CCCFCWCD lands.



6. Design, Use and Management Guidelines

This section provides guidelines for the design and operation of the Marsh Creek Regional Trail. Implementation of the trail will require a precise design that complies with a variety of local, state and federal guidelines for pedestrian and bicycle facilities.

Trail design and siting should be consistent with the guidelines of applicable agencies, including the East Contra Costa County Habitat Conservation Plan, East Bay Regional Parks, Contra Costa County and California State Parks. This Section discusses the policies of each organization, as well as design considerations of the typical trail components that will be implemented as part of the project.

Regulatory Design Standards

- East Contra Costa County habitat Conservation Plan
- East Bay Regional Park District
- Contra Costa County
- California State Parks

Trail Components

- Trail Surface
- Trail Width
- Trail Structures
- Typical Trail Sections
- Fencing and Barriers
- Signage And Wayfinding
- Site Furnishings
- Trailheads and Staging Areas
- Trail Operations and Use Guidelines

6.1 East Contra Costa County Habitat Conservation Plan/Natural Community Conservation Plan (HCP/NCCP)

The HCP/NCCP provides a process for streamlining project implementation, as long as specified siting and species protection protocols are followed. The specific protocols for trails projects include:

Siting Requirements:

- Site in least sensitive locations
- Site equipment storage away from sensitive areas
- Conduct project surveys well in advance of design
- Planning survey requirements apply to roadway

Wildlife Design requirements:

- Design requirements superseded by latest research
- Construction Actions:
- Best Management Practices
- Post-Construction Actions:
- Revegetate cut/fill slopes with natives



Siting Requirements

- *Planned roads will be located in the least environmentally sensitive location feasible and will avoid, to the greatest extent feasible, impacts on covered species and sensitive natural communities such as wetlands. Alignments will follow existing roads, easements, rights-of-way, and disturbed areas as appropriate to minimize additional habitat fragmentation. The footprint of disturbance will be minimized to the maximum extent practicable.*
- *Equipment storage, fueling, and staging areas will be sited on disturbed areas or on ruderal or non-sensitive nonnative grassland land cover types, when these sites are available, to minimize risk of direct discharge into riparian areas or other sensitive land cover types.*
- *Project surveys, including land cover mapping, will be conducted during the conceptual planning stage of each project (i.e., well in advance of project design) so that the results can inform the siting and design process. Project surveys should be conducted in as wide a study corridor as possible to enable project siting to minimize environmental impacts.*
- *All planning survey requirements of this Plan will be followed within the construction corridor (i.e., the limit of project construction plus equipment staging areas and access roads) and the entire road right-of-way. Expanding the survey area beyond the project footprint will help identify covered species and their habitats so that impacts on covered species that occur adjacent to the construction zone can be minimized.*
- *For certain road projects, data collection will be required on wildlife movement through the road study corridor for at least 1 year prior to project design. Wildlife movement will be studied at the site to determine which species move across it, when they move, and, most importantly, which landscape features are most often used. These data will be used to select the most appropriate design requirements for the species and conditions unique to the site.*
- *Transportation project proponents will consult early with the HCP/NCCP Implementing Entity, CDFG, and USFWS on individual projects to ensure that conceptual designs (siting) and project designs (construction and staging areas) meet the terms of this Plan.*

Design Requirements for Wildlife Movement and Impact Minimization

- *Design requirements will be updated or changed by designs shown by the best available science to be more effective at facilitating safe wildlife movement across roads. The effectiveness of road crossings for wildlife is an active area of research, so frequent advances in design are expected throughout the permit term.*
- *Wildlife crossing needs will be assessed for each road project as a whole (for those projects subject to this provision, not by road segment, and for each wildlife species likely to need to cross the facility (Barnum 2003). Data will be collected on wildlife movements at the proposed project site for at least 1 year. These data will inform the design of wildlife movement structures suitable for the site and the species that use the area.*
- *Placement of Undercrossings. Road undercrossings will be constructed at frequent intervals to allow wildlife movement. A combination of large structures (bridges, large culverts, or large tunnels) spaced at greater intervals and small structures (small culverts or tunnels) spaced at frequent intervals will be used to accommodate a wide variety of wildlife species. However, placement of undercrossings in areas where wildlife are most likely to use them is more important than maintaining a certain frequency or spacing. Wildlife crossings that serve multiple*



species should be used whenever possible. Crossing facilities should be installed at known travel routes, natural pinch points, or other topographically appropriate locations to maximize the chance of use.

- *Suitable areas may include stream crossings or natural drainages. Undercrossings should be placed at grade whenever possible to maximize their use by wildlife.*
- *Use of Bridges. Bridges, viaducts, or causeways will be used for certain projects to minimize impacts on important upland areas, wetlands, streams, and local surface hydrology that feeds wetlands and streams near the road, and to provide the widest and most natural passageways for wildlife (i.e., to allow natural vegetation and physical features to occur in the undercrossing). If possible, bridges will span the bed and bank of streams and avoid or minimize bridge piers or footings within the stream, within bridge safety limits. If possible, the span of bridges that cross streams should also include some upland habitat beneath their spans to provide dry areas for wildlife species that do not use creeks or for use during storms. Native plantings, natural debris, or rocks should be installed under bridges to provide wildlife cover and encourage the use of crossings.*
- *Crossing Frequency. Large wildlife crossings (for medium to large mammals) will be placed approximately once every mile along new or substantially expanded roads that cross wildlife movement routes. Small wildlife crossings will be placed approximately every 1,000 feet along new or substantially expanded roads.*
- *Within these parameters, undercrossings should be placed where wildlife are most likely to use them, rather than evenly spaced. The required interval can be used as an average if it can be demonstrated that strict adherence to the requirement will not benefit wildlife movement.*
- *Culvert Designs. Tunnels or culverts must be the minimum length, height, and width necessary to provide safe passage under the road. Culvert designs will be based on the best available data at the time. Current thinking recommends that culverts designed for medium-size mammals such as San Joaquin kit fox, coyote, raccoon, be 5–8 feet in diameter (although culverts larger than 8 feet in diameter may be needed for longer crossings). Culverts designed for small mammals are recommended at 18–48 inches in diameter; smaller structures may be preferred by smaller wildlife species. Culverts should, when feasible, provide a natural substrate on which wildlife can travel (e.g., open bottom). It is also recommended that wildlife undercrossings using tunnels or culverts use grating on the inactive part of the roadbed (e.g., road shoulders) to allow filtration of ambient light and moisture but minimize noise intrusion. Artificial lighting inside tunnels or culverts is not recommended; these devices have not been shown to be effective and may deter nocturnal wildlife.*
- *Fencing Design. Fencing will be used along the roadway to direct wildlife to undercrossings and minimize their access to the road (see Table 6-6 for applicability). Fencing designs will be customized for the wildlife expected to use the undercrossing and will be based on the best available data at the time. Fencing must be continuous along the road and must be attached to the undercrossing to facilitate its use. Fencing must also extend well beyond the target undercrossing to reduce the chance of wildlife moving around the fence. For example, four fencing designs have been installed along Vasco Road and monitored for their effectiveness in reducing mortality of California tiger salamanders (Jones & Stokes Associates 1998b, 1999).*
- *Fencing must be monitored regularly by the applicant and repairs made promptly to ensure effectiveness. Wildlife undercrossings must be at the same or similar elevation as the fencing (e.g., along elevated roadways) to increase chances of their use. Vegetation must be managed*



along small mammal and amphibian fencing to reduce the opportunity for these species to climb the fence. Fencing designed for small mammal or amphibian exclusion must be installed at least 8 inches deep into the soil to prevent small mammal burrows providing access under the fence.

- *Where roads cross the wildlife exclusion fences, gates should be used whenever possible with material at the base of the gate to minimize the gap between the gate and the roadbed. If gates are not feasible, an in-roadway barrier (e.g., wildlife grates or similar devices) or device that channels species away must be installed to deter wildlife from moving around fences into the road.*
- *Road Median Designs. When compatible with vehicle safety, road medians should allow wildlife to cross under or over the median in the event they become trapped on the roadway.*

Construction Requirements

The following measures are specifically required for rural road and transportation projects. Other conservation measures described in this Plan for covered activities also apply.

- *No erodible materials will be deposited into watercourses. Brush, loose soils, or other debris material will not be stockpiled within stream channels or on adjacent banks.*
- *All no-take species will be avoided.*
- *Construction activities will comply with the Migratory Bird Treaty Act and will consider seasonal requirements for birds and migratory non-resident species, including covered species.*
- *Temporary stream diversions, if required, will use sand bags or other approved methods that minimize instream impacts and effects on wildlife.*
- *Silt fencing or other sediment trapping method will be installed downgradient from construction activities to minimize the transport of sediment off site.*
- *Barriers will be constructed to keep wildlife out of construction sites, as appropriate.*
- *Onsite monitoring will be conducted throughout the construction period to ensure that disturbance limits, BMPs, and Plan restrictions are being implemented properly.*
- *Active construction areas will be watered regularly to minimize the impact of dust on adjacent vegetation and wildlife habitats, if warranted.*
- *The following construction measure will be applied differently to each rural road project*
- *Install sturdy lock-boxes for cameras at each large wildlife undercrossing to facilitate wildlife monitoring by the Implementing Entity. Boxes should be at least 1 foot square, include a removable door, and be prewired for electricity (solar, battery, or alternating current). This will provide for the least intrusive, most secure, most flexible, and most cost-effective way to monitor wildlife usage, while minimizing human impacts. Boxes will be mounted on adjustable pedestals to vary the height of the box.*

Post-construction Requirements

- *Roadside vegetation within the right-of-way and adjacent to HCP/NCCP Preserves or other open space areas will be controlled to prevent the spread of invasive exotic plants such as yellow star-thistle into nearby or adjacent preserves.*
- *Vegetation and debris must be managed in and near culverts and under and near bridges to ensure that entryways remain open and visible to wildlife and the passage through the culvert or under the bridge remains clear.*



- *Cut-and-fill slopes will be revegetated with native, non-invasive nonnative, or non-reproductive (i.e., sterile hybrids) plants suitable for the altered soil conditions.*
- *All structures constructed for wildlife movement (tunnels, culverts, underpasses, fences) must be monitored at regular intervals and repairs made promptly to ensure that the structure is in proper condition.*

6.2 Regulatory Design Standards

Much of the trail alignment will be located on State Parks land, but constructed, operated and managed by EBRPD. Trail design and construction would be consistent with District standards, as well as consider the design standards utilized by Contra Costa County and California State Parks. Trail design will also need to be consistent with the ECCHCP, as discussed in **Section 6.1**.

Within the City of Brentwood, the trail will be located on the existing widened sidewalk and bridge over Marsh Creek. Signal modifications (timing and buttons) at the intersection may be needed to serve pedestrian and equestrian use. Bridge rail modifications may be needed to close gaps in the bridge railing.

This section provides an overview of relevant trail design standards.

East Bay Regional Park District

Typically, a Land Use Plan specific to a project site is prepared for lands that the District owns or acquires. This document specifies the type of use intended and design standards based on site conditions. For this project, the design would be consistent with other segments of the Marsh Creek Regional Trail, which generally utilizes an 8-10 foot wide design section with two foot shoulders and is otherwise consistent with Caltrans Highway Design Manual Chapter 1000: Bikeway Planning and Design standards.

Chapter 1000 of the HDM outlines design guidance for bikeway and pedestrian facilities. The design goal for these shared-use trails would be a Class I facility, with exclusive right of way for use by bicycles and pedestrians, with cross flows by vehicles minimized. Two way Class I facilities are required to have a minimum 8 foot width (10 ft. preferred, with a minimum 2 foot (3 foot preferred) shoulder (12-16 feet), as well as a minimum 5 foot separation from a traveled way (road or street) plus standard shoulder width. The maximum grade for Class I facilities is 5 %.

Contra Costa County

Contra Costa County utilizes the Contra Costa County Trail Design Resource Handbook (2001) that provides guidance on trail siting, signage, intersection design, maintenance and ramps. Trail design standards are also consistent with Caltrans Highway Design Manual Chapter 1000: Bikeway Planning and Design.

California State Parks

The Trails Handbook (1991, revised in 2019) provides guidance regarding designing and constructing trails for various user types in State Parks, with design recommendations primarily geared for backcountry conditions. In general, the Handbook advocates that trail width shall be limited to that required for the type of use and classification of the specific trail. Other guidance includes:

- Trails should be designed and constructed to improve sustainability and drainage, prevent erosion, and reduce future maintenance needs.
- Trails should provide public access to the park’s most popular features.
- Loops and connections to other trail systems may give users more choices for the length and duration, as well as a greater diversity of terrain and experiences.

A primary element of State Parks trails is that to be considered “multi-use”, a trail must be designated for cyclists, equestrians, and pedestrians. Trails that allow cyclists and pedestrians or trails that allow equestrians and pedestrians are not considered “multi-use”. Design for multi-use trails is to be based on the highest standards for the intended user groups. The Handbook includes standards for planning, layout, design and construction. Common design requirements for hiking, bicycle and equestrian use trails include:

- Firm and stable trail surface
- Minimum 36” clear trail width
- 5’ x 5’ passing space at least every 1,000’ if the trail is less than five feet wide
- Minimal trail obstacles
- Not more than 30% of trail can be steeper than 8.33%

The *California State Parks Accessibility Guidelines (2015)* outline department policies and practices and Design guidelines for accessible parks and provide a project review process for determining accessibility of features across the park system. The guidelines do not address bicycle use.

State Parks also utilizes a process to prepare a *Roads and Trails Management Plan* to provide guidance for establishing and maintaining California’s trail systems within State Parks. This includes integrating state parks’ trails-related program efforts as much as possible with federal, local government agencies, and private organizations’ trail systems, their planning, funding, development, operation, and maintenance. A RTMP has not been prepared for Marsh Creek State Historic Park.

6.3 Accessibility

As outlined above, trail accessibility standards vary according to the jurisdiction constructing and managing the facility, as well as the intent and purpose of the project. To the extent feasible, the Marsh Creek Trail will be designed to comply with applicable federal and state guidelines for universal access. The Trail is intended to be an all-weather shared-use trail, capable of accommodating pedestrians, bicycles, equestrians and universally accessible modes.



Accessibility guidelines are provided by multiple agencies, and compliance would be applicable depending on the type of facility, implementing agency, and funding source.



Guidelines include:

- Americans With Disabilities Act (ADA) www.Access-Board.Gov
- Title 24, California Building Code
- Architectural Barriers Act, Final Guidelines For Outdoor Developed Areas, November 25, 2013
- American Association of State Highway and Transportation Officials (AASHTO)
- Manual Of Uniform Traffic Control Devices (MUTCD)
- Institute Of Traffic Engineering (ITE)
- Federal Highway Administration/National Highway Institute (FHWA, NHI)

In addition to federal regulations, California State Department of Parks and Regulations, and Contra Costa County utilize trail standards covering trail width and surfacing, running slope and cross-slope, and other feature. Depending upon which agency ultimately constructs and operates the trail, these accessibility and design standards may vary in some aspects.

The trail will be designed in accordance with accessibility guidelines wherever feasible, which require a firm, stable surface for trails, and design accommodations for grade, cross-slope, width, etc. There are many design standards that provide guidance regarding trail design, and the trail segments will need to comply with one or more standards, depending upon funding, use and feasibility for compliance with applicable standards. There are numerous standards that may be applicable to implementation of the trail.

Access to project facilities by people of all abilities is subject to regulations and standards set forth by the United States Access Board. The Access Board is an independent federal agency that promotes equality for people with disabilities, and develops and maintains design criteria for the built environment. The Board provides technical assistance and training on these requirements and on accessible design and continues to enforce accessibility standards that cover federally funded facilities. Accessibility is regulated under the Americans with Disabilities Act (ADA), Title 24 of the California Building Code, and may be subject to standards of the Architectural Barriers Act (ABA), which applies to facilities on federal lands (or with federal funding).

Americans with Disabilities Act

The United States Congress enacted the Americans with Disabilities Act (ADA) in 1990 to address discrimination against individuals with physical and mental disabilities. The ADA requires that all facilities and buildings open to the public be accessible to those with disabilities. ADA standards for outdoor areas have not been finalized, but will likely be similar to standards for outdoor areas adopted as part of the ABA (see below). Design and implementation of portions of the trail that connect to parking areas, restrooms, trailheads or other physical facilities might also need to comply with federal regulations contained in the *ADA Accessibility Guidelines for Buildings and Facilities* (ADAAG) <http://www.access-board.gov/adaag/html/adaag.htm#4.3>. These guidelines require a 36 inches minimum clear trail width, with passing space at minimum 200-foot intervals if the trail is less than 60 inches wide, depending upon the anticipated trail use.



Architectural Barriers Act

Standards issued under the Architectural Barriers Act (ABA) apply to facilities designed, built, altered, or leased with certain federal funds. Passed in 1968, the ABA is one of the first laws to address access to the built environment. The law applies to projects built or altered with federal grants or loans.

To address the need for accessibility standards for outdoor areas, the Access Board developed the Architectural Barriers Act Accessibility Guidelines; Outdoor Developed Areas, which became effective November 25, 2013¹¹. These guidelines have been incorporated into Chapter 10 of the ABA Standards, and include design standards for facilities such as piers and platforms; outdoor constructed features such as picnic tables, benches and viewing scopes; viewing areas; outdoor recreation access routes; and trails. The standards also outline the conditions for exceptions to accessibility compliance. These guidelines set forth recommended trail width, gradient, cross slope and other factors that affect trail accessibility. Generally, for providing access to a range of potential trail users with differing degrees of mobility, the goal of a trail plan is to keep the majority of the trail running grade at less than 5%, where possible, with short segments of trail from 5% to 10% and with occasional resting or landing areas, and with the maximum running grade at 12%. Since the site consists of relatively gentle slopes, meeting accessibility standards should be feasible. Typical trail design slope and distance regulations that may apply to this trail are contained in the federal Architectural Barriers Act (ABA) summarized in **Table 6-1**.

Table 6-1: Maximum Trail Running Slope and Segment Length

Steeper than	But not Steeper than	Maximum Length of Segment
1:20 (5%)	1:12 (8.33%)	200 feet (61 m)
1:12 (8.33%)	1:10 (10%)	30 feet (9 m)
1:10 (10%)	1:8 (12%)	10 feet (3050 mm)

Source: <https://www.access-board.gov/guidelines-and-standards/buildings-and-sites/about-the-aba-standards/aba-standards/chapter-10-recreation-facilities>

Title 24, California Building Code

The State of California has also adopted a set of design guidelines for accessible facilities, incorporating accessibility guidelines. These requirements are contained in the California Code of Regulations, Title 24, Part II, California Building Code (CBC)¹². CBC contains general building design and construction requirements relating to fire and life safety, structural safety, and access compliance. Most project facilities including trailheads, access points and related facilities will be subject to ADA and state accessibility Title 24 regulations. Site furnishings and facilities such as benches, picnic tables, accessible parking stalls, and routes of travel to restrooms or other facilities are regulated under Title 24. The code is updated on a three year cycle, and was most recently updated in 2019, effective January 2020.

AASHTO Guidelines

The primary design guide for bicycle and shared use facilities is the “Guide for the Development of Bicycle Facilities” from the American Association of State Highway and Transportation Officials

¹¹ Architectural and Transportation Barriers Compliance Board, September 26, 2013, Architectural Barriers Act Accessibility Guidelines; Outdoor Developed Areas, Final Rule, 36 CFR Part 1191 RIN 3014-AA22.

¹² California Code of Regulations, Title 24 Part 2, 2019.



(AASHTO), 1999. The AASHTO Guide defines a “shared use path” as a facility on exclusive right-of-way and minimal cross flow by motor vehicles. Users generally include bicyclists, skaters, and pedestrians. In most cases, the AASHTO Guide requires a greater level of accessibility when designing trails for pedestrians, including bicyclists and skaters than the ABA guidelines, but trails should ideally be designed to comply with both standards.

NACTO’s *Urban Street Design Guide* and *Urban Bikeway Design Guide* (<http://nacto.org/usdg/>) also incorporates AASHTO guidelines for the design of complete roadway facilities and shared use paths.

Accessibility Exceptions

The final trail design should be in compliance with all applicable guidelines and regulations for accessibility, however it is possible that a spur trail or beach access stairway would be constructed in the future that would not meet accessibility guidelines. Exceptions might apply for some steeper areas where there are topographic constraints, steep slopes and/or environmentally sensitive areas that must be avoided. Conditions for exceptions should be documented as each trail segment is implemented.

Segments with grades over 5% would need to be designed with ramps, structures or other design elements to comply with accessibility requirements. Documentation of exception conditions would be need to be included in the detailed design planning for each segment as it is implemented, including Caltrans Design exception for any non-compliant trail segments within Caltrans ROW. Exception conditions include:

- Condition 1. Compliance Would Cause Substantial Harm to Cultural, Historic, Religious, or Significant Natural Features or Characteristics
- Condition 2. Compliance Would Substantially Alter the Nature of the Setting or the Purpose of the Facility, or Portion of the Facility
- Condition 3. Compliance Would Require Construction Methods or Materials That Are Prohibited by Federal, State, or Local Regulations or Statutes
- Condition 4. Compliance Would Not Be Feasible Due to Terrain or the Prevailing Construction Practices

6.4 Geotechnical Considerations

Slope stability, landslide, erosion potential, seismic design considerations, poor soil conditions and trail drainage issues will need to be carefully evaluated during the trail design. In general, the trail should be out-sloped to minimize slope disturbance, however, in some areas of steep slopes and less stable terrain, it may be necessary to in-slope the trail and provide drainage swales.

- **Levee/embankment Stability.** The preferred alignment minimizes siting on the dam embankment, but will utilize the existing berm upstream of the dam for trail purposes. A detailed geotechnical assessment will be prepared prior to construction to ensure that any needed grading or structure modification does not impact stability and that flood management is not compromised. Levee/embankment strengthening or reinforcement could conceivably be combined with flood management actions as part of a comprehensive project, subject to additional discussions with the County Flood Control District.
- **Vehicular Load Rating for Emergency Access.** In general, design for emergency access is not needed. However, trail segments should generally be designed for access by emergency



- vehicles, with a minimum weight capacity of 10,000 pounds (H-10 load). Heavier load ratings (H-20) may be required by local fire and emergency response units, depending on availability of access and location. This may be desirable in locations where the trail will also provide fire access to the site.
- **Flood Prone Areas.** Trails located adjacent to areas that may be subject to periodic inundation may need to be reinforced with structural geosynthetics such as geocells to provide a stable or non-erosive trail surface and improve year-round accessibility and maintenance ease. The need for special structural support or elevation will be determined through additional engineering analysis as part of the trail design. Where trails are proposed to cross over such areas, they will require special structures and treatment, such as over-excavation and placement of engineering geotextile such as geocell, and import of thick section of granular aggregate base. The wettest of these areas may require the use of a boardwalk structure supported on short piles or another anchor system.
 - **Slope Instability and Erosion Control.** Precise trail siting will be needed to avoid and/or address potentially unstable areas. If the trail will cross slopes or potential instability, these areas must be carefully evaluated to ensure that trail safety is maintained, and that further degradation of slope conditions does not occur. Although the site is relatively flat, the trail will need to cross several steep, uncontrolled gullies. Retaining walls may be needed in some areas, and careful placement is essential to reduce cost and visual impact. Control of erosion associated with trail construction (to minimize sediment) will also be a critical trail design and implementation issue.
 - **Pavement Design.** Depending on soil conditions and pavement design needs, the use of geotextiles and a permeable trail surface, such as stabilized decomposed granite (DG) or stabilized quarry fines (QF), should be considered. A detailed geotechnical assessment will be prepared to identify the appropriate trail surface, thickness of materials and compaction requirements of the pavement.

6.5 Aesthetic Considerations

The trail alignment was selected to minimize earthwork that would create exposed slopes. Design to minimize excessive cut or fill slopes, setbacks, buffers, restoration planting and/or barrier design for built elements should be incorporated into the planning effort to minimize potential visual impact.

6.6 Trail Elements

Trail Surface and Width

The trail must have a firm and stable surface to be ADA compliant. In general, shared use trail segments would be designed to accommodate bicycles and occasional motorized use by vehicles, and the trail surface would be paved asphalt, concrete or stabilized permeable pavement.

Trail sections along ramps, bridges, rail crossings and boardwalk approaches, and any trails that will be routinely utilized by motorized vehicles for access and maintenance should be paved. The trail should generally be elevated slightly above existing grade, with a cross slope of 2% to provide drainage.

Marsh Creek trail segments would be multi-use, separated paths, with accommodations for equestrian use. This would include an 8-10 foot (minimum) paved or stabilized trail section and unpaved shoulders to accommodate equestrians. Future Marsh SHP facilities may include a separate facility for horses.

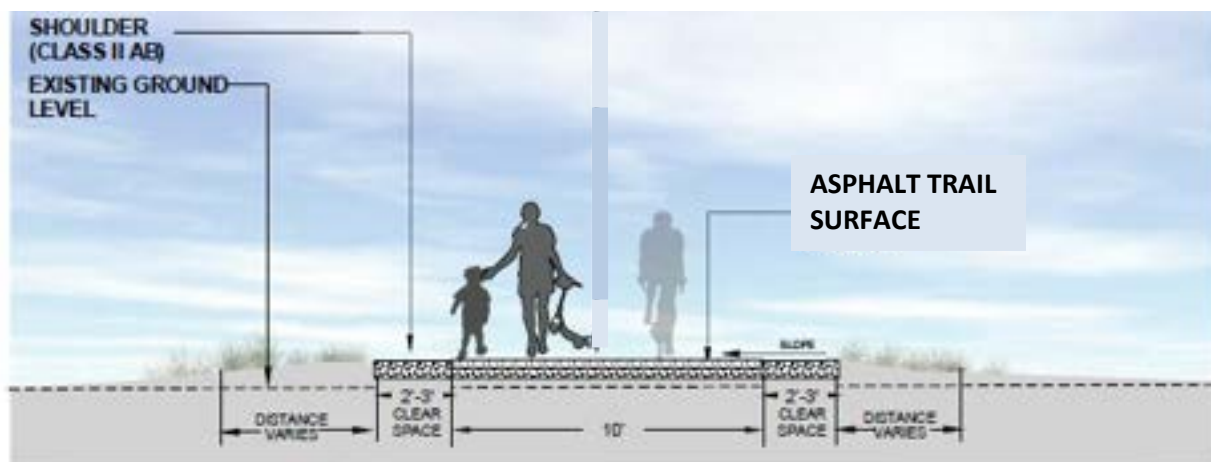
The asphalt trail would be constructed generally using 3 inches of asphalt concrete, with 2-foot wide (minimum) shoulders of 4 to 8 inches of Class 2 aggregate base (AB).

Trail Pavement Design in Areas Where Cultural Resources May be Present

A concern regarding facilities in the vicinity of the John Marsh House is the potential disturbance of subsurface cultural resources. The preferred alignment was selected to avoid additional disturbance in this area by utilizing Old Marsh Creek Road (portions of which are graded and paved) and existing road right of way.

Where the trail is needed to cross potential cultural resource areas, the trail design section can be modified to minimize subsurface excavation. Use of geocells or other geotechnical membranes can be utilized to spread load and provide structural support with minimal ground disturbance.

John Marsh House Typical Trail Cross Section



Fencing

Fencing, gates and bollards may be installed to direct trail users and define the trail corridor:

- Fencing on portions of the trail that are not directly adjacent to roadways, to separate adjacent land uses from trail users, and to define the trail corridor;
- Gates and Bollards, where needed to preclude vehicular entry or to allow access to adjacent lands.

Fencing. Fencing, if needed, along portions of the Trail that are not adjacent to roadways would generally consist of wire strand field fencing. Farm field fencing is appropriate in agricultural operations to preclude trail users from entering rangelands. Split rail fence, such as fencing, may also be used to define the trail path.

At wildlife crossings, fencing would be provided to direct wildlife use to the underpass/crossing.

At trailheads, stone monuments or other thematic fencing design could be utilized to provide a visual cue for public access and to reflect the scenic setting. This would be appropriate at entry locations such as trailheads and at key intersections. The design of fencing should be in keeping with the historic character and scenic nature of the area.

Gates and Bollards. Bollard posts at trail intersections and entrances maybe necessary to keep vehicles from entering. Posts should be designed to be easily moveable by emergency vehicles, such as bollards or a pipe gate and bollard, but consistent with the rural setting. Pipe gates are appropriate at locations where vehicular access will be needed, and would be designed to permit wheelchair access.



Bridges and Crossings



Issues associated with bridge placement include proximity to sensitive species, erosion, length of span, floodplain hydrology, resilience, access and maintenance. Bridge implementation may require regulatory approvals that would include habitat mitigation and protection protocols. Detailed hydraulic, geotechnical, structural engineering and environmental studies would be needed to inform and confirm final bridge and bridge abutment design.

Bridges, boardwalks or drainage structures (culverts) would be needed where the trail crosses creeks, drainages or other floodplain areas. As discussed in the Water Resources section, creeks and drainages within the Project area part of a network of waterways that eventually drain into the Delta and ultimately San Francisco Bay. In addition to design that does not create a visual barrier or affect aesthetics, bridges and crossings must be designed and installed to avoid potential biological and hydrologic impacts, including clearspan structures where feasible, avoiding displacement or alteration of floodways, and inclusion of avoidance and minimization measures to protect sensitive wildlife, both during construction and in long term use.

Bridges, boardwalks or drainage structures (culverts) would be needed where the trail crosses creeks, drainages or other floodplain areas. As discussed in the section, creeks and drainages within the Project area part of a network of waterways that drain into the Delta. In addition to design that does not create a visual barrier or affect aesthetics, bridges and crossings must be designed and installed to avoid potential biological and hydrologic impacts, including clearspan structures where feasible, avoiding displacement or alteration of floodways, and inclusion of avoidance and minimization measures to protect sensitive wildlife, both during construction and in long term use.

Signage, Wayfinding and Interpretive Elements



Typical Trail Signs

Traffic Signs

The Manual of Uniform Traffic Control Devices (MUTCD) defines the standards to install and maintain traffic control devices on all public streets, Highways, bikeways, and private roads open to public traffic. The MUTCD, and adopted in California by Caltrans, contains standards for all traffic control devices, including road markings, Highway signs, and traffic signals.

Traffic control devices are defined as all signs, signals, markings, and other devices used to regulate, warn, or guide traffic, placed on, over, or adjacent to a street, highway, pedestrian facility, or bikeway by authority of a public agency or official having jurisdiction, or, in the case of a private road, by authority of the private owner or private official having jurisdiction.



In general, all signs should be located two to four feet from the edge of the paved surface, have a minimum vertical clearance of 8.5 feet when located above the trail surface and be a minimum of four feet above the trail surface when located on the side of the trail. All signs should be oriented for clarity to the user.

6.7 Trailhead Staging

The Round Valley Staging Area provides parking, trash receptacles, restroom and picnic facilities to serve trail users. The existing unpaved, informal parking area accommodates approximately 70-80 vehicles, with a separate area that can accommodate approximately 25 vehicles with trailers. The staging area can be expanded by up to 30 additional vehicles as envisioned in the Marsh Creek State Park Master Plan.



6.8 Street/Trail Crossings

The existing intersection of Vineyards Parkway and Miwok Drive is a signal-controlled intersection, and trail users will utilize the existing crosswalk to access the trail north of Vineyards Parkway.

A trail undercrossing of Marsh Creek Road is proposed to eliminate an at-grade crossing of Marsh Creek Road.

6.9 Trail Operations and Maintenance

EBRPD proposes to operate and manage the trail, consistent with the rest of the Marsh Creek Regional Trail and operation of Round Valley Regional Preserve. New agreements or modification of existing agreements through easements, license agreements or Memorandum of Understanding will be needed for the segments of the trail crossing State Parks, Contra Costa County Flood Control and Water Conservation District and Contra Costa County.

Maintenance and management activities will include security and patrol, fire fuels management, emergency response and repair and replacement of trail improvements as needed.

Precise trail siting to facilitate fire fuels management and grazing/fencing should be coordinated with landowners for efficiency and optimal management.

6.10 Environmental Restoration and Habitat Enhancement for Trail Mitigation

The Preferred Alignment was selected, in part, to minimize potential impacts to environmental resources in other parts of the Study Area. This includes:

- Locating the trail on Vineyards Parkway, utilizing the existing Marsh Creek Bridge instead of a separate creek crossing or bridge to the south
- Selecting an alignment, and utilizing a design section to minimize subsurface excavation in the vicinity of the John Marsh House, where cultural resources are present
- Siting of a new pedestrian bridge on the south section of Marsh Creek to avoid hydraulic impacts to the proposed vehicle bridge on Marsh Creek Road, and to avoid in-channel resource disturbance
- Provision of a wildlife-friendly undercrossing of Marsh Creek Road to facilitate wildlife corridor movement, consistent with the ECCHCP.

Regulatory permits may be needed associated with the new creek crossing and a minor crossing of a Marsh Creek tributary south of Marsh Creek Road. Local habitat enhancement and restoration to mitigate for project impacts should be included in the project design plans.



7. Preliminary Project Costs

A planning-level cost estimate has been developed for the Preferred Alignment identified in this report. Because the estimate has been developed without the benefit of detailed engineering design drawings, it is to be considered preliminary and will need to be refined as the Project moves forward in the planning and implementation process. A 20% contingency is included as part of construction costs. In addition to actual trail construction costs, design, permitting, construction management, and biological/cultural monitoring will need to be budgeted into trail implementation. For this project, professional services for design and permitting are estimated to total an additional 12% on top of the construction cost estimate, and construction management and biological and cultural resources monitoring are estimated to total an additional 16%. **Table 7-1** presents a detailed implementation cost estimate.

Table 7-1: Implementation Cost Estimate

Item #	Description	Unit	Est. Qty.	Unit Price	Total
1	Mobilization (8% of 2-18)	LS	1.00	\$240,000.00	\$240,000.00
2	Site Protection and Erosion Control	LS	1.00	\$25,000.00	\$25,000.00
3	Demolition and Clearing	LS	1.00	\$40,000.00	\$40,000.00
4	Trail and Parking Grading	CY	19,500.00	\$25.00	\$487,500.00
5	Trail base and AC paving	SF	92,000.00	\$6.50	\$598,000.00
6	Fencing and Gates	LF	10,500.00	\$16.00	\$168,000.00
7	Entry Sign, Kiosk	EA	2.00	\$15,000.00	\$30,000.00
8	Shade Structure /Benches	EA	2.00	\$12,000.00	\$24,000.00
9	Signs/Interpretive Elements	LS	1.00	\$50,000.00	\$50,000.00
10	Underpass	LS	1.00	\$850,000.00	\$850,000.00
11	Marsh Creek (140'x8') Ped. Bridge	SF	1,120.00	\$200.00	\$224,000.00
12	Dam Ramp/Marsh Rd. Geotech. Wedge Fill	CY	500.00	\$65.00	\$32,500.00
13	Round Valley Parking Improvements	LS	1.00	\$50,000.00	\$50,000.00
14	Round Valley Second Restroom Vault	LS	1.00	\$75,000.00	\$75,000.00
15	John Marsh House connection improvement	LS	1.00	\$25,000.00	\$25,000.00
16	Vineyard Ave. connection improvement	LS	1.00	\$35,000.00	\$35,000.00
17	Vineyard -Marsh Creek Road Intersection Improvements-contribution	LS	1.00	\$150,000.00	\$150,000.00
18	Restoration/Mitigation Allowance- Marsh Creek Bridge area	LS	1.00	\$150,000.00	\$150,000.00
SUBTOTAL CONSTRUCTION					\$3,254,000
Contingency (20%)					\$650,800
TOTAL CONSTRUCTION					\$3,904,800
Cost per Mile (2.2 miles)					\$1,479,0913
Design and Permitting (12%)					\$390,480
Construction Management and Bio/Cultural Monitoring (16%)					\$520,640
TOTAL CONSTRUCTION					\$4,815,920



8. Recommendations and Next Steps

Review and/or approval of this Study by EBRPD and project stakeholders.

- Certification of environmental document.
- Continue discussions with stakeholders where easements or right-of-way are needed. Obtain Agreements or Memorandums of Understanding for right-of-way and trail operation.
- Prepare Preliminary Engineering Design Documents.
- Obtain regulatory permit approvals.
- Negotiate and complete right-of-way (ROW) agreements, including easements, and trail use or licensing agreements.
- Prepare detailed engineering design plans and construction documents.
- Publicly bid the project's Construction Plans.
- Construction, including construction oversight of the approved plans by a qualified Contractor to ensure that the project plans, along with all of the environmental mitigation measures and all permit conditions, are followed and implemented as approved.



9. References

- Beason, Mark A., and Jarma Jones. 2007 California Department of Parks and Recreation 523 Record for P-07-002991. On file, Northwest Information Center, Sonoma State University, Rohnert Park, California.
- California Department of Fish and Wildlife (CDFW). 2019. California Natural Diversity Database (CNDDB), commercial version dated July 2019. Biogeographic Data Branch, California Department of Fish and Wildlife, Sacramento.
- California Department of Fish and Wildlife (CDFW). 2018. Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities. March 20.
- California Department of Water Resources, Division of Safety of Dams.
- California Geological Survey, 1982, Alquist-Priolo Earthquake Fault Zone Map.
- California Native Plant Society (CNPS). 2019. Inventory of rare and endangered plants in California (online edition, v8-02). California Native Plant Society, Sacramento. Website: www.cnps.org/inventory. July 26.
- California State Parks, January 2012. Marsh Creek State Park General Plan and Programmatic Environmental Impact Report.
- City of Brentwood, General Plan July 2014.
- City of Brentwood, Parks, Trails and Recreation Master Plan Update, February 2019.
- Contra Costa County. East Contra Costa County Habitat Conservation Plan.
- Contra Costa County General Plan 2005.
- Contra Costa County Bicycle and Pedestrian Master Plan, July 2018.
- Contra Costa County, 2001. Trail Design Resource Handbook.
- Donaldson, Milford Wayne. 2012. Letter dated August 8, 2012, to Ms. Carol Shull, Keeper of the National Register of Historic Places. On file, Northwest Information Center, Sonoma State University, Rohnert Park, California.
- East Bay Regional Park District Master plan 2013.
- Harrington, Lori, William Self, and James Allen. 1995. *Archaeological Site Testing and Burial Recovery at Site CA-CCO-548, Cowell Ranch, Contra Costa County, California*. William Self Associates, Orinda, California.



- Meyer, Jack. 2015. *Phase 2 Geoarchaeological Testing at CA-CCO-18/H for the Marsh Creek State Historic Park, Contra Costa County, California*. Far Western Anthropological Research Group, Inc., Davis, California.
- Rosenthal, Jeffrey. 2008. California Department of Parks and Recreation 523 Record for P-07-002930. On file, Northwest Information Center, Sonoma State University, Rohnert Park, California.
- Rosenthal, Jeffrey, and Jack Meyer. 2009. *Archaeological Survey and Geoarchaeological Investigation of the Marsh Creek Dam Rehabilitation Project Area, Eastern Contra Costa County, California*. Far Western Anthropological Research Group, Inc., Davis, California.
- Rosenthal, Jeffrey, Jack Meyer, Jim Nelson, Denise Furlong, Tim Carpenter, and Eric Wohlgemuth. 2006. *Results of Limited Geoarchaeological and Archaeological Study of CA-CCO-18/548, John Marsh Historic Park, Brentwood, California*. Far Western Anthropological Research Group, Inc., Davis, California.
- Samuelson, Ann, William Self, Greg Mattson, and James Allan. 1993. *Archaeological Survey and Testing Report, Cowell Ranch Project, Contra Costa County, California*. William Self Associates, Orinda, California.
- Sonoma State University Academic Foundation. 1992. *Evaluation, Request for Determination of Eligibility, and Effect for the Los Vaqueros Project, Alameda and Contra Costa Counties, California*. Sonoma State University Academic Foundation, Rohnert Park, California.
- Strother, Eric. 2010. *Archaeological Survey Report, Marsh Creek Road Shoulder Widening Project, Contra Costa, California*. William Self Associates, Orinda, California.
- Wiberg, Randy S. 2010. *Archaeological Investigations at CA-CCO-18/548: Final Report for the Vineyards at Marsh Creek Project, Contra Costa County, California*. Holman & Associates, San Francisco, California.



Appendix A

Public Meeting Materials

Marsh Creek Regional Trail

Vineyards Parkway to Round Valley Regional Preserve

Please join us to discuss the Feasibility and Conceptual Engineering / Initial Study for the Marsh Creek Trail: Vineyard Parkway to Round Valley Regional Preserve project.

Public Meeting #1

Project objectives, needs, and existing conditions will be presented for public review and comment.

Wednesday April 10, 2019

7:00 PM to 9:00 PM

Brentwood Community Center, Hall B
35 Oak Street | Brentwood, CA 94513



East Bay Regional Park District (EBRPD) is leading a Feasibility and Conceptual Engineering Study for a 3-mile extension of the Marsh Creek Regional Trail from Vineyards Parkway in Brentwood to Round Valley Regional Preserve trailhead on Marsh Creek Road. The Study will incorporate your comments and suggestions from three public meetings. It will identify a recommended preliminary trail alignment and design to provide a safe crossing for trail users at Marsh Creek Road. Once complete, the Study will be available for review online at EBRPD's website, www.ebparcs.org.



Study Area →

**Questions?
Not able to attend?**

Contact Sean Dougan,
Project Manager
(510) 544-2611

sdougan@ebparcs.org





Marsh Creek Regional Trail Vineyard Parkway to Round Valley Regional Preserve

Public Meeting #1

Agenda

(April 10, 2019)

Purpose: Ensure that participants understand the Project's goals and context for the future trail system; solicit the participants comments about the trail system.

- 1. Welcome and Introductions**
- 2. Presentation**
 - **Goals**
 - **Existing Conditions**
 - **Preliminary Alignment Options**
- 3. Questions and Answers**
- 4. Break-out Groups**
 - **Review Project Maps**
 - **Document Comments**
- 5. Wrap-up and Summarys**



Today's Presentation

- **Introductions**
- **Presentation**
 - Goals
 - Existing Conditions
 - Preliminary Alignment Options
- **Questions & Answers**
- **Review**
- **Summary & Next Steps**



MARSH CREEK TRAIL FEASIBILITY STUDY

Introductions

2M Associates

- Patrick Miller, FASLA

Questa

- Jeff Peters
- Margaret Henderson

EBRPD

- Sean Dougan

ACME Consulting

- Jim Townsend

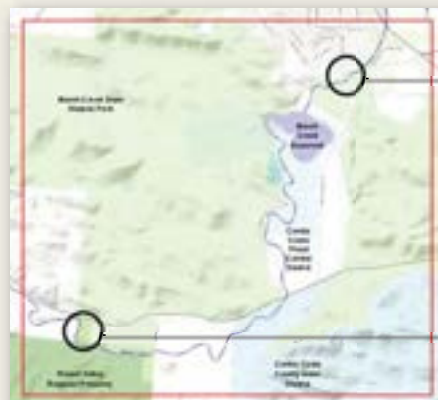


Ground Rules

- **LISTEN**
- **KEEP IT SHORT**
- **DO NOT INTERRUPT**
- **TAKE TURNS (ONE SPEAKER AT A TIME)**
- **BE POLITE!**



PROJECT LOCATION



**FROM: VINEYARDS
PARKWAY AT
MIWOK AVENUE**

**TO: ROUND VALLEY
REGIONAL
PRESERVE
STAGING AREA**

PROJECT LOCATION



**TO: ROUND
VALLEY
REGIONAL
PRESERVE
STAGING
AREA**

□ **FROM:
VINEYARDS
PARKWAY
AT MIWOK
AVENUE**



Feasibility Study Goals

GOALS



- ❑ Complete the Marsh Creek Trail / Close the gap between Vineyards Parkway and Round Valley Regional Preserve
- ❑ Document existing conditions based on available resource information and identify data gaps
- ❑ Identify and evaluate 3 alternatives
- ❑ Present a preferred alignment and applicable trail standards
- ❑ Provide implementation strategy and costs
- ❑ Prepare environmental document evaluating issues related to trail implementation, including applicable habitat restoration/enhancement opportunities

Feasibility Study Outcomes

Basis for Informed Decision-Making

- ❑ Develop “best fit” solutions
- ❑ Cost comparisons
- ❑ Environmental Analysis
 - ❑ Project components
 - ❑ Habitat enhancement opportunities
 - ❑ Technical studies/permits/environmental review timeline
- ❑ Implementation Strategy
 - ❑ Phases/segments
 - ❑ Nexus with other projects
 - ❑ Collaboration with State Parks and CCCFCD

Setting: Regional Perspective

CONNECT

- ❑ Big Break Regional Preserve and Dutch Slough
- ❑ Through Oakley and Brentwood
- ❑ To Round Valley Regional Preserve
- ❑ And beyond to the Los Vaqueros Reservoir watershed

PROJECT AREA

- ❑ Vineyards Parkway to Round Valley Regional Preserve through Marsh Creek State Park



Setting: Area Perspective

PARTNERS

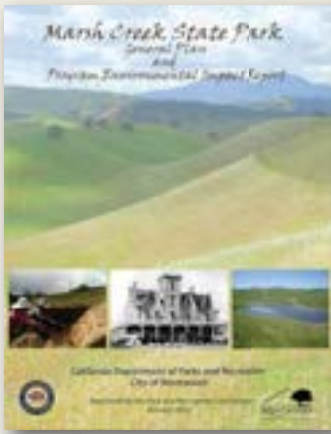
- ❑ EBRPD
- ❑ City of Brentwood
- ❑ California State Parks
- ❑ Contra Costa County Flood Control District
- ❑ Contra Costa County
- ❑ John Marsh Historic Trust Inc. / Friends of John Marsh
- ❑ Friends of Marsh Creek Watershed



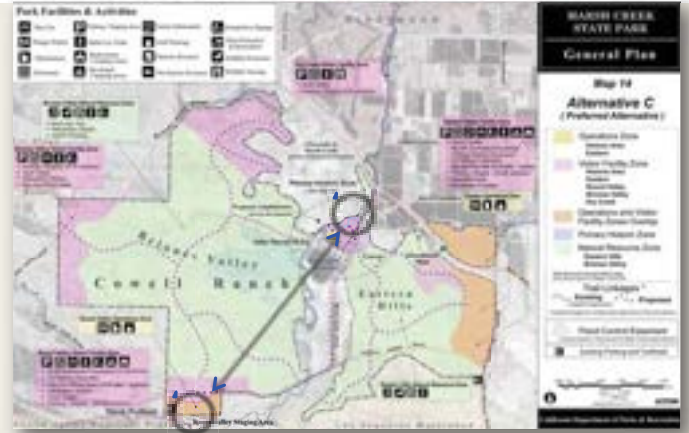
EXISTING CONDITIONS



Context: Marsh Creek State Park General Plan



Setting: Marsh Creek State Historic Park General Plan



Setting: Marsh Creek State Historic Park General Plan

HISTORIC ZONE



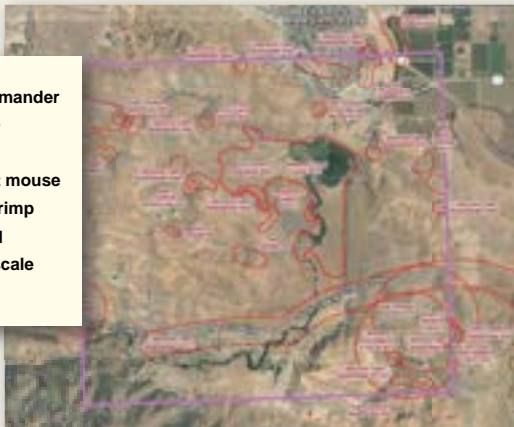
Environmental Considerations

- ❑ Biological Resources (ESA, resource and permitting issues)
- ❑ Cultural Resources
- ❑ Geotechnical / Soils / Topography
- ❑ Hydrology / Flooding / Water Quality
- ❑ Cultural Resources
- ❑ Ownership / Right of Way / Engineering
- ❑ Safety
 - ❑ Marsh Creek Dam and Reservoir
 - ❑ Marsh Creek Road

Environmental Considerations

BIOLOGY

California tiger salamander
 Western pond turtle
 Swainson's hawk
 San Joaquin pocket mouse
 Vernal pool fairy shrimp
 Tricolored blackbird
 San Joaquin spearscale
 Big Tarplant



Environmental Considerations

CULTURAL RESOURCES



Credit: John Marsh Historic Trust



Environmental Considerations

HYDROLOGY

- Creeks & Drainages (Contra Costa County)
- FEMA Flood Zones**
- Flood Zone A: 100 Year Flood Zone
- Area of Minimal Flood Threat



Environmental Considerations

LANDSLIDE DISTRIBUTION

- mostly landslide
- many landslides
- few landslides
- very few landslides
- surficial deposits



Environmental Considerations

LAND USE

- Agricultural Core
- Agricultural Lands
- Open Space
- Parks and Recreation
- Public and Semi-Public
- Water
- Watershed



Environmental Considerations

SOILS

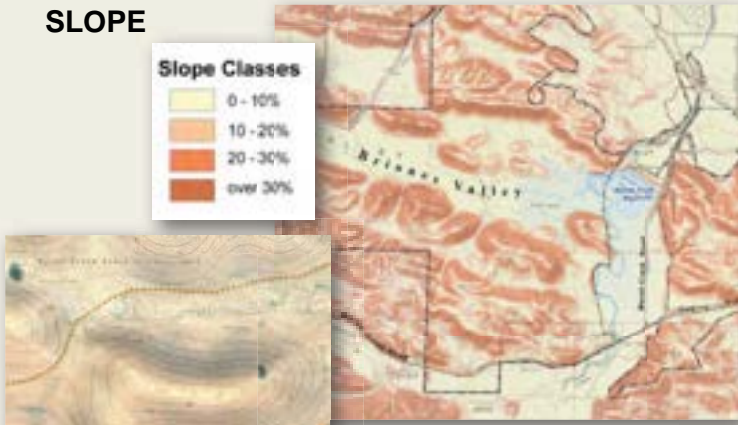
- AU1 Alluvial clay, 0 to 15 percent slopes, MUSA 12
- AU2 Alluvial clay, 15 to 30 percent slopes, MUSA 12
- AU3 Alluvial Fortuna complex, 30 to 50 percent slopes
- BU Barrenland clay loam
- BU1 Barren heavy sand, 0 to 30 percent slopes
- BU2 Barren heavy sand, 30 to 50 percent slopes
- CU1 Clayey clay, 0 to 3 percent slopes, MUSA 12
- CU2 Clayey clay, 3 to 15 percent slopes, MUSA 12
- CU3 Clayey clay, 2 to 5 percent slopes
- GAW Sand
- FA Fortuna-Roman complex
- GA1 Hardpan gravelly clay loam, 2 to 5 percent slopes
- GA2 Hardpan gravelly clay loam, 5 to 30 percent slopes
- LAF Low Clay clay loam, 30 to 50 percent slopes, MUSA 12
- PL1 Pleistocene clay loam, 0 to 8 percent slopes, MUSA 12
- SL1 Barren clay clay loam
- W Water



Environmental Considerations

SLOPE

- Slope Classes**
- 0 - 10%
- 10 - 20%
- 20 - 30%
- over 30%



Environmental Considerations

SAFETY: TRAFFIC COLLISIONS

- Fatal
- Injury, Complaint of Pain
- Injury, Severe
- Injury, Visible





Siting & Design Considerations

TRAIL OPTIONS



TRAIL CONTINUITY AND ACCESSIBILITY



Siting & Design Considerations

Siting & Design Considerations

CREEK CROSSINGS

SAFETY: CROSSING MARSH CREEK ROAD (AT GRADE, BRIDGE, OR TUNNEL)



Potential Trail Alignments

Use & Design Options



Crossing Options



Interpretive Options



Next Steps: Tasks

- ❑ Incorporate public input from Workshop 1 into alignment options
- ❑ Workshop 2: Present potential and preferred alignment and trail types to public for additional comments
- ❑ Complete Draft Feasibility Study and release for public review
- ❑ Prepare Environmental Document
- ❑ Perform individual and stakeholder outreach and secure agreements for precise trail location
- ❑ Begin design process for trail alignment
- ❑ Implement project when funding and resources are secured

GENERAL QUESTIONS

?

BREAK-OUT GROUPS (20 Minutes)

BREAKOUT REVIEW

Break-Out Group Questions

- Proximity to existing roads?
- Separation of user types?
- Trail surface types?
- What trail features mentioned in the presentation are most important?
- What trail features **not** mentioned in the presentation should be considered?
- What is the most important trail amenity to add?
- What else could be done to improve the regional trail experience?



SUMMARY & NEXT STEPS



Next Steps: Public Input

- ❑ Workshop 1 – April 10, 2019 (TONIGHT!)
- ❑ Workshop 2 – TBD
- ❑ Release of Draft Study - Summer 2019
- ❑ Environmental Review and Preliminary Design - Fall 2019-Winter 2020
 - ❑ Design
 - ❑ Environmental Process
 - ❑ Stakeholder Outreach
- ❑ EBRPD Board Meeting

Ongoing Opportunities

COMMENTS OR INQUIRIES:

Sean Dougan
Trail Development Program Manager
E-mail: sdougan@ebparks.org

UPDATES

Please visit the EBRPD website at:
<https://www.ebparks.org>



THANK YOU!

Marsh Creek Trail Feasibility Study

April 10, 2019
Meeting Notes

Sean Dougan of EBRPD introduced County Supervisor Diane Burgis and EBRPD District Board representative Colin Coffey. The Marsh Creek Trail is approximately 10 miles long, originating at Big Break Regional Shoreline.

This study will close the gap in the trail between Vineyards Parkway and Round Valley Regional Shoreline. The one mile section north of this from Concord Avenue to Vineyards Parkway will be installed by Trilogy developer.

The feasibility study will identify three alternative alignments, and optimum routes for best recreation and/or transportation experience

Some of the interested parties include Friends of Marsh Creek Watershed, Marsh Creek State Historic Park, John Marsh Historic Trust, and others. The trail may go through or around historic zone.

Environmental resources to be evaluated as part of the trail project include sensitive species, cultural resources, flooding and hydrology, geologic hazards, land use-grazing, soils –trail structure and design.

ADA accessibility is the goal and there are some slopes to evaluate. The trail will need to serve bicyclists, pedestrians and equestrian use. The Study will evaluate safety and traffic collisions associated with crossing Marsh Creek Road, as well as any needed creek crossings.

Preliminary trail route options include a trail along Marsh Creek Road, Ranch road trails and a network of possible trails. Types of trail - design standards will be evaluated, as well as crossing options for Marsh Creek Road at the Round Valley trailhead.

Interpretive opportunities include the opportunity to provide access and interpretation with John Marsh House.

Next steps will include another workshop, identify a preferred alignment, draft study, environmental document, implementation includes approval, adoption, agreement among stakeholders.

The Vineyards developer will construct one mile from flood basin and Concord Ave. to Vineyards Parkway.

General questions:

1. How much will it cost to pave the trail? Want to get it going.
 - a. General cost is about \$1million per mile.
2. Explore opportunities for field studies associated with Los Medanos College. Trail will be used by cyclists to access campus.
 - a. Noted.

3. Is there a schedule from when trail from Concord Ave will be installed? (This study will evaluate Trail from intersection of Miwok and Vineyards).
 - a. Hopefully within the year.
4. There is a separate CCC feasibility study to extend trail along Marsh Creek Road.
 - a. Noted.
5. How will trail work with cattle grazing all along the land.
 - a. Trails throughout EBRPD coexist with grazing lands, there may be cattle crossings or fencing needed.
6. What is the study schedule?
 - a. The general timeline is about a year. Alternatives work and identifying a preferred alternative, environmental document in fall / winter.
7. How was meeting advertised? Paul Sieeger from Sierra Club would like to attend.
 - a. Notices sent to city of Brentwood, Delta Peddlers, Bike East Bay, hiking groups, Park District website, John Marsh Historic Trust, Save Mount Diablo, Nextdoor, etc.
8. Will the presentation be posted?
 - a. Can post the presentation.

Group Sessions to discuss trail options and amenities:

- Favor trail along road for cyclists plus secondary hiking trail
- Likely fewer conflicts along Marsh Creek Road
- Overlooks and interpretive facilities are important
- Provide shade structures, rest areas, benches overlooks
- Provide Directional signage, trail markers
- Acknowledge connections to Deer Valley, Mt Diablo and Los Vaqueros
- Larger scale wayfinding information - trail markers, distances, interpretive facilities, accessible with links to higher elevations for overlook.
- Interpret natural features
- State Park is doing restoration from house to Trilogy
- Interpret mercury mine
- Provide Las Vaqueros connector
- Connect to Deer Valley corridor
- Provide spurs or loops to higher points on the property
- Support for crossing under Marsh Creek Road that could be used by equestrians.
- There is lots of equestrian use at Round Valley.
- State Parks is planning to remove the old dam and restore creek banks downstream of dam.
- Packed natural surface is preferred along trail. Maybe some pavement if needed for ADA.
- John Marsh Trust is planning a picnic and parking area with interpretive facilities, trail connection would be good.
- Trail security should be considered, make sure there is no dumping along trail or adjacent road.
- Some fencing might be needed.
- Trail along the road would be great for bicyclists.

NAME (PLEASE PRINT CLEARLY)	REPRESENTING	E-MAIL
JOE DOZYZWALSKI	CITY OF DUNSMITH	jdozrywalski@brentwood.ca.gov
HERMIT SWEEN	SELF	omahop@aol.com (Paul)
Barry Wartsgaon	FOWLER	barywartsgaon@gmail.com
RICK LEMMYRE	SONNENSAH HISTORIC TRUST	RICKLEMMYRE@GMAIL.COM
Diane Burgess	Contra Costa County III	supervisor - burgis@cos.county.ca.gov
Mohi Goolwin	Chief of Staff	
Kathy & Dan Griffith	Self + Alliance for a Better Brentwood	GMcGriffith@comcast.net
CHARON H. HOARSON	California State Parks	CHARON.HOARSON@PARKS.CA.GOV
Dave Stoettler	Delta Paddlers Bicycle Club	dstoettler@sbcglobal.net
Colin Coffey	Board - EBRPD	coffey@elspark.org

Marsh Creek Regional Trail Vineyards Parkway to Round Valley Regional Preserve

Please join us for a discussion about the Feasibility and Conceptual Engineering / Initial Study for the Marsh Creek Trail: Vineyard Parkway to Round Valley Regional Preserve.

Public Meeting #2

Project objectives, issues and challenges, and alignment options will be presented for public review and comment.

Wednesday August 14, 2019

7:00 PM to 9:00 PM

Brentwood Community Center

Hall B

35 Oak Street | Brentwood, CA 94513



East Bay Regional Park District (EBRPD) is leading a Feasibility and Conceptual Engineering Study for a 3-mile extension of the Marsh Creek Regional Trail from Vineyards Parkway in Brentwood to Round Valley Regional Preserve trailhead on Marsh Creek Road. The Study will incorporate your comments and suggestions from three public meetings. It will identify a recommended preliminary trail alignment and design to provide a safe crossing for trail users at Marsh Creek Road. Once complete, the Study will be available for review online at EBRPD's website, www.ebparcs.org.



**Questions?
Not able to attend?**

Contact Sean Dougan,
Project Manager
(510) 544-2611
sdougan@ebparcs.org



COMMUNITY WORKSHOP #2



MARSH CREEK TRAIL

FEASIBILITY STUDY



Today's Presentation

PURPOSE: Present potential and preferred alignment and trail types to public for additional comments

- ❑ **Introductions**
- ❑ **Presentation**
 - Goals
 - Overview Existing Conditions
 - Alignment Alternatives for Feasibility Analysis
- ❑ **Questions & Answers**
- ❑ **Review**
- ❑ **Summary & Next Steps**

Introductions

2M Associates

- ❑ Patrick Miller, FASLA

Questa

- ❑ Jeff Peters
- ❑ Margaret Henderson

EBRPD

- ❑ Sean Dougan

ACME Consulting

- ❑ Jim Townsend



Ground Rules

- ❑ LISTEN
- ❑ BE SUCCINCT
- ❑ DO NOT INTERRUPT
- ❑ TAKE TURNS
(ONE SPEAKER AT A TIME)
- ❑ BE POLITE!



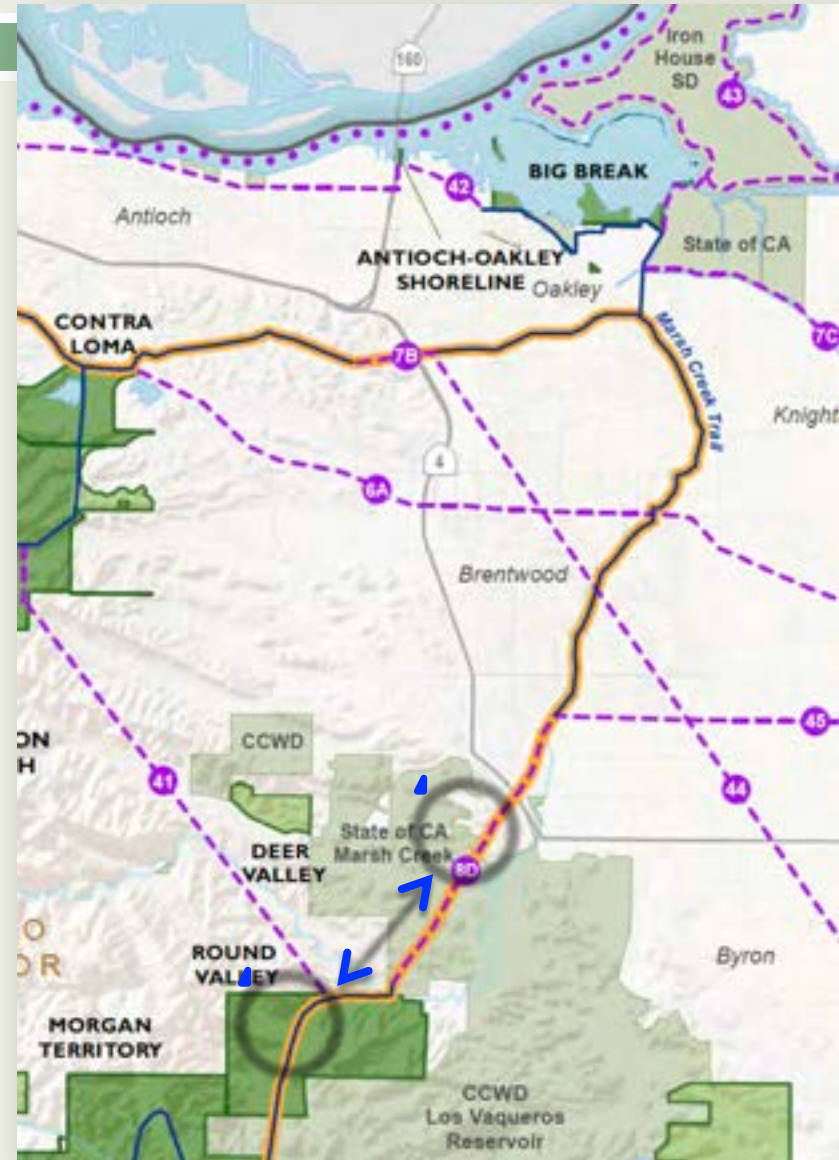
Setting: Regional Perspective

CONNECT

- ❑ Big Break Regional Preserve and Dutch Slough
- ❑ Through Oakley and Brentwood
- ❑ To Round Valley Regional Preserve
- ❑ And beyond to the Los Vaqueros Reservoir watershed

PROJECT AREA

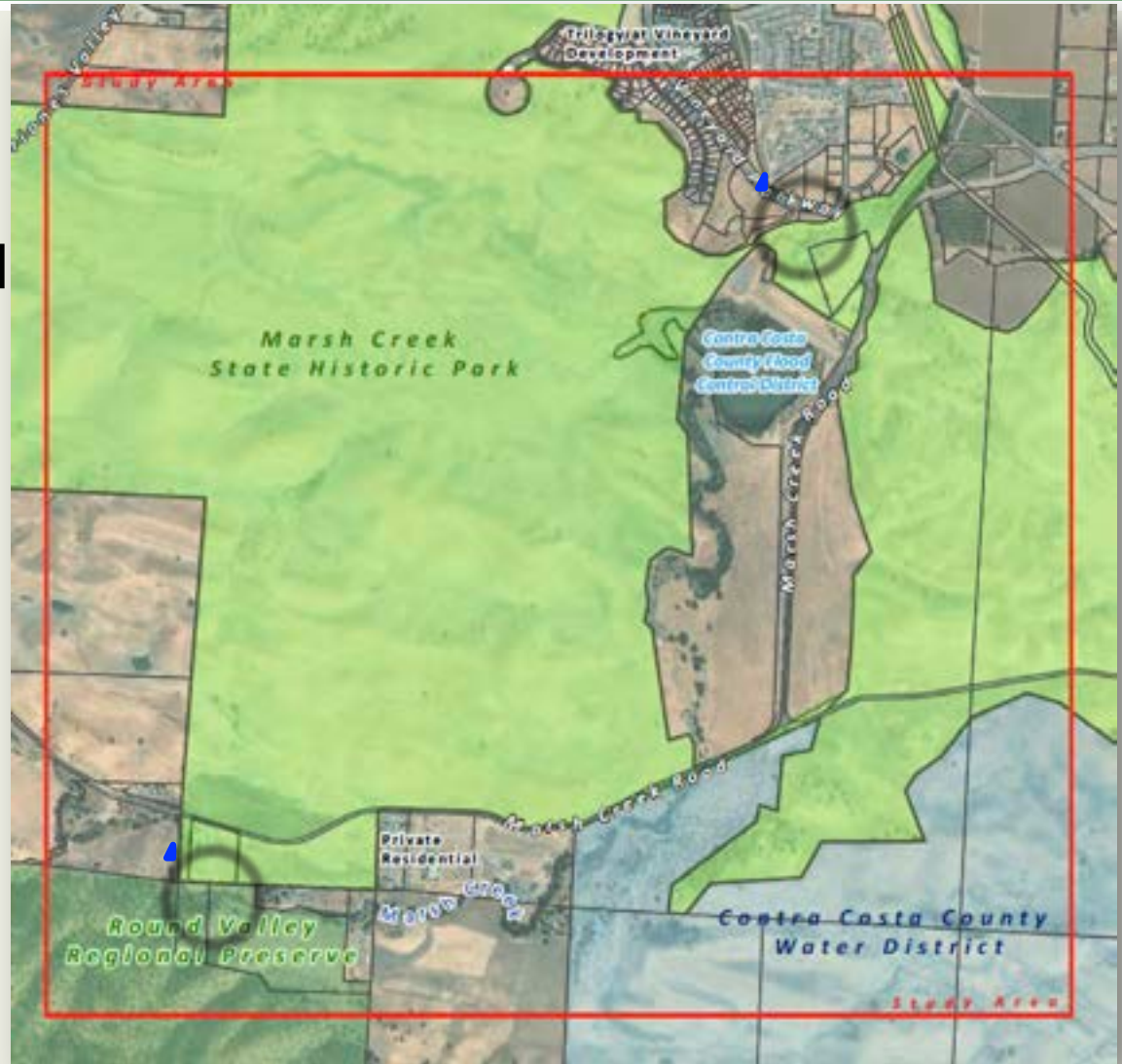
- ❑ Vineyards Parkway to Round Valley Regional Preserve through Marsh Creek State Historic Park



Setting: Area Perspective

PARTNERS

- ❑ EBRPD
- ❑ City of Brentwood
- ❑ California State Parks
- ❑ Contra Costa County Flood Control District
- ❑ John Marsh Historic Trust





GOALS

Feasibility Study Goals

- ❑ **Close a gap in the Marsh Creek Trail between Vineyards Parkway and Round Valley Regional Preserve**
- ❑ **Document existing conditions based on available resource information and identify data gaps**
- ❑ **Identify and evaluate alternatives**
- ❑ **Present a preferred alignment and applicable trail standards**
- ❑ **Provide implementation strategy and costs**
- ❑ **Prepare environmental document evaluating issues related to trail implementation, including applicable habitat restoration/enhancement opportunities**

Feasibility Study Outcomes

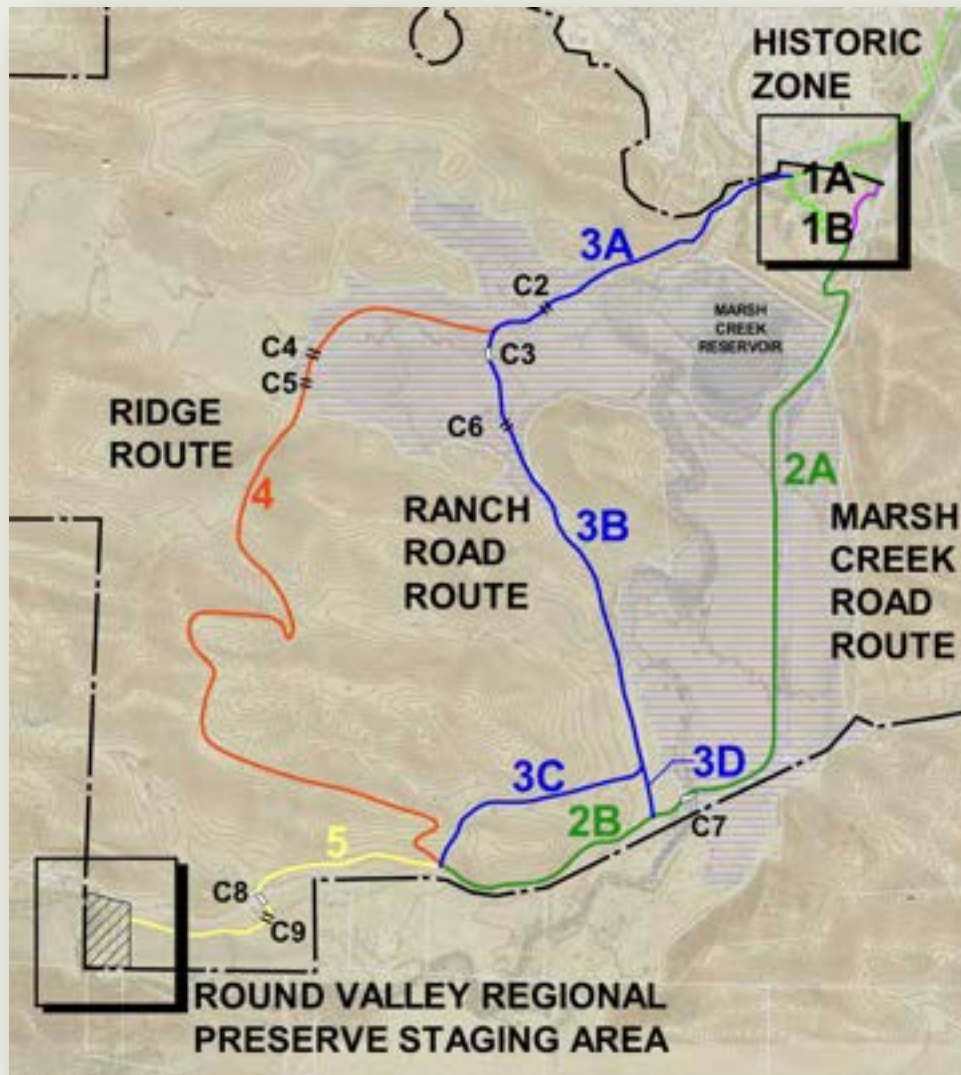
Basis for Informed Decision-Making

- ❑ Develop “best fit” solutions
- ❑ Cost comparisons
- ❑ Environmental Analysis
 - ❑ Project components
 - ❑ Habitat enhancement opportunities
 - ❑ Technical studies/permits/environmental review timeline
- ❑ Implementation Strategy
 - ❑ Phases/segments
 - ❑ Nexus with other projects



TRAIL ALTERNATIVES

ALTERNATIVES: Overview



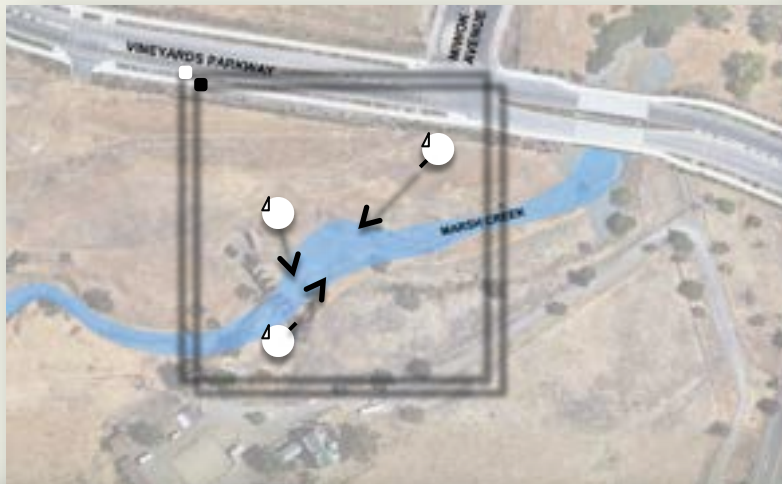
LEGEND

- 3B Trail Segment
- C4 Crossing of Creek, Drainage, or Road

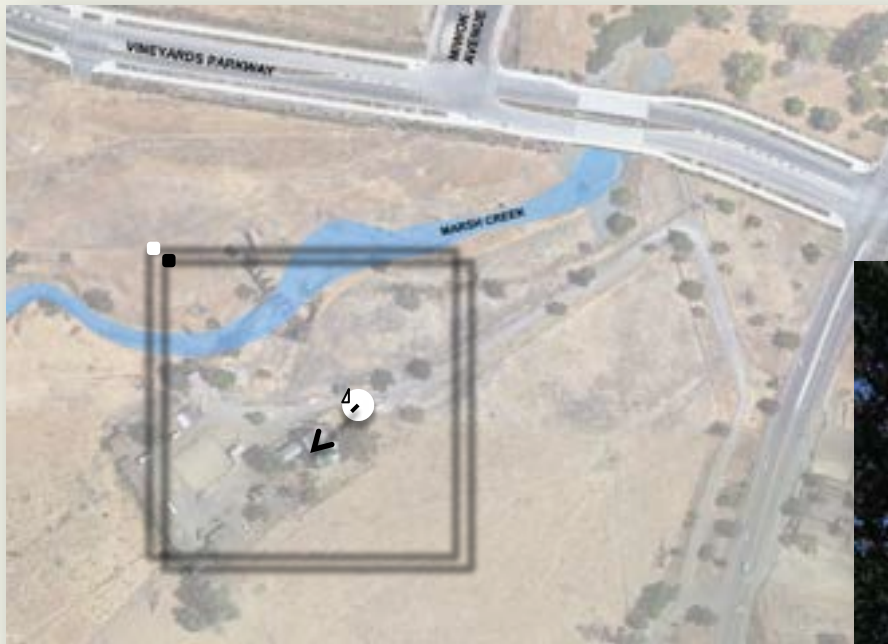
Segment #1: Historic Zone



Segment #1: Historic House Area

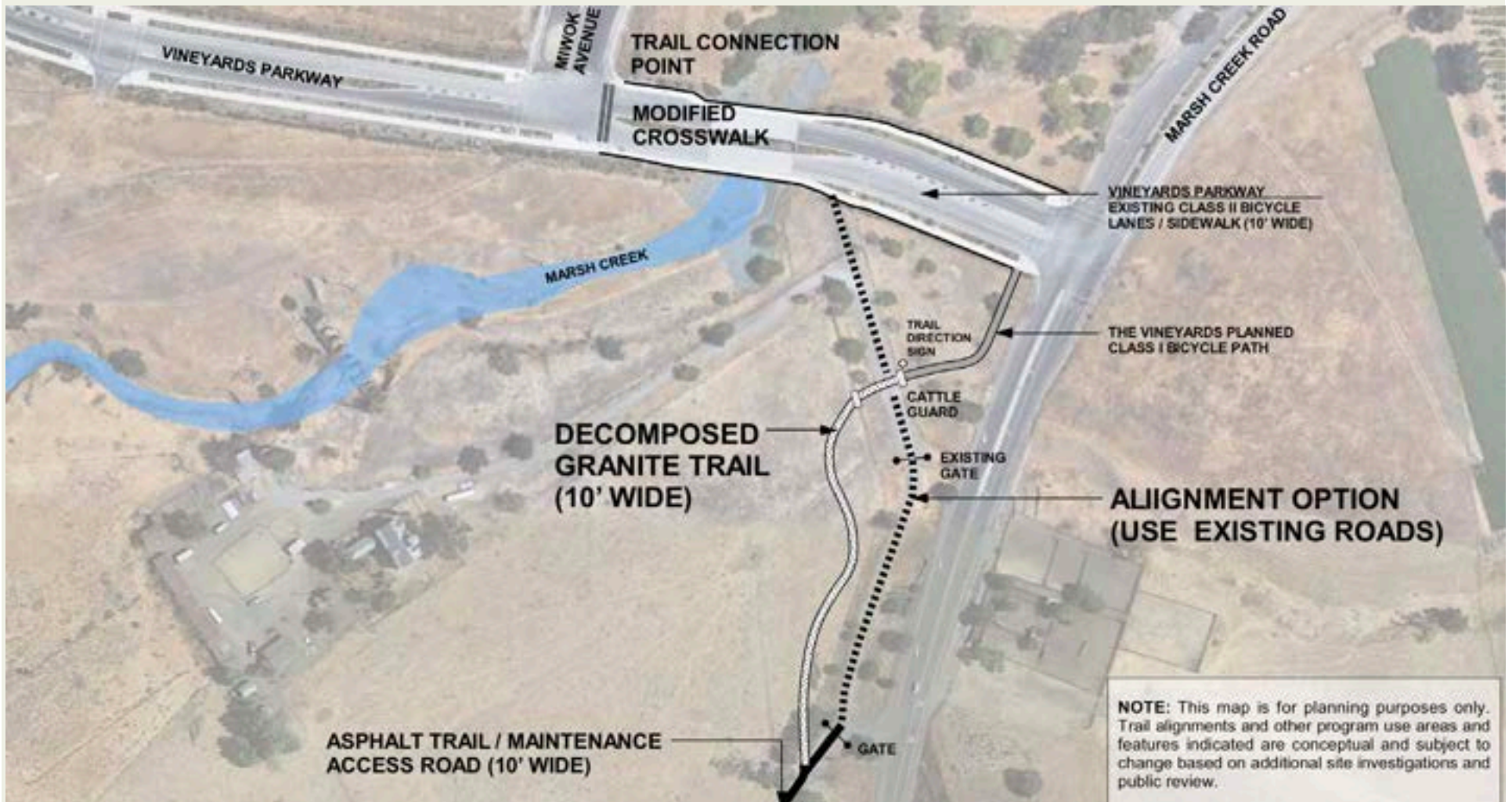


Segment #1: Historic Zone



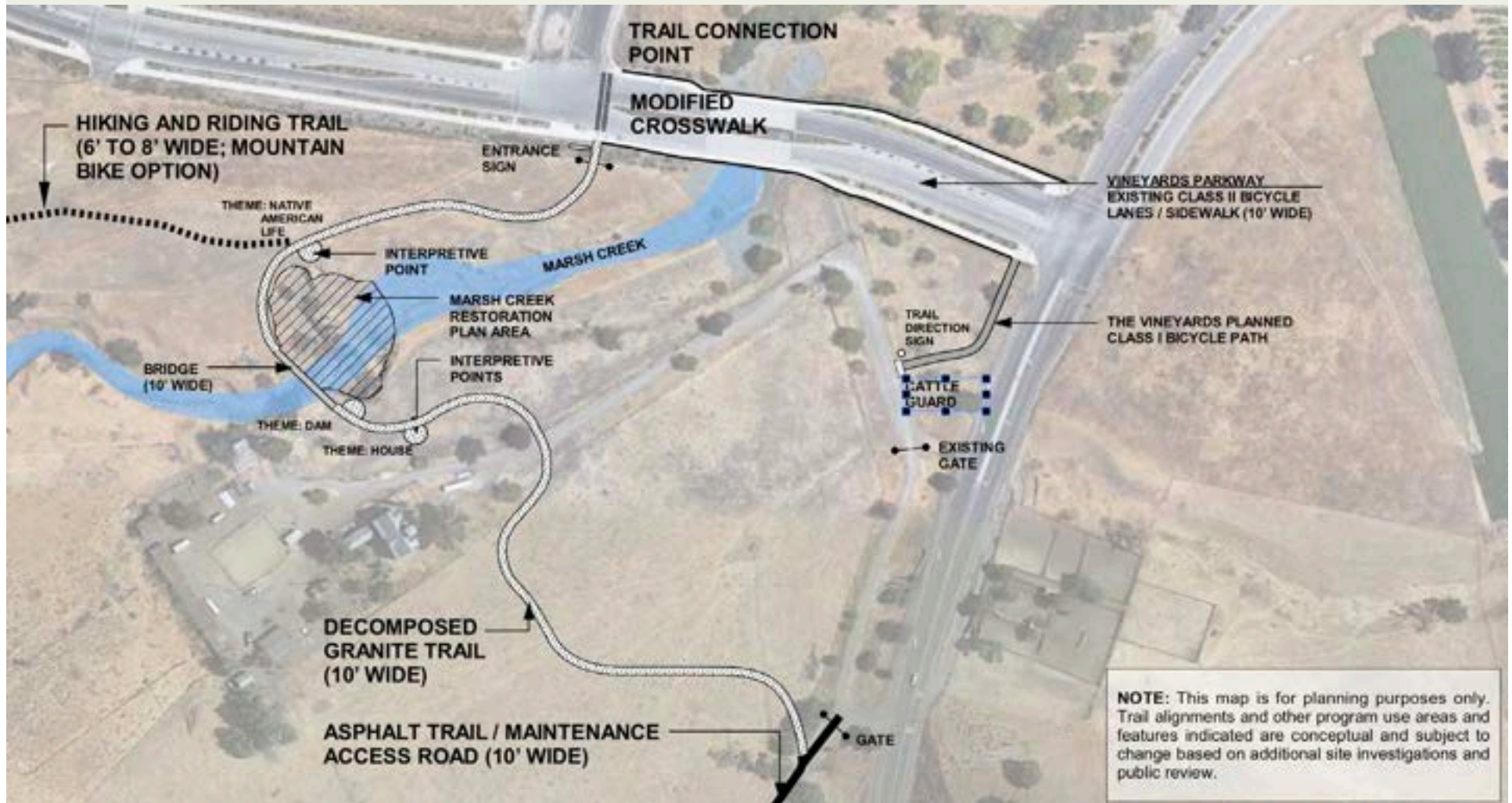
Segment #1: Historic Zone

SEGMENT OPTION 1A: ALIGNMENT CONCEPT



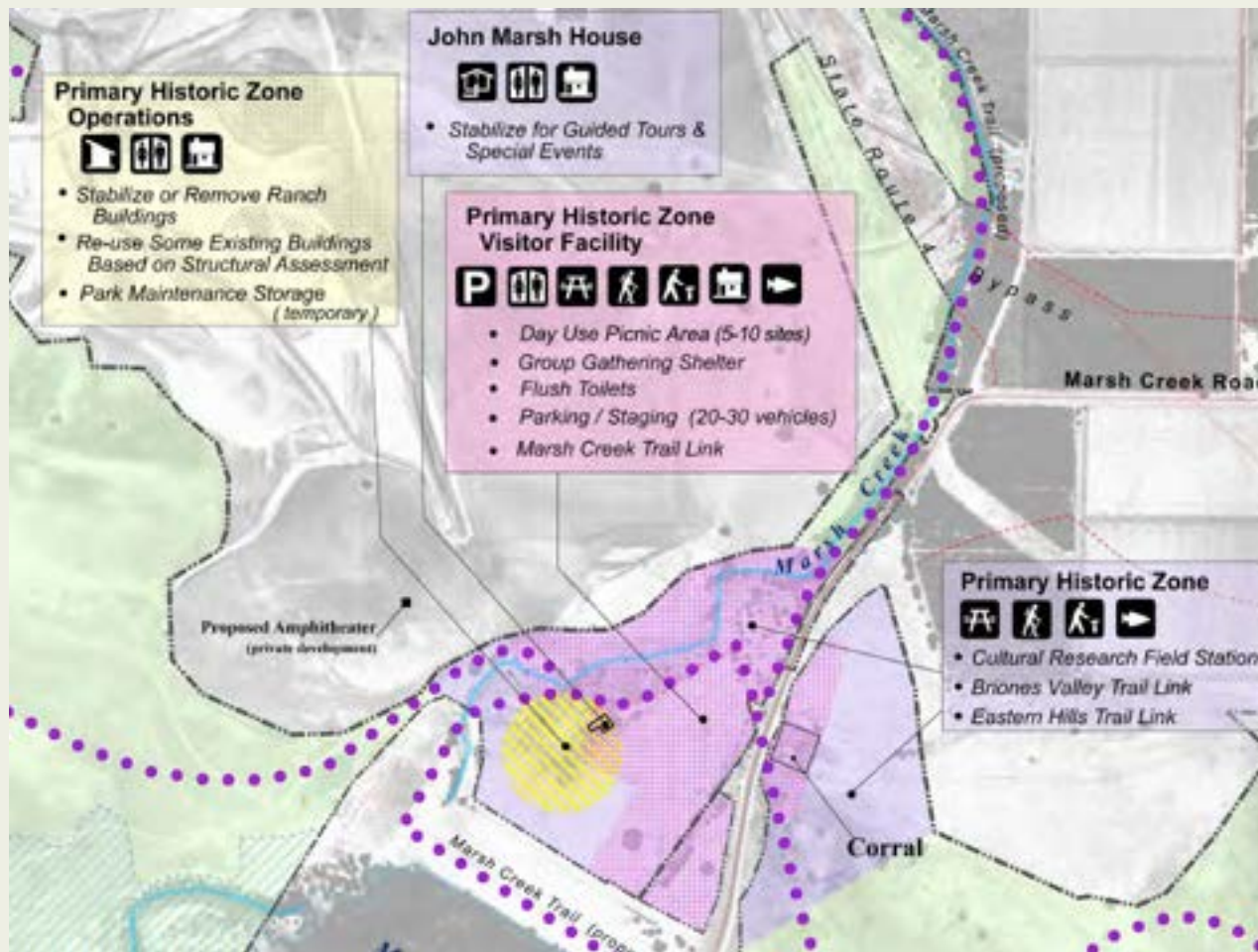
Segment #1: Historic Zone

SEGMENT OPTION 1B: ALIGNMENT CONCEPT



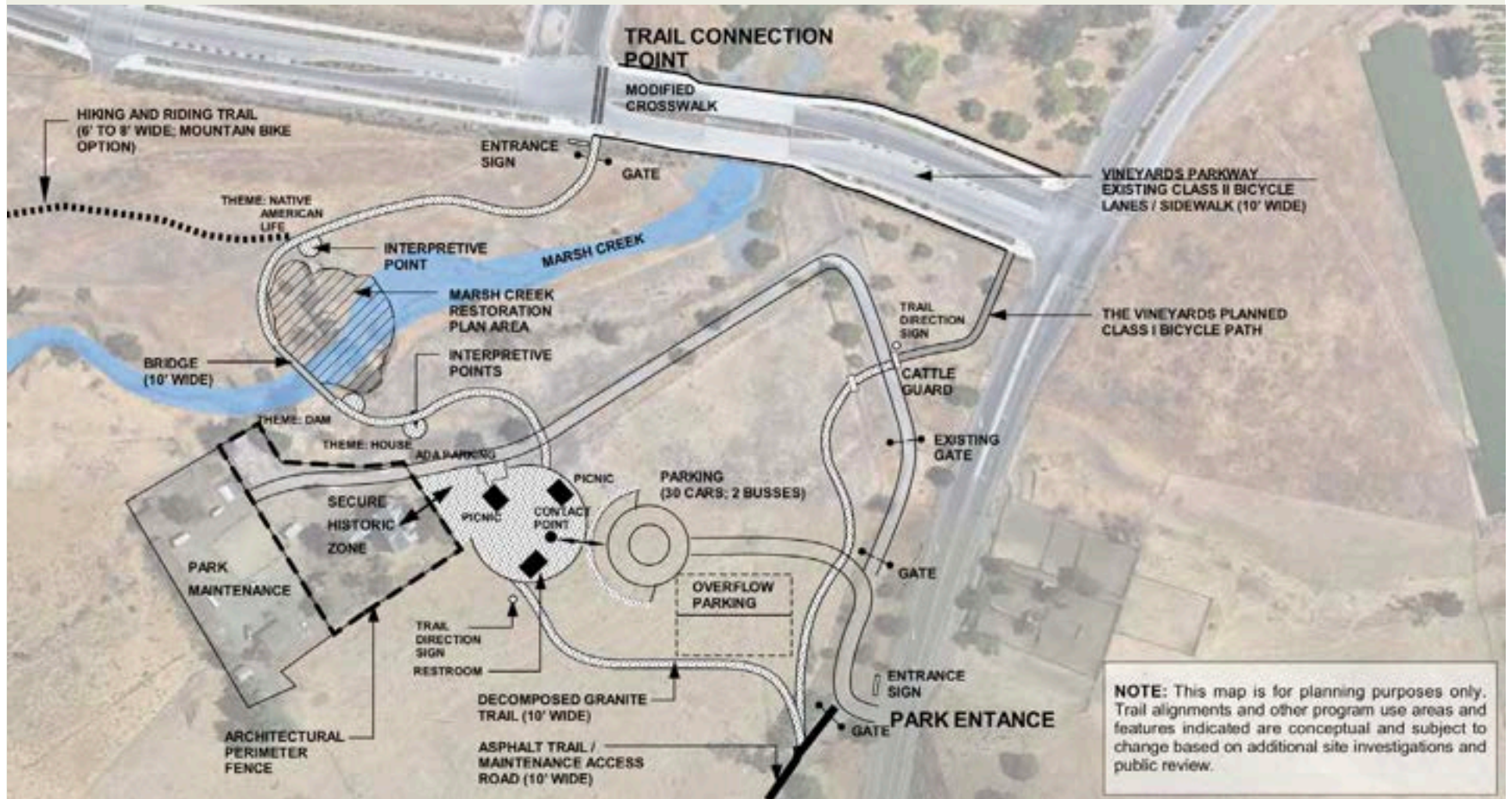
Segment #1: Historic Zone

STATE HISTORIC PARK PROGRAM

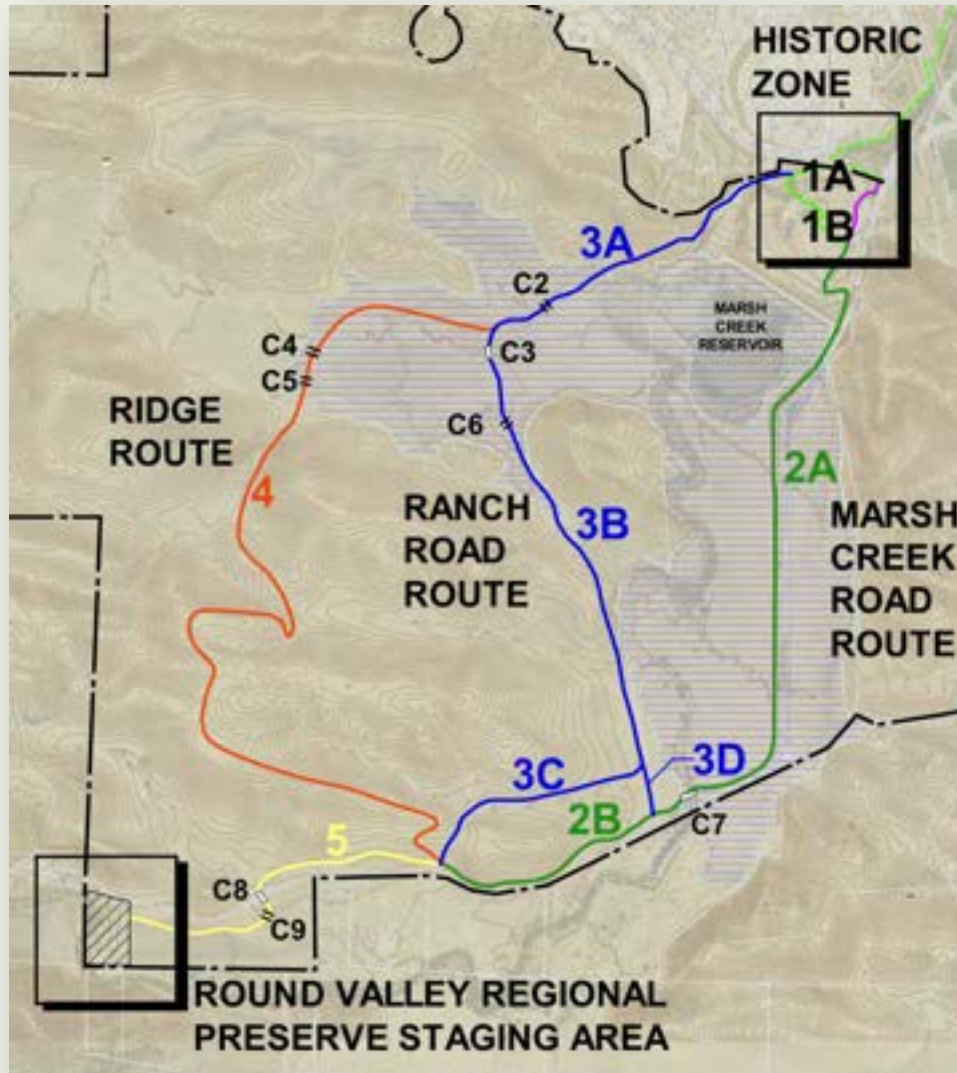


Segments #1A and 1B: Historic Zone

SEGMENT OPTIONS WITH PARK PROGRAM



ALTERNATIVES: Round Valley Connection



LEGEND

- 3B Trail Segment
- C4 Crossing of Creek, Drainage, or Road

Segment #2A

MARSH CREEK ROAD / RESERVOIR LEVEE

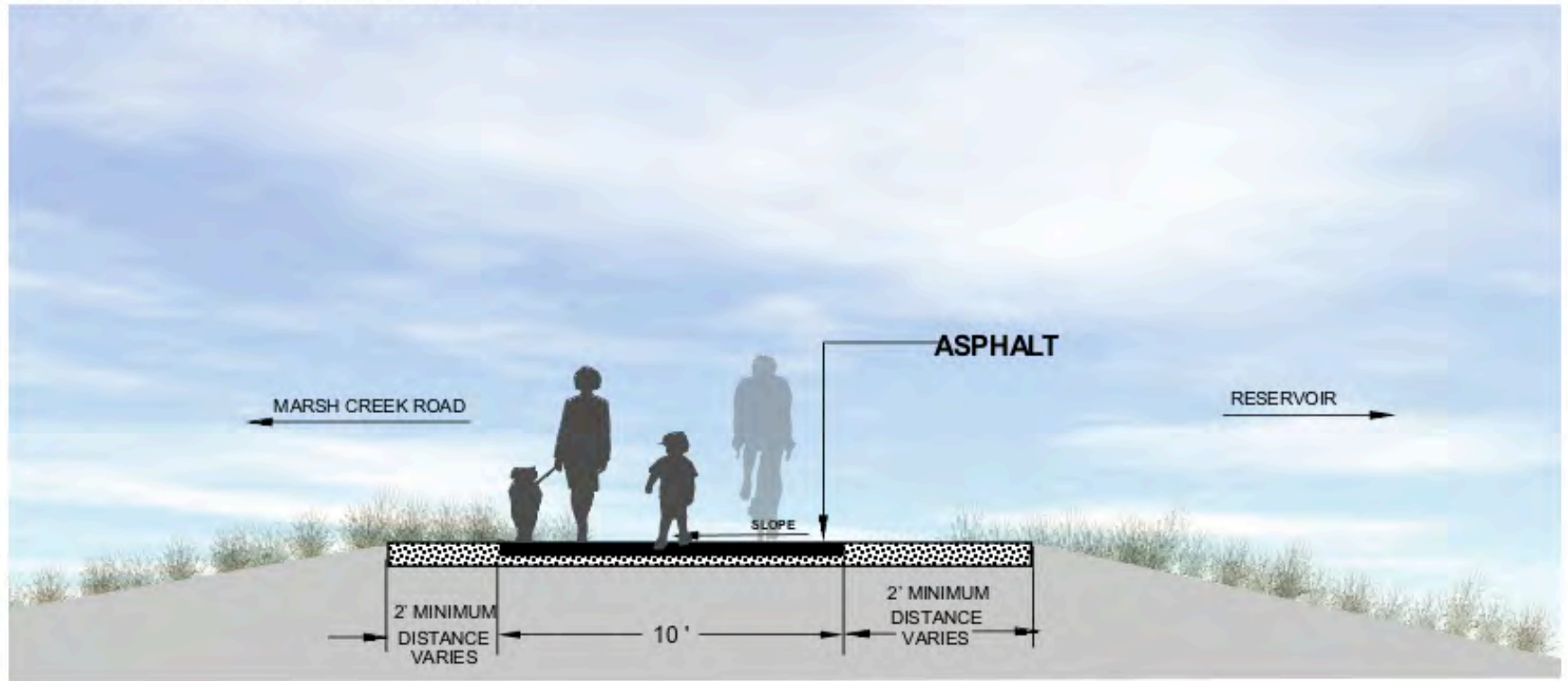


Segment #2A

MARSH CREEK ROAD / RESERVOIR LEVEE



MULTI-USE BICYCLE PATH



Segment #2B

MARSH CREEK ROAD MARSH CREEK BRIDGE CROSSING



Segment #2B

MARSH CREEK ROAD MARSH CREEK BRIDGE CROSSING

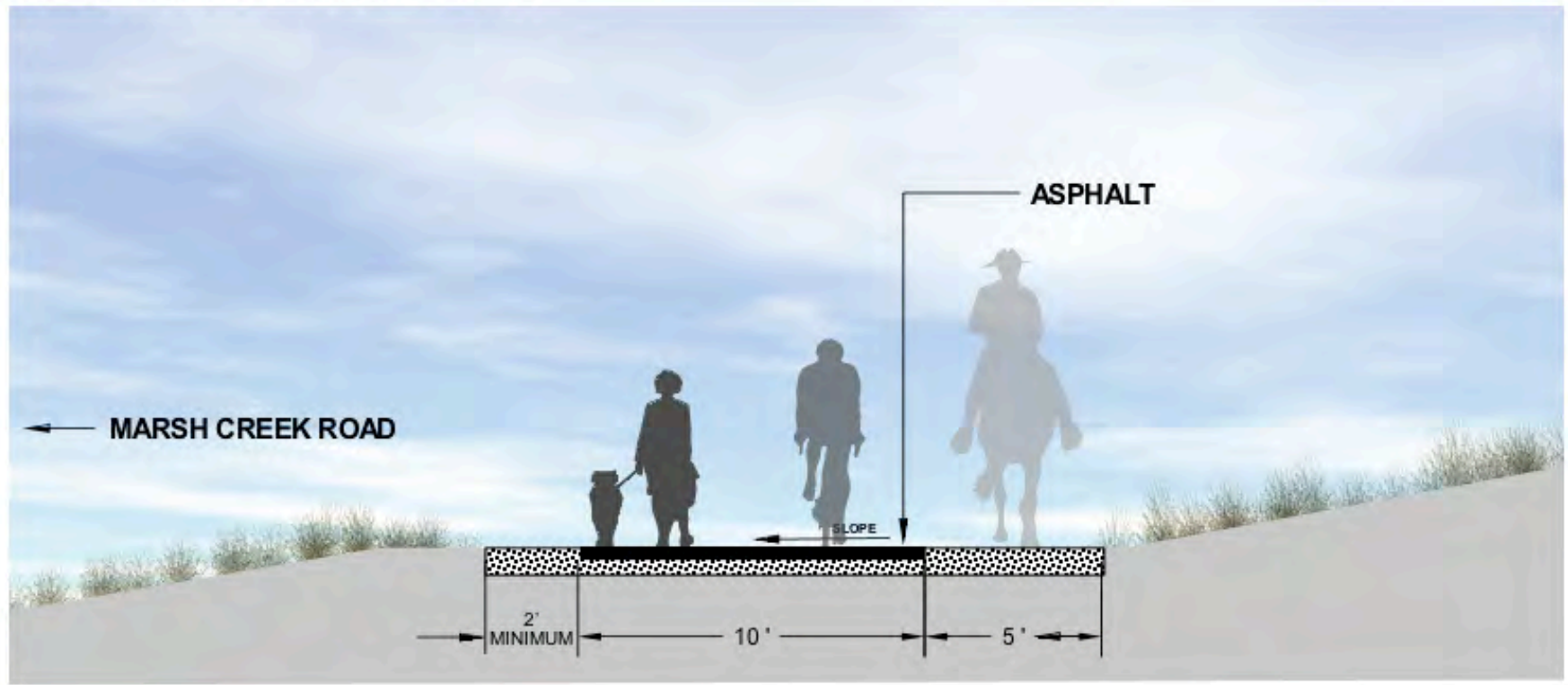


Segment #2B and #5

MARSH CREEK ROAD



MULTI-USE BICYCLE PATH

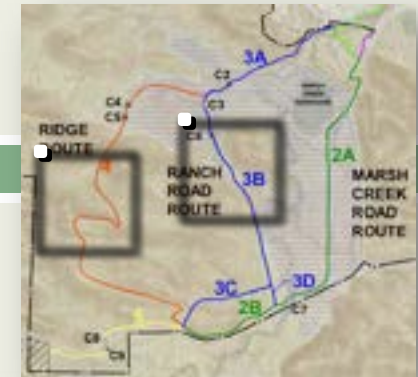


Segment #3 and #4

RANCH ROAD / RIDGE ROUTE DRAINAGE CROSSINGS

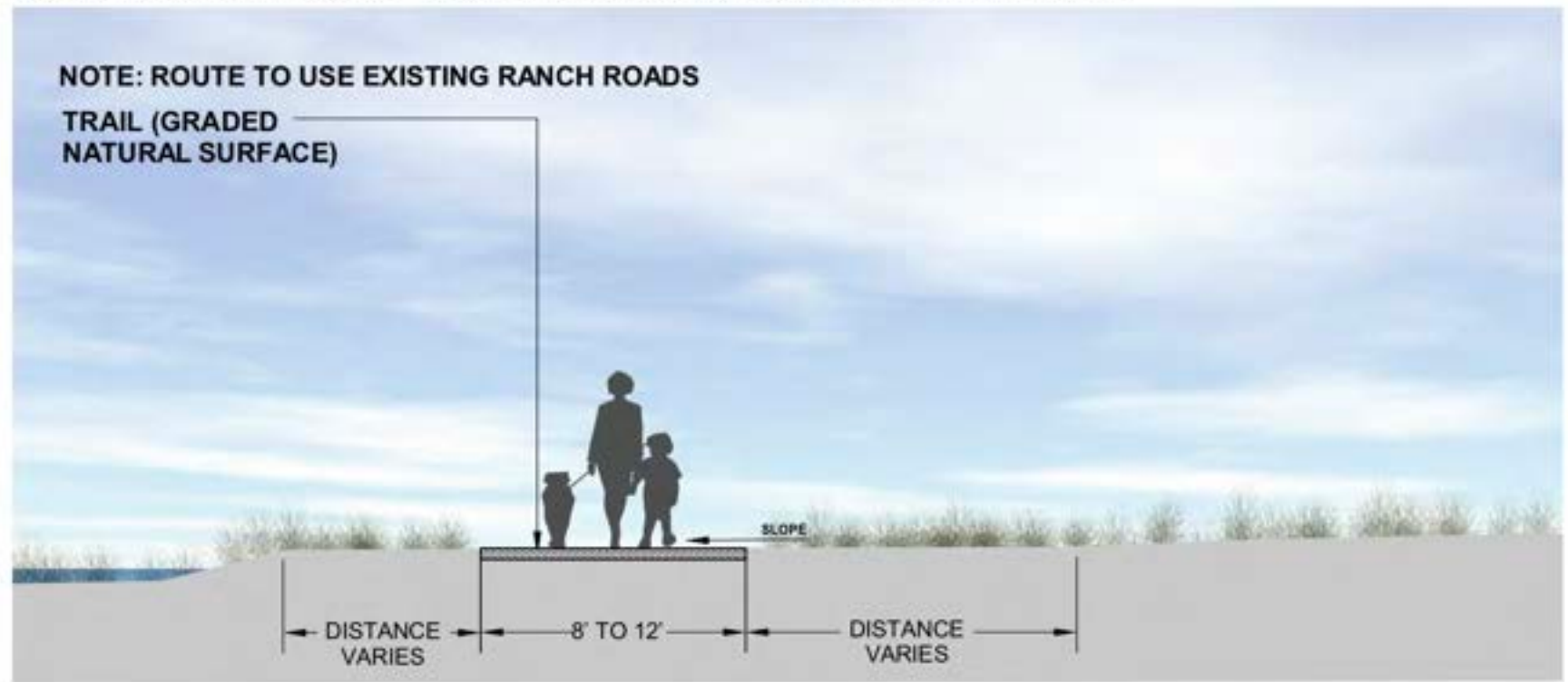


Segment #3 and #4



RANCH ROAD AND RIDGE ROUTE

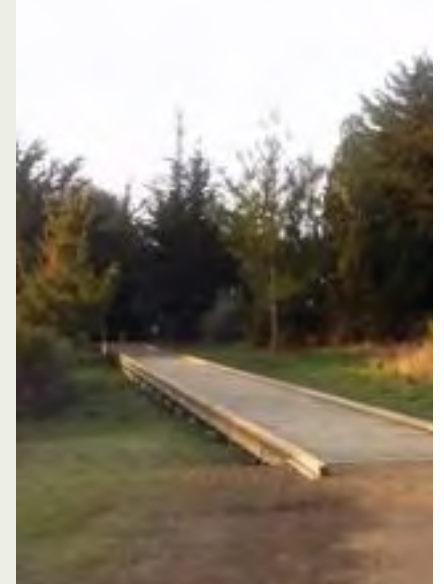
RIDING AND HIKING TRAIL / FUEL MANAGEMENT BREAK



Boatwalks & Drainage Circ

Segment

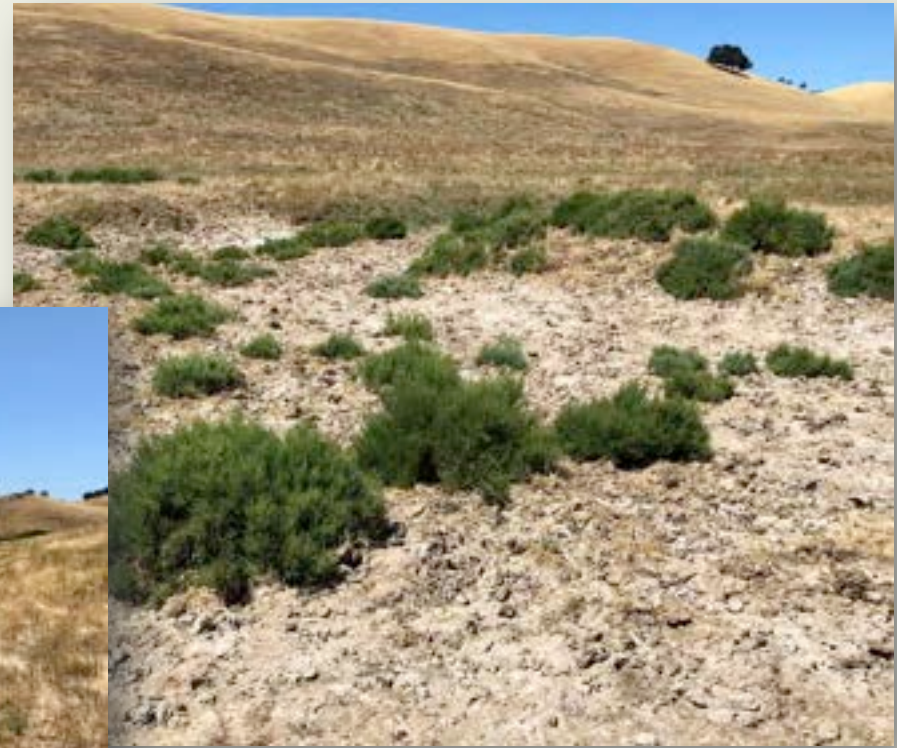
RANCH ROAD
RIDGE ROUT



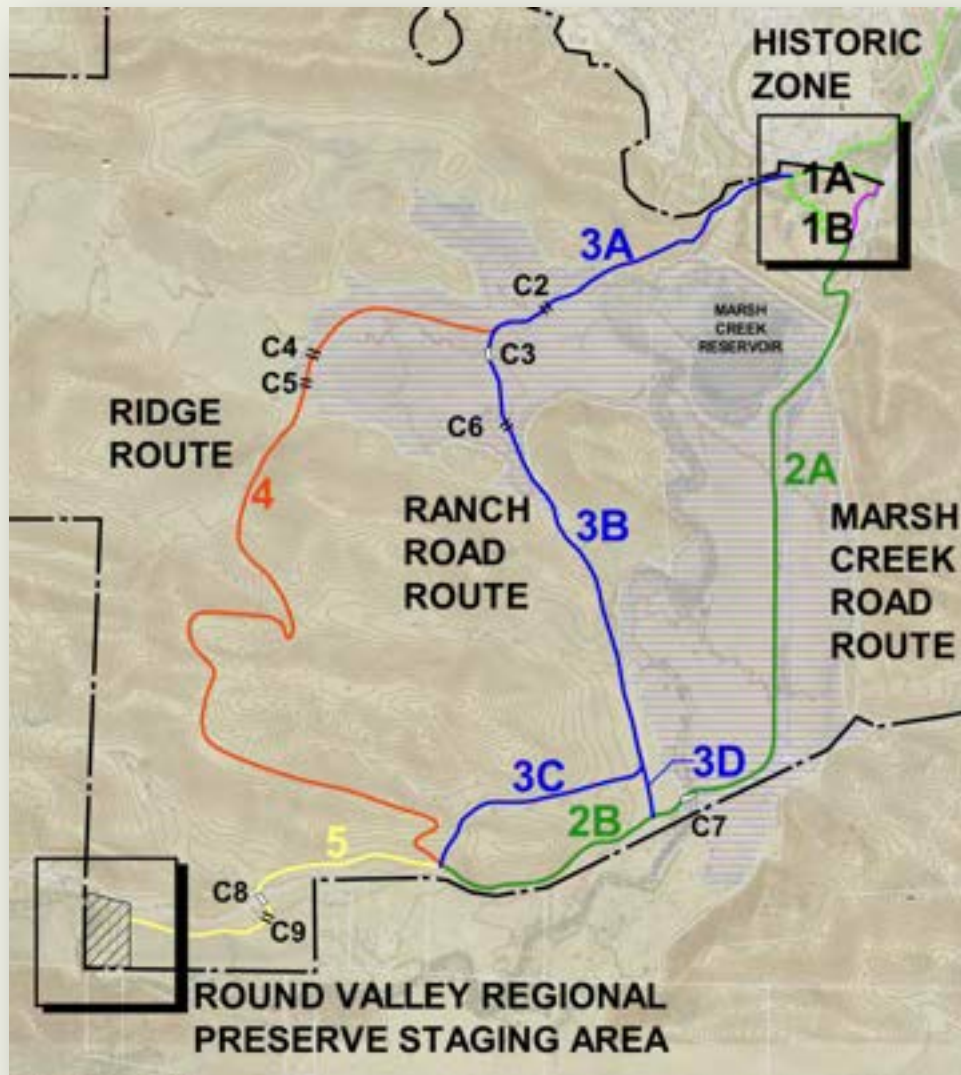
ALTERNATIVES: Habitat



ALTERNATIVES: Habitat



ALTERNATIVES: Overview



LEGEND

- 3B Trail Segment
- C4 Crossing of Creek, Drainage, or Road

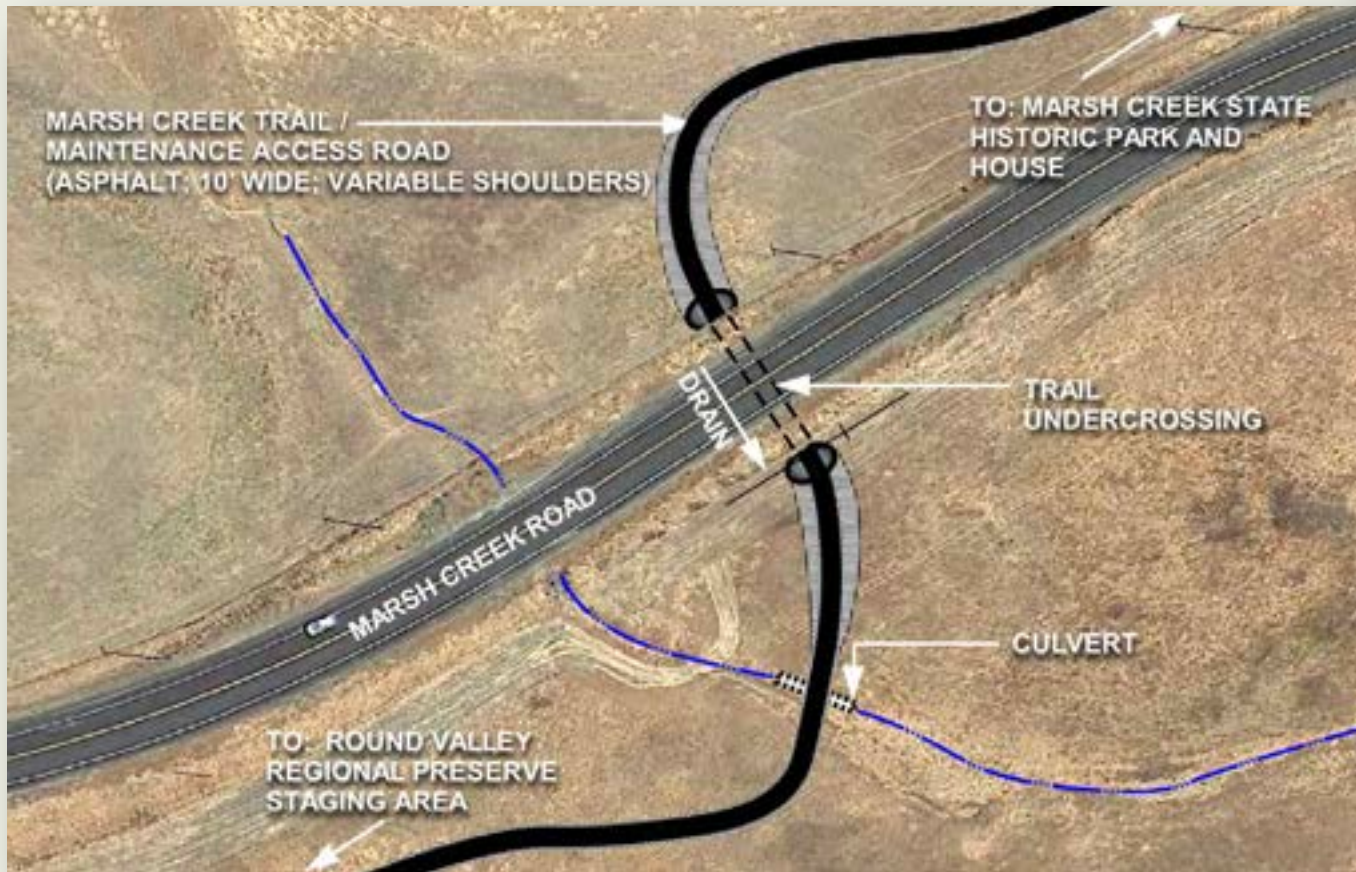
Segment #5

MARSH CREEK ROAD UNDERCROSSING



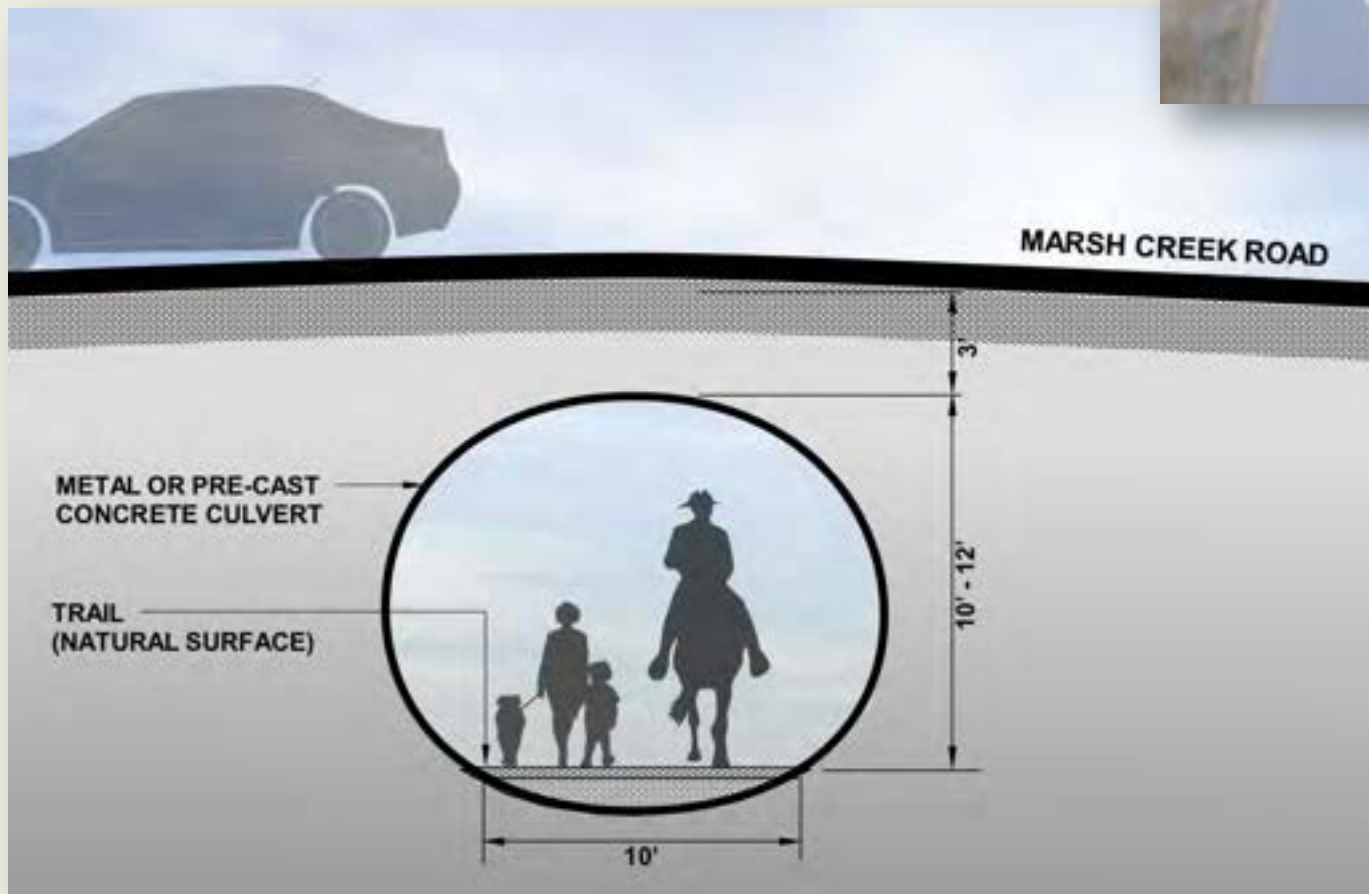
Segment #5

MARSH CREEK ROAD UNDERCROSSING



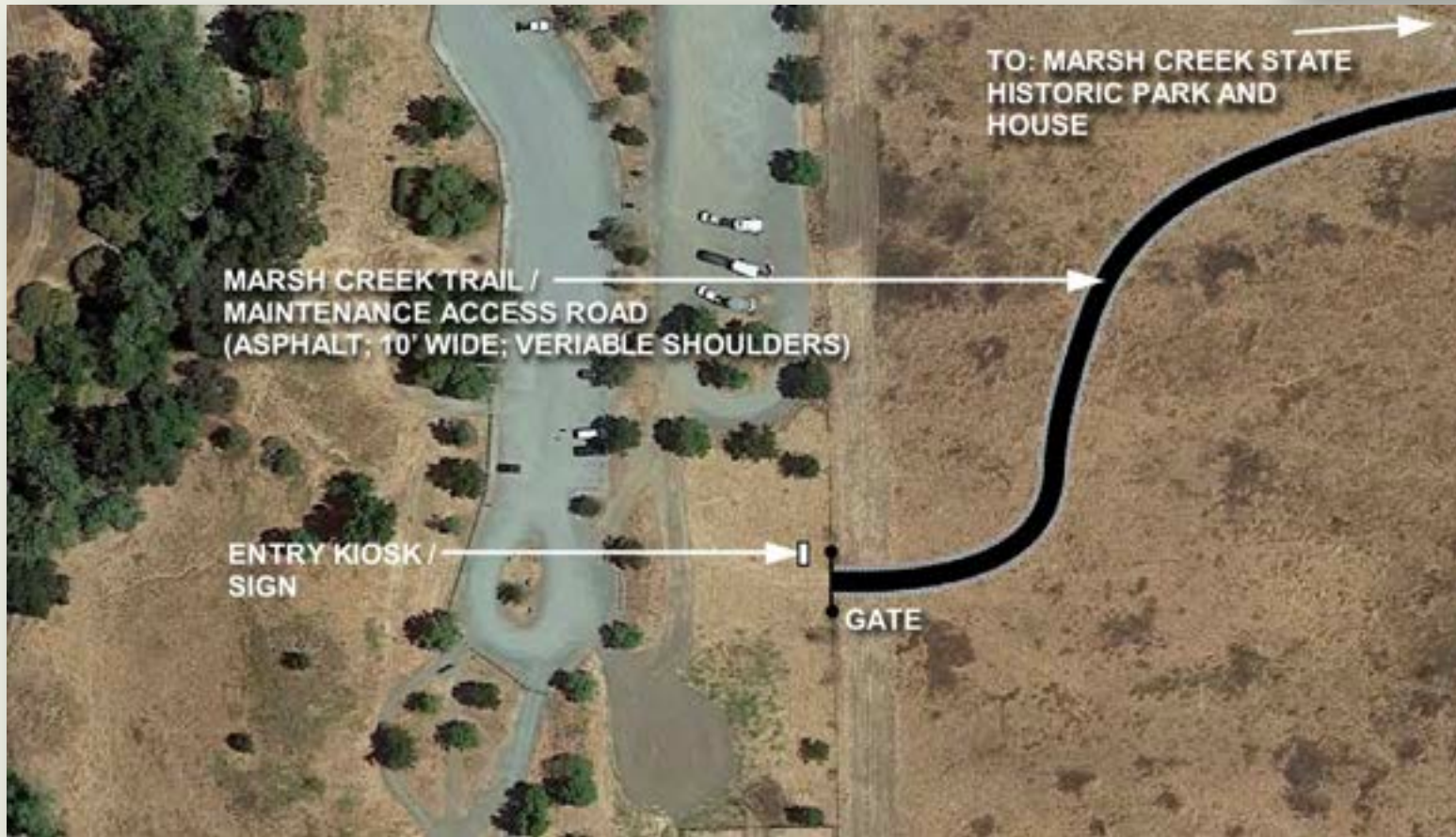
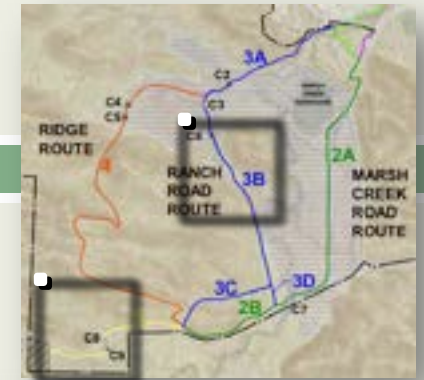
Segment #5

MARSH CREEK ROAD UNDERCROSSING

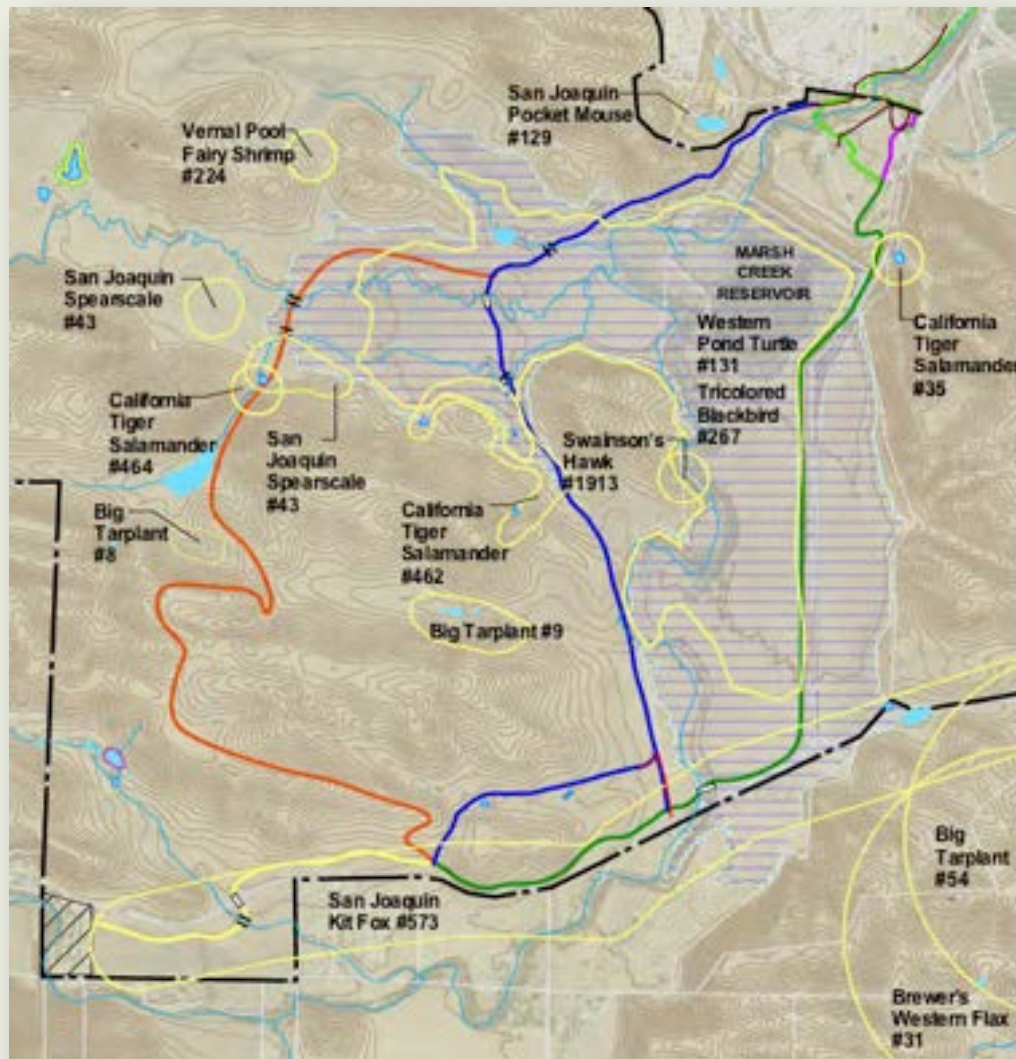


Segment #5

MARSH CREEK ROAD ROUND VALLEY STAGING AREA

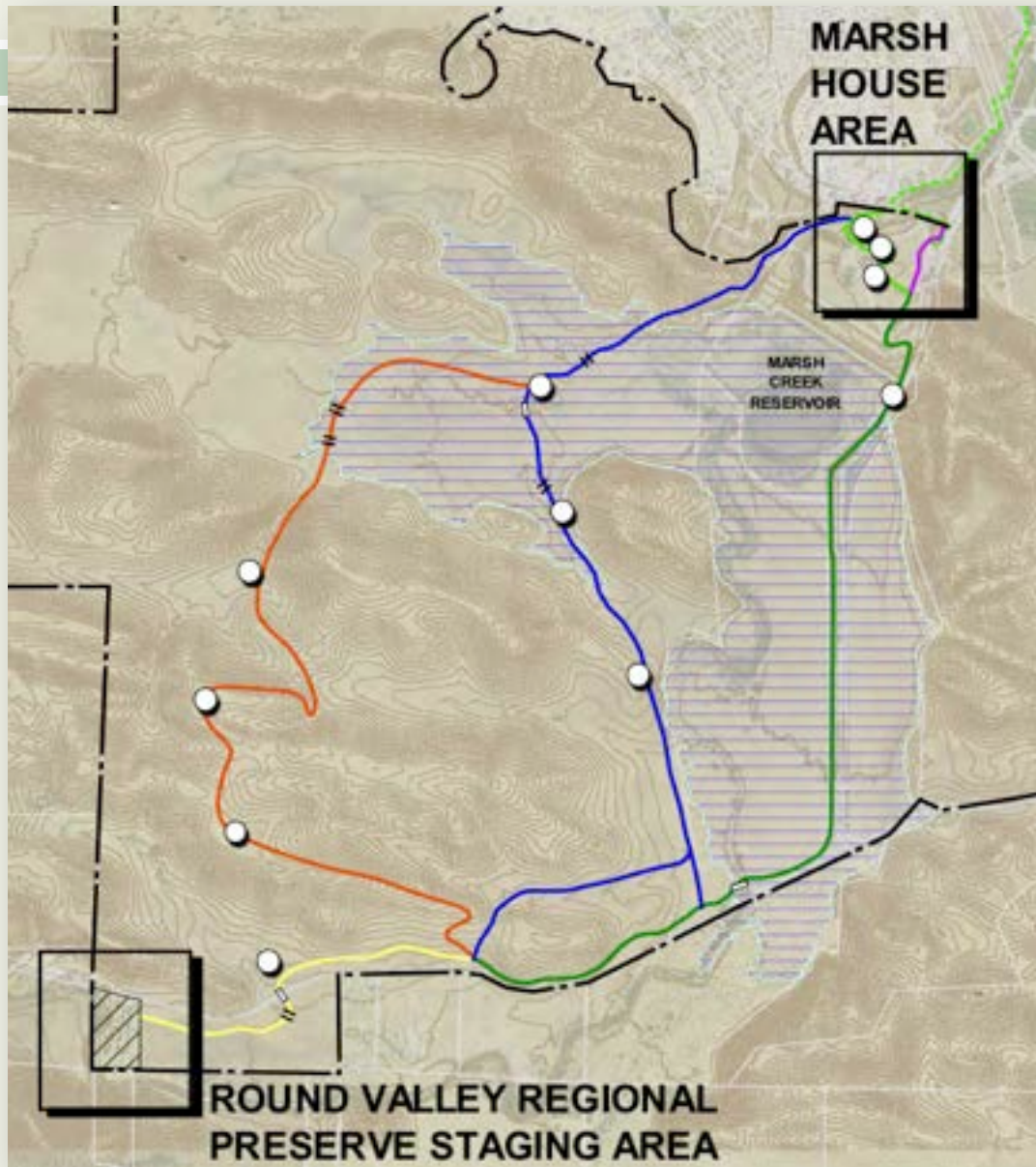


ALTERNATIVES: Habitat



EXISTING RANCH
ROADS TO BE
USED TO MINIMIZE
IMPACTS TO
RESOURCES:
BIOLOGICAL;
CULTURAL;
HYDROLOGY

ALTERNATIVES: Interpretation



POTENTIAL
LOCATIONS FOR
VISTA /
INTERPRETIVE
POINTS AND
SHADE SHELTERS



TRAIL ALTERNATIVES

**QUESTIONS /
COMMENTS**



QUESTIONS & COMMENTS

- ❑ **PROJECT DESCRIPTION**
 - ❑ **HISTORIC HOUSE AREA**
 - ❑ **MARSH CREEK ROAD**
 - ❑ **RANCH ROAD**
 - ❑ **RIDGE ROUTE**
- ❑ **ENVIRONMENTAL EFFECTS**



SUMMARY & NEXT STEPS

Next Steps: Tasks

- ❑ Incorporate public input from Workshop 1 into alignment options
- ❑ Workshop 2: Present potential and preferred alignment and trail types to public for additional comments
- ❑ **Complete Draft Feasibility Study and release for public review**
- ❑ Prepare Environmental Document
- ❑ Perform individual and stakeholder outreach and secure agreements for precise trail location
- ❑ Begin design process for trail alignment
- ❑ Implement project when funding and resources are secured

Next Steps: Public Input

- ❑ Workshop #1 – April 10, 2019
- ❑ Workshop #2 – August 14, 2019 (TONIGHT!)
- ❑ Release of Draft Study - Fall 2019
- ❑ Environmental Review and Preliminary Design - Fall 2019-Winter 2020
 - ❑ Concept Design
 - ❑ Environmental Process
 - ❑ Stakeholder Outreach
- ❑ EBRPD Board Meeting

Ongoing Opportunities

COMMENTS OR INQUIRIES:

Sean Dougan

Trail Development Program Manager

E-mail: sdougan@ebparks.org

UPDATES

Please visit the EBRPD website at:

<https://www.ebparks.org>



THANK YOU!

Marsh Creek Trail Feasibility Study

August 14, 2019
Meeting Notes

Patrick Miller presented information regarding the project background, status and preliminary route options for the trail. Options include a route using existing roads and new facilities near Marsh Creek Road, an interior trail using existing ranch roads through John Marsh State Historic Park, and a new trail on State Park lands further west of existing ranch roads.

Approximately 40 people attended the meeting, and most were notified by direct contact, with a few from the newspaper or EBRPD website.

Questions and answers from meeting attendees:

1. Will the undercrossing of Marsh Creek Road be wildlife friendly?
 - a. Yes, it will be large enough for wildlife to cross, and will be accessible to serve as a crossing.
2. Who will build the trail from Miwok/Vineyards intersection north?
 - a. That section will be built as part of the developer's project, and plans have been approved.
3. Will the trail stand up to bike use if it is made from crushed granite? Will it be paved for road bikes?
 - a. The trail within the State Parks would not likely be paved due to cultural resources issues. Other portions of the trail along Marsh Creek Road would be paved, with a wide shoulder if possible to allow equestrian use.
4. If the trail is gravel is it possible to have a place to cut in or entry from Marsh Creek Road?
 - a. Yes, the trail entry would be in the vicinity of the John Marsh House entrance road.
5. Would like to have a bike route that used Vineyards Parkway and Marsh Creek Road to avoid using a gravel road.
 - a. Noted.
6. From Miwok, the trail will connect to Round Valley. At Round Valley, the trails are not paved, and must coexist with mountain bikes.
 - a. Noted.
7. Is the intent to extend Marsh Creek Trail (current asphalt paved) to Round Valley or beyond? There is not sufficient shoulder in all areas from Concord Ave north to Big Break to accommodate horses.
 - a. This project will complete the Marsh Creek Trail to Round Valley Regional Preserve. There is a separate study being conducted by Contra Costa County Community Development (contact Jamar Stamps) to identify a trail route that will continue west to Clayton.
8. The goal for equestrians is to connect Round Valley to John Marsh State Park.
 - a. Noted.

- b. The Marsh Creek Trail is identified on EBRPD's Master Plan as a Class I Regional Trail from Big Break to Round Valley. As a Regional Trail, these are usually paved regional trails, and where possible, a wide shoulder is provided to accommodate horses. Underpasses would be designed to serve bicycles, pedestrians and horses as much as possible.
- 9. Bicycles ride long distances, and Marsh Creek Road is dangerous; I try to avoid Marsh Creek Road.
 - a. Noted.
- 10. For the inland trails and creek crossings, since the water is seasonal, could equestrians just cross through the creek?
 - a. It would depend on resource avoidance and permitting. A trail through the creek would not serve pedestrians or bicyclists.
- 11. Will a switchback be needed on the east side of the dam to get up the hill and meet ADA?
 - a. Some switchback will likely be needed to meet accessibility requirements (approximately 8%).
- 12. State Parks has not approved the concept. How will it get built? Is anyone from State Parks here?
 - a. This project will implement a portion of the John Marsh State Park Master Plan. Further discussions with EBRPD, agreement on use and management, and approval by State Parks would be part of the implementation process. There are State Parks representatives here, and they have been included in the planning
- 13. I think Trail 1B would meet everyone's needs, but am concerned about the time frame for the State Park to be opened.
 - a. Noted.
- 14. Can both options be accommodated?
 - a. Yes, there could be a paved bicycle/pedestrian path and an unpaved equestrian route.
- 15. When will the County replace the Marsh Creek Bridge? Within the next 5 years?
 - a. Yes, it is currently in design stage.
- 16. What is the project timeline?
 - a. The draft study will be completed this fall, with the environmental document completed during winter 2019/20, so the final study should be approved by EBRPD Board next spring.
- 17. Information about this study is difficult to find on the EBRPD website.
 - a. On the website, type in "Planning" to help find project information.
- 18. Old Marsh Creek Road is an historic route, and there should be interpretation and recognition of this.
 - a. Noted, could be an interpretive panel.
- 19. I favor an undercrossing, a bridge would block views of Mount Diablo.
 - a. Noted.
- 20. I am interested in driving horses, and would like a place on the trail to drive a buggy.
 - a. Noted.

Comment Cards

Twenty three comment cards were submitted. Responses to the questions:

What zip code do you live in:

94513 - 19
94561 - 1
94521 - 1
94565 - 1
94509 - 1

How would you mostly use this segment of the Marsh Creek Regional Trail? Please check those that apply to you.

16 For hiking / walking
13 For general bicycling
6 For mountain biking
9 To ride a horse
7 With a dog (in addition to any of the above)
0 Other

What do you think your main purpose to use this segment of the trail would be?

12 As an extension of a trail trip experience starting from from Brentwood or Oakley
4 To specifically get to the John Marsh State Historic Park without having to drive
15 To specifically get to Round Valley Regional Preserve and Los Vaqueros Reservoir watershed trail system without having to drive
0 Other:

The segment of Marsh Creek Regional Trail being evaluated will connect a paved multi-use trail in Brentwood with the unpaved trails of Round Valley Regional Preserve. It will pass through the John Marsh State Historic Park. All of the alternatives could accommodate multiple uses. However, should this segment of the trail be paved with the transition to a natural surface at Round Valley or unpaved with the transition to a more natural surface occurring at the historic house area? Please check one.

10 Yes, paved to Round Valley
13 No, transition to a more natural surface at the historic house area.

Comments:

1. Does 1A preclude 3A? How will you get over the dam?
2. Much nicer to have the trail away from the road so I would prefer the ridge trail option. 1B looks nicer than 1A for entrance to the trail.
3. Safe trail for horses and links to other trails.
4. The inland trail option would be the first choice. It satisfies several issues, utilizes existing ranch roads, minimal impact on environment and lower financial costs. Most important concern is the connection between Round Valley and State Parks property.

5. Equestrian. Resident of Marsh Creek Road. Safety no. 1 (traffic separation and cyclists sight). Use internal trails, equestrian preference. Longer ride more natural.
6. Equestrians! Thank you!
7. What deterrence plans may be implemented to address auto burglaries, unlawful parking, wildfire protection?
8. Interpretive panels. Trail connection to house allows offsite parking for school buses, for school children to access programs at interpretive center Archeology-Miwok, Windmiller site.
9. Creek restoration at old dam site possible salmon spawning habitat on creek section below old dam site.
10. Access to historic features: John Marsh House, archaeological features, Old Marsh Creek Road alignment is historic route of Bidwell/Bartleson overland party to John Marsh House.
11. From a visual point of view would like to have an underground crossing at Marsh Creek Road into Round Valley Park. Because an alternative bridge would inhibit the westward views of Mount Diablo and the Round Valley hills.
12. I like 1B through JM House. Not paved past JM House is my preference.
13. With the understanding that part of the new trail extension will be gravel - - it would be good to find a way to connect the old trail and the new at some point that is paved all the way.
14. Please make a paved trail or bicycle lane to keep cars and bikes separated on Marsh Creek Road.
15. Will Concord Avenue be crossed with a bridge/undercrossing or traffic light? Appreciate benches for breaks – especially for senior citizens – they should be at appropriate distances from each other. Will EBRPD police patrol the area?
16. Design the trail so that no matter how wide Marsh Creek Road is built, it won't impinge on the as-built trail. Want REAL trail – no sidewalk! Want PAVED trail 10 feet wide. No gravel. Want trees along bike path. Farther from Marsh Creek Road would be better trail experience for trail users. Shade structures are good, how will you keep the homeless in check? NO SEASONAL CLOSURES. It is very hard to find information about this project on the EBRPD website. What about someone running a horse-drawn buggy on this trail?
17. 1B yes. 3B inland yes! John Bidwell party signage. Overflow of water storage, when is the bridge going to be changed?

Marsh Creek Trail Feasibility Study

The John Marsh Historic Trust (JMHT) values being a partner in the Marsh Creek Trail Feasibility Study. The JMHT has been an active partner with State Parks in drawing up the Marsh Creek State Historic Park General Plan, stabilizing and rebuilding portions of the John Marsh House, and promoting public awareness of the rich history and cultural legacy of the original Rancho Los Meganos. Our goal is to provide the residents of East Contra Costa County and California with an opportunity to walk, bike, and ride in the Marsh Creek State Historic Park while learning its colorful history and enjoying its natural beauty.

The Primary Historic Zone, outlined in the Marsh Creek State Historic General Plan, offers many of the historic and cultural elements in the Park. The Historic Zone is fairly compact and is close to major roads and potential access routes. The interpretive themes present in this area are comprised of:

- An Archaeological site with Native American artifacts dating thousands of years old.
- An Historic Dam / Bridge structure over Marsh Creek.
- A major creek bank stabilization and Native plant restoration project.
- The 1856 John Marsh Stone House, now undergoing major structural and stabilization work.
- The end of trail for the 1841 Bartleson / Bidwell overland pioneers at the old Marsh adobe.
- A planned Interpretive Center with classroom programs reliving the era of John Marsh's Rancho Los Meganos, and the life of the Vaqueros on the Rancho.

The Trust believes that the Segment Trail option 1B, as shown in the 2nd Public Meeting Presentation, brings the users of Marsh Creek Trail to Round Valley directly to these unique historic and cultural features. Option 1B provides an opportunity for accessibility to docent tours, classroom visits, and interpretive panels, all within the Historic Zone.

This alignment also provides connection points to the Marsh Creek Road Route (2), and the Ranch Road Route (3).

Thank You for your consideration,
Barry Margesson,
Co-Chair JMHT

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Appendix B

Traffic Memorandum

MEMORANDUM

To: Jeffrey Peters, Questa Engineering
From: Michelle DeRobertis, P.E.
Date: May 10, 2019
Subject: Trail Crossing Considerations of Marsh Creek Road

Introduction

This memorandum presents an evaluation of a potential crossing of Marsh Creek Road by the future Marsh Creek trail. It describes the existing traffic conditions on Marsh Creek Road and past collision history as well as an analysis of sight distance and potential traffic control options. This analysis is for planning purposes only.

Setting

Marsh Creek Road is a rural two-lane roadway in unincorporated Contra Costa County. It connects the cities of Clayton to the west and Brentwood in the east. It has rolling hill terrain and consequently numerous horizontal and vertical curves, with embankments alternating on either side. In the Contra Costa County General Plan (CCCGP) it is considered an arterial and a scenic route. In the CCCGP, a scenic route is defined as *"a road, street, or freeway which traverses a scenic corridor of relatively high visual or cultural value. It consists of both the scenic corridor and the public right-of-way.it should also include cycling or hiking trails, roadside rests, or turnouts, etc. Public projects in the right-of-way should be designed and carried out recognizing the purpose of this plan."*¹ The portion of Marsh Creek Road that the proposed trail would approximately parallel and cross is on the eastern portion. Although it is outside the city limits of the City of Brentwood and also outside its sphere of influence, this section of Marsh Creek Road is within or near Brentwood's Planning Area.²

Between Deer Valley Road and Camino Diablo, there are a few minor intersections with Marsh Creek Road; all but one, Lydia Lane, are either private or public driveways. In this section, Marsh Creek Road is approximately 24 feet wide with narrow to medium width shoulders. The posted speed limit is 50 mph.

The proposed trail would terminate in the Round Valley Regional Preserve. The driveway entering the Round Valley Regional Preserve is located about 1.7 miles

¹ Source: Contra Costa County General Plan. January 18, 2005. p. 5-24.

<http://www.cccounty.us/4732/General-Plan>

² Source: City of Brentwood General Plan update, Figure 2-1: General Plan Land Use Designations.



1834 Casterline Road Oakland CA 94602

510-482-9010

east of Deer Valley Road and half mile west of Lydia Lane. There is an eastbound right-turn lane to enter the driveway. Marsh Creek Road beginning from east of the driveway for just over half mile was the subject of a shoulder widening project that was completed in 2013. This segment of Marsh Creek Road is 36 feet, with two 12-foot lanes and 6-foot shoulders.

Traffic Volumes and Speeds

Traffic volumes and speeds were provided by Contra Costa County Public Works Department (CCC PWD). The data was collected on August 15, 2012 at a location 200 feet east of the Round Valley Park entrance. The data revealed that the ADT is 4,077 vehicles per day (VPD). The 85th percentile speed for both eastbound and westbound traffic falls in the 5 mph range of 51 to 55 mph. This data is presented in Table 1. A formal Engineering and Traffic Survey was prepared by the CCC PWD dated October 17, 2012 and recommended that the posted speed be retained at 50 mph. According to the Engineering and Traffic Survey, Marsh Creek Road also has a significant amount of large truck and trailer traffic. Data provided by the CCCPWD for August 15, 2012 indicated that the composition of large vehicles was on average 6.5% as follows:

- Eastbound: 7% of traffic is composed of vehicles of 21-27 feet in length; 1.3% of traffic is greater than or equal to 28 feet. Thus, a total of over 8% of eastbound traffic is heavy or large vehicles.
- Westbound: 3.3 % of traffic is composed of vehicles of 21-27 feet in length; 1.4% of traffic traffic is greater than or equal to 28 feet. Thus, a total of almost 5% of westbound traffic is heavy or large vehicles.

Table 1. Existing Traffic Data for Marsh Creek Road

	Eastbound	Westbound	Total
ADT	2067	2010	4077
AM peak hour	66 (7:00-8:00 a.m.)	451 (6:30-7:30 a.m.)	492 (7:00-8:00 a.m.)
PM peak hour	457 (5:00-6:00 p.m.)	126 (4:15-5:15 p.m.)	550 (5:00-6:00 p.m.)
85 th percentile speed	51-55 mph	51-55 mph	na
Source: Contra Costa County Public Works Department Date of counts: August 15, 2012.			

Estimates of future traffic volumes on Marsh Creek Road were obtained from traffic studies prepared for Brentwood Center Transportation Assessment, April 20, 2015 by Fehr and Peers. This study forecasted the peak hour volumes at build-out of the



center (year 2040) which are shown in Figure 1. Based on these peak hour volumes, it is estimated that the future ADT on Marsh Creek Road at the Round Valley driveway would be 5,400.³

No bicycle or pedestrian counts were available in the vicinity of the Round Valley Regional Preserve driveway. Given its scenic location, it is likely that weekend bicycle volumes are higher than weekday.

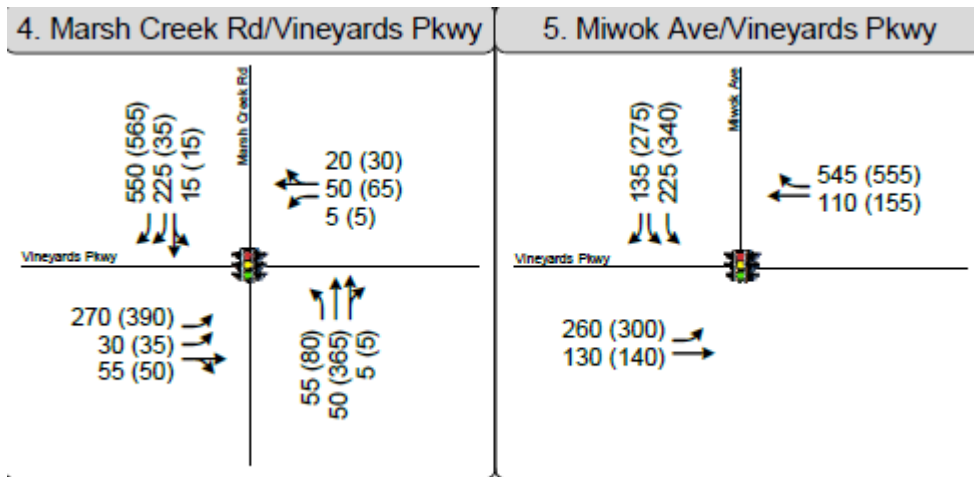


Figure 1 2040 Peak hour volumes [AM (PM)]. Source: Fehr and Peers 2015.

Collisions on Marsh Creek Road

The collision history on Marsh Creek Road in Contra Costa County was analyzed using the interactive tool Transportation Injury Mapping System (TIMS) which maps reported collisions in California assembled by the California Highway Patrol in their SWITRS database.⁴

There were 79 reported collisions in the last five years (1/1/14-12/31/2018) on Marsh Creek Road between Pine Lane at the Clayton border and Camino Diablo. These are depicted in Figure 2 and summarized in Tables 2 - 4. Six of the 79 collisions occurred at an intersection but it is unknown how many are associated with driveways. Based on the mapping, one collision was located in the vicinity of the Round Valley Regional Preserve driveway, which was a single vehicle (motorcycle) crash attributed to improper turning.

³ The rule of thumb is that the peak hour volumes are 10% of the ADT.

⁴ <https://tims.berkeley.edu/tools/qismap/>

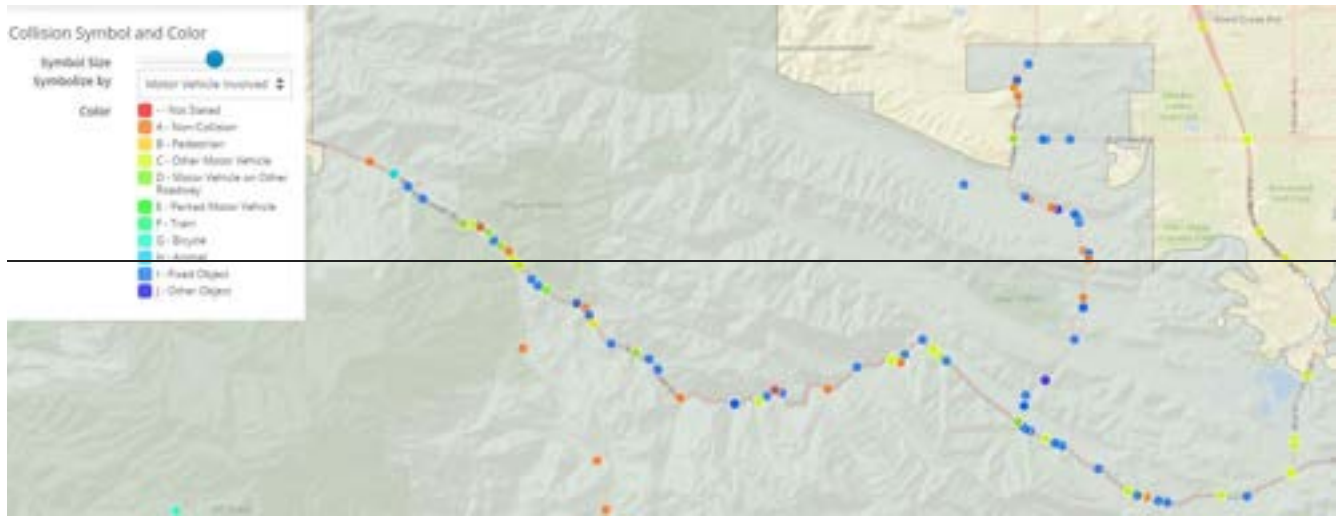


Figure 2 Collisions by type of vehicle involved in collision. (2014-2018). Source: TIMS

Two-thirds of the collisions (50 of the 79) involved a single vehicle: 38 hit a fixed object and 13 were considered noncollision i.e. the vehicle overturned. The most common type of collision involving two vehicles or parties is Sideswipe (10 collisions) followed by Broadside (7), Head-on (6) and Rear-end (4). (See Table 2).

Table 2. Collisions by Crash Type Marsh Creek Road between Pine Lane and Camino Diablo (2014-2018)	
Head-on	6
Sideswipe	10
Rear-End	4
Broadside	7
Hit Object	38
Overturned	14
Total	79

During this five-year time period, there was one fatality and one reported collision with no injuries; all the other collisions had at least one injured party. One collision involved a bicyclist, 12 involved motorcycles, and one involved a truck or truck-trailer (Table 3). The one reported bicycle crash on Marsh Creek Road occurred in 2018 and was located 4200 feet east of Pine Lane. In this incident, an eastbound motorist hit and injured two eastbound bicyclists, apparently attempting to pass. The incidence of motorcycle crashes on Marsh Creek Road is higher than the county



average: 15% (12/79) compared to the countywide average of 7% over the same 5-year period, which may indicate that this road is popular for motorcyclists.

Table 3. Collisions on Marsh Creek Road between Pine Lane and Camino Diablo (2014-2018)			
Crashes	Injury	Fatal	Total
Single vehicle crashes (fixed object or overturned)			
Truck	1	0	1
Automobile	41 *	1	42
Motorcycle	7	0	7
Collisions with other vehicles or parties			
Automobile with auto	22		22
Automobile with Bicycle	1	0	1
Automobile with Pedestrian	0	0	0
Automobile with Motorcycle	5		5
Total	77	1	78*
*There was one noninjury collision in the TIMS database, which does not appear in this table			
Source: TIMS. https://tims.berkeley.edu/tools/gismap/			

Table 4 presents the Primary Collision Factor (PCF) for all collisions and also for motorcycle-involved collisions. The most common PCF overall and for motorcycles was Improper Turn, which was cited in 40 of the 79 crashes (50%). The next most highest PCF, for 13 crashes (16%), was attributed to Unsafe Speed and 10 collisions (13%) were attributed to Wrong Side of the Road. It is unknown without reading the police report why so many drivers were making “improper turns”, especially given the lack of land uses and reasons to turn. Upon further investigation it was determined that the movement prior to collision for these collisions was either making left turn or “other unsafe turn.” Again, without reading the police reports it is unknown why these “other unsafe turns” couldn’t be categorized either a right or left turn. But most of these *Improper Turn* crashes (36 of the 40) were single vehicle crashes.

The prevalence of single vehicle crashes seems to imply that that speeding is an issue even though Unsafe Speed was not cited as the PCF as often as was Improper Turn.

To try to further analyze the collisions, the locations were further investigated to see if there was a difference between the western part of Marsh Creek Road, whose alignment is hillier with more horizontal and vertical curves, and the eastern part



(from about 1.3 miles west of Deer Valley Road continuing to the east to Camino Diablo. The eastern section is where the Round Valley Regional Preserve driveway is located and Marsh Creek Road becomes somewhat straighter. Of the 79 crashes, 52 were located in the western part and 27 on the eastern third, a distance of about 4.5 miles. Although straighter, the number of collisions per mile is about the same (6 per mile) thus the improved alignment does not appear to affect collision incidence. Nor does it seem to have affected the types of collisions, as both sections had about 15% motorcycle crashes and two-thirds single vehicle crashes. Thus the collision types and vehicles involved on the eastern part of Marsh Creek Road appear to be about same as for the whole stretch of Marsh Creek Road.

Table 4. Primary Collision Factor, Marsh Creek Road Collisions 2014 to 2018		
Primary Collision Factor	Number of Total Collisions	Number of Motorcycle Collisions
Improper turn (1)	40	6
Unsafe speed	13	4
Wrong side of road	10	1
Improper passing	1	1
Driving under the influence	7	0
Other	8	0
Total	79	12
(1) The movement prior to collision for these collisions was either making left turn or other unsafe turn. It is unknown without reading the police report why the "other unsafe turn" drivers were making a turn, and why it couldn't be categorized as either a right or left turn. Source: TIMS. https://tims.berkeley.edu/tools/gismap/		

Sight Distance

There are two types of sight distance to consider with an at-grade crossing: stopping sight distance and corner (intersection) sight distance. At a minimum, the stopping sight distance should be provided; optimally intersection sight distance should be provided.

The stopping sight distance is calculated from the perspective of the motor vehicle on the roadway being crossed. It is the distance a motor vehicle needs to be able to come to a safe stop after seeing an object (or trail user) 0.5 ft. high in the road. According to the Caltrans Highway Design Manual (HDM), a roadway with a 60 mph

design speed has a stopping sight distance of 580 feet⁵. Trail users are, of course, higher than 0.5 feet high, but this height is appropriate for a worst-case scenario of someone who may have fallen down when crossing. Thus, the motorist on Marsh Creek Road needs enough sight distance to be able to see the fallen person, react and come to a stop.

The corner (intersection) sight distance is calculated from the perspective of the vehicle (or bicycle pedestrian or equestrian) crossing the roadway and the oncoming vehicle; in effect the reciprocal sight distance between the vehicle crossing the roadway and the oncoming vehicle. The goal is to allow the crossing vehicle/trail user to judge a gap in traffic large enough that will not require through traffic to radically alter their speed. Thus in the case of the trail crossing, the corner sight distance is the distance that the trail user needs in order to be able to judge whether there is an adequate gap for them to cross the entire roadway without requiring traffic on the roadway being crossed to change their speed. This provides the trail user with the most safety as it does not depend on any action on the part of the motorist, who may be distracted or inattentive. Both parties are assumed to have an eye height of 3.5 feet.

The HDM section 405.1 provides the following formula to calculate the required corner sight distance at a given location: $1.47V_mT_g$, where: V_m is the design speed (mph) of the major road and T_g is the time gap (seconds) needed for a stopped vehicle to turn left, right or cross the roadway. T_g is composed of the reaction time plus the time it takes to physically cross the road; the latter depends on the width of the road and the speed of the traveler.

The values provided in the HDM Table 405.1A for the time gap T_g are for motor vehicles. Since this study is for a multi-use trail and since pedestrians and bicyclists have slightly different reaction times from motor vehicles, the values from AASHTO Bike Guide⁶ and the Minnesota manual for At-grade Trail – Crossing Treatments⁷ were used. The conservative (greatest amount of time) is calculated using the values for a pedestrian. Given a pedestrian crossing a roadway of 24 feet with posted speeds of 50 mph, i.e. design speed of 60 mph, with an assumed pedestrian speed of 3.5 feet per second and 3 seconds of reaction time, the required corner sight

⁵ HDM Table 201.1. The distances given in this table are based on design speed not posted speed, which is typically 10 mph above posted speed. Thus for a design speed of 60 mph, the required stopping sight distance is 580 feet.

⁶ American Association of State Highway and Transportation Officials (AASHTO) (2011). A Policy on Geometric Design of Highways and Streets 6th Edition. AASHTO, Washington.

⁷ Minnesota DOT “Best Practices Synthesis and Guidance at At-grade Trail – Crossing Treatments”. September 2013.



distance is 870 feet⁸. If the full 36-foot width of the roadway at the Round Valley driveway is used, which assumes the trail user is waiting outside the shoulder (a more logical assumption), this distance increases to 1170 feet. The stopping sight distance and corner (intersection) sight distance for various design speeds is shown in Table 5.

Table 5. Stopping Sight Distance And Corner Sight Distance For Various Design Speeds And Roadway Widths.			
Design Speed	Stopping Sight Distance (1)	Corner (intersection) Sight Distance (2)(3)	
		24 ft. wide road	36 ft. wide road
25 mph	150 ft.	360 ft.	490 ft.
40 mph	300 ft.	580 ft.	780 ft.
50 mph	430 ft.	724 ft.	975 ft.
55 mph	500 ft.	800 ft.	1070 ft.
60 mph	580 ft.	870 ft.	1170 ft.

Notes:
 1) Table 201.1. Caltrans Highway Design Manual 6th Edition
 2) Based on formula $1.47 V_m T_g$ from HDM section 405.1. Assumes roadway width of 24 feet and 36 feet as indicated.
 3) The minimum value for corner sight distance at Private Road Intersections (and Rural Driveways) should be equal to the stopping sight distance as given in Table 201.1. Source: HDM 405.1(2)c.

The existing sight distance at the Round Valley Regional Preserve driveway between potential trail users and vehicles at the driveway and traffic to the west (i.e. to eastbound traffic) is clear for a distance of about 1400 feet. There is a gentle downgrade which does not obscure sight distance. The horizontal curve reduces sight distance to about 1400 feet, which is greater than the values shown in Table 5 for speeds of 60 mph. To the east, however, (i.e. for westbound traffic) the sight distance is less particularly to trail users on the north side of the road. It is restricted by both a horizontal and a vertical curve. The corner sight distance restricted by the horizontal curve is about 1050 feet; this is sufficient for a 24-foot roadway but not sufficient for the full width of 36 feet including the shoulders. Considering the sag vertical curve, there is sufficient corner sight distance for trail users. However, the sag vertical curve does compromise the stopping sight distance to objects that are less than two feet in height. The sight distance to an object 0.5 feet in height is about 450 feet. This is less than the 580 feet stopping sight distance needed for a design speed of 60 mph.

⁸ Corner sight distance calculations for pedestrian speeds. Roadway width of 24 feet: $1.47 * 60 * (3.0 \text{ sec.} + 24 \text{ ft} / 3.5 \text{ ft/sec}) = 870 \text{ feet}$. Roadway width of 36 feet: $1.47 * 60 * (3.0 \text{ sec.} + 36 \text{ ft} / 3.5 \text{ ft/sec.}) = 1170 \text{ feet}$.

Potential Roadway Crossing Options

The two options for crossing Marsh Creek Road are a grade-separated crossing and an at-grade crossing. These will be discussed in turn below.

Grade-Separated Crossing of Marsh Creek Road

The trail could cross over Marsh Creek Road as a bridge or under as a tunnel. The preferred location and engineering evaluation of a grade separation is to be done by others.

The main advantage of a grade separation is the complete elimination of conflicts with motor vehicle traffic on Marsh Creek Road, which in turn eliminates the possibility of a collision between roadway users and trail users. Given the high speeds on Marsh Creek Road and the characteristics of the collisions, this is an essential consideration. Since there are no major and only a few minor intersections, the drivers' experience for almost 15 miles is uninterrupted flow with no stops signs or signals; there is not even any cross traffic since all access to Marsh Creek Road is T-intersections or driveways between Pine Lane in Clayton to the west and Vineyards Parkway in Brentwood to the east. Thus the motorists' expectation of the need to stop or even slow for side traffic or entering cars, bicyclists or pedestrians is low. Given the collision history of inattention or bad judgment on the part of motorists, this is a serious consideration. A grade-separated crossing would also be preferable from the perspective of equestrians potentially having to wait in close proximity to the roadway, especially given the high speeds. The main disadvantage of a grade separation is cost. A secondary disadvantage is the inclination of the trail alignment, i.e. trail users must gain and lose approximately ten to 20 feet in elevation. Given that they are human powered, (except for equestrians), this involves additional effort on the part of the trail user to traverse the roadway.

With respect to a tunnel versus a bridge, often the best option from the point of view of the trail user is a tunnel, since the vertical clearance required by a multi-use trail is less than that of motor roadway. Thus, the total elevation change for the trail user would be the least with a tunnel. In addition, with a tunnel, the descent comes first which can help propel cyclists up the slope to return to grade. Often a good design solution for a trail undercrossing in order to reduce the total elevation change for trail users is to elevate the roadway slightly so that the tunnel does not have to be depressed below grade as much. Horses and equestrians also tend to prefer tunnels. Another disadvantage of a bridge or overcrossing, in addition to the greater climbing on the part of the trail user, is its visual impact on this scenic corridor adjacent to the parklands. With respect to the grade differential experienced by the



trail users, depending on the location of the crossing, an overcrossing could be optimized if it began on an embankment i.e. such that the starting point was already above grade. In this case the only (or most of the) elevation change with respect to the trail would be on only one side of the roadway not both. This would ameliorate the elevation change, but would not change the fact that trail bed would be above the roadway with visual impacts, horses may still be reticent, and climbing on the part of the trail users would be needed on one side of the roadway.

At-grade Trail Crossing of Marsh Creek Road

If an at-grade traffic crossing were to be provided, the presumed location would be at the location of the Round Valley Regional Preserve driveway. This has the advantage of combining all activity at a single location, increasing the awareness and the visibility of the activity to the motorists on Marsh Creek Road. It also is the optimal location given the terrain and probable alignment of the trail.

The two considerations with an at-grade crossing are 1) sight distance and 2) traffic volumes and the resulting available gaps in traffic.

The first critical issue is whether there is adequate stopping sight distance, then if there is adequate corner sight distance. As discussed above, the stopping sight distance for westbound traffic is less than needed for a roadway with a design speed of 60 mph. The corner sight distance is also marginal, adequate for 24 feet in width but not sufficient for 36 feet. Even if there were sufficient stopping sight distance and corner sight distance, an at-grade crossing relies on the trail user to not attempt to cross the road if they see an approaching vehicle within the sight zone. Trail users that are not used to rural conditions and speeds may not have the judgment to know how to assess high speeds and /or to know that they should not expect the motorist to stop/yield, as they may expect in an urban or suburban situation. Although there is not adequate stopping sight distance to an object 0.5 feet in height, there would be adequate stopping sight distance to traffic control devices, thus a device such as a traffic signal could ameliorate but not resolve the lack of adequate stopping sight distance and corner sight distance. But given the high speeds and collision history of bad judgment on the part of motorists, a signal is not a guarantee of a conflict-free crossing. Thus, an at-grade crossing is not recommended.

The second consideration is whether the trail users could expect natural adequate gaps in the traffic flow or whether a traffic control device would be needed to provide the gaps by assigning right of way (i.e. traffic signal). Although this is a moot point with the recommended grade separation, it will be discussed for the sake of the analysis. Future traffic volumes are estimated to be relatively low such



that delay would not be a major problem for either trail users or vehicles on the roadway, yet would be high enough that some traffic control device would be recommended in addition to the standard trail warning sign assembly. Such a traffic control device serves one of two purposes. It improves the awareness of the motorist that there is a crossing and of the potential need to yield, or, in the case of a signal or pedestrian hybrid beacon (also referred to as a hawk signal), the device requires motorists to stop and yield the right of way. The latter are particularly beneficial if traffic volumes are high enough such that there are not adequate gaps in traffic flow to allow pedestrians to cross without waiting too long. In this case, the standard traffic signal or the hawk signal can provide the required gaps.

Identifying the available gaps in traffic is more complicated than calculating the time needed to cross since it depends on random arrivals and statistical probabilities rather than the use of simple formula as presented above for the Tg. For existing conditions, the procedure is to conduct a field survey in order to physically count the number and length of the gaps in the stream of traffic during the peak hour. For future conditions, that is not possible. However, the state of Wisconsin has developed a method specifically for a trail crossing a rural highway⁹, which is the case with the Marsh Creek Trail. The table from the Wisconsin manual indicates that with ADT above 3,500, a grade separation should be considered with trail volumes of 6 persons or more during the peak hour. This ADT is met with existing traffic volumes on Marsh Creek Road. Thus based on Wisconsin guidelines, this location would merit a grade separation with as few as 6 trail users during the peak hour.

At-grade traffic control device options are discussed below for the sake of complete analysis.

Rectangular Rapid Flashing Beacon

The Rectangular Rapid Flashing Beacon (RRFB) traffic control device has interim approval (IA) from the FHWA (its IA status was reinstated in 2018). It is considered a “conspicuity enhancement” that supplements standard pedestrian and trail crossing signs at uncontrolled marked crosswalks. It operates upon activation by the pedestrian or trail user. The flashing lights provide the motorist with a visible indication that there is a pedestrian waiting to cross. No guidance is given in the IA as to maximum speed limits on roads to use this device. RRFB are permitted to be used in conjunction with roundabouts. Research has shown that RRFBs increase the rate of drivers’ yielding to pedestrians at marked crosswalks. However research was conducted in urban and suburban settings, not rural settings. Given that there is not research to show if the RRFB is effective at slowing traffic in a rural context, it is not

⁹ State of Wisconsin, FDM 11-46-20 Permanent Public Trail Crossing Rural Public Roads, Attachment 20.1.



considered sufficient to ameliorate the insufficient sight distance if there were a trail crossing at the Round Valley Regional Preserve driveway.



Pedestrian Hybrid Beacon

A pedestrian hybrid beacon (also known as a hawk signal) is a relatively new traffic control device; it rests in unilluminated or dark mode, and only becomes illuminated upon the activation by the pedestrian or bicyclist. It is typically used in urban and suburban settings, although the CA MUTCD does allow for it to be installed on higher speed (> 35 mph) roadways. The advantage of the pedestrian hybrid beacon over a traditional pedestrian traffic signal is that the design of the indications is such that motorists are not delayed unnecessarily once the pedestrian has cleared the intersection. (This is compared to a traditional signal with a traditional Walk phase where the motorist must wait for their green signal even if the pedestrians have completed their crossing.) The guidelines for the minimum pedestrian volumes do not explicitly cover the conditions at this location (volumes and street width), but in general, the minimum pedestrian (or trail) volumes is 20 per hour. The MUTCD also allows for the consideration of a pedestrian hybrid beacon on the basis of high speeds, volumes and the presence/lack of adequate gaps. But although a hawk signal could ameliorate the lack of adequate stopping sight distance, in the worst case scenario, with a fallen trail user, a motorist would still lack the stopping sight distance needed to stop in time. Given the high speeds, the rural location, collision history of motorist bad judgment, and the relative newness of the pedestrian hybrid beacon (and therefore motorist unfamiliarity), and existing stopping sight distance, a grade separation is preferred over the use of this device.



Figure 4 Pedestrian Hybrid Beacon. Source: FHWA

Traffic Signal

Traffic signals are used to assign right of way, to improve congestion and reduce driver confusion at current one-way or two-way stop controlled intersections. They can also be used for where the traffic volume on a major street is so heavy that pedestrians experience excessive delay in crossing the major street. Given the high speeds on Marsh Creek Road, a traffic control device that interrupts traffic flow would be preferred to allowing trail users the discretion to cross. The traffic signal warrants for the intersection of Marsh Creek Road were evaluated using the projected future daily and peak hour traffic volumes. Based on the estimated ADT of 5,400 vpd, the signal warrants based on ADT in Figure 4C-103 are not met. The warrants were then analyzed using the pedestrian peak hour warrants and estimates of future-year peak hour traffic volume. Given the projection of 540 vph there would need to be 260 trail users per hour (Figure 4C-8) to satisfy the pedestrian peak hour warrants for a high speed location. The school crossing signal warrants was also analyzed. This warrant specifically looks at available gaps in traffic; it is based on the desire to have an average of at least one adequate gap for each minute of the school crossing time period in question (e.g. 20 minutes, 45 minutes, etc.). If the observed number of gaps is less than the minutes that children are crossing, and if there are at least 20 students, the school signal warrant is satisfied. It is unlikely that the trail will have more than 200 trail users an hour during the peak hour. It may or may not meet the school warrant, which does not technically apply in this case. A gap analysis would verify whether or not there are adequate gaps, such that a signal is not needed to interrupt traffic. But although a traffic signal could ameliorate the lack of adequate stopping sight distance, in the worst case scenario, with a fallen trail user, a motorist would still lack the stopping sight distance needed to stop in time. Thus, a grade separation is preferred to the installation of a traffic signal.

Modern Roundabout

Roundabouts have proven effective as an alternative to four-way stops and to traffic signals. The CA MUTCD Chapter 4C. *Traffic Control Signal Needs Studies* states “On local streets and highways, the engineering study should include consideration of a roundabout (yield control). If a roundabout is determined to provide a viable and practical solution, it should be studied in lieu of, or in addition to a traffic control signal.” The landscaped circle in the middle of the roundabout gives the motorists an advance visual cue that there is a reason they must slow. Properly signed and striped, the motorists navigate roundabouts successfully at speeds of about 22 mph. Since they rarely have to come to a complete stop they are not delayed as much as with traffic signals or four-way stop sign control. Roundabouts have proven to be practical even on high speed rural state highways, and Caltrans has implemented them in several such locations.

In general, a roundabout is a good alternative for intersection control for two-lane roadways with low to moderate traffic volumes. Roundabouts have the added benefit of slowing traffic before it enters the roundabout since they are designed to be traversed at speeds less than 25 mph. It improves safety for pedestrians since the slower speeds gives the motorist more time to react and yield to pedestrians intending to cross the roadway. These slower speeds also significantly reduce the required stopping distance i.e. from 580 to 150 feet, which also contributes to the decrease collisions compared to the before-roundabout condition.

At a roundabout, a marked crosswalk is typically provided for pedestrians; bicyclists have the option of using the roundabout as a vehicle or a pedestrian, or a bikeway can be incorporated into the design. While the side street volumes (i.e. the Round Valley Regional Preserve driveway and Marsh Creek trail volumes) are much lower than on Marsh Creek Road, the fact the traffic is only slowed and rarely stopped makes the roundabout less intrusive compared to a traffic signal or even a pedestrian hybrid beacon. The fact that traffic is slowed by design rather than just with signs and signals also makes a roundabout the safest option. It is very difficult to “run” a roundabout the way one can a “run” a stop sign or traffic signal. In addition, a roundabout is the only traffic control device that resolves the stopping sight distance of 450 feet, since the reduced speeds of less than 25 mph have a stopping sight distance of 150 feet.



Conclusions and Recommendations

The potential crossing of Marsh Creek Road by Marsh Creek trail would either be grade separated or at-grade. If grade separated, the exact location is to be determined by others. Undercrossings (tunnels) have more advantages for trail crossings than overcrossings, including less overall grade change (ascent and descent) on the part of the pedestrians, cyclists and horses.

If at-grade, the crossing would be at the driveway of the Round Valley Regional Preserve. This location has limited stopping sight distance for westbound traffic to a trail user who may have fallen in the road due to the vertical curve and it also has limited intersection sight distance to trail users coming from the north due to the horizontal curve. Given design speeds of 60 mph and the 36-foot roadway width, both the stopping sight distance and the corner sight distances are less than recommended by the HDM. In addition, the collision history for the past five years reveals that two-thirds have been single vehicle crashes, which indicates inattention or bad judgment on behalf of the motorists. The alignment of Marsh Creek Road combined with the high speeds results in two-thirds of collisions either hitting a fixed object or being an overturned vehicle.

Existing ADT on Marsh Creek Road is 4,077 which is projected to increase to 5,400 by the year 2040. Even if there were sufficient gaps in traffic so that trail users could cross without undue delay, it is not clear that trail users would be able to judge rural high speed conditions. Thus, if there were an at-grade crossing, some type of traffic control device in addition to the standard trail warning signs would be indicated. The use of traffic control devices such as a traffic signal, pedestrian hybrid beacon, RRFB, or a roundabout was analyzed for their appropriateness in this application. Given the limited sight distances, the rural nature of the roadway and the high speeds, compounded by 6.5% heavy vehicles, none were considered ideal for this situation, (although a roundabout could resolve the inadequate sight distance by slowing traffic on Marsh Creek Road to less than 25 mph). Thus, a grade-separated trail crossing is recommended. A grade separation would maximize both the safety and the quality of the trail user experience. While the State of California does not have specific guidance for public trails crossing rural roads, the State of Wisconsin does. Based on their guidelines, a grade separation is recommended for roadways with an ADT of 3,500. This corroborates the finding that a grade separation is appropriate for this location.





Appendix C

Preliminary Engineering Concept Plans

MARSH CREEK REGIONAL TRAIL PROJECT

NOTES

GENERAL NOTES

1. ALL MATERIALS, WORKMANSHIP, AND CONSTRUCTION SHALL CONFORM TO THE STATE OF CALIFORNIA STANDARD SPECIFICATIONS AND STANDARD PLANS (LATEST REVISION), UNLESS OTHERWISE NOTED.
2. ALL UTILITIES CONFLICTING WITH THE PROPOSED CONSTRUCTION SHALL BE LOCATED PRIOR TO START OF CONSTRUCTION.
3. THE SUBGRADE, CLASS II AGGREGATE BASE, ASPHALTIC CONCRETE SHALL BE 50% (MIN.) VIRGIN MATERIALS AND SHALL HAVE A RELATIVE COMPACTION OF 95%, SHALL BE FREE OF LOOSE OR EXTRANEIOUS MATERIAL, AND BE A TIGHT, NON-YIELDING SURFACE WITH NO VISIBLE DISPLACEMENT.
4. UNDERGROUND SERVICE ALERT (USA) – CALL TOLL FREE 800-642-2444 AT LEAST 48 HOURS PRIOR TO EXCAVATION.
5. ALL UNUSABLE EXCESS SOIL MATERIAL, STUMPS AND BOULDERS SHALL BE REMOVED FROM THE SITE AND DISPOSED OF IN A LEGAL MANNER AND BECOME PROPERTY OF THE CONTRACTOR.

GRADING NOTES

1. PERFORM GRADING IN ACCORDANCE WITH THE LATEST EDITION OF APPENDIX CHAPTER 33 OF THE CALIFORNIA BUILDING CODE, APPLICABLE CONTRA COSTA COUNTY REGULATIONS AND TO THE RECOMMENDATIONS OF THE GEOTECHNICAL ENGINEER.
2. EXISTING DRAINAGE COURSES RECEIVING WATERS FROM THIS SITE AND LOCATED THROUGHOUT THIS SITE SHALL REMAIN OPEN AND CLEAR OF DEBRIS TO PROPERLY CONVEY STORM WATER. IF EXISTING DRAINAGE COURSES RECEIVING WATERS FROM THIS SITE ARE LOCATED IN THE COUNTY RIGHT-OF-WAY AND NEED MAINTENANCE, CONTACT THE CONTRA COSTA COUNTY PUBLIC WORKS DEPARTMENT AT (925) 313-2000 FOR FURTHER ASSISTANCE. IN ANY EVENT, THE OWNER AND/OR CONTRACTOR SHALL BE HELD LIABLE FOR ANY DAMAGE DUE TO OBSTRUCTING NATURAL DRAINAGE PATTERNS.
3. THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE DESIGN ENGINEER UPON DISCOVERING SIGNIFICANT DISCREPANCIES, ERRORS OR OMISSIONS IN THE PLANS. PRIOR TO PROCEEDING, THE OWNER SHALL HAVE THE PLANS REVISED TO CLARIFY IDENTIFIED DISCREPANCIES, ERRORS OR OMISSIONS. THE REVISED PLANS SHALL BE SUBJECT TO REVIEW BY THE CHIEF BUILDING OFFICIAL.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR NOTIFYING UNDERGROUND SERVICE ALERT (USA), TOLL FREE AT 1-800-642-2444, AT LEAST TWO WORKING DAYS PRIOR TO EXCAVATION. THE CONTRACTOR SHALL UNCOVER RELEVANT UTILITIES TO VERIFY THEIR LOCATION AND ELEVATION. IF UNEXPECTED OR CONFLICTING UTILITIES ARE ENCOUNTERED DURING EXCAVATION, NOTIFY USA, THE UTILITY OWNER AND/OR THE PROJECT ENGINEER IMMEDIATELY. UTILITIES INCLUDE BUT ARE NOT LIMITED TO WATER, SEWER, ELECTRICAL, GAS, TELEPHONE AND CABLE/TV.
5. IN THE EVENT CULTURAL RESOURCES (I.E., HISTORICAL, ARCHAEOLOGICAL, AND PALEONTOLOGICAL RESOURCES, AND HUMAN REMAINS) ARE DISCOVERED DURING GRADING OR OTHER CONSTRUCTION ACTIVITIES, WORK SHALL BE HALTED WITHIN A 100 FOOT RADIUS OF THE FIND. THE NORTHWEST INFORMATION CENTER SHALL BE NOTIFIED AT (707) 588-8455. A QUALIFIED ARCHEOLOGIST SHALL BE CONSULTED FOR AN ON-SITE EVALUATION. ADDITIONAL MITIGATION MAY BE REQUIRED BY THE COUNTY PER THE ARCHEOLOGISTS RECOMMENDATIONS. IF HUMAN BURIALS OR HUMAN REMAINS ARE ENCOUNTERED, THE CONTRACTOR SHALL ALSO NOTIFY THE COUNTY CORONER AT (925) 313-2850.
6. SHOULD GRADING OPERATIONS ENCOUNTER HAZARDOUS MATERIALS, OR WHAT APPEAR TO BE HAZARDOUS MATERIALS, STOP WORK IN THE AFFECTED AREA IMMEDIATELY AND CONTACT 911 OR THE APPROPRIATE AGENCY FOR FURTHER INSTRUCTION.

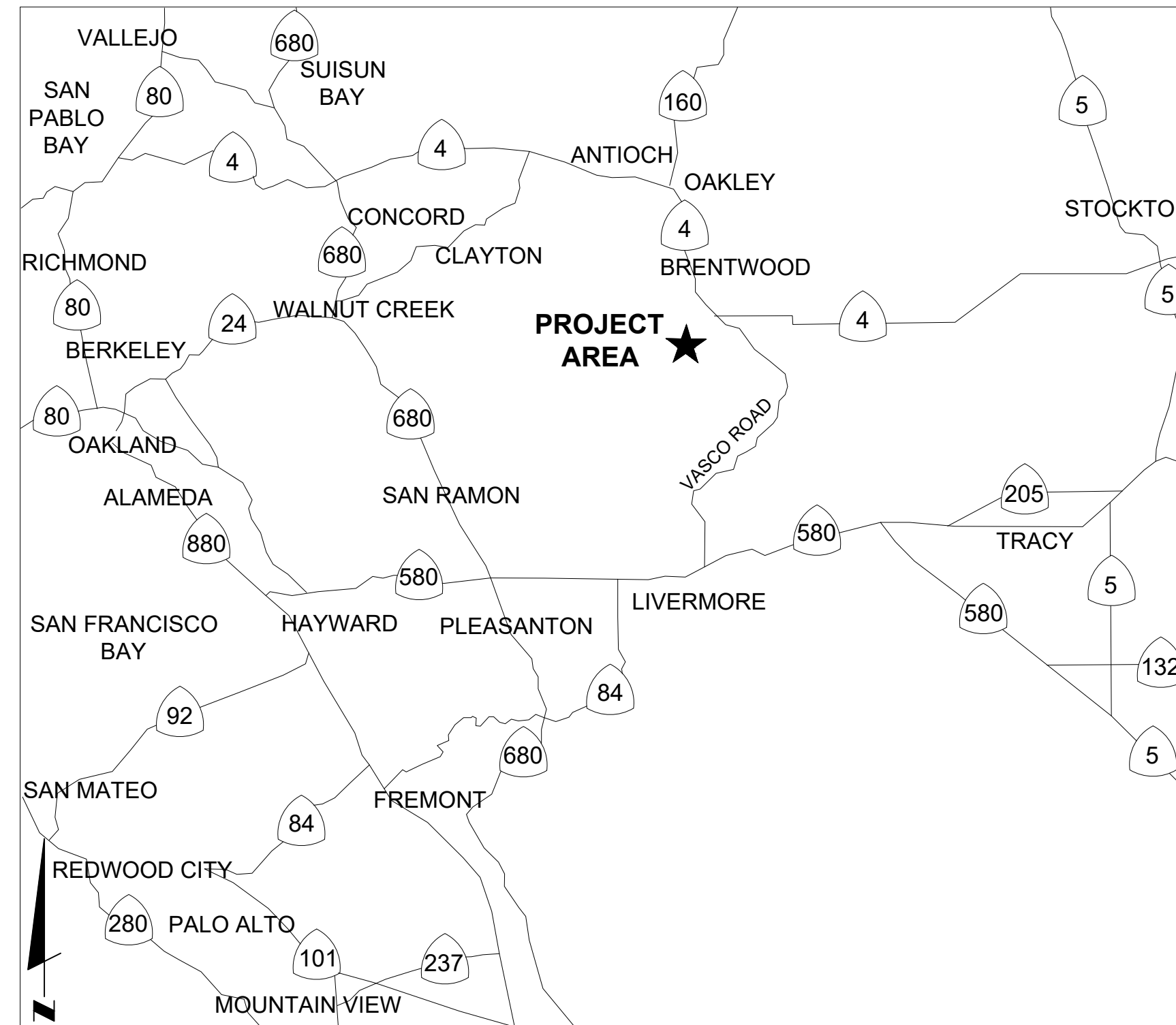
ABBREVIATIONS

AB	AGGREGATE BASE
AC	ASPHALT CONCRETE
AFG	ABOVE FINISH GRADE
AGGR	AGGREGATE
&	AND
APPROX	APPROXIMATE
@	AT
BFG	BELOW FINISH GRADE
BVCE	BEGIN VERTICAL CURVE ELEVATION
BVCS	BEGIN VERTICAL CURVE STATION
CL	CLASS
CONC	CONCRETE
CLR	CLEARANCE
CP	CONTROL POINT
DIA, Ø	DIAMETER
EA	EACH
EL, ELEV	ELEVATION
EP	EDGE OF PAVEMENT
EVCE	END VERTICAL CURVE ELEVATION
EVCS	END VERTICAL CURVE STATION
EX., EXIST	EXISTING
(E)	EXISTING
FG	FINISHED GRADE
FL	FLOW LINE
FT	FEET
GALV	GALVANIZED
GB	GRADE BREAK
H, HORIZ	HORIZONTAL
INV	INVERT
JP	JOINT POLE
LF	LINEAR FEET
LT	LEFT
MAX	MAXIMUM
MIN	MINIMUM
MISC	MISCELLANEOUS
MH	MANHOLE
MON	MONUMENT
N	NORTH
No., #	NUMBER
NTS	NOT TO SCALE
O.C.	ON CENTER
OH	OVER HEAD
PCC	POINT COMPOUND CURVE
PRC	POINT OF REVERSE CURVATURE
PI	POINT OF INTERSECTION
PP	POWER POLE
PROP	PROPERTY
PT	POINT
PRVCE	POINT OF REVERSE VERTICAL CURVE ELEVATION
PRVCS	POINT OF REVERSE VERTICAL CURVE STATION
PVI	POINT OF VERTICAL INTERSECTION
R	RADIUS
RBP	RESIN BASED PAVEMENT
RC	RELATIVE COMPACTION
RCP	REINFORCED CONCRETE PIPE
R/W	RIGHT OF WAY
S	SLOPE OR SOUTH
SD	STORM DRAIN
SDMH	STORM DRAIN MANHOLE
SHT	SHEET
SS	SANITARY SEWER
STA	STATION
STD	STANDARD
ST	STREET
STL	STEEL
TC	TOP OF CURB
TYP	TYPICAL
VC	VERTICAL CURVE
W/	WITH
W/O	WITH OUT

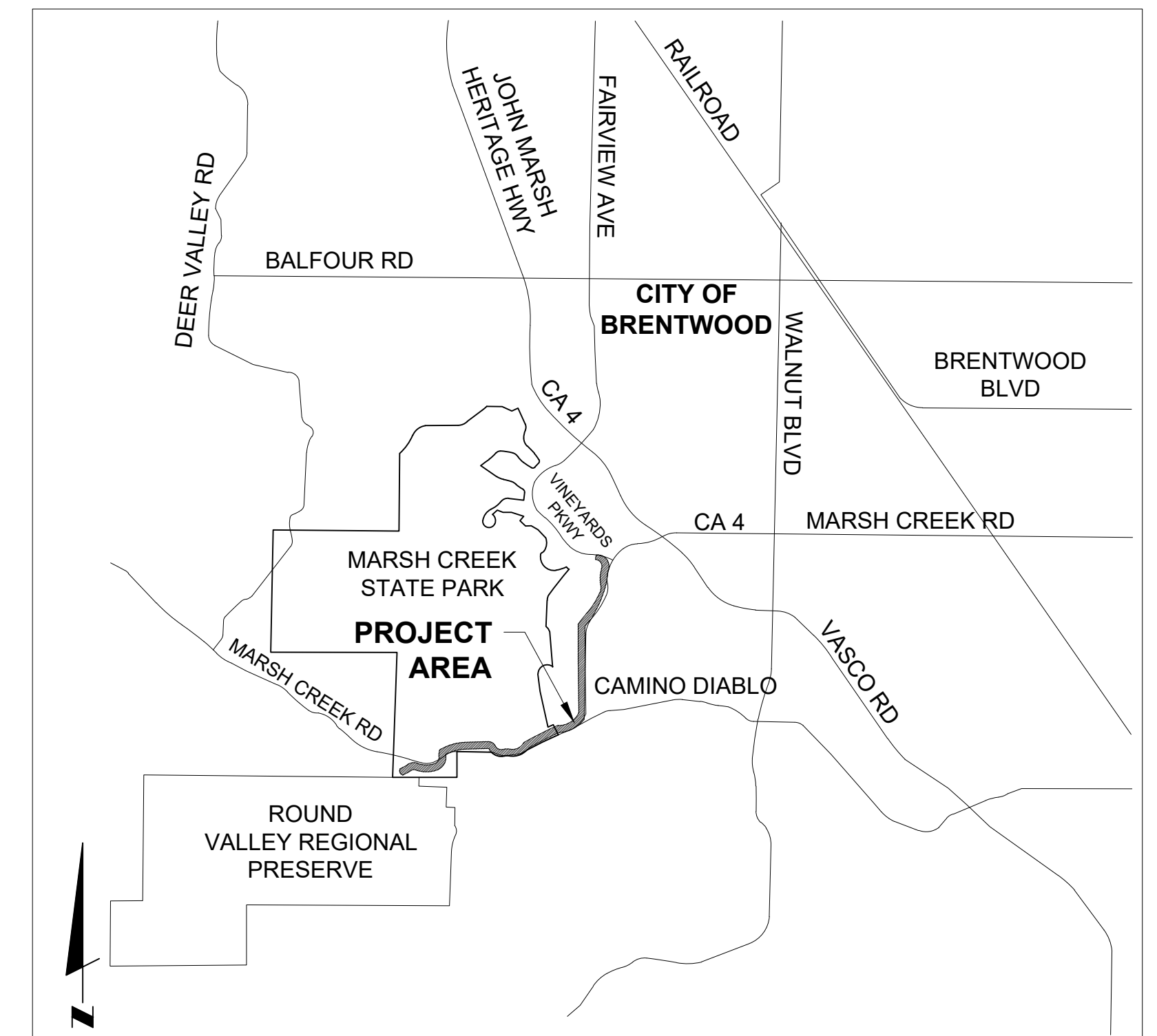
DISTURBED AREA

TOTAL AREA = ### ACRES

BRENTWOOD, CONTRA COSTA COUNTY, CALIFORNIA PRELIMINARY ENGINEERING CONCEPT



VICINITY MAP
NOT TO SCALE



LOCATION MAP
NOT TO SCALE

Sheet List Table	
Sheet Number	Sheet Title
1	TITLE SHEET & SHEET INDEX
2	STORM WATER POLLUTION PREVENTION PLAN (SWPPP)
3	SITE OVERVIEW
4	TRAIL PLAN - STA 0 + 00 TO 59+57
5	TRAIL PLAN - STA 59+57 TO 118+90
6	TRAIL PLAN - STA 118+90 TO 160+40
7	SITE PLAN - ROUND VALLEY PARKING EXPANSION AREA
8	SITE PLAN AND PROFILE - UNDERPASS STA. 17+00 TO 26+00
9	SITE PLAN AND PROFILE - BRIDGE STA. 74+00 TO 80+00
10	SITE PLAN - STATION 138+00 TO 151+00
11	SITE PLAN - STATION 148+00 TO 161+35
12	TRAIL SECTIONS
13	FENCE AND GATE DETAILS
14	PARKING DETAILS
15	SITE FURNISHINGS
16	WALL DETAILS
17	EROSION CONTROL
18	CREEK RESTORATION & MITIGATION CONCEPT

PRELIMINARY ENGINEERING DESIGN - NOT FOR CONSTRUCTION



REVISIONS

DATE



EAST BAY REGIONAL PARK DISTRICT
2950 PERALTA OAKS COURT, OAKLAND, CA 94605
WWW.EBPARKS.ORG 888-327-2757



APPROVED

design:

operations:

scale: AS NOTED

drawn: CC

checked: MH

date: 12/4/2020

TITLE SHEET & SHEET INDEX
MARSH CREEK TRAIL
VINEYARD PARKWAY TO ROUND VALLEY REGIONAL PRESERVE
CONTRA COSTA COUNTY
PROJECT NO. 1800108

CONTRACT NO.

SHEET NO.

1

OF: 18

STORM WATER POLLUTION PREVENTION PLAN (SWPPP) GUIDELINES - MINIMIZING CONSTRUCTION SITE IMPACTS

CONSTRUCTION ACTIVITIES CAN SIGNIFICANTLY IMPACT WATER QUALITY AND ECOLOGIC PROCESSES. EROSION AND TRANSPORT OF DIRT, DEBRIS, CHEMICALS, AND OTHER CONSTRUCTION WASTE CAN ENTER MUNICIPAL DRAIN SYSTEMS, LOCAL CREEKS, AND REGIONAL WATERWAYS AND CAUSE SEVERE DAMAGE TO NATURAL SYSTEMS AND HUMAN INFRASTRUCTURE. MINIMIZE ENVIRONMENTAL IMPACTS BY FOLLOWING THE BMPS OUTLINED IN THE PROJECT. FAILURE TO COMPLY WITH THE BMPS INCLUDED IN THE PROJECT SPECIFICATIONS AND LOCAL, STATE, AND FEDERAL LAWS GOVERNING CONSTRUCTION SITE IMPACT MANAGEMENT AND WATER QUALITY COULD RESULT IN LEGAL VULNERABILITY AND FINES EXCEEDING \$10,000 PER DAY. TO AVOID SUCH INSTANCES, PLAN AHEAD, IMPLEMENT THE SPECIFIC BMPS OUTLINED FOR THIS PROJECT, AND FOLLOW THE GUIDELINES OUTLINED BELOW. MORE INFORMATION ON CONSTRUCTION SITE BMPS AND SWPPPS CAN BE FOUND AT: http://www.dot.ca.gov/hq/construc/stormwater/documents/October2016_SWPPP_Manual.pdf

NON-HAZARDOUS MATERIAL STORAGE

1. STORE ALL SAND, DIRT, AND OTHER ERODIBLE MATERIAL AT LEAST 10 FEET FROM CATCH BASINS AND WHEN FORECASTS CALL FOR RAIN, COVER WITH A TARP, AND SECURE EDGES WITH SANDBAGS, BRICKS, OR OTHER HEAVY OBJECTS.
2. KEEP A CLEAN JOBSITE BY SWEEPING UP PAVED OR OTHER IMPERMEABLE SURFACES DAILY, ESPECIALLY WHEN RAIN IS FORECASTED. DO NOT ADVERTENTLY OR INADVERTENTLY TRANSPORT SEDIMENT OFFSITE, INTO STORM DRAINS, OR ROADWAYS USING WATER, BLOWERS, OR OTHER MECHANICAL DEVICES. DISPOSE ALL NON-HAZARDOUS WASTES INTO THE APPROPRIATE DUMPSTER UNITS.
3. RECYCLE AT LEAST THE MINIMUM REQUIRED AMOUNT OF DEMOLITION MATERIAL INCLUDING CONCRETE, ASPHALT, BASE AGGREGATE, WOOD, ETC. AS OUTLINED IN PROJECT SPECIFICATIONS. PROMOTE RECYCLING OF DAILY CONSUMPTIVE MATERIALS SUCH AS PAPER AND DRINK CANS BY PROVIDING RECYCLE BINS ONSITE.
4. BE SURE DUMPSTERS AND STORAGE CONTAINERS ADEQUATELY MEET ONSITE DEMAND. CHECK FOR ANY LEAKS, CRACKS, OR MATERIAL OVERFLOW ON A REGULAR BASIS. ORDER EXTRA DUMPSTERS AS NECESSARY AND REPAIR ALL LEAKS AND CRACKS IMMEDIATELY.

HAZARDOUS MATERIALS MANAGEMENT AND STORAGE

1. ALL HAZARDOUS MATERIALS AND WASTE MUST BE LABELED (E.G., DIESEL, GASOLINE, ANTIFREEZE, SOLVENTS, THINNERS, PESTICIDES, FERTILIZERS) IN CONFORMITY TO ALL LOCAL, STATE, AND FEDERAL REGULATIONS. FOR GENERAL INFORMATION ON HAZARDOUS WASTE LABELING VISIT: [HTTP://WWW.EPA.GOV/EPASW/OSW/HAZWASTE.HTM](http://www.epa.gov/epaoswer/osw/HAZWASTE.HTM)
2. FOR A COMPLETE LIST OF EPA DEFINED HAZARDOUS WASTES VISIT: [HTTP://WWW.EPA.GOV/EPASW/OSW/HAZWASTE/LISTING-REF.PDF](http://www.epa.gov/epaoswer/HAZWASTE/LISTING-REF.PDF)
3. STORE ALL HAZARDOUS MATERIALS AND WASTES IN APPROVED SECONDARY CONTAINERS PROTECTED FROM THE ELEMENTS (WIND, RAIN, WATER, DIRECT SUNLIGHT). CONSIDER LIMITING THE AVAILABILITY OF HAZARDOUS WASTES BY LOCKING THEM IN SECURED CABINETS/AREAS.
4. FOLLOW THE MANUFACTURER'S INSTRUCTIONS WHEN STORING, TRANSPORTING, APPLYING, AND DISPOSING OF UNUSED HAZARDOUS WASTES. IN GENERAL, OUTDOOR APPLICATION OR USE OF MATERIALS LABELED AS HAZARDOUS WASTES SHOULD BE AVOIDED WHEN FORECASTS CALL FOR RAIN OR HEAVY FOG.

SPILL PREPARATION AND CONTROL

1. PREPARE FOR SPILLS BY STOCKING AN ADEQUATE SUPPLY OF RAGS, ABSORBENTS, SPILL POWDERS, AND SAFETY EQUIPMENT (GLOVES, EYEGLASSES, ETC). FOLLOW ALL HAZARDOUS WASTE STORAGE AND USE RECOMMENDATIONS OUTLINED ABOVE AND CONSULT PROJECT ENGINEERS REGARDING SPILL PREPARATION PLANS THAT MAY BE REQUIRED.
2. COMMUNICATE WITH ALL CONSTRUCTION SITE WORKERS THE IMPORTANCE OF DETECTING AND REPORTING LEAKS TO JOBSITE MANAGERS.
3. CONTAIN ALL SPILLS OR LEAKS UPON DETECTION.
4. PREVENT ALL LEAKS AND SPILLS FROM ENTERING GUTTERS, MUNICIPAL STORM DRAINS, AND ADJACENT CREEKS/WATERWAYS.
5. REPORT ALL HAZARDOUS MATERIAL SPILLS TO THE LOCAL GOVERNMENT ENTITIES OVERSEEING CONSTRUCTION. IN ADDITION, ANY SPILL OF HAZARDOUS MATERIALS, INCLUDING OIL, PAINT, GASOLINE, AND DIESEL, THAT REACH STATE WATERS MUST BE REPORTED TO THE OFFICE OF SPILL PREVENTION AND RESPONSE. THEY CAN BE REACHED THROUGH THE DEPARTMENT OF FISH AND GAME'S TOLL FREE LINE: CALTIP 1-888-DFG-CALTIP

VEHICLE MAINTENANCE AND CLEANING

1. INSPECT ALL ON-SITE VEHICLES FOR OIL, FUEL, ANTIFREEZE, OR GENERAL FLUID LEAKS. IF LEAKS ARE DETECTED USE APPROPRIATELY SIZED CATCH BASINS TO CAPTURE FLUIDS AND MAKE NECESSARY REPAIRS IMMEDIATELY IN AN APPROVED STAGING AREA.
2. CONDUCT ALL REFUELING AND MAINTENANCE WORK ON VEHICLES WITHIN DESIGNATED STAGING AREA. USE APPROPRIATELY SIZED DRIP PANS TO CAPTURE ALL FLUIDS, AND PREVENT SOIL AND WATER CONTAMINATION. DO NOT ALLOW FLUIDS TO REACH STORM GUTTERS, RUN-OFF IMPERVIOUS SURFACES, OR ENTER WATER BODIES AT THE SITE (SEE SPILL PREPARATION AND CONTROL, ABOVE).
3. IF VEHICLE CLEANING IS REQUIRED, DO NOT ALLOW WASH WATER TO LEAVE THE STAGING AREA. THIS MAY REQUIRE CONSTRUCTION OF BERMS AND TARPS THAT PROHIBIT RUN-OFF TO GUTTERS, STREETS, STORM DRAINS, OR CREEKS.
4. DO NOT CLEAN VEHICLES WITH DEGREASERS, SOLVENTS, OR STEAM EQUIPMENT.

EROSION CONTROL AND SOIL CONTAMINATION

1. STORE, TRANSPORT, AND TRANSFER ALL EXCAVATED SOIL, SAND, AND MATERIAL IN CONFORMITY WITH THE TECHNICAL SPECIFICATIONS. IN ADDITION, AVOID STORING EXCAVATED MATERIAL WHERE IT CAN EASILY ERODE OR BE TRANSPORTED TO STREAMS, ROADWAYS, AND DRAIN SYSTEMS
2. CLEARING, EXCEPT THAT NECESSARY TO ESTABLISH SEDIMENT CONTROL DEVICES, SHALL NOT BEGIN UNTIL ALL SEDIMENT CONTROL DEVICES HAVE BEEN INSTALLED AND HAVE BEEN STABILIZED.
3. MAJOR GRADING OPERATIONS SHALL BE SCHEDULED DURING DRY MONTHS, AND SHALL ALLOW ADEQUATE TIME BEFORE RAINFALL BEGINS TO STABILIZE THE SOIL WITH EROSION CONTROL MATERIALS.
- 4.
5. EXAMINE AND FOLLOW THE SPECIFIC EROSION CONTROL PLAN TO MINIMIZE TRANSPORT OF DEBRIS AND SILT OFF THE CONSTRUCTION SITE. THIS MAY INCLUDE INSERTING FIBER ROLLS, SILT FENCING, WATTLES, SEEDING AND OTHER APPROVED BMPS.
6. VEGETATION REDUCES RAINFALL IMPACT AND PROVIDES COHESIVE PROPERTIES TO SOIL. THEREFORE, DURING SITE CLEARING AND GRUBING MINIMIZE THE REMOVAL OF NATURAL VEGETATION INCLUDING FORBS, GRASSES, SHRUBS, GROUND COVERINGS, AND TREES.
7. SLOPES DISTURBED DURING CONSTRUCTION ACTIVITIES WILL REQUIRE SOME FORM OF TEMPORARY AND PERMANENT STABILIZATION. CONSULT THE PROJECT EROSION CONTROL PLANS AND SPECIFICATIONS REGARDING THE SPECIFIC REQUIREMENTS. PROJECT BMPS INCLUDE INSTALLATION OF EROSION CONTROL FABRIC, HYDRO-SEEDING, DRILL-SEEDING, OR DIRECT PLANTING SEEDING AND MULCHING SHALL BE DONE AS SOON AS GRADING IS COMPLETE.
8. SOIL STABILIZATION SHALL BE COMPLETED WITHIN FIVE DAYS OF CLEARING OR INACTIVITY IN CONSTRUCTION
9. SOIL STOCKPILES MUST BE STABILIZED AND/OR SECURELY COVERED AT THE END OF EACH WORKDAY.
10. IN AREAS WHERE PERMANENT RE-SEEDING AND PLANTING IS NOT ESTABLISHED AT THE CLOSE OF THE CONSTRUCTION SEASON, ADDITIONAL CONTROL MEASURES SHALL BE USED, SUCH AS A HEAVY MULCH LAYER OR ANOTHER METHOD THAT DOES NOT REQUIRE GERMINATION, TO ENSURE SOIL STABILIZATION AT THE SITE.
11. WHERE RUNOFF NEEDS TO BE DIVERTED FROM ONE AREA AND CONVEYED TO ANOTHER, EARTH DIKES, DRAINAGE SWALES, SLOPE DRAINS OR OTHER SUITABLE PRACTICE SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE DESIGN CRITERIA SET FORTH IN THE MOST RECENT VERSION OF THE CALIFORNIA STORMWATER QUALITY ASSOCIATION BEST MANAGEMENT PRACTICE HANDBOOK.
12. LINEAR SEDIMENT BARRIERS SHALL BE PLACED BELOW THE TOE OF EXPOSED AND ERODIBLE SLOPES, DOWN-SLOPE OF EXPOSED SOIL AREAS, AROUND SOIL STOCKPILES, AND AT OTHER APPROPRIATE LOCATIONS ALONG THE SITE PERIMETER.
13. STREET SWEEPING SHALL BE CONDUCTED ON AN AS NEEDED BASIS TO REMOVE SEDIMENT FROM STREETS AND ROADWAYS AND TO PREVENT THE SEDIMENT FROM ENTERING STORM DRAINS OR RECEIVING WATERS.
14. EVERY STORM DRAIN INLET WITH THE POTENTIAL TO RECEIVE SEDIMENT-LADEN RUNOFF SHALL BE PROTECTED IN ACCORDANCE WITH THE DESIGN CRITERIA SET FORTH IN THE MOST RECENT VERSION OF THE CALIFORNIA STORMWATER QUALITY ASSOCIATION BEST MANAGEMENT PRACTICE HANDBOOK. INLET PROTECTION SHALL BE INSPECTED AND MAINTAINED FREQUENTLY.
15. SEDIMENT BASINS OR SEDIMENT TRAPS SHALL BE INSTALLED ON PROJECTS WHERE SEDIMENT-LADEN WATER MAY ENTER THE DRAINAGE SYSTEM OR WATERCOURSES AND IN ASSOCIATION WITH DIKES, TEMPORARY CHANNELS, AND PIPES USED TO CONVEY RUNOFF FROM DISTURBED AREAS.
16. OTHER MEASURES, SUCH AS TRACK-OUT PREVENTION DEVICES, OR AS REQUIRED BY THE DISTRICT INSPECTOR IN ORDER TO ENSURE THAT SEDIMENT IS NOT TRACKED ONTO PUBLIC STREETS BY CONSTRUCTION VEHICLES OR WASHED INTO STORM DRAINS.
17. DURING EXCAVATION WORK, LOOK FOR UNDERGROUND STORAGE TANKS, ABANDONED PIPES, OR BURIED DEBRIS THAT WERE NOT IN THE PROJECT PLANS OR JOBSITE BACKGROUND INVESTIGATION. IF FOUND, IMMEDIATELY CONTACT THE PROJECT ENGINEER.
18. IF CONTAMINATED SOIL IS FOUND, IMMEDIATELY CONTACT SITE ENGINEERS AND LOCAL GOVERNMENT ENTITIES OVERSEEING CONSTRUCTION. SPECIAL EXCAVATION, TRANSPORT, AND TREATMENT OF CONTAMINATED SOILS MAY BE REQUIRED.
19. SUFFICIENT EROSION AND SEDIMENT CONTROL SUPPLIES SHALL BE AVAILABLE ON SITE DURING THE RAINY SEASON (OCTOBER THROUGH APRIL) TO PROTECT AREAS SUSCEPTIBLE TO EROSION DURING RAIN EVENTS. CONTRACTORS SHALL BE PREPARED YEAR-ROUND TO DEPLOY EROSION AND SEDIMENT TREATMENT CONTROL PRACTICES.

WATER USE

1. WATER IS A PRECIOUS RESOURCE. RECYCLE AND RE-USE ON-SITE WATER RESOURCES FOR DUST CONTROL, IRRIGATION, AND OTHER USES WHEN POSSIBLE.
2. CONTACT THE LOCAL MUNICIPALITY OR AGENCY RESPONSIBLE FOR DRAINAGE IF STORM GUTTERS, SEWER SYSTEMS, OR WATER BODIES WILL RECEIVE ANY JOBSITE RUN-OFF.
3. WATER CONTAINING HIGH AMOUNTS OF SEDIMENT AND OTHER CONTAMINANTS MAY REQUIRE CONSTRUCTION OF SEDIMENT BASINS, TREATMENT FACILITIES, OR SPECIAL TRANSPORT THAT ARE OUTLINED IN THE PROJECT DRAWINGS AND SPECIFICATIONS.
4. TO REDUCE THE IMPACT OF CONTAMINATED SURFACE WATERS ON LOCAL/REGIONAL GROUNDWATER QUALITY, CONSULT WITH LOCAL OFFICIALS AND PROJECT ENGINEERS REGARDING THE PROPER TESTING, TREATMENT, AND DISPOSAL OF CONTAMINATED WATERS.

CUTTING WOOD, ASPHALT, OR CONCRETE MATERIALS

1. CONTAIN AND PROPERLY DISPOSE ALL SAWDUST FROM CUTTING OPERATIONS AT THE JOBSITE. DO NOT ALLOW SAWDUST AND WOOD DEBRIS, ESPECIALLY TREATED LUMBER PRODUCTS, TO ENTER STORM DRAINS OR ENTER ADJACENT WATER BODIES.
2. PRIOR TO FORECASTED RAINFALL EVENTS, CLEAN UP AND DISPOSE OF ALL WOOD WASTE SOURCES.
3. WHEN SAW CUTTING ASPHALT OR CONCRETE MATERIALS BLOCK ALL STORM GUTTERS AND DRAINS TO PROHIBIT SLURRY FROM CONTAMINATING AND CLOGGING INFRASTRUCTURE. IMMEDIATELY REMOVE ANY AND ALL SLURRY WASTE THAT REACHES STORM DRAINS/GUTTERS
4. INSTALLATION OF FILTER FABRICS, SEDIMENT BASINS, STRAW BALES, OR SPECIAL FILTER EQUIPMENT MAY BE REQUIRED. CONSULT THE PROJECT PLANS AND TECHNICAL SPECIFICATIONS.
5. CONTAIN, CLEAN UP, AND PROPERLY DISPOSE ALL CUTTING WASTE AND SLURRIES UPON MOVING LOCATIONS AND COMMENCING DAILY OPERATIONS.

ASPHALTIC PAVING

1. ASPHALTIC PAVING DURING WET WEATHER IS NOT PERMITTED DUE TO APPLICATION GUIDELINES AND ENVIRONMENTAL CONCERNS.
2. COVER ALL DRAINS AND MANHOLES WHEN PAVING OR APPLYING SEAL COATS, TACK COATS, SLURRY SEALS, AND FOG SEALS.
3. ASPHALTIC PAVING MACHINES CAN LEAK WHEN NOT IN USE. PLACE DRIP PANS AND OTHER ABSORBENT MATERIALS IN APPROPRIATE LOCATIONS TO MINIMIZE LEAKS AND SPILLS WHEN ASPHALTIC PAVING EQUIPMENT IS BEING STORED OR NOT IN USE.
4. ALL SAND USED DURING PAVING, SLURRY SEALING, AND COATING SHOULD BE REMOVED FROM THE JOB SITE AND DISPOSED OF AS TRASH. DO NOT ALLOW EXCESS MATERIALS TO ENTER STORM DRAINS OR LOCAL WATER BODIES.

CONCRETE AND CEMENTITIOUS MATERIALS

1. STORE AND CONTAIN ALL CONCRETE AND CEMENTITIOUS PRODUCTS IN DRY AREAS AND AWAY FROM ANY WATER SOURCES.
2. IF TRUCK AND EQUIPMENT CLEANUP OCCURS ON-SITE, DESIGNATE A BASIN/AREA FOR WASHING. ALLOW WATER TO SEEP INTO A VISQUEEN LINED BASIN AND WAIT UNTIL CONCRETE HARDENS. REMOVE AND DISPOSE ALL HARDENED CONCRETE IN THE APPROPRIATE SOLID WASTE UNIT.
3. DO NOT ALLOW TRUCK AND MIXING EQUIPMENT WASH WATER TO ENTER STORM DRAINS, GUTTERS, OR ADJACENT WATER BODIES.

PAINTING

1. RINSING OF PAINT BRUSHES, PANS, SPRAYERS AND ANY ASSOCIATED EQUIPMENT INTO STORM DRAINS, STREETS, OR WATER BODIES IS NOT PERMITTED.
2. PRIOR TO CLEANING WATER BASED PAINTING EQUIPMENT, ROLL, BRUSH, OR SPRAY ANY EXCESS PAINT ONTO A DISCARDABLE SURFACE (WOOD, PAPER, ETC.) WHEN A SINK IS UNAVAILABLE DILUTE WASTE PAINT WITH WATER AND POUR ONTO SOIL WHILE AGITATING WITH A SHOVEL OR RAKE.
3. PRIOR TO CLEANING OIL BASED PAINTING EQUIPMENT WITH A THINNER, ROLL, BRUSH, OR SPRAY ANY EXCESS PAINT ONTO A DISCARDABLE SURFACE. FILTER AND RE-USE PAINT THINNERS FOR FUTURE USE AND DISPOSE UNUSABLE THINNER AS HAZARDOUS WASTE.

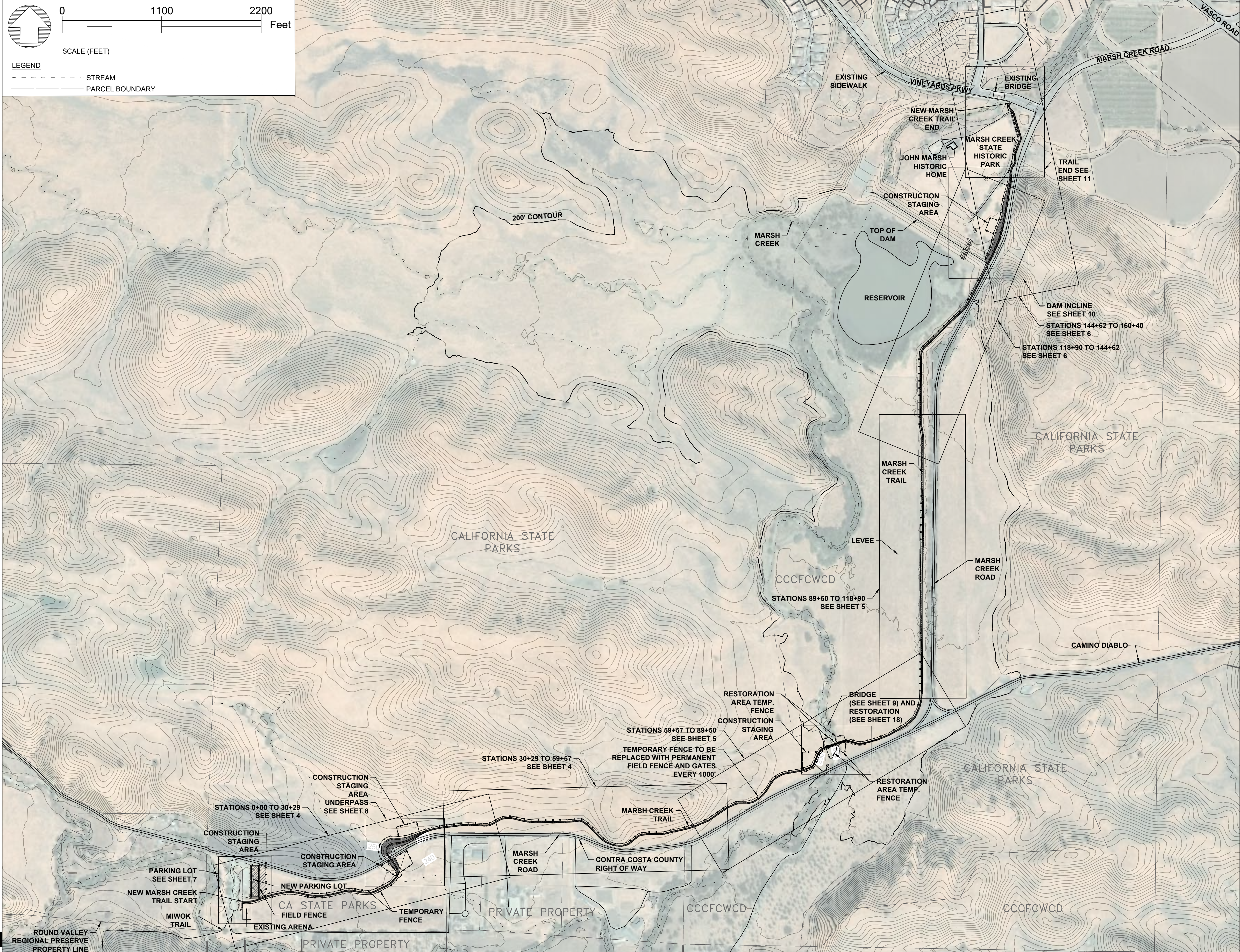
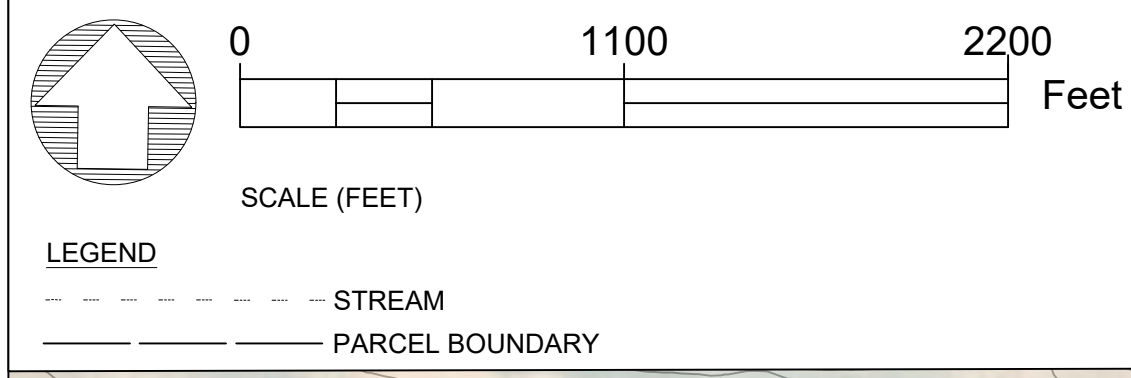
GENERAL

1. SANITARY FACILITIES OF SUFFICIENT NUMBER AND SIZE TO ACCOMMODATE CONSTRUCTION CREWS SHALL BE LOCATED AWAY FROM STORM DRAIN INLETS AND DRAINAGE FACILITIES, AND ANCHORED TO PREVENT BEING BLOWN OVER OR TIPPED BY VANDALS. THE FACILITIES SHALL BE MAINTAINED IN GOOD WORKING ORDER AND EMPTIED AT REGULAR INTERVALS BY A LICENSED SANITARY WASTE HAULER.
2. TECHNIQUES SHALL BE EMPLOYED TO PREVENT THE BLOWING OF DUST OR SEDIMENT FROM THE SITE SUCH AS WATERING ACCESS ROADS AND COMPACTION AND SEEDING OF FILL AREAS.

PRELIMINARY ENGINEERING DESIGN - NOT FOR CONSTRUCTION

REVISIONS	DATE	 EAST BAY REGIONAL PARK DISTRICT 2950 PERALTA OAKS COURT, OAKLAND, CA 94605 WWW.EBPARKS.ORG 888-327-2757	 QUESTA <i>Civil Environmental & Water Resources</i> ENGINEERING CORP. (510) 236-6114 FAX (510) 236-2423 queta@questaec.com P.O. Box 70356 1220 Brickyard Cove Road Point Richmond, CA 94807	APPROVED design: operations:	scale: AS NOTED drawn: CC checked: MH date: 12/3/2020	STORM WATER POLLUTION PREVENTION PLAN (SWPPP) MARSH CREEK TRAIL VINEYARD PARKWAY TO ROUND VALLEY REGIONAL PRESERVE CONTRA COSTA COUNTY PROJECT NO. 1800108	SHEET NO. 2 OF: 18
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SITE OVERVIEW
MARSH CREEK TRAIL
VINEYARD PARKWAY TO ROUND VALLEY REGIONAL PRESERVE
CONTRA COSTA COUNTY
PROJECT NO. 1800108

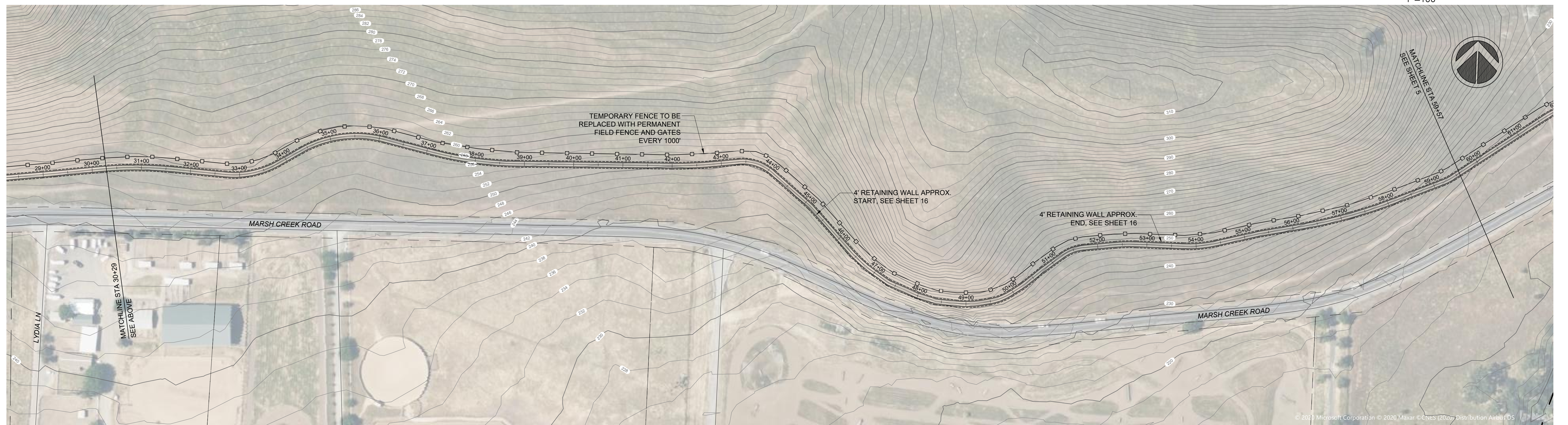
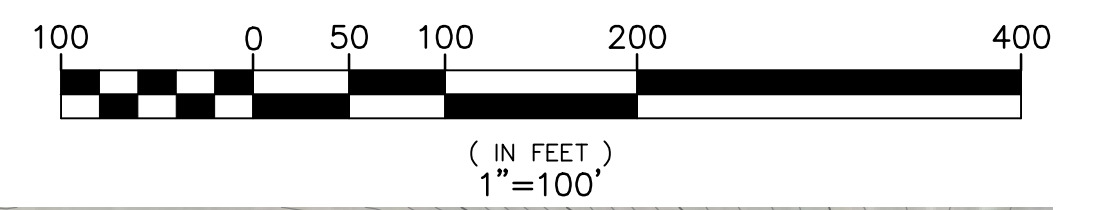
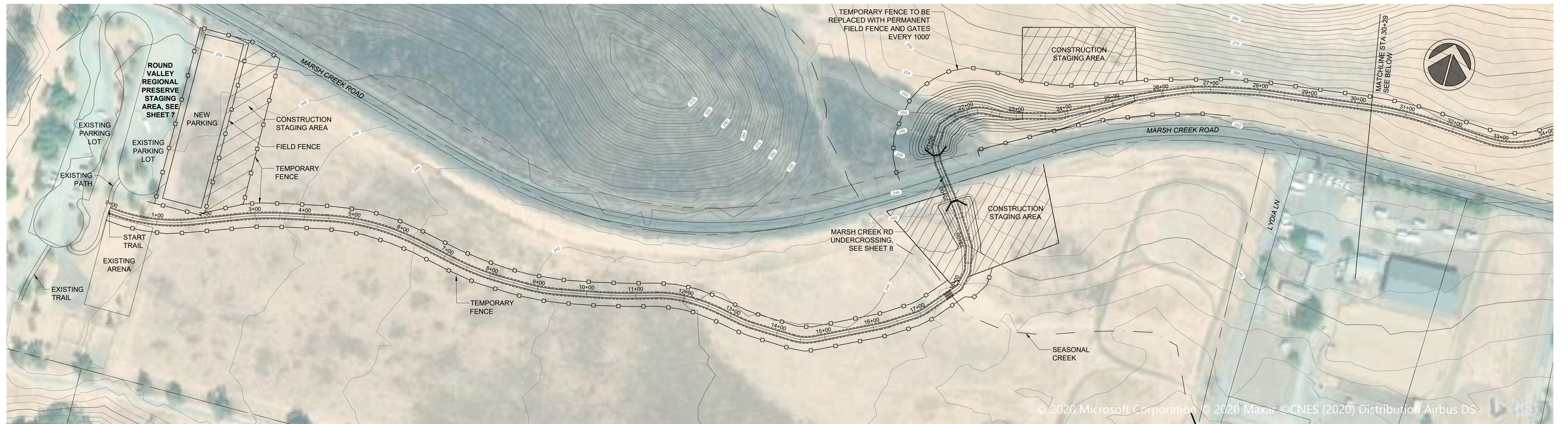
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SHEET NO.

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OF: **18**

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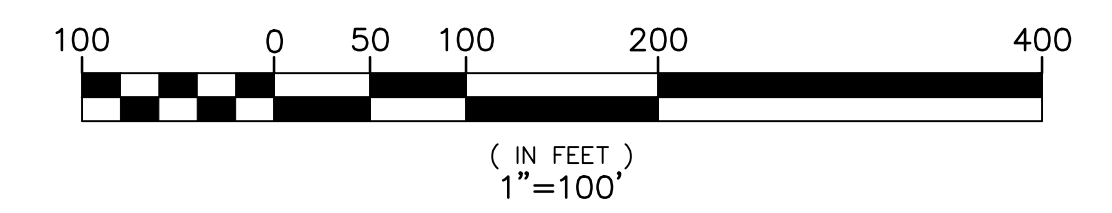
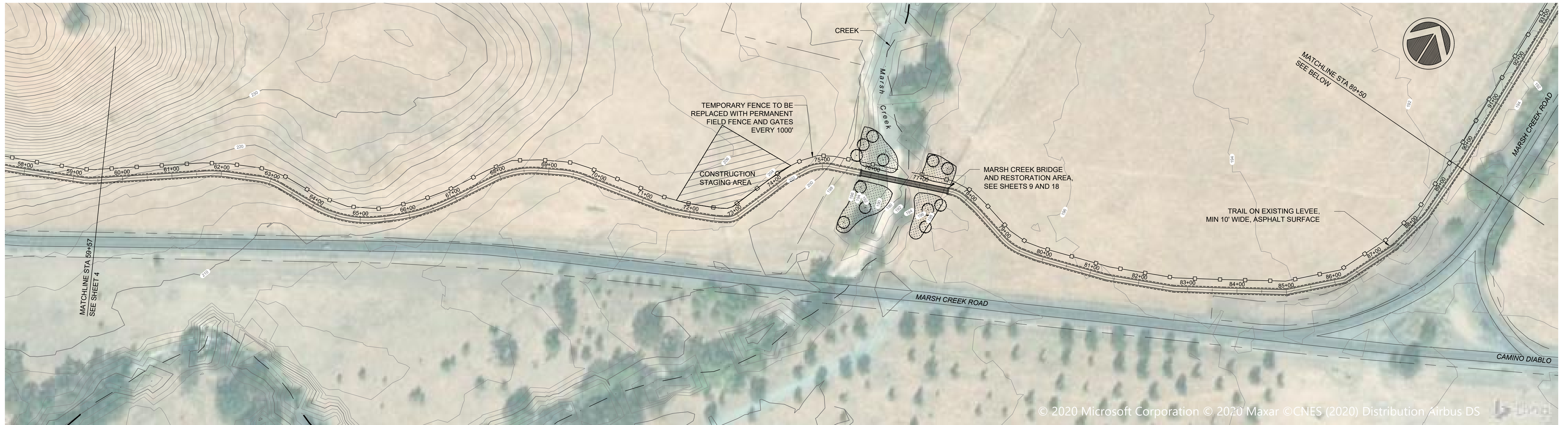
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TRAIL PLAN - STA 0 + 00 TO 59+57
MARSH CREEK TRAIL
 VINEYARD PARKWAY TO ROUND VALLEY REGIONAL PRESERVE
 CONTRA COSTA COUNTY
 PROJECT NO. 1800108

CONTRACT NO.

SHEET NO. **4**
 OF: **18**



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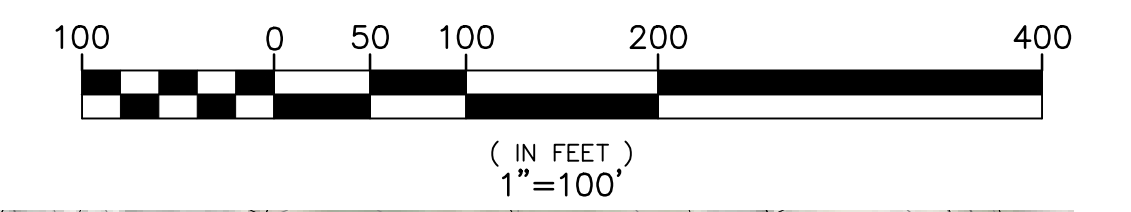
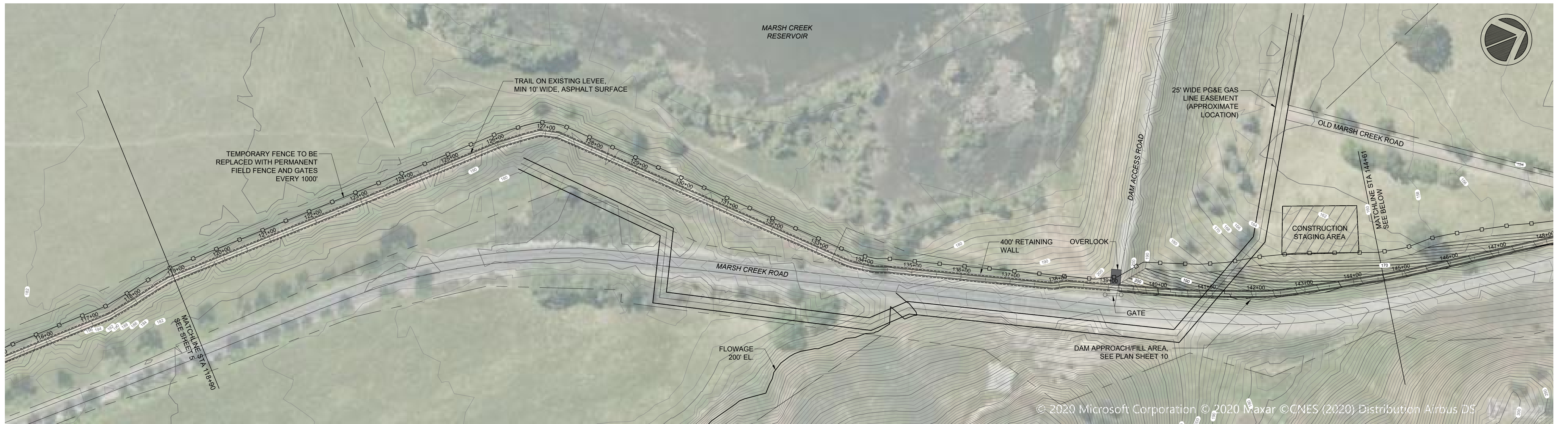
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 operations:

TRAIL PLAN - STA 59+57 TO 118+90
MARSH CREEK TRAIL
 VINEYARD PARKWAY TO ROUND VALLEY REGIONAL PRESERVE
 CONTRA COSTA COUNTY
 PROJECT NO. 1800108

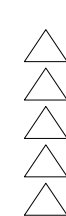
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 OF: **18**

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TRAIL PLAN - STA 118+90 TO 160+40
MARSH CREEK TRAIL
 VINEYARD PARKWAY TO ROUND VALLEY REGIONAL PRESERVE
 CONTRA COSTA COUNTY
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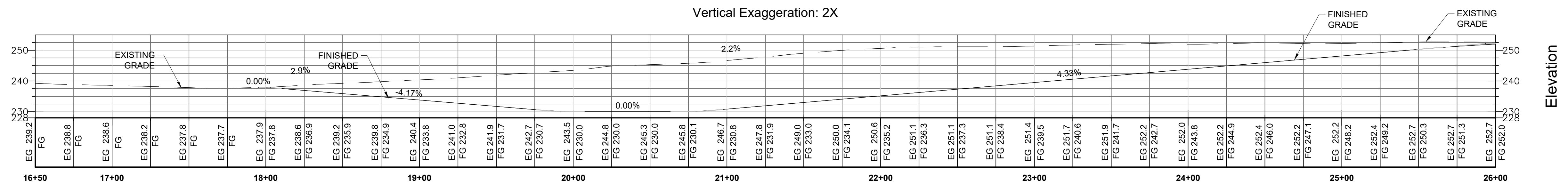
SITE PLAN - ROUND VALLEY PARKING EXPANSION AREA
MARSH CREEK TRAIL
 VINEYARD PARKWAY TO ROUND VALLEY REGIONAL PRESERVE
 CONTRA COSTA COUNTY
 PROJECT NO. 1800108

SHEET NO. **7**
 OF: **18**

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PLAN VIEW



PROFILE VIEW

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SITE PLAN AND PROFILE - UNDERPASS STA. 17+00 TO 26+00
MARSH CREEK TRAIL
 VINEYARD PARKWAY TO ROUND VALLEY REGIONAL PRESERVE
 CONTRA COSTA COUNTY
 PROJECT NO. 1800108

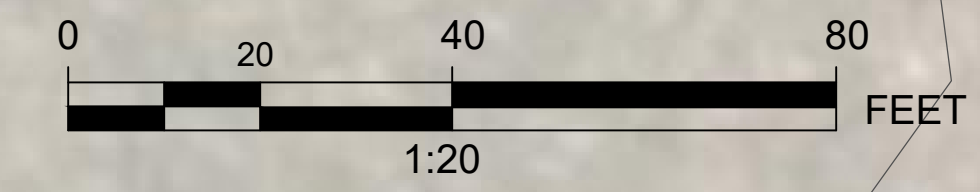
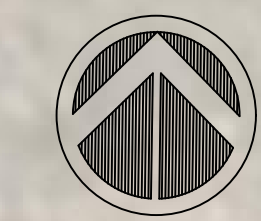
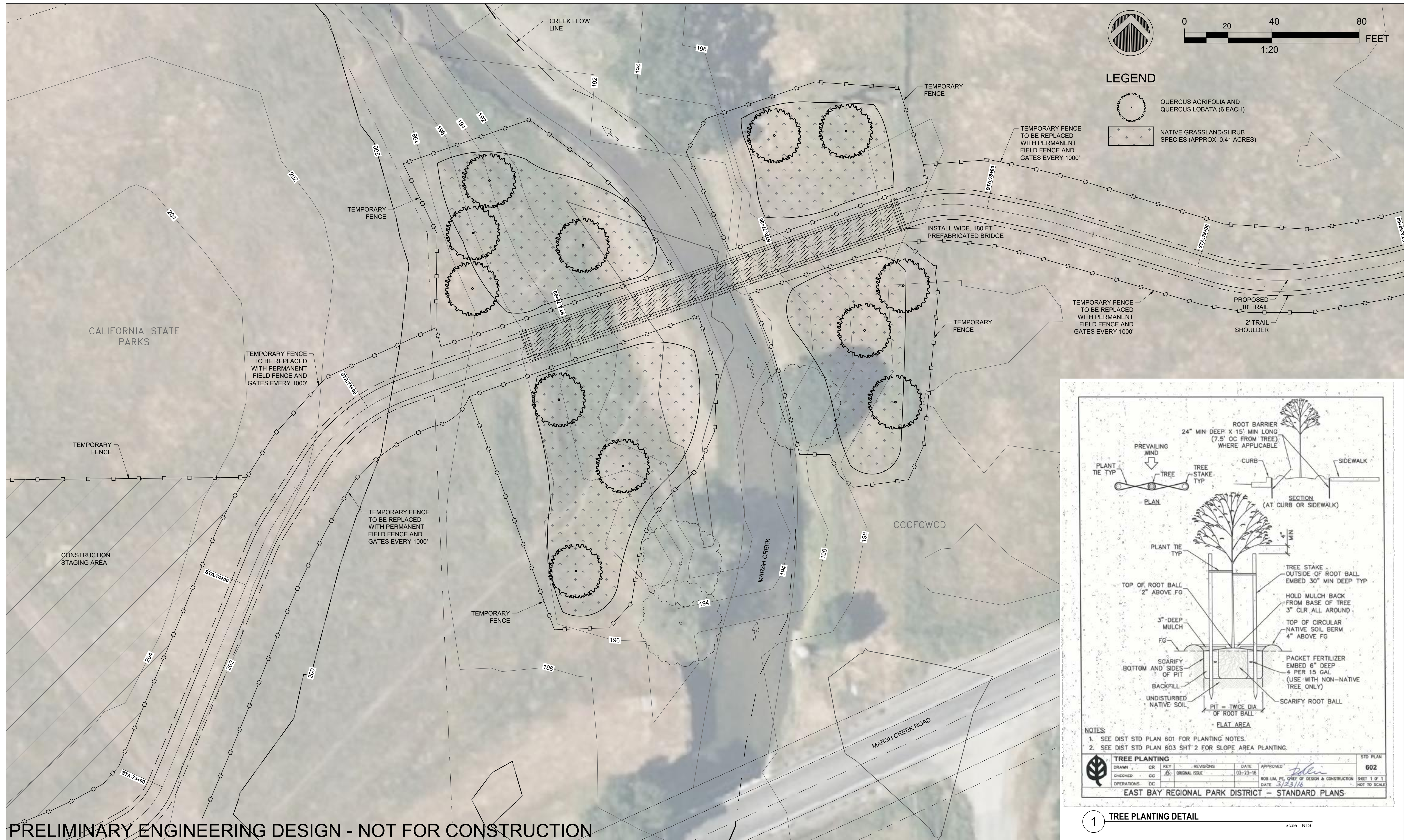
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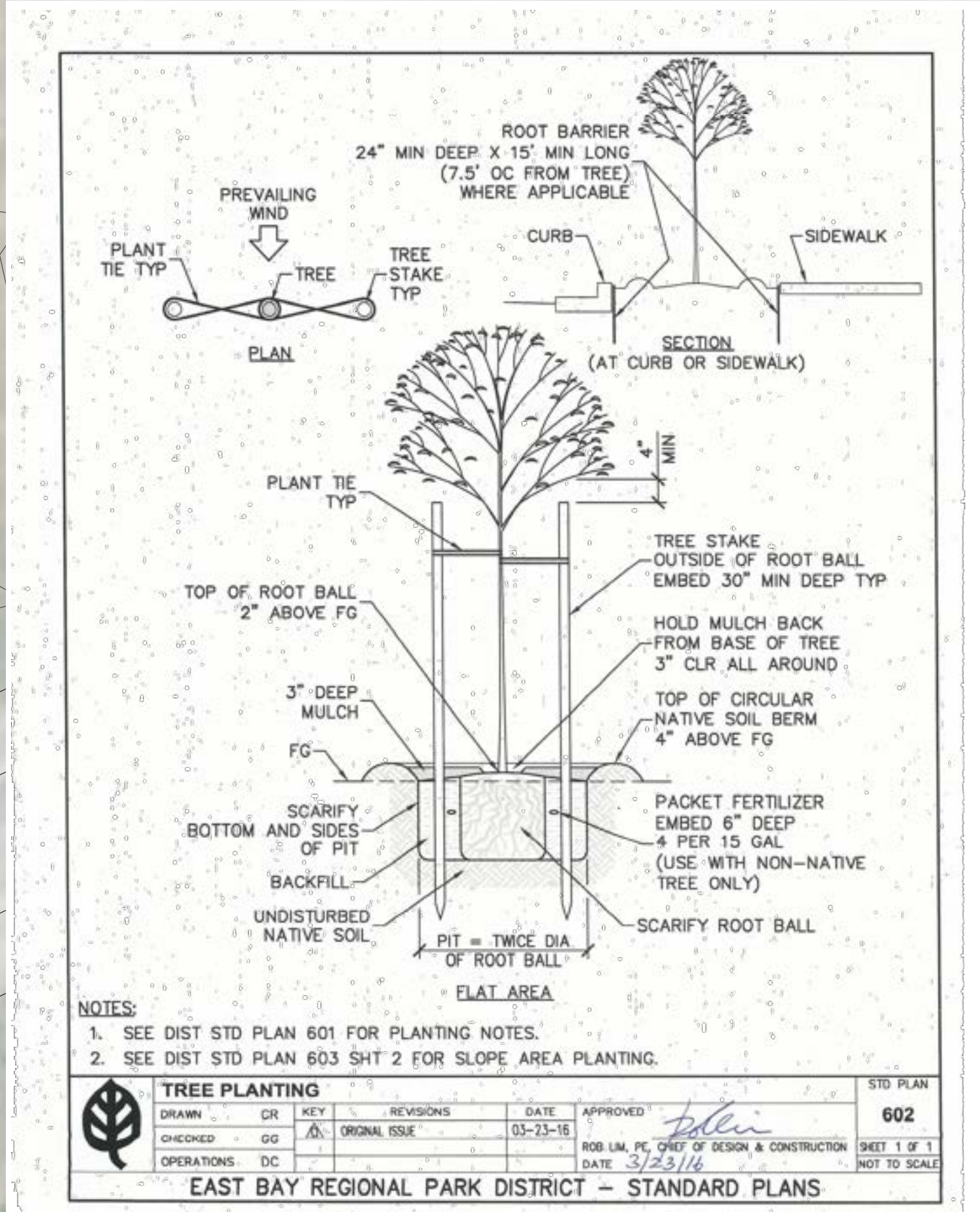
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LEGEND

-  QUERCUS AGRIFOLIA AND QUERCUS LOBATA (6 EACH)
-  NATIVE GRASSLAND/SHRUB SPECIES (APPROX. 0.41 ACRES)



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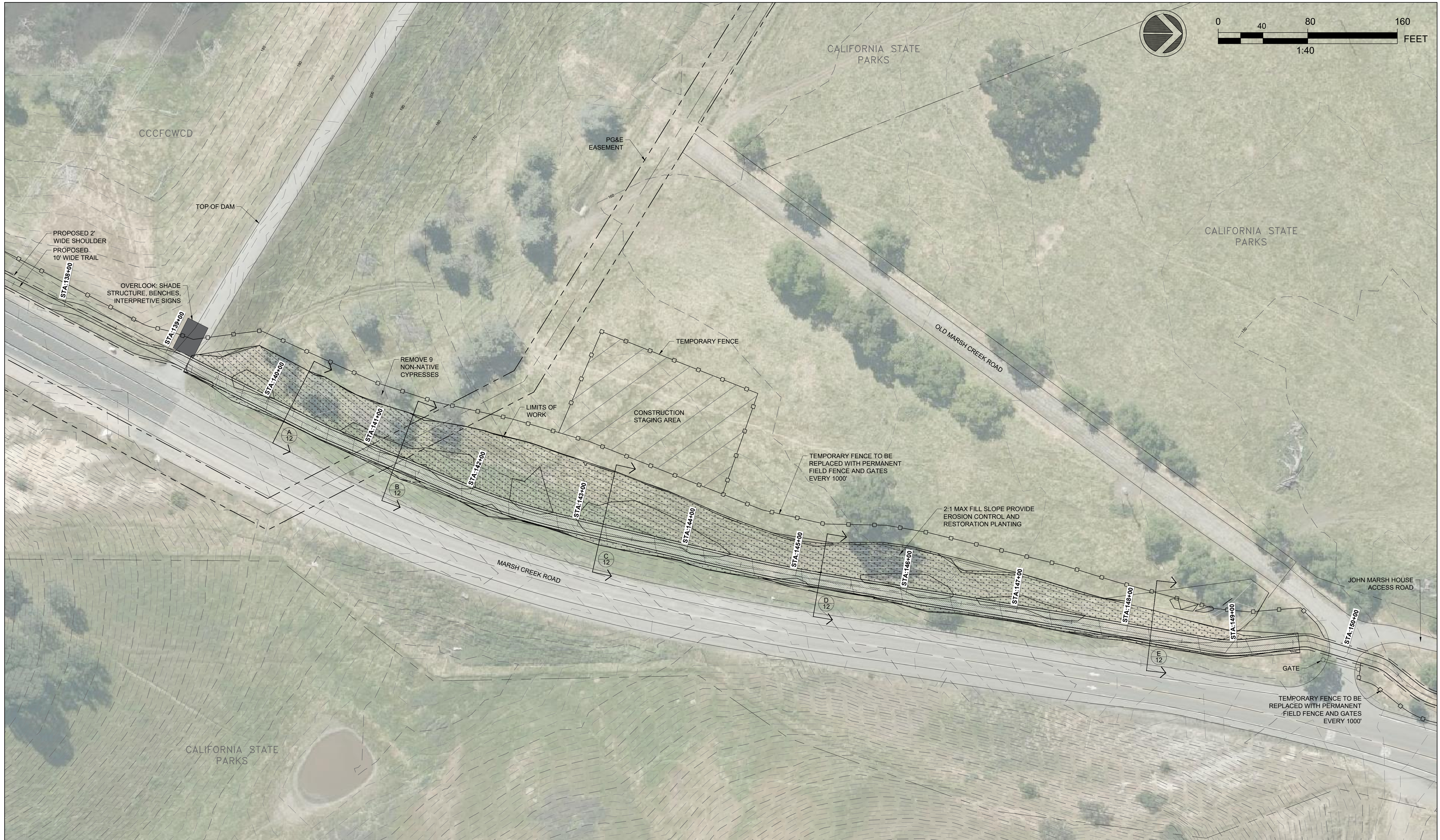
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CREEK RESTORATION & MITIGATION CONCEPT
MARSH CREEK TRAIL
 VINEYARD PARKWAY TO ROUND VALLEY REGIONAL PRESERVE
 CONTRA COSTA COUNTY
 PROJECT NO. 1800108

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SITE PLAN - STATION 138+00 TO 151+00
MARSH CREEK TRAIL
 VINEYARD PARKWAY TO ROUND VALLEY REGIONAL PRESERVE
 CONTRA COSTA COUNTY
 PROJECT NO. 1800108

SHEET NO. **10**
 OF: **18**

CONTRACT NO.

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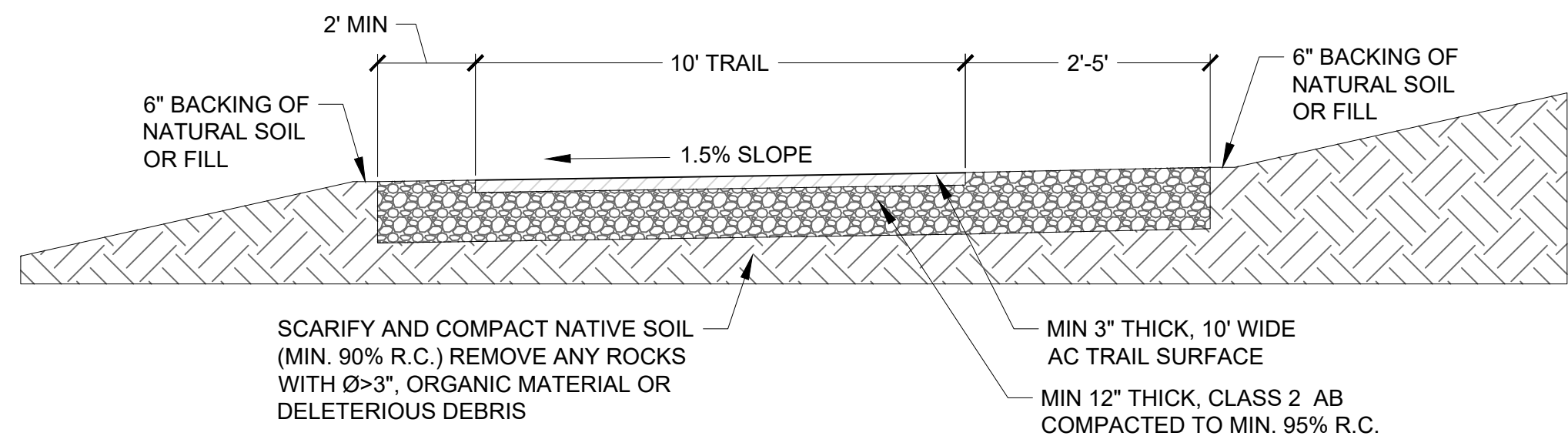
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SITE PLAN - STATION 148+00 TO 161+35
MARSH CREEK TRAIL
 VINEYARD PARKWAY TO ROUND VALLEY REGIONAL PRESERVE
 CONTRA COSTA COUNTY
 PROJECT NO. 1800108

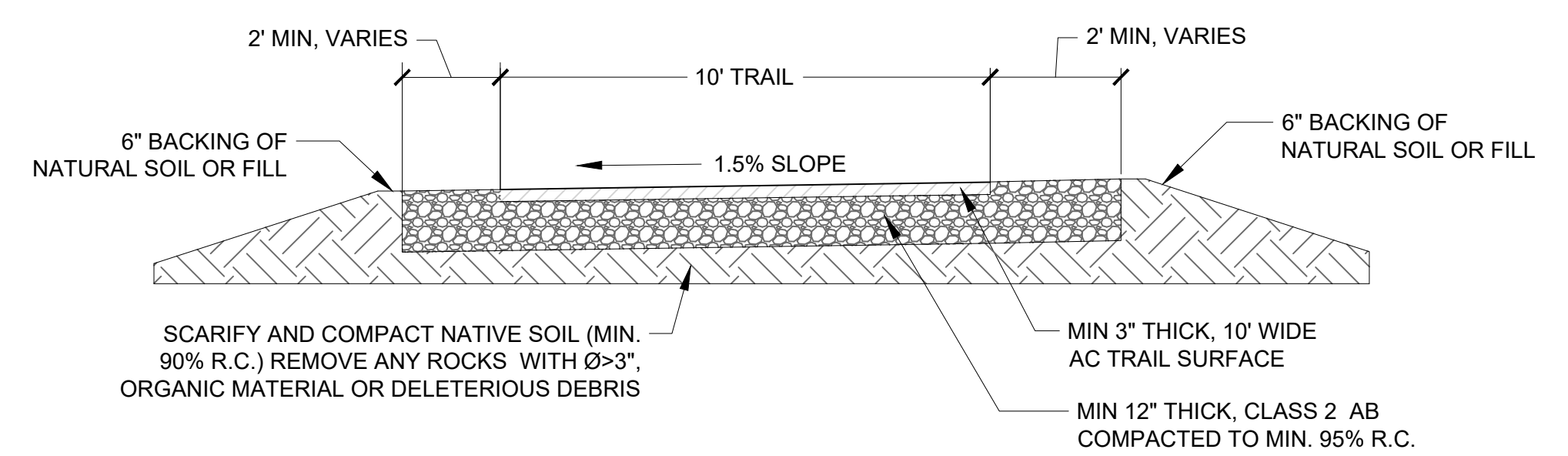
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 OF: 18

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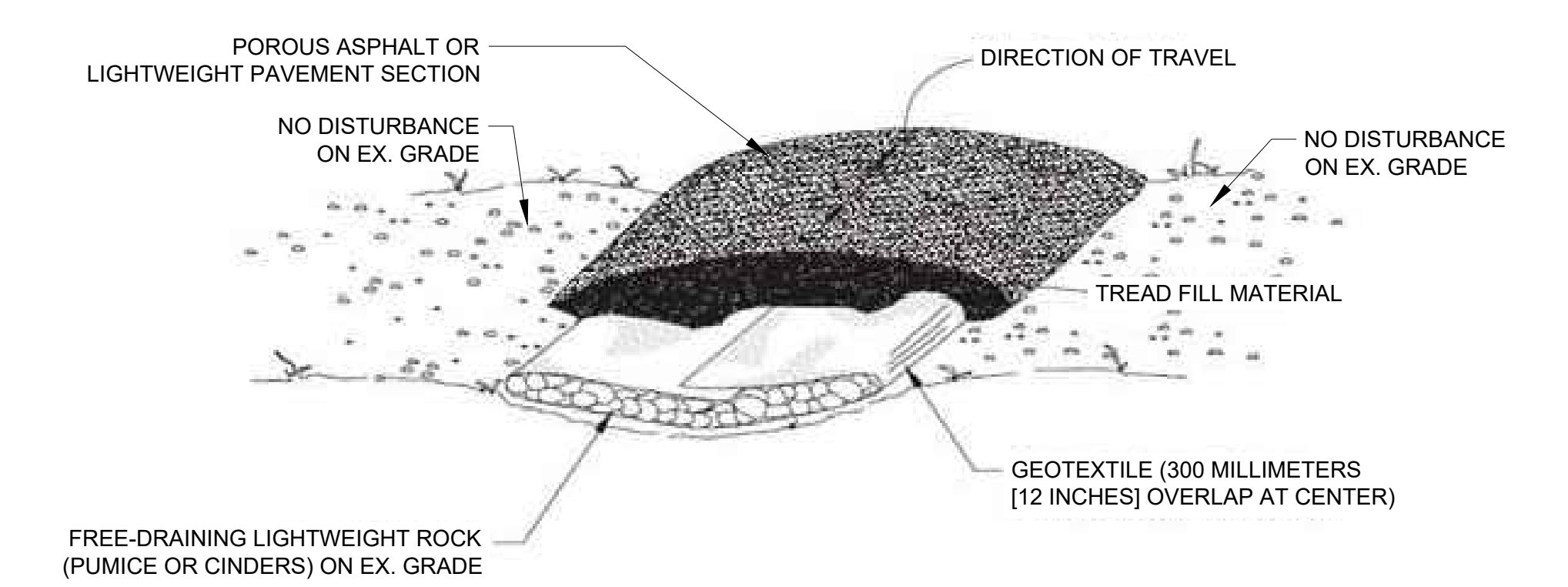
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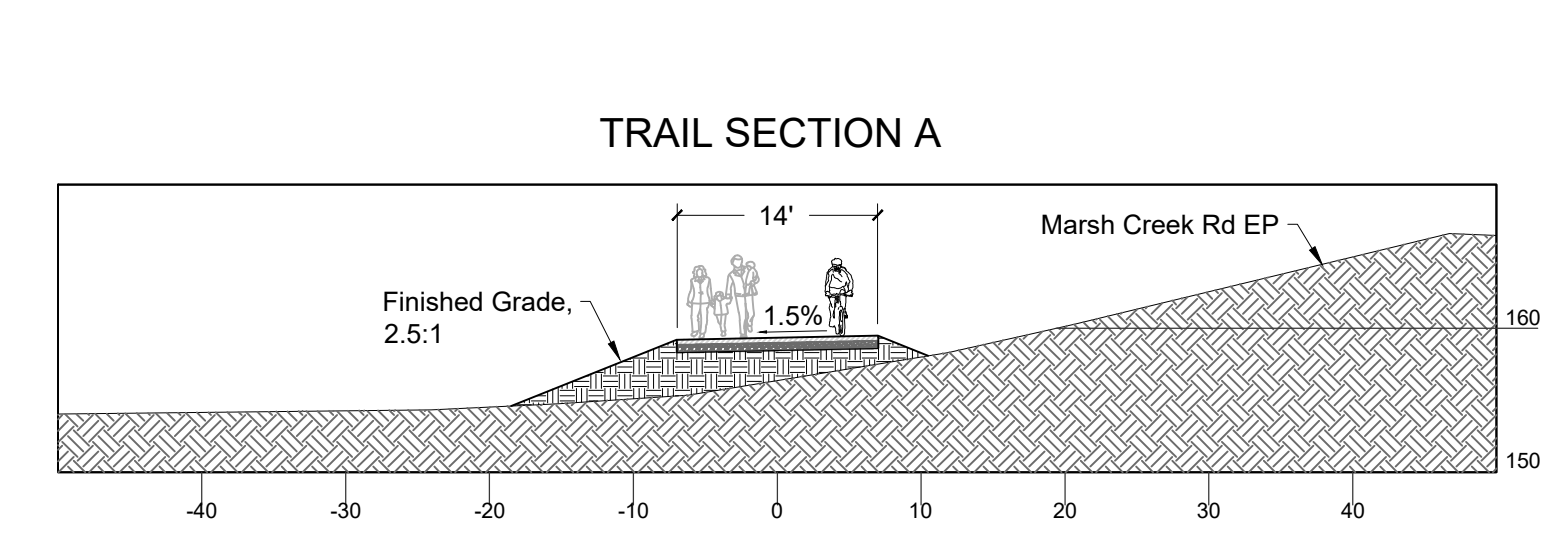
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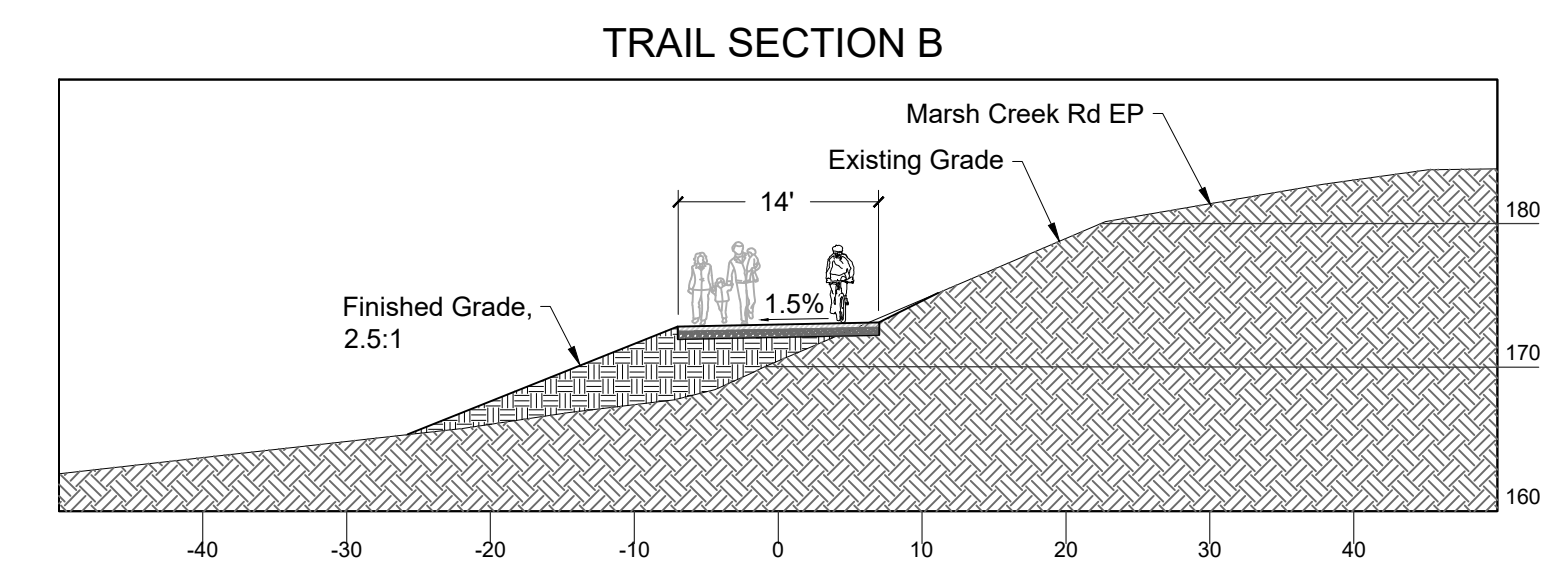
2 TYPICAL TRAIL SECTION - LEVEE OR LEVEL GRADE
Scale = NTS



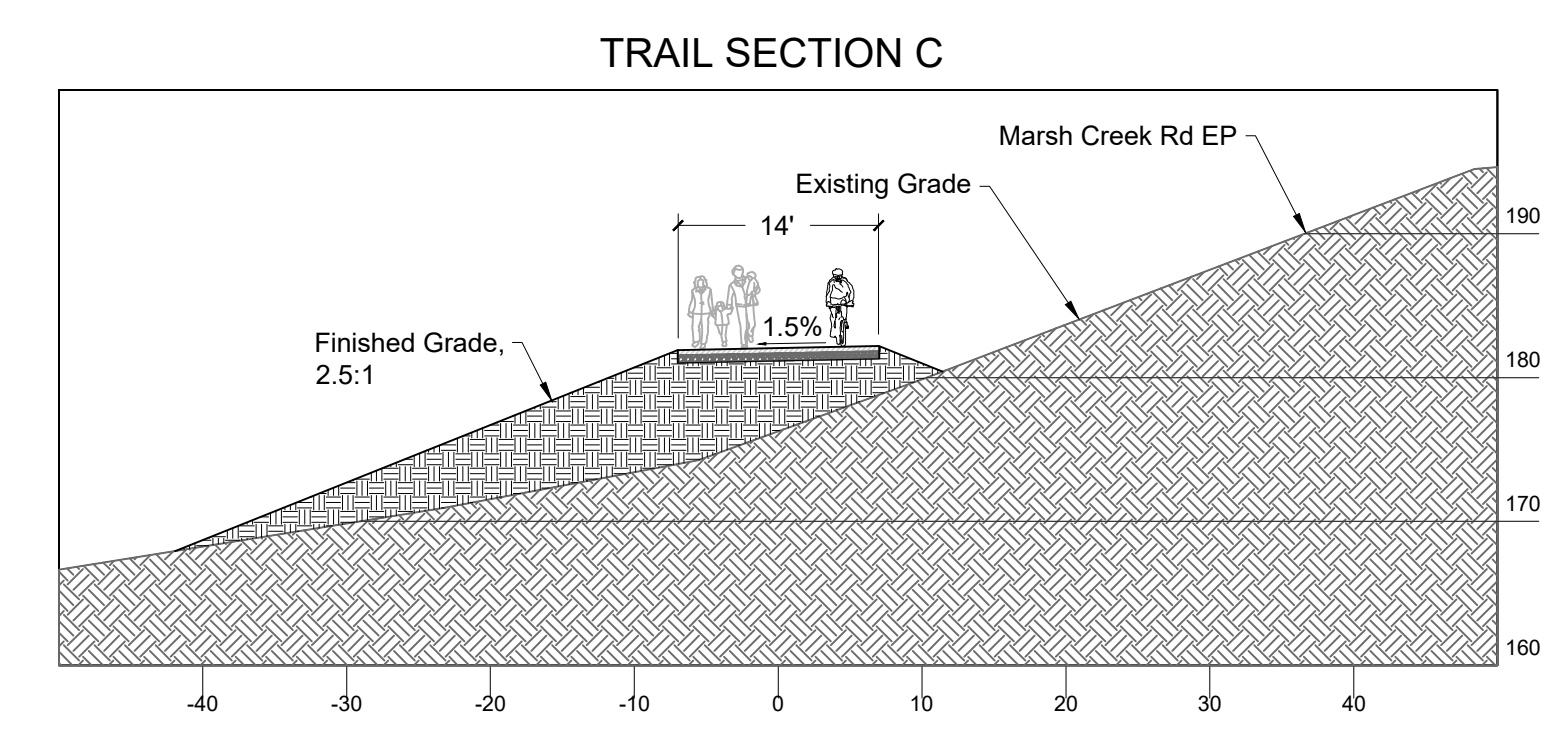
3 TYPICAL TRAIL SECTION IN SENSITIVE AREAS (NO SUBSURFACE DRAINAGE)
Scale = NTS



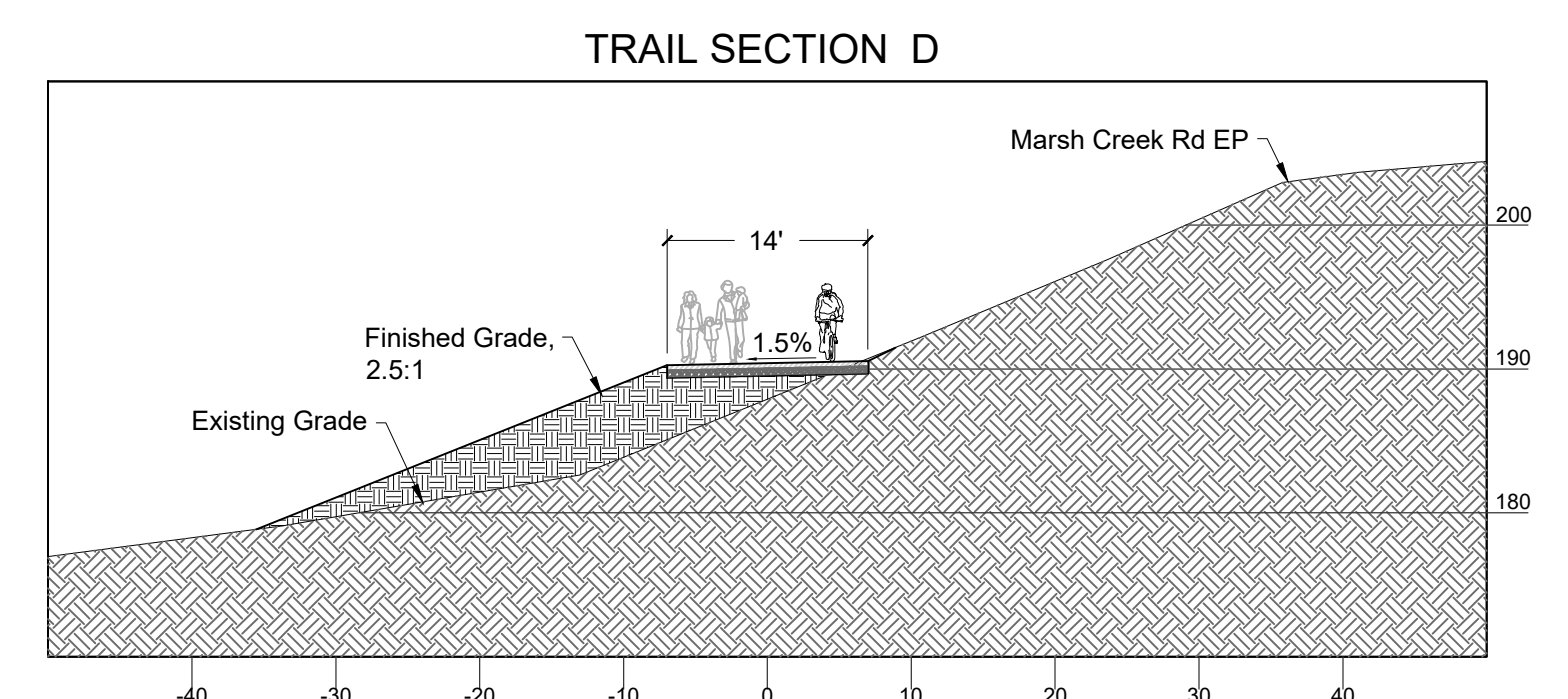
TRAIL SECTION A



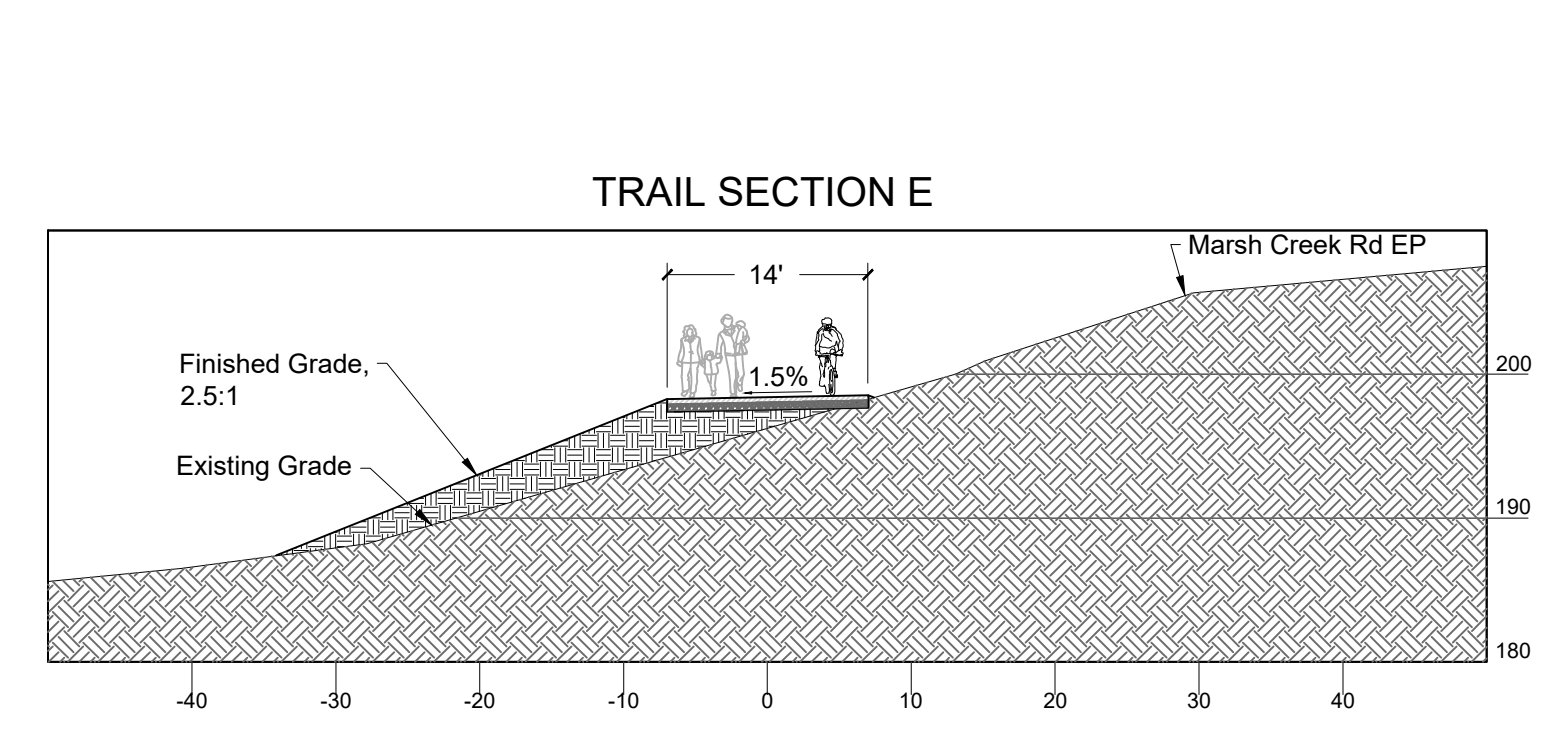
TRAIL SECTION B



TRAIL SECTION C

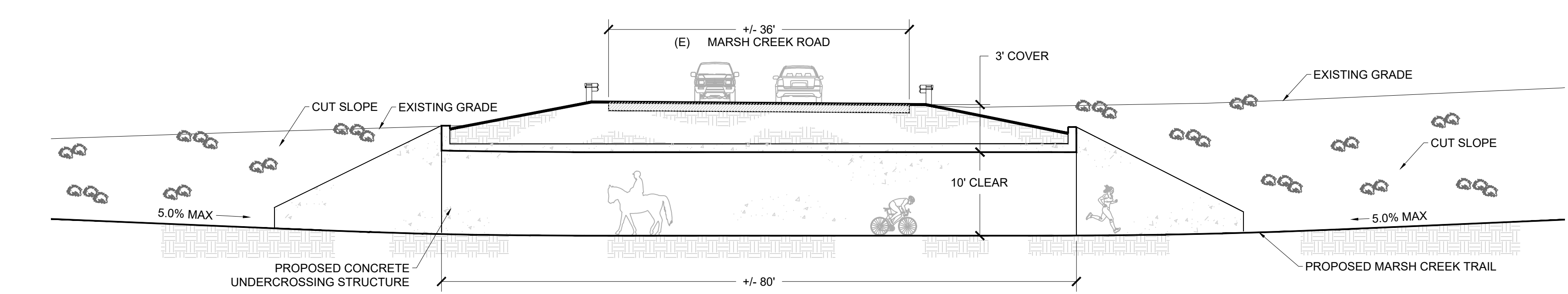


TRAIL SECTION D

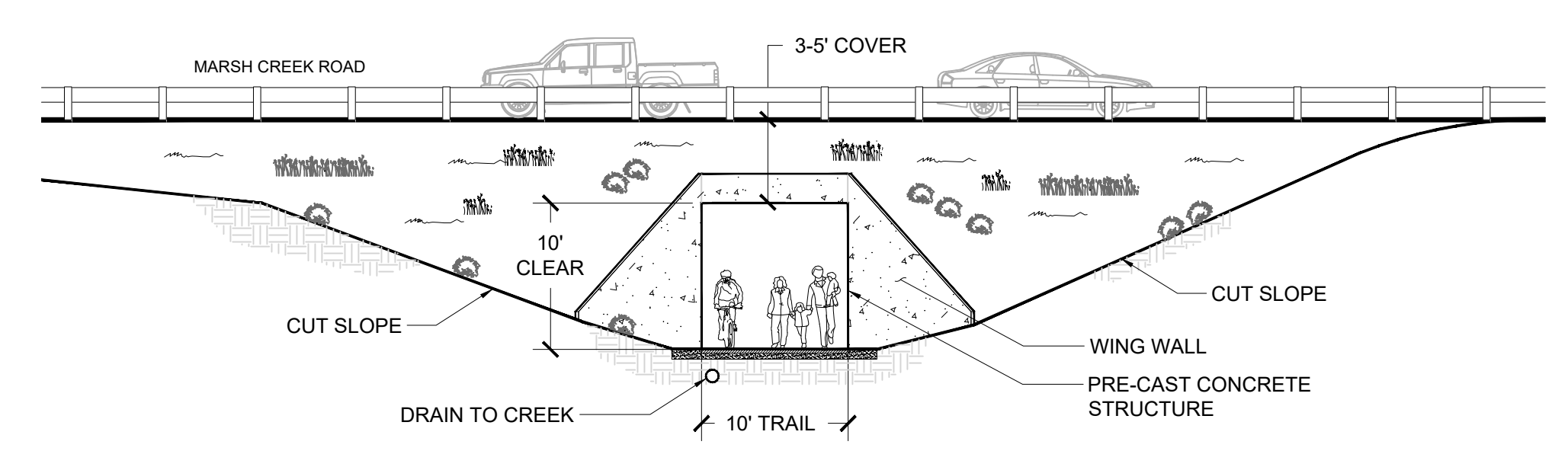


TRAIL SECTION E

4 DAM FACE TYPICAL CROSS SECTIONS
Scale = NTS



5 TRAIL UNDERCROSSING AT MARSH CREEK ROAD - PROFILE VIEW
Scale = NTS



6 TRAIL UNDERCROSSING AT MARSH CREEK ROAD - SECTION VIEW
Scale = NTS

PRELIMINARY ENGINEERING DESIGN - NOT FOR CONSTRUCTION

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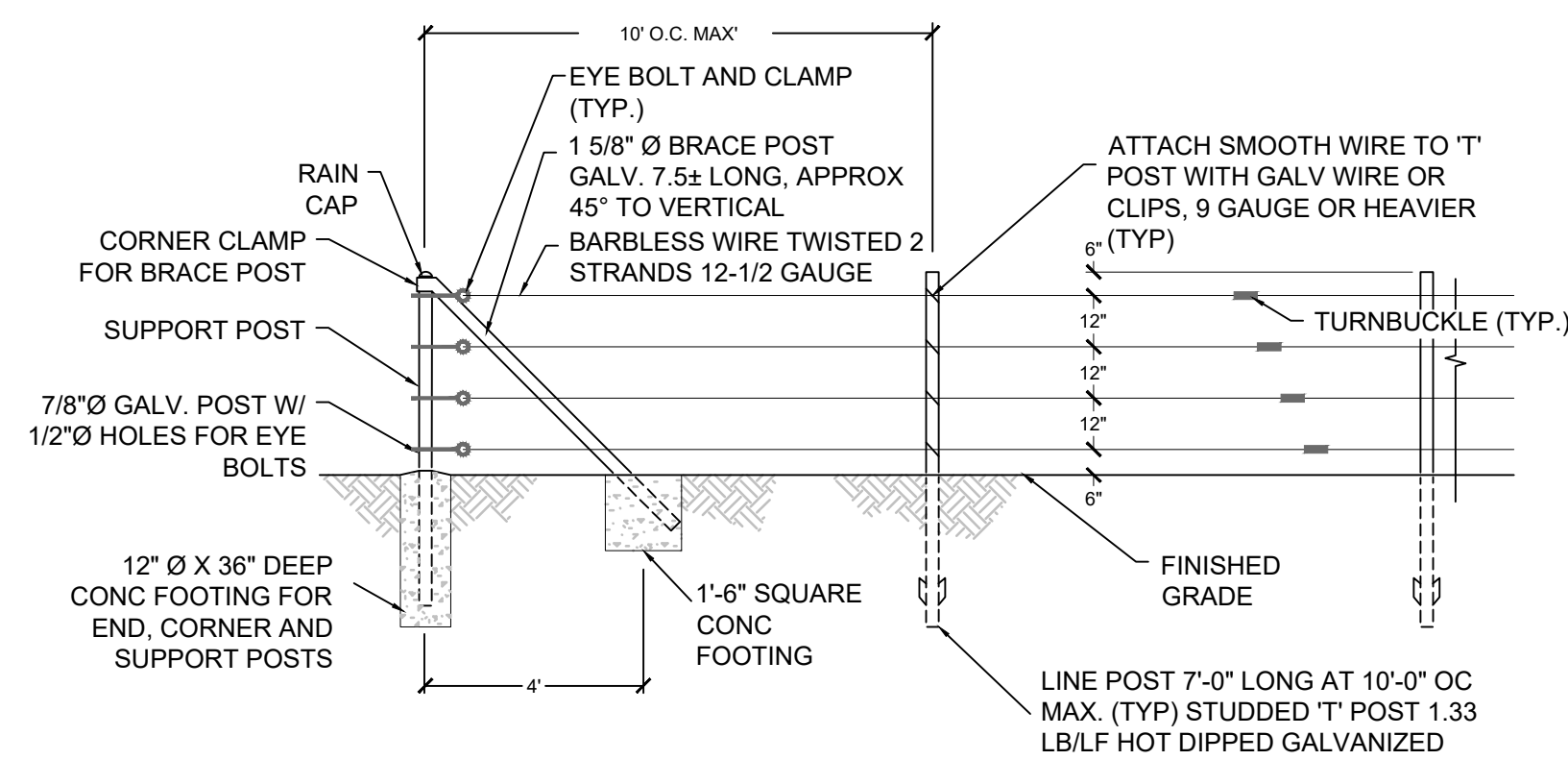
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checked: MH
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TRAIL SECTIONS
MARSH CREEK TRAIL
VINEYARD PARKWAY TO ROUND VALLEY REGIONAL PRESERVE
CONTRA COSTA COUNTY
PROJECT NO. 1800108

SHEET NO. 12
OF: 18

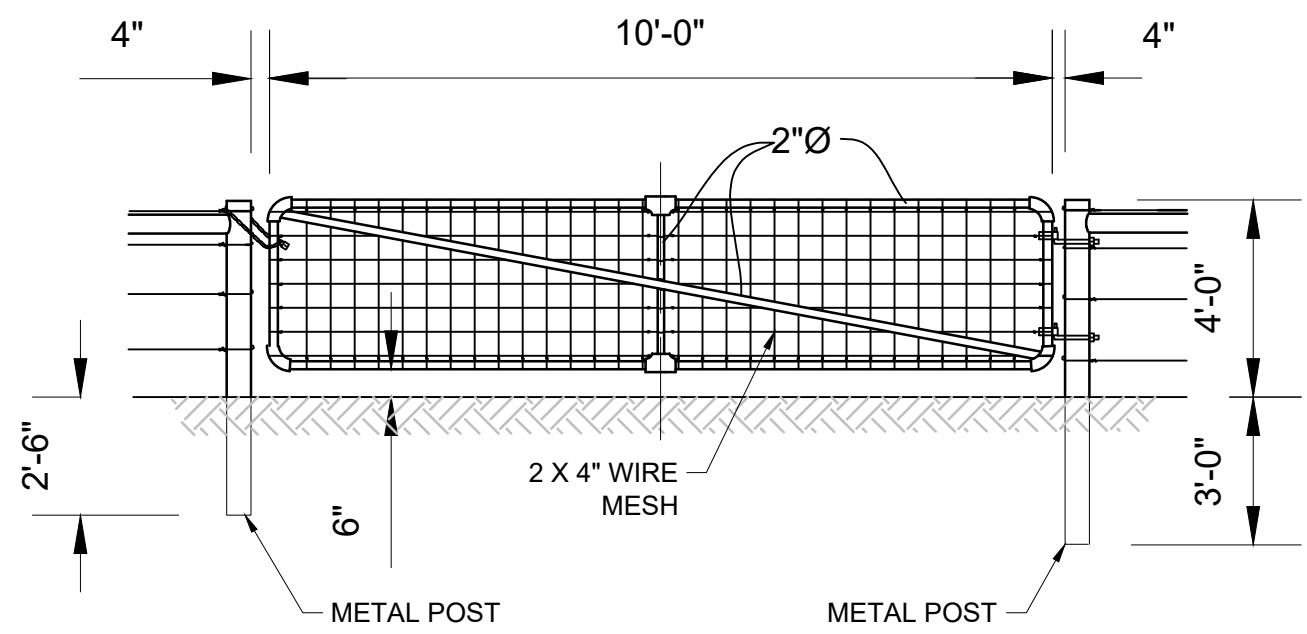
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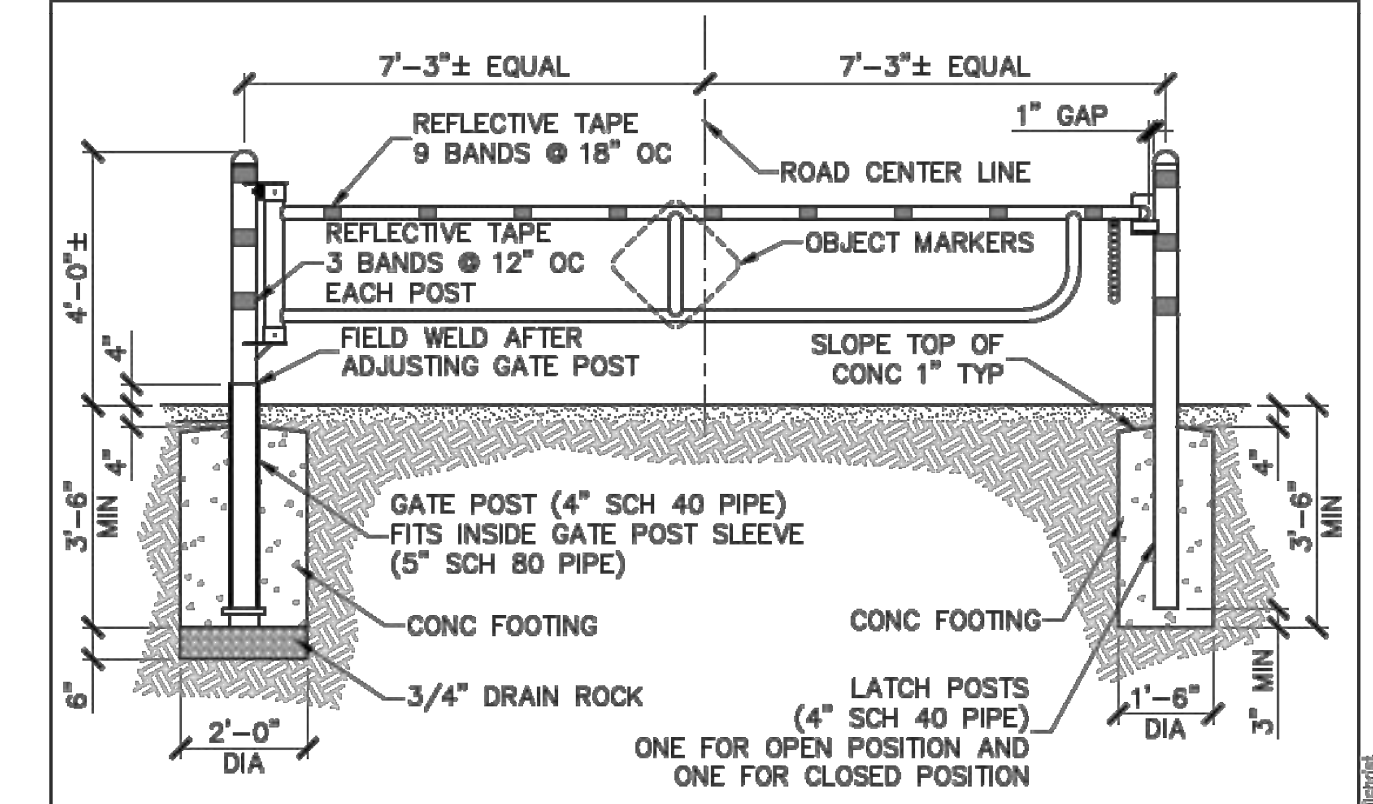
STANDARD FIELD FENCE (SMOOTH-WIRE FENCE) NOTES:

1. ALL POSTS, BRACES AND FITTINGS SHALL BE HOT DIPPED GALVANIZED.
2. CONCRETE SHALL BE COMMERCIAL CONCRETE, 5 SACK MIX.
3. WIRE SHALL BE TWISTED 2 STRANDS 12-1/2 GAUGE.
4. BRACE POSTS ARE REQUIRED ON EACH SIDE OF SUPPORT POSTS AT CORNER.
5. SUPPORT POSTS REQUIRED AT ENDS AND CORNERS.
6. SUPPORT POSTS SHALL BE LOCATED 100' O.C. MAX FOR STRAIGHT RUNS, WITH BRACE POSTS ON EACH SIDE OF SUPPORT POSTS, AT ALL TURNS AND ANGLES.
7. 'T' POSTS SHALL WEIGH 1.33 POUNDS PER LINEAR FOOT AND BE HOT DIPPED GALVANIZED.
- 'T' POSTS SHALL BE DRIVEN TO THE DEPTH INDICATED ON DRAWING IN ALL SOILS, HOWEVER NO BENT OR DAMAGED POSTS SHALL BE ACCEPTED.

1 STANDARD FIELD FENCE (SMOOTH-WIRE FENCE)
Scale = NTS



2 10' PIPE GATE
Scale = NTS

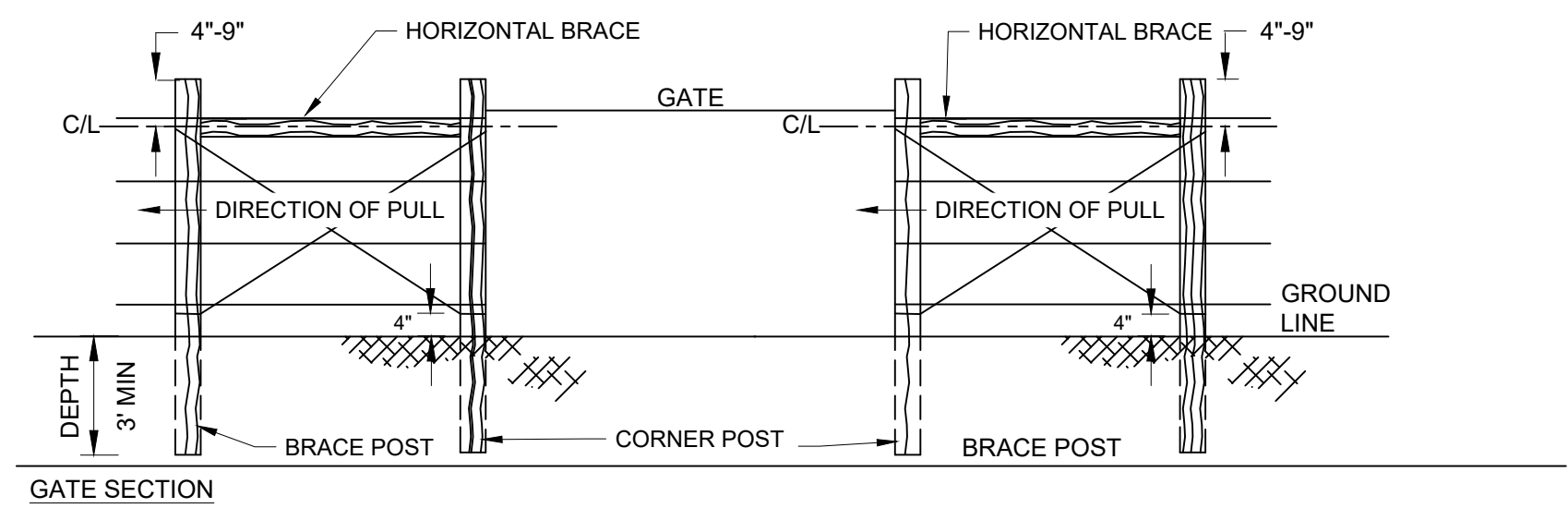
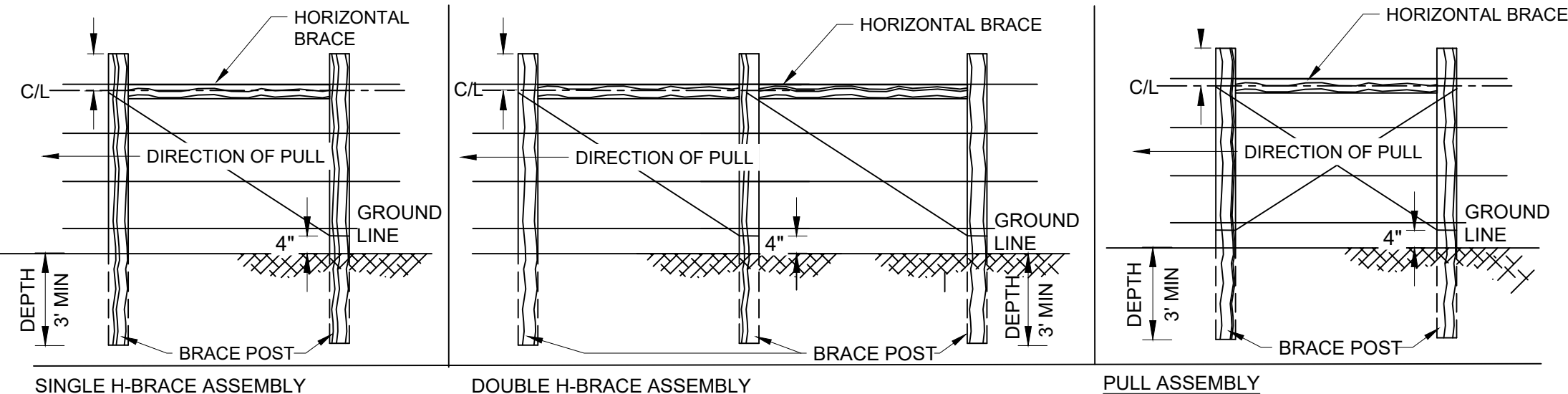


NOTES

1. PRE-FABRICATED PIPE GATE, GATE POSTS, LATCH POSTS, SLEEVES AND HARDWARE ARE STOCKED AT EBRPD CENTRAL STORES. INSTALLER TO PROVIDE ALL OTHER ITEMS.
2. STEEL PARTS SUPPLIED BY EBRPD ARE HOT-DIP GALVANIZED AFTER FABRICATION THEN PRE-PAINTED WITH ONE (1) COAT OF PRIMER AND TWO (2) COATS OF "EBRPD BROWN" INDUSTRIAL LATEX ENAMEL. CONTRACTOR SHALL TOUCH-UP FINISH PER SPECIFICATIONS.
3. PLUMB AND LEVEL GATE THEN SHIM POSTS IN SLEEVES WITH THIN STOCK. TACK WELD AT JOINT BETWEEN POST AND SLEEVE IN FOUR (4) PLACES.
4. CHECK THAT GATE SWING CLEARS ALL OBSTACLES PRIOR TO INSTALLATION. HEIGHT OF GATE MAY REQUIRE ADJUSTMENT.
5. SEE PLANS FOR SPECIFIC PLACEMENT OF GATES. EACH POST LOCATION, INCLUDING OPEN GATE LATCH POSTS, TO BE REVIEWED AND APPROVED IN THE FIELD BY THE DISTRICT INSPECTOR PRIOR TO INSTALLATION.
6. OBJECT MARKERS SHALL BE CA TYPE N OBJECT MARKERS, 18" YELLOW DIAMOND INSTALLED BOTH SIDES OF EACH GATE.
7. REFLECTIVE SAFETY TAPE SHALL BE 3" WIDE YELLOW BANDS. SAFETY TAPE SHALL BE RATED FOR 5 YEAR MIN OUTDOOR LIFE AND MEET D.O.T. SPECIFICATION FP-85 FOR TYPE 2 SHEETING.
8. KNOX BOX TYPE AND LOCATION SHALL BE APPROVED BY THE LOCAL FIRE DEPARTMENT HAVING JURISDICTION.
9. LOCATE UNDERGROUND UTILITIES PRIOR TO EXCAVATING.
10. CONCRETE SHALL BE COMMERCIAL 5-SACK PRE-MIX CONCRETE OR EQUIVALENT.

SINGLE PIPE GATE INSTALLATION	DESIGNED BY: [REDACTED]	DATE: [REDACTED]	DIVID NO.:
DISTRICT STANDARD DETAILS ARE PROVIDED TO ASSIST IN THE INSTALLATION AND/OR FABRICATION OF [REDACTED]	APPROVED BY: [REDACTED]	DATE: [REDACTED]	GT-12
STANDARD DETAIL MAY BE MODIFIED WITHOUT NOTICE. SEE PROJECT MANUAL OR CONTACT THE DESIGN MANAGER FOR CLARIFICATION WHERE SITE CONDITIONS MAY REQUIRE VARIATION FROM THIS STANDARD.	DESIGNED BY: [REDACTED]	DATE: [REDACTED]	
STANDARDS DETAILS - EAST BAY REGIONAL PARK DISTRICT	OPERATIONS:		SHEET 1 OF 1

3 SINGLE PIPE GATE INSTALLATION
Scale = NTS



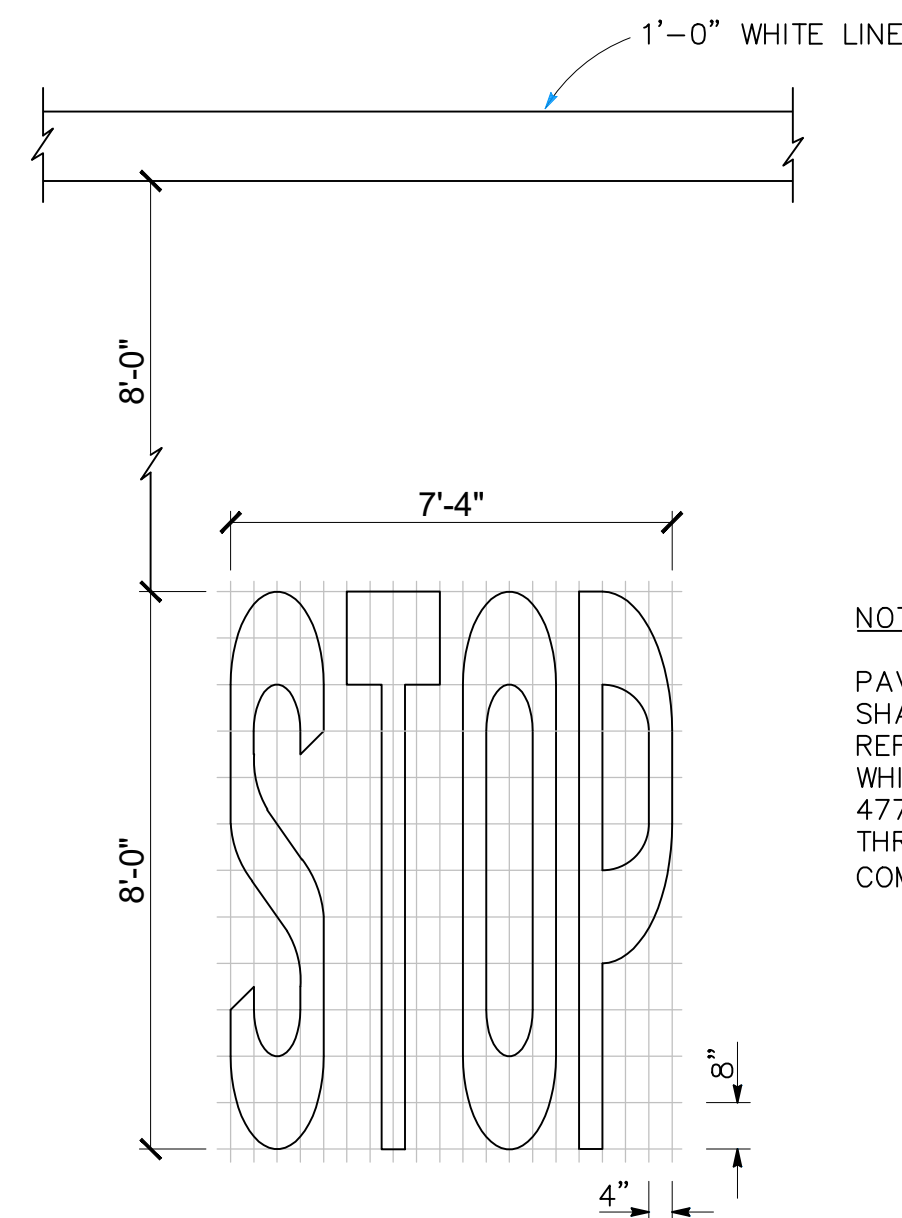
- POSTS**
WOOD: 4" X 6" PTF
STEEL: HORIZONTAL BRACES MUST MEET ASTM A702 AND ASTM A499 AND HAVE A COATING THICKNESS OF 1 MIL.
- HORIZONTAL OR DIAGONAL BRACE**
STEEL: HORIZONTAL BRACES MUST MEET ASTM A702 AND ASTM A499 AND HAVE A COATING THICKNESS OF 1 MIL.
- NOTES:**
USE PTF POSTS ONLY FOR VERTICAL POSTS.
H-BRACE OR FLOATING DIAGONAL BRACE IS REQUIRED ON ALL CORNERS, ENDS AND GATES. AN H-BRACE IS REQUIRED AT ALL PULL ASSEMBLIES AND MUST BE INSTALLED EVERY 660', EXCEPT FOR HIGH TENSILE WIRE FENCE.
CORNER OR BEND ASSEMBLY SHALL BE USED WHENEVER THE HORIZONTAL ALIGNMENT CHANGES MORE THAN 15 DEG. AND OR WHERE VERTICAL ALIGNMENT CHANGE IS MORE THAN 15 DEG.
- TENSION WIRE**
2 COMPLETE LOOPS OF 9-GUAGE SMOOTH WIRE OR 12-GUAGE DOUBLE STRAND WIRE, OR A SINGLE LOOP OF 12.5 GAUGE HIGH TENSILE SMOOTH WIRE
- **7" MIN. LENGTH CAN BE USED FOR DOUBLE H-BRACE. SHTWWF POST LENGTH IS DEPENDENT ON THE HEIGHT OF FENCE.**

4 BRACES
Scale = NTS

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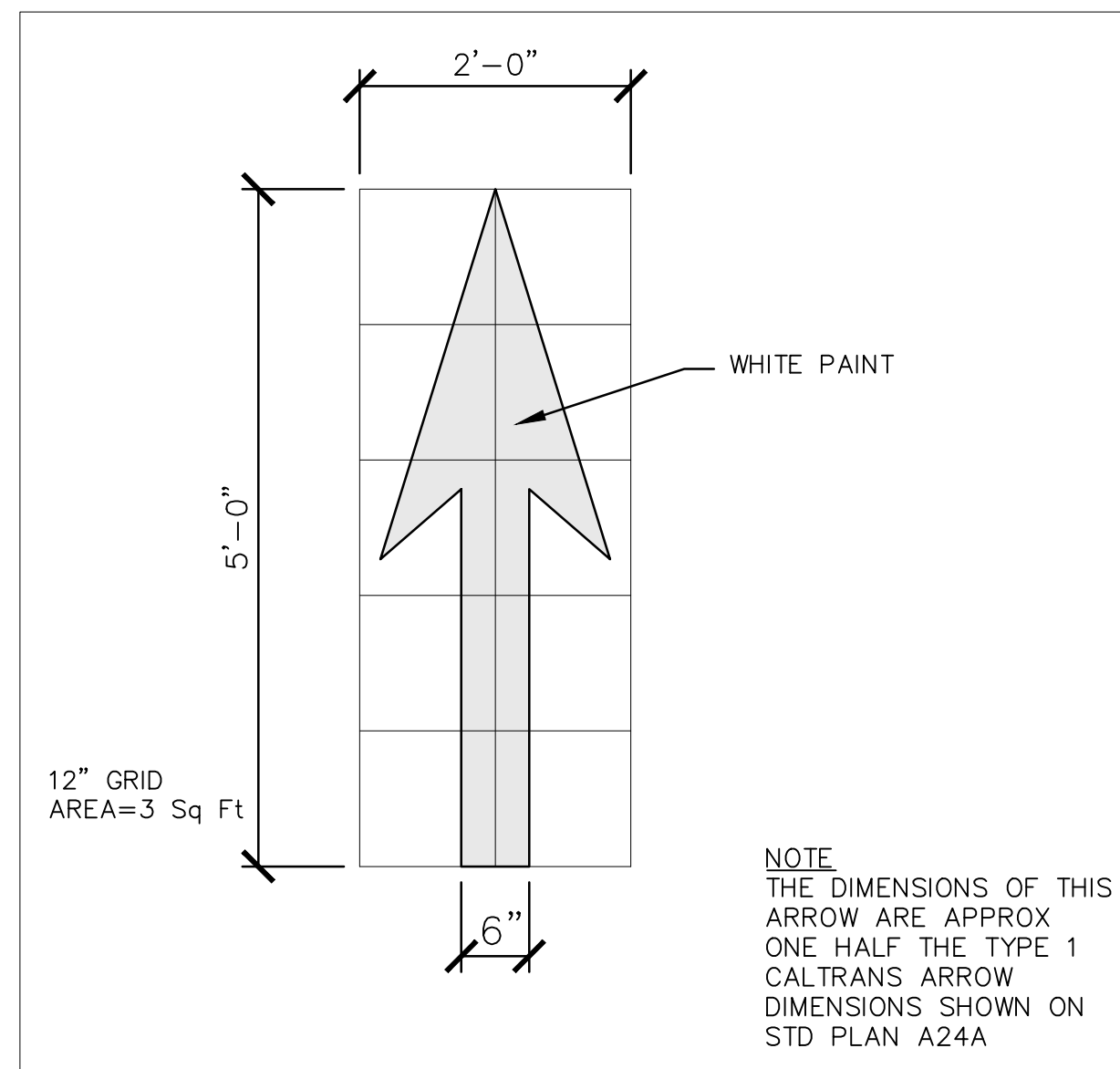
REVISIONS	DATE	EAST BAY REGIONAL PARK DISTRICT 2950 PERALTA OAKS COURT, OAKLAND, CA 94605 WWW.EBPARKS.ORG 888-327-2757	QUESTA Civil Environmental & Water Resources ENGINEERING CORP. (510) 236-6114 FAX (510) 236-2423 P.O. Box 70356 1220 Brickyard Cove Road Point Richmond, CA 94807	APPROVED design: operations:	scale: AS NOTED drawn: CC checked: MH date: 12/7/2020	FENCE AND GATE DETAILS MARSH CREEK TRAIL VINEYARD PARKWAY TO ROUND VALLEY REGIONAL PRESERVE CONTRA COSTA COUNTY PROJECT NO. 1800108	SHEET NO. 13 OF: 18
CONTRACT NO.							

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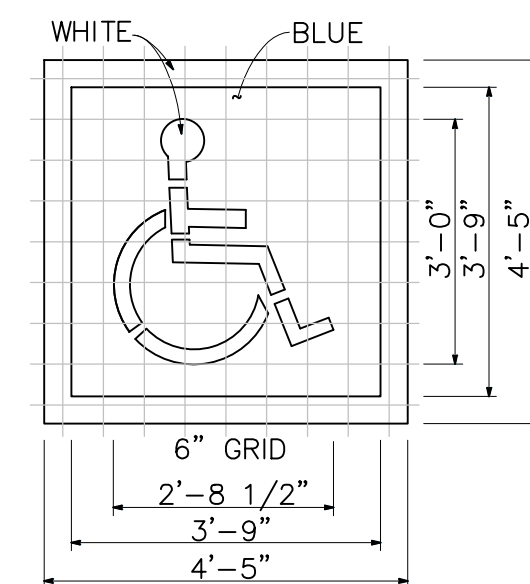
NOTE:
PAVEMENT MARKING PAINT SHALL BE WATER BASED, REFLECTORIZED, RAPID DRY WHITE TRAFFIC PAINT, PERVO 4773AR OR EQUAL, AVAILABLE THROUGH PERVO PAINT COMPANY, (800) 892-3647.

1 STOP BAR AND LEGEND
Scale = NTS

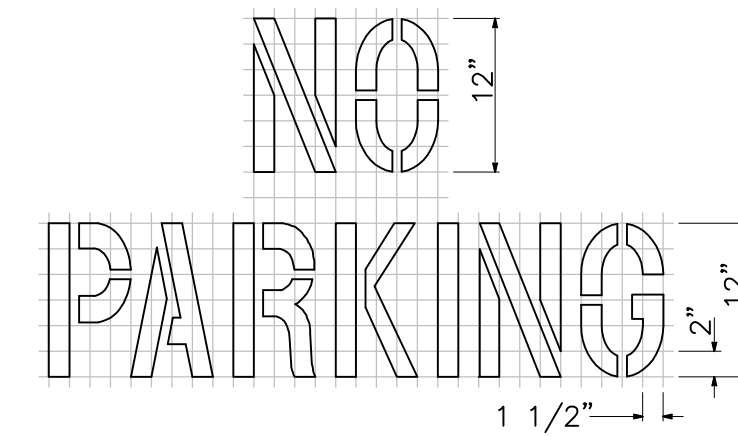


NOTE:
THE DIMENSIONS OF THIS ARROW ARE APPROX ONE HALF THE TYPE 1 CALTRANS ARROW DIMENSIONS SHOWN ON STD PLAN A24A

2 TRAFFIC ARROW
Scale = NTS

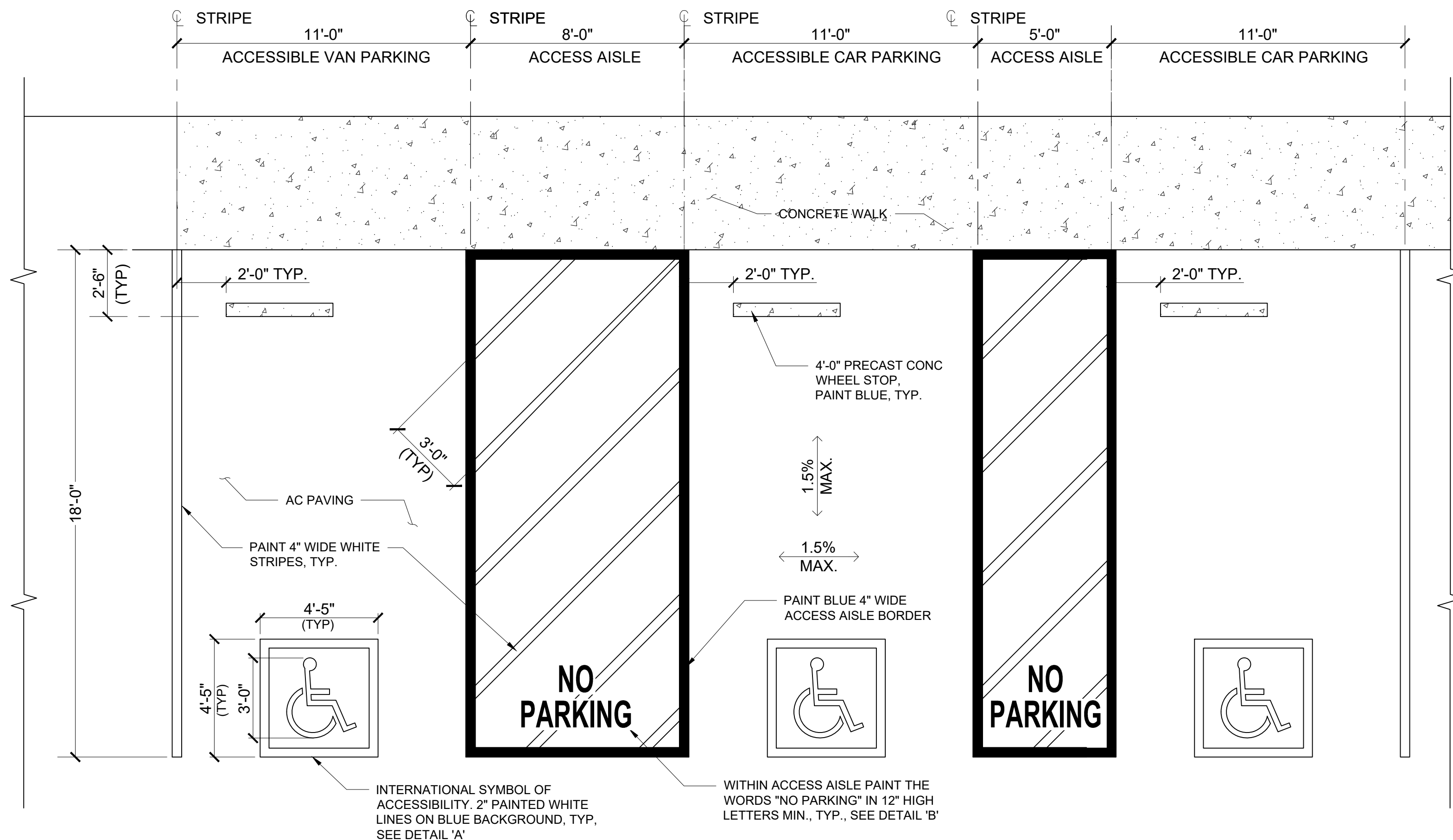


A INTERNATIONAL SYMBOL OF ACCESSIBILITY (ISA) MARKING



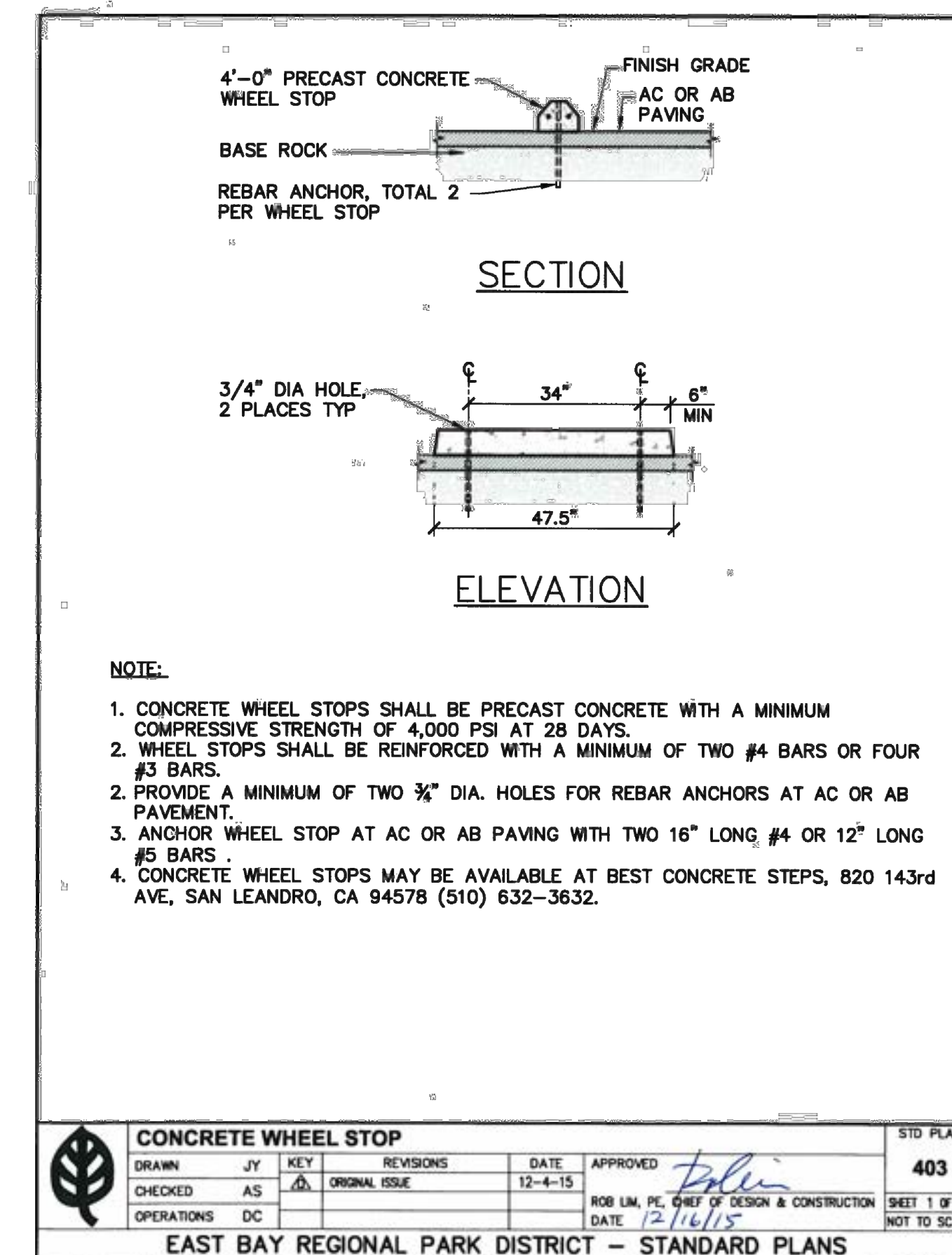
B NO PARKING LETTERS

3 ROAD MARKINGS
Scale = NTS



NOTES:
1. PARKING TO COMPLY WITH CBC 2013 SECTION 11B-502
2. PARKING SPACES AND ACCESS AISLES SHALL BE AT THE SAME LEVEL WITH SURFACE SLOPES NOT EXCEEDING 1.5% IN ANY DIRECTION.

4 ADA PARKING
Scale = NTS



NOTE:
1. CONCRETE WHEEL STOPS SHALL BE PRECAST CONCRETE WITH A MINIMUM COMPRESSIVE STRENGTH OF 4,000 PSI AT 28 DAYS.
2. WHEEL STOPS SHALL BE REINFORCED WITH A MINIMUM OF TWO #4 BARS OR FOUR #3 BARS.
3. PROVIDE A MINIMUM OF TWO 3/8" DIA. HOLES FOR REBAR ANCHORS AT AC OR AB PAVING.
4. ANCHOR WHEEL STOP AT AC OR AB PAVING WITH TWO 16" LONG #4 OR 12" LONG #5 BARS.
5. CONCRETE WHEEL STOPS MAY BE AVAILABLE AT BEST CONCRETE STEPS, 820 143rd AVE, SAN LEANDRO, CA 94578 (510) 632-3632.

5 CONCRETE WHEEL STOPS
Scale = NTS

PRELIMINARY ENGINEERING DESIGN - NOT FOR CONSTRUCTION

REVISIONS	DATE

EAST BAY REGIONAL PARK DISTRICT
2950 PERALTA OAKS COURT, OAKLAND, CA 94605
WWW.EBPARKS.ORG 888-327-2757

QUESTA
Civil Environmental & Water Resources
ENGINEERING CORP.
P.O. Box 70356 1220 Brickyard Cove Road Point Richmond, CA 94807
(510) 236-6114
FAX (510) 236-2423
questa@questaec.com

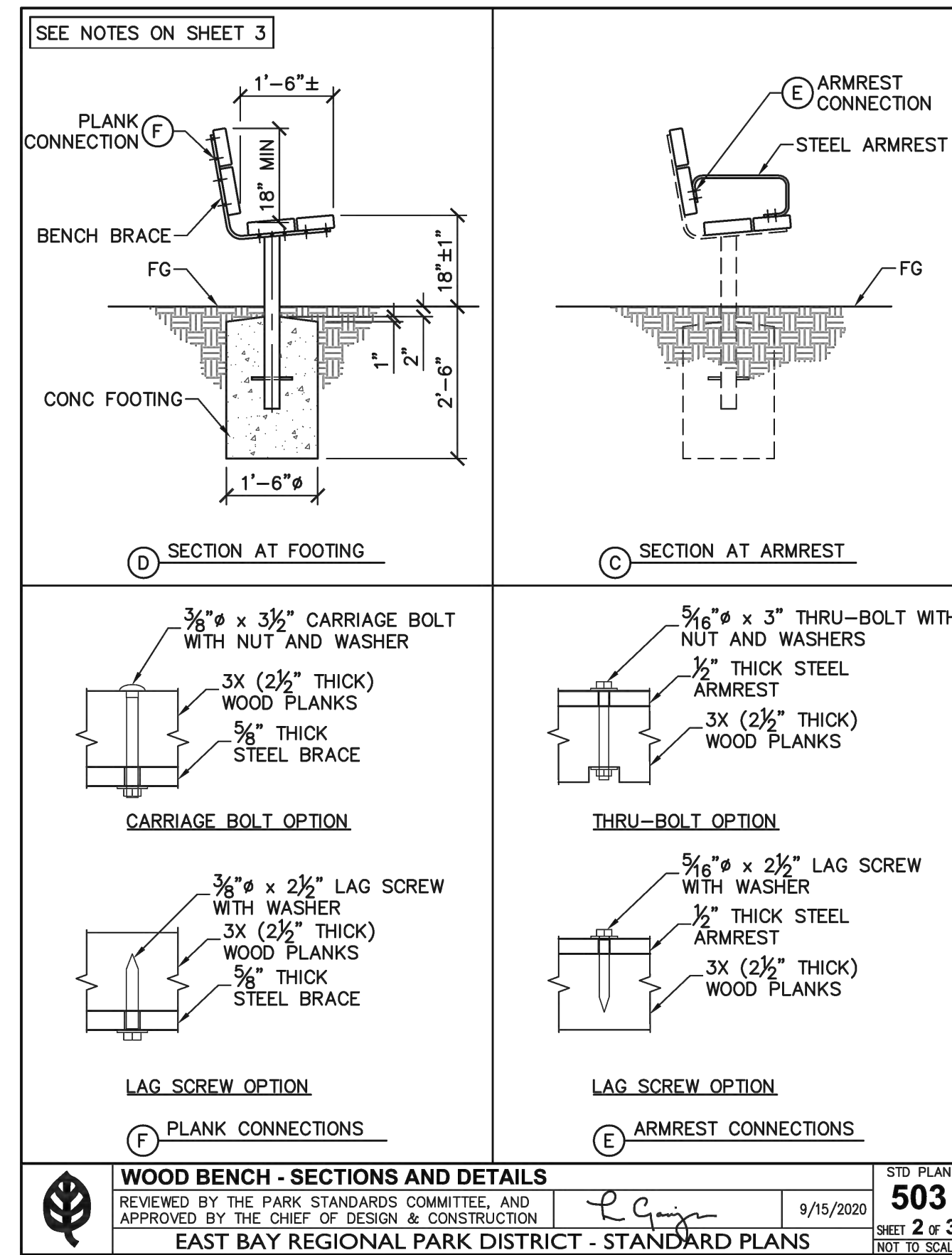
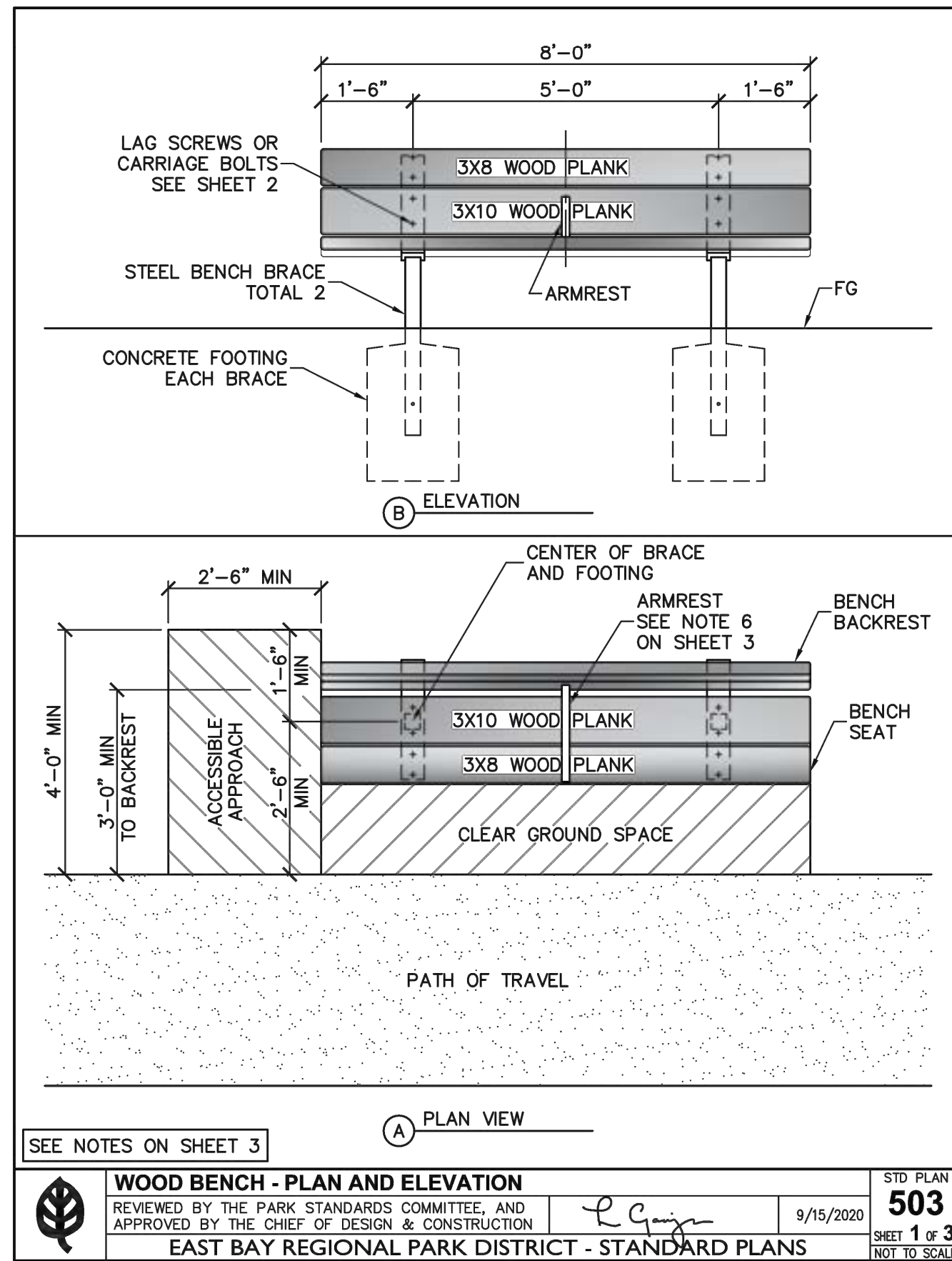
APPROVED
design:
checked: MH
operations:
scale: AS NOTED
drawn: CC
checked: MH
date: 12/3/2020

PARKING DETAILS
MARSH CREEK TRAIL
VINEYARD PARKWAY TO ROUND VALLEY REGIONAL PRESERVE
CONTRA COSTA COUNTY
PROJECT NO. 1800108

CONTRACT NO.

SHEET NO. **14**
OF: **18**

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ADA ACCESSIBILITY

- AT LEAST 20%, BUT NOT LESS THAN ONE, OF THE FIXED BENCHES PROVIDED IN A FACILITY OR A BUILDING SHALL BE ACCESSIBLE AND SHALL BE DISPERSED AMONG THE TYPES PROVIDED.
- THE CLEAR GROUND SPACE AND ACCESSIBLE APPROACH DIMENSIONS SHOWN ON SHEET 1 ARE THE MINIMUMS REQUIRED AT ADA ACCESSIBLE BENCH LOCATIONS.
- ACCESSIBLE APPROACH MAY BE LOCATED AT EITHER END OF THE BENCH.
- THE CLEAR GROUND SPACE AND ACCESSIBLE APPROACH SHALL NOT OVERLAP PATHS OF TRAVEL, OUTDOOR RECREATION ROUTES, TRAILS, OR OTHER REQUIRED CLEAR SPACE.
- THE CLEAR GROUND SPACE AND ACCESSIBLE APPROACH AREA SHALL BE FIRM AND STABLE. RECOMMENDED AC OR CONCRETE PAVED SURFACES SHALL SLOPE A MAXIMUM OF 2% MEASURED IN ANY DIRECTION. WHERE THE SURFACE IS NOT PAVED, THE SLOPE MAY BE INCREASED TO A MAXIMUM OF 5% ONLY AS REQUIRED TO PROVIDE ADEQUATE DRAINAGE.
- A SINGLE ARMREST AT THE MIDDLE OF THE BENCH OR AT THE END FARTHEST FROM THE ACCESSIBLE APPROACH IS REQUIRED AT ADA ACCESSIBLE BENCHES. IN NO CASE SHALL AN ARMREST BE PLACED ADJACENT TO AN ACCESSIBLE APPROACH. WHERE NOT ACCESSIBLE, ARMRESTS MAY BE INSTALLED PER DESIGNER'S PREFERENCE.
- BENCH DETAILS COMPLY WITH THE STATE OF CALIFORNIA DEPARTMENT OF PARKS AND RECREATION 11/28/2018 MEMO ON BENCHES AND PICNIC TABLES. NOTE THAT CBC 11B-903 IS NOT APPLICABLE TO OUTDOOR SEATING.

MATERIALS

B. WOOD PLANKS

- 3X8 (2 1/2" X 7 1/4") AND 3X10 (2 1/2" X 9 1/4") S4S EE (EASED EDGES).
- SEASONED DRY WITH A MAX MOISTURE CONTENT OF 19%.
- WESTERN RED CEDAR NO. 2 CLEAR OR BETTER, OR FSC CERTIFIED REDWOOD CONSTRUCTION HEART OR BETTER (EXCEPT THAT IF BENCH IS TO BE A MEMORIAL BENCH THEN WOOD PLANKS SHALL ONLY BE WESTERN RED CEDAR).

9. FASTENERS SHALL BE HOT-DIP GALVANIZED PER ASTM A153.

10. CONCRETE SHALL BE COMMERCIAL 5-SACK PRE-MIX CONCRETE OR EQUIVALENT.

11. SEE STANDARD PLAN 503F FOR FABRICATION OF STEEL BRACES AND ARMRESTS.

12. WOOD PLANKS, FASTENERS, BENCH BRACES, AND ARMRESTS, MAY BE AVAILABLE AT PARK DISTRICT CENTRAL STORES, FOR PURCHASE BY PARK DISTRICT STAFF ONLY.

WORKMANSHIP

- LOCATE UNDERGROUND UTILITIES PRIOR TO DIGGING. CALL USA (UNDERGROUND SERVICE ALERT) 1-800-277-2600, MON THRU FRI 6AM TO 7PM, A MINIMUM 2 WORKING DAYS WITH A MAXIMUM 14 CALENDAR DAYS, TO OBTAIN A TICKET. CONTACT THE DISTRICT INSPECTOR OR PARK SUPERVISOR FOR DISTRICT UTILITIES NOT LOCATED BY USA.
- WOOD PLANKS SHALL NOT BE COATED (DO NOT SEAL, PAINT, OR STAIN).
- ENDS OF WOOD PLANKS SHALL BE EASED 1/4" RADIUS ALL AROUND.
- PROJECTING BOLT ENDS SHALL BE CUT FLUSH WITH PLANKS AFTER TIGHTENING. ANY SHARP EDGES OR SHARP POINTS SHALL BE MADE DULL.
- INSTALL WASHERS BELOW BOLT HEADS AND NUTS BEARING ON STEEL.
- BENCH BRACES SHALL BE INSTALLED PLUMB AT CENTER OF CONCRETE FOOTING.
- ANY DAMAGE TO PAINTED METAL FINISH SHALL BE TOUCHED-UP WITH PRIMER AND PAINT PER DISTRICT STANDARD PLAN 003, PAINTING AND STAINING SPECIFICATION.
- FOR MEMORIAL PLAQUE AND MOUNTING INFORMATION, CONTACT THE DISTRICT CREATIVE DESIGN GROUP AT (510) 544-3223.

1 WOOD BENCH DETAILS
Scale = NTS

WOOD BENCH - PLAN AND ELEVATION
REVIEWED BY THE PARK STANDARDS COMMITTEE, AND APPROVED BY THE CHIEF OF DESIGN & CONSTRUCTION
DATE: 9/15/2020
SHEET 1 OF 3
EAST BAY REGIONAL PARK DISTRICT - STANDARD PLANS

WOOD BENCH - SECTIONS AND DETAILS
REVIEWED BY THE PARK STANDARDS COMMITTEE, AND APPROVED BY THE CHIEF OF DESIGN & CONSTRUCTION
DATE: 9/15/2020
SHEET 2 OF 3
EAST BAY REGIONAL PARK DISTRICT - STANDARD PLANS

WOOD BENCH - NOTES
REVIEWED BY THE PARK STANDARDS COMMITTEE, AND APPROVED BY THE CHIEF OF DESIGN & CONSTRUCTION
DATE: 9/15/2020
SHEET 3 OF 3
EAST BAY REGIONAL PARK DISTRICT - STANDARD PLANS

PRELIMINARY ENGINEERING DESIGN - NOT FOR CONSTRUCTION

REVISIONS: _____ DATE: _____

EAST BAY REGIONAL PARK DISTRICT
2950 PERALTA OAKS COURT, OAKLAND, CA 94605
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ENGINEERING CORP.
(510) 236-6114
FAX (510) 236-2423
QUESTA@QUESTAEC.COM
P.O. Box 70356 1220 Brickyard Cove Road Point Richmond, CA 94807

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design: _____
operations: _____

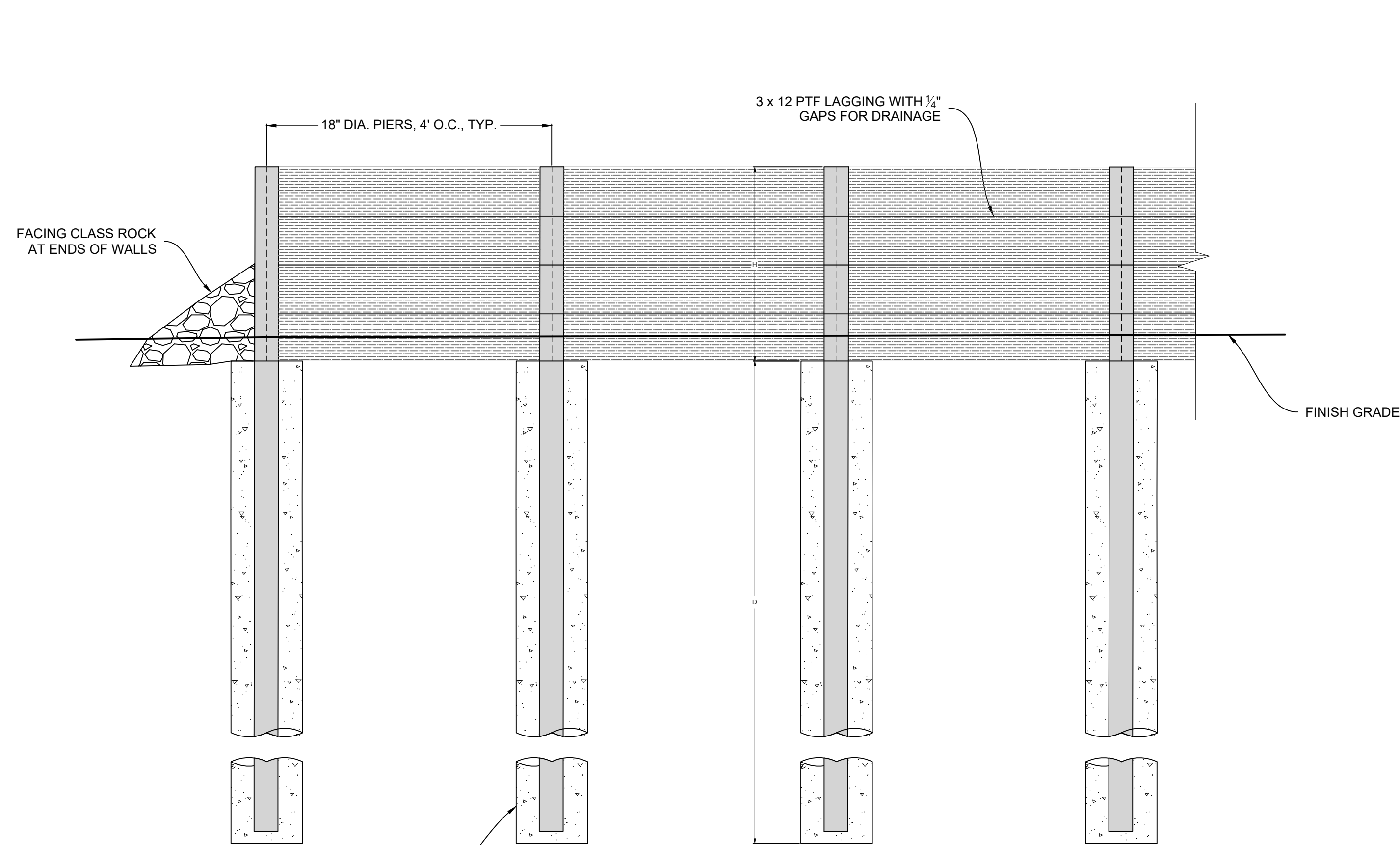
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SITE FURNISHINGS
MARSH CREEK TRAIL
VINEYARD PARKWAY TO ROUND VALLEY REGIONAL PRESERVE
CONTRA COSTA COUNTY
PROJECT NO. 1800108

CONTRACT NO.

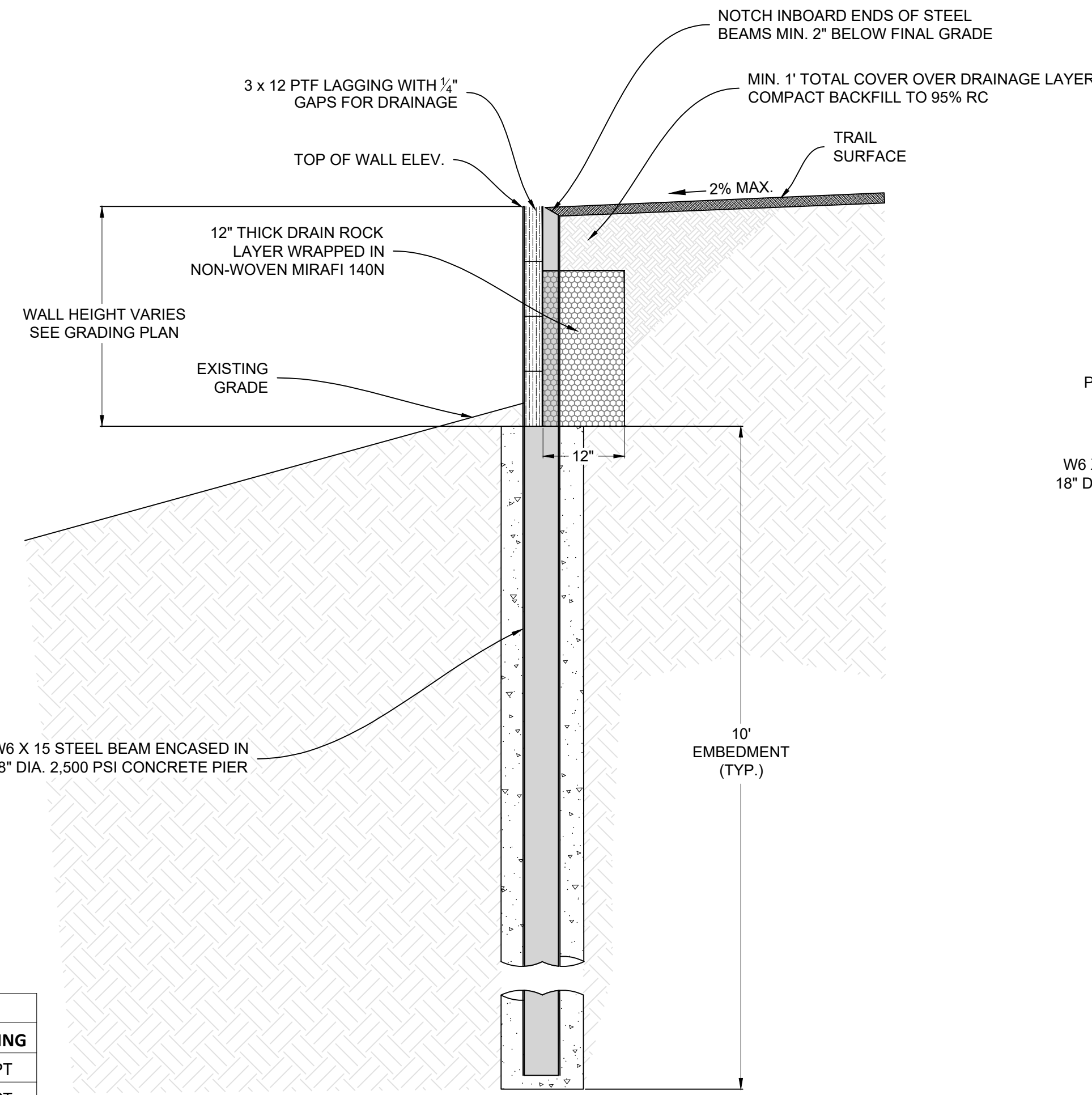
SHEET NO. 15
OF: 18

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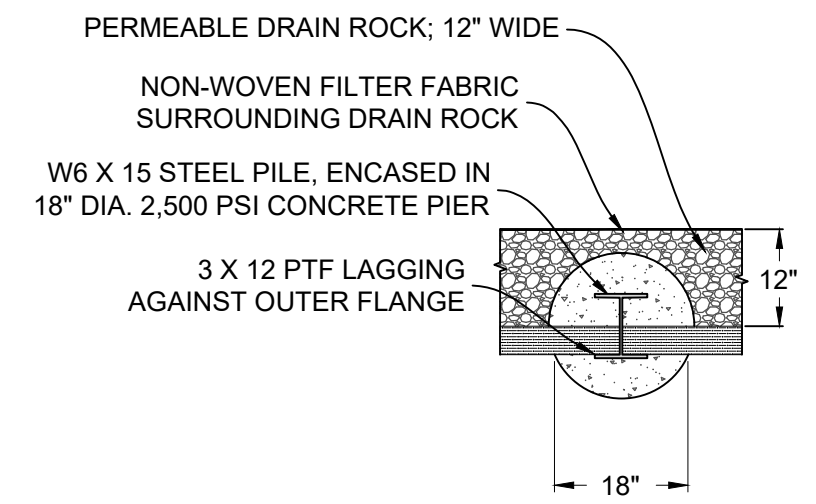
FRONT VIEW

1B
16 STEEL PILE, ENCASED IN 2,500 PSI CONCRETE, TYP.

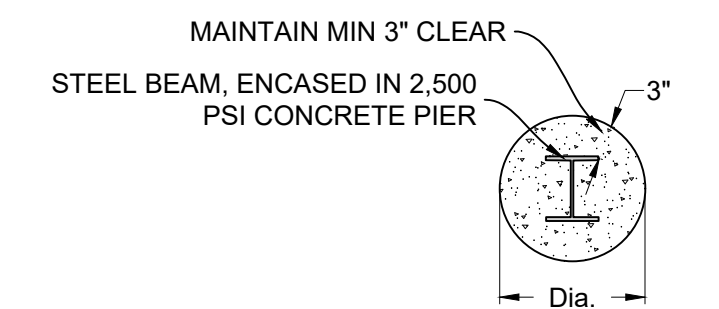


SIDE VIEW

1B
16 W6 X 15 STEEL BEAM ENCASED IN 18" DIA. 2,500 PSI CONCRETE PIER



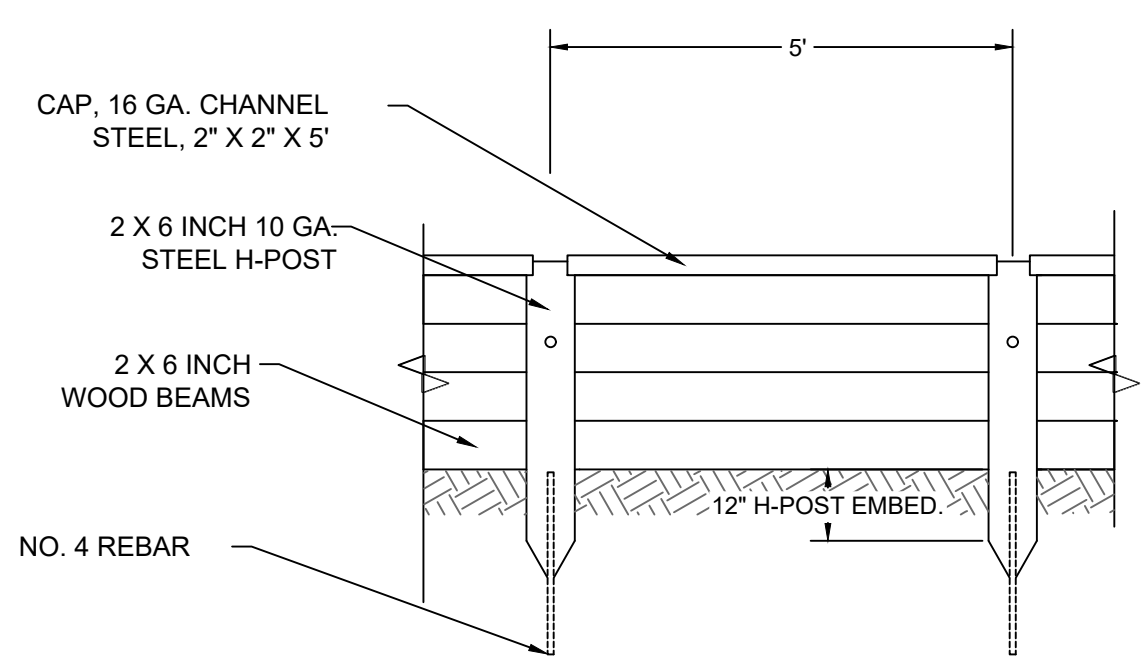
PILE SECTION 1A



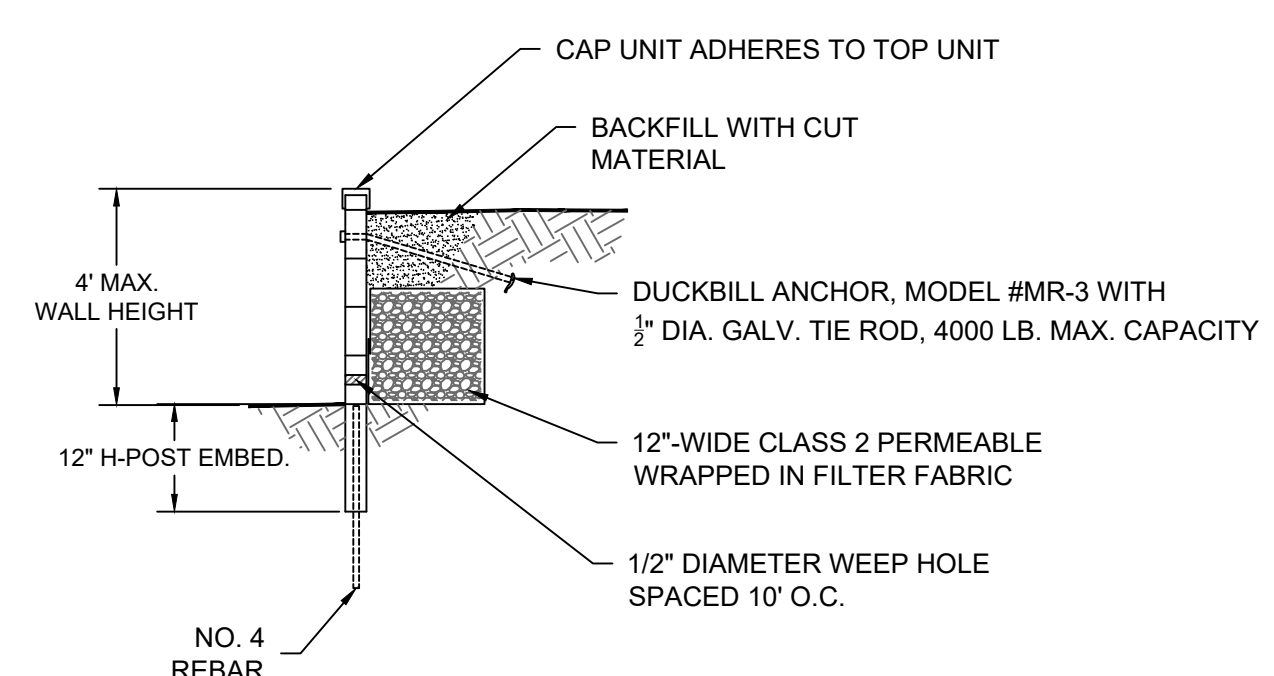
PILE SECTION 1B

SOLDIER PILE WALL TABLE				
H (ft)	D (ft)	Dia. (in)	STEEL SECTION	LAGGING
≤ 2	5	18	w 6x12	3 x PT
≤ 3	7	18	w 6x12	3 x PT
≤ 4	9	18	w 6x12	3 x PT
≤ 5	10	18	w 6x16	4 x PT
≤ 7	13	18	w 6x16	4 x PT

1 SOLDIER PILE RETAINING WALL (4' - 8')
Scale = NTS



FRONT VIEW



SIDE VIEW

2 SUTTER RETAINING WALL (LESS THAN 4')
Scale = NTS

PRELIMINARY ENGINEERING DESIGN - NOT FOR CONSTRUCTION

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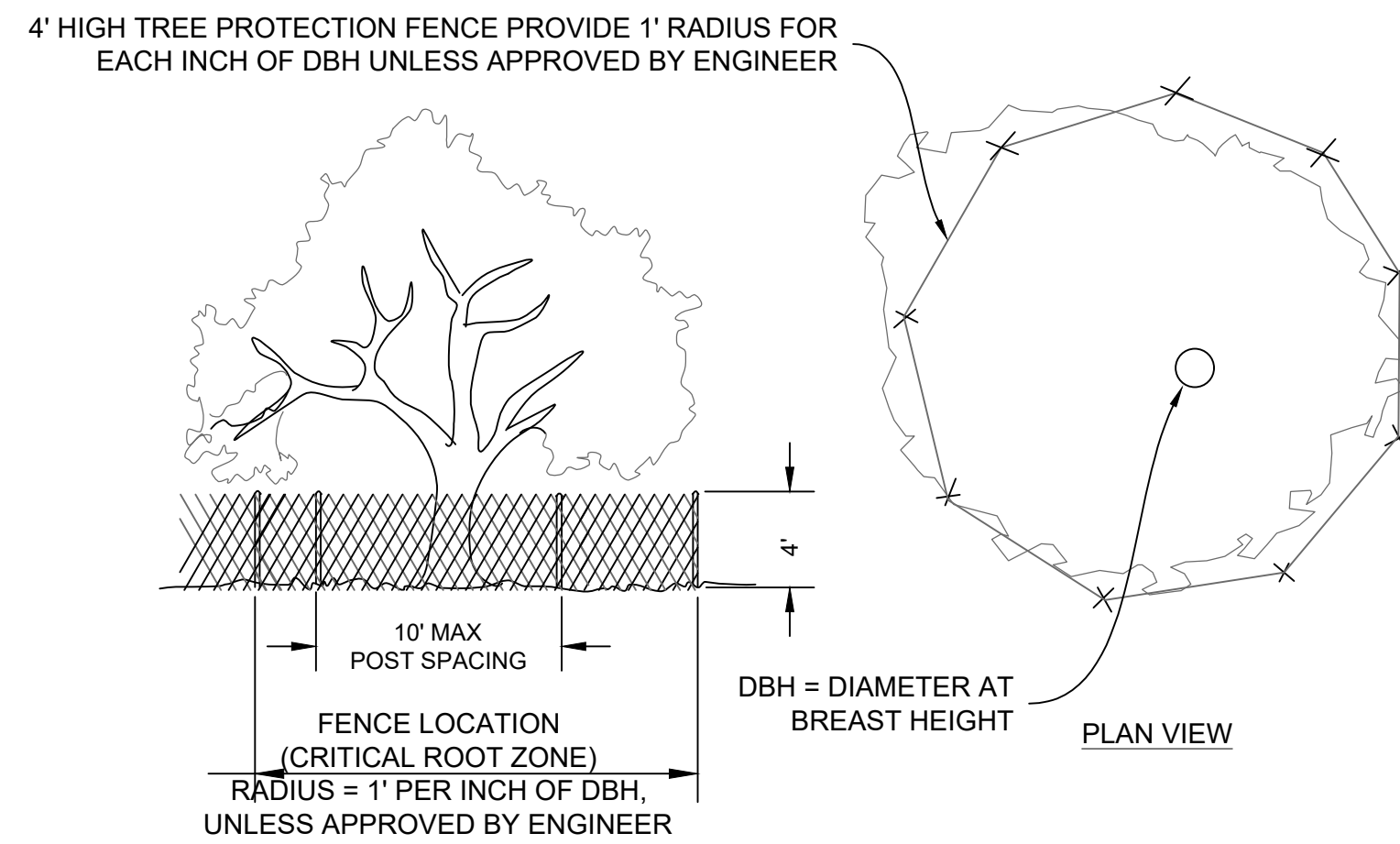
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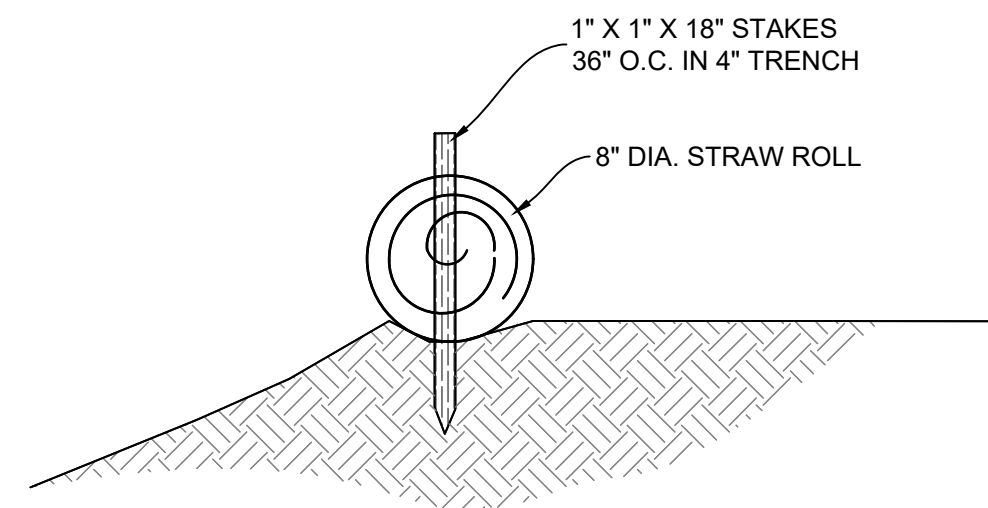
WALL DETAILS
MARSH CREEK TRAIL
VINEYARD PARKWAY TO ROUND VALLEY REGIONAL PRESERVE
CONTRA COSTA COUNTY
PROJECT NO. 1800108

SHEET NO. **16**
OF: **18**
CONTRACT NO.

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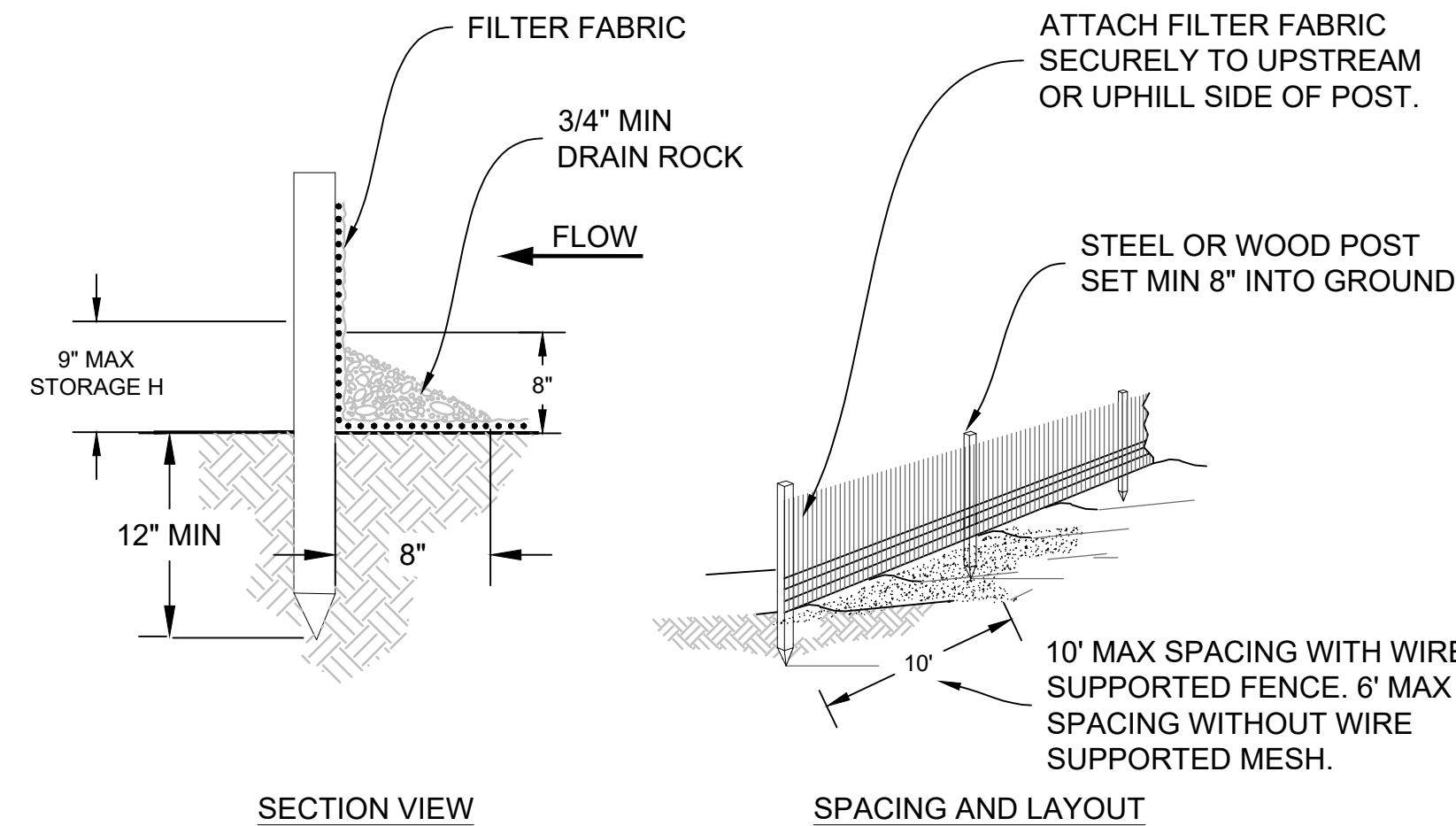


1 TREE PROTECTION FENCING
NTS

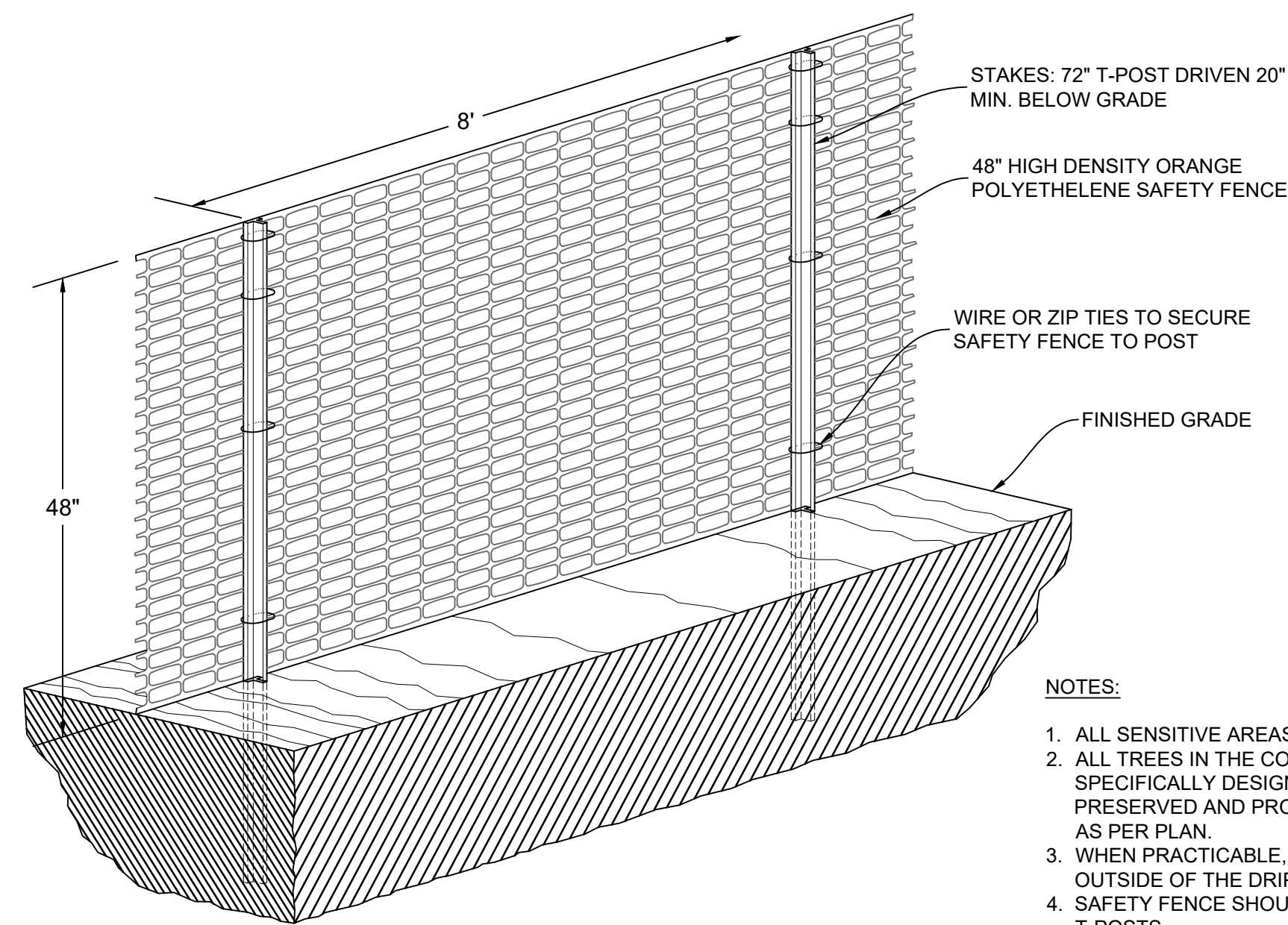


- NOTES:
1. PLACE THE LOOSE EDGE OF THE FIBER ROLLS INTO A 4-INCH DEEP TRENCH AND SECURE WITH A SINGLE ROW OF STAPLES INSTALLED ON 12-INCH CENTERS
 2. POSITION THE FIBER ROLLS INTO THE TRENCH ADJACENT TO THE SIDEWALK/BACK OF CURB/BACK OF V-DITCH
 3. DRIVE WOODEN 18-INCH STAKES THROUGH THE ROLL ON APPROXIMATELY 3-FOOT CENTERS TO SECURE IN PLACE
 4. USE COCONUT ROLLS FOR PERMANENT PLACEMENT

2 FIBER ROLL INSTALLATION
NTS

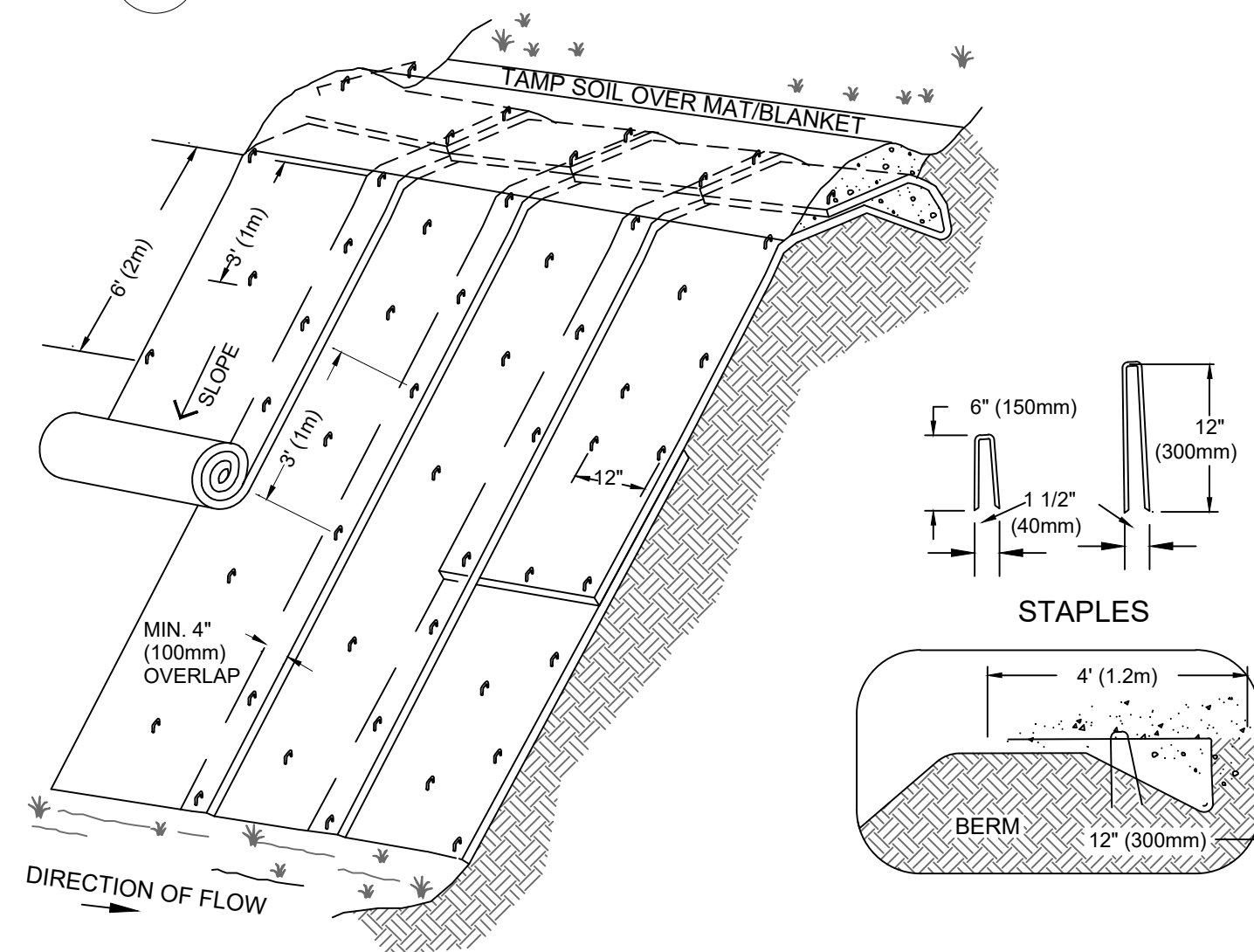


3 TEMPORARY SIL/ENVIRONMENTALLY SENSITIVE AREA FENCING AT LIMIT OF WORK
NTS



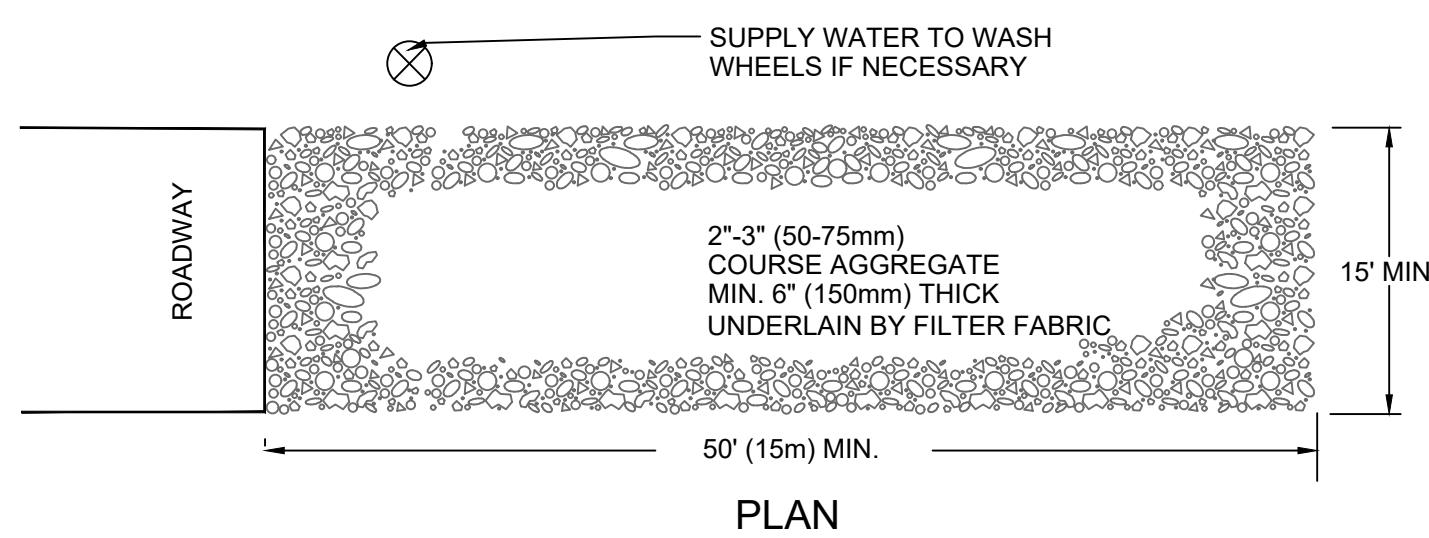
- NOTES:
1. ALL SENSITIVE AREAS SHALL BE PROTECTED AS PER PLAN.
 2. ALL TREES IN THE CONSTRUCTION AREA NOT SPECIFICALLY DESIGNATED FOR REMOVAL SHALL BE PRESERVED AND PROTECTED WITH HIGH VISIBILITY FENCE AS PER PLAN.
 3. WHEN PRACTICABLE, INSTALL HIGH VISIBILITY 3 FEET OUTSIDE OF THE DRIP LINE OF THE TREE.
 4. SAFETY FENCE SHOULD BE FASTENED SECURELY TO THE T-POSTS.
 5. THE FENCING MUST REMAIN IN PLACE DURING ALL PHASES OF CONSTRUCTION; ANY CHANGE OF THE PROTECTIVE FENCING MUST BE APPROVED.

4 CONSTRUCTION BARRIER FENCE
NTS



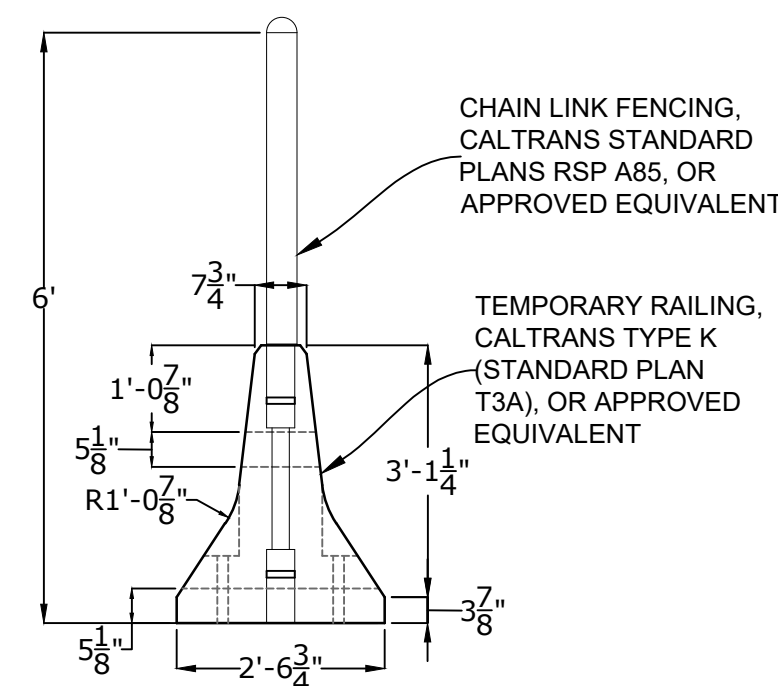
- NOTES:
1. EROSION CONTROL BLANKETS/MATS SHALL BE BIODEGRADABLE (SEE SPECS)
 2. SLOPE SURFACE SHALL BE FREE OF ROCKS, CLOUDS, STICKS AND GRASS.
 3. MATS/BLANKETS SHALL HAVE GOOD SOIL CONTACT.
 4. APPLY PERMANENT SEEDING BEFORE PLACING BLANKETS.
 5. LAY BLANKETS LOOSELY AND STAKE OR STAPLE TO MAINTAIN DIRECT CONTACT WITH THE SOIL. DO NOT STRETCH.
 6. MATS/BLANKETS SHOULD BE INSTALLED VERTICALLY DOWNSLOPE.

6 EROSION CONTROL FABRIC
NTS



- NOTES:
1. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHT-OF-WAYS. THIS MAY REQUIRE TOP DRESSINGS, REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT.
 2. WHEN NECESSARY, WHEELS SHALL BE CLEANED PRIOR TO ENTRANCE ONTO PUBLIC RIGHT-OF-WAY.
 3. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE THAT DRAINS INTO AN APPROVED SEDIMENT TRAP OR SEDIMENT BASIN.

5 TEMPORARY GRAVEL CONSTRUCTION ENTRANCE/EXIT
NTS



7 TEMPORARY SECURITY BARRIER
NTS

- TEMPORARY SECURITY FENCE NOTES
1. MATERIAL TO BE CHAIN LINK, OR APPROVED EQUIVALENT;
 2. HEIGHT OF SECURITY FENCE TO BE 6' MINIMUM
 3. CALTRANS STANDARD PLAN RSP A85, OR APPROVED EQUIVALENT

8 TEMPORARY SECURITY FENCE
NTS

EROSION CONTROL NOTES

1. GRADING, EROSION CONTROL PRACTICES, AND SEDIMENT CONTROL PRACTICES SHALL MEET THE DESIGN CRITERIA SET FORTH IN THE MOST RECENT VERSION OF THE CALIFORNIA STORMWATER QUALITY ASSOCIATION BEST MANAGEMENT PRACTICE HANDBOOK AND SHALL BE ADEQUATE TO PREVENT TRANSPORTATION OF SEDIMENT FROM THE SITE TO ANY OFFSITE AREA TO THE SATISFACTION OF THE ENGINEER.
2. CLEARING, EXCEPT THAT NECESSARY TO ESTABLISH SEDIMENT CONTROL DEVICES, SHALL NOT BEGIN UNTIL ALL SEDIMENT CONTROL DEVICES HAVE BEEN INSTALLED AND HAVE BEEN STABILIZED.
3. SUFFICIENT EROSION AND SEDIMENT CONTROL SUPPLIES SHALL BE AVAILABLE ON SITE DURING THE RAINY SEASON (OCTOBER THROUGH APRIL) TO PROTECT AREAS SUSCEPTIBLE TO EROSION DURING RAIN EVENTS. CONTRACTORS SHALL BE PREPARED YEAR-ROUND TO DEPLOY EROSION AND SEDIMENT TREATMENT CONTROL PRACTICES.
4. SOIL DISTURBANCE WORK SHALL BE CONDUCTED DURING DRY WEATHER.
5. THE CONTRACTOR SHALL PROVIDE A SWPPP PRIOR TO THE COMMENCEMENT OF WORK.
6. THE CONTRACTOR SHALL PROVIDE ADEQUATE MATERIALS MANAGEMENT, INCLUDING COVERING, SECURING, AND SEGREGATING POTENTIALLY TOXIC MATERIALS (ASPHALT, HERBICIDES, PESTICIDES, FERTILIZER, GREASE, OILS, FUEL, PAINTS, STAINS, SOLVENTS, WOOD PRESERVATIVES, ETC.), AND PROVIDING SECONDARY CONTAINMENT FOR HAZARDOUS MATERIALS.
7. THE CONTRACTOR SHALL PROVIDE TRAINING AND EQUIPMENT TO CONTAIN SPILLS OF OIL AND OTHER HAZARDOUS MATERIALS.
8. PAVING OPERATIONS SHALL BE CONDUCTED IN A MANNER THAT PROPERLY DISPOSES OF WASTES AND IN WHICH MEASURES TO CONTROL RUN ON AND PREVENT RUNOFF FROM AREAS BEING PAVED ARE IMPLEMENTED.
9. SANITARY FACILITIES OF SUFFICIENT NUMBER AND SIZE TO ACCOMMODATE CONSTRUCTION CREWS SHALL BE LOCATED AWAY FROM STORM DRAIN INLETS AND DRAINAGE FACILITIES, AND ANCHORED TO PREVENT BEING BLOWN OVER OR TIPPED BY VANDALS. THE FACILITIES SHALL BE MAINTAINED IN GOOD WORKING ORDER AND EMPTIED AT REGULAR INTERVALS BY A LICENSED SANITARY WASTE HAULER.
10. SOIL STABILIZATION SHALL BE COMPLETED WITHIN FIVE DAYS OF CLEARING OR INACTIVITY IN CONSTRUCTION.
11. PROJECTS SHALL BE DESIGNED TO AVOID DISTURBING LAND IN SENSITIVE AREAS AND TO PRESERVE EXISTING VEGETATION WHEREVER POSSIBLE.
12. MAJOR GRADING OPERATIONS SHALL BE SCHEDULED DURING DRY MONTHS WHEN PRACTICAL, AND SHALL ALLOW ADEQUATE TIME BEFORE RAINFALL BEGINS TO STABILIZE THE SOIL WITH EROSION CONTROL MATERIALS.
13. SEEDING AND MULCHING SHALL BE DONE AS SOON AS GRADING IS COMPLETE.
14. IF SEEDING OR ANOTHER VEGETATIVE EROSION CONTROL METHOD IS USED, THE VEGETATIVE COVER SHALL BECOME ESTABLISHED WITHIN A TIME-FRAME APPROVED BY THE ENGINEER, OR THE ENGINEER MAY REQUIRE THE SITE TO BE RE-SEEDING OR A NON-VEGETATIVE OPTION EMPLOYED.
15. SPECIAL TECHNIQUES THAT MEET THE DESIGN CRITERIA OUTLINED IN THE CALIFORNIA STORMWATER QUALITY ASSOCIATION BEST MANAGEMENT PRACTICE HANDBOOK ON STEEP SLOPES OR IN DRAINAGE WAYS SHALL BE USED TO ENSURE STABILIZATION.
16. SOIL STOCKPILES MUST BE STABILIZED AND/OR SECURELY COVERED AT THE END OF EACH WORKDAY.
17. IN AREAS WHERE PERMANENT RE-SEEDING AND PLANTING IS NOT ESTABLISHED AT THE CLOSE OF THE CONSTRUCTION SEASON, ADDITIONAL CONTROL MEASURES SHALL BE USED, SUCH AS A HEAVY MULCH LAYER OR ANOTHER METHOD THAT DOES NOT REQUIRE GERMINATION, TO ENSURE SOIL STABILIZATION AT THE SITE.
18. WHERE RUNOFF NEEDS TO BE DIVERTED FROM ONE AREA AND CONVEYED TO ANOTHER, EARTH DIKES, DRAINAGE SWALES, SLOPE DRAINS OR OTHER SUITABLE PRACTICE SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE DESIGN CRITERIA SET FORTH IN THE MOST RECENT VERSION OF THE CALIFORNIA STORMWATER QUALITY ASSOCIATION BEST MANAGEMENT PRACTICE HANDBOOK.
19. TECHNIQUES SHALL BE EMPLOYED TO PREVENT THE BLOWING OF DUST OR SEDIMENT FROM THE SITE.
20. TECHNIQUES THAT DELIVER UPLAND RUNOFF PAST DISTURBED SLOPES SHALL BE EMPLOYED WHEN DETERMINED NECESSARY BY THE PROJECT ENGINEER.
21. LINEAR SEDIMENT BARRIERS SHALL BE PLACED BELOW THE TOE OF EXPOSED AND ERODIBLE SLOPES, DOWN-SLOPE OF EXPOSED SOIL AREAS, AROUND SOIL STOCKPILES, AND AT OTHER APPROPRIATE LOCATIONS ALONG THE SITE PERIMETER.
22. STREET SWEEPING SHALL BE CONDUCTED ON AN AS NEEDED BASIS TO REMOVE SEDIMENT FROM STREETS AND ROADWAYS AND TO PREVENT THE SEDIMENT FROM ENTERING STORM DRAINS OR RECEIVING WATERS.
23. EVERY STORM DRAIN INLET WITH THE POTENTIAL TO RECEIVE SEDIMENT-LADEN RUNOFF SHALL BE PROTECTED IN ACCORDANCE WITH THE DESIGN CRITERIA SET FORTH IN THE MOST RECENT VERSION OF THE CALIFORNIA STORMWATER QUALITY ASSOCIATION BEST MANAGEMENT PRACTICE HANDBOOK. INLET PROTECTION SHALL BE INSPECTED AND MAINTAINED FREQUENTLY.
24. SEDIMENT BASINS OR SEDIMENT TRAPS SHALL BE INSTALLED ON PROJECTS WHERE SEDIMENT-LADEN WATER MAY ENTER THE DRAINAGE SYSTEM OR WATERCOURSES AND IN ASSOCIATION WITH DIKES, TEMPORARY CHANNELS, AND PIPES USED TO CONVEY RUNOFF FROM DISTURBED AREAS.
25. OTHER MEASURES, SUCH AS TRACK-OUT PREVENTION DEVICES, OR AS REQUIRED BY THE ENGINEER IN ORDER TO ENSURE THAT SEDIMENT IS NOT TRACKED ONTO PUBLIC STREETS BY CONSTRUCTION VEHICLES OR WASHED INTO STORM DRAINS.

PRELIMINARY ENGINEERING DESIGN - NOT FOR CONSTRUCTION

REVISIONS	DATE



EAST BAY REGIONAL PARK DISTRICT
2950 PERALTA OAKS COURT, OAKLAND, CA 94605
WWW.EBPARKS.ORG 888-327-2757



APPROVED
design:
operations:

scale: AS NOTED
drawn: CC
checked: MH
date: 12/3/2020

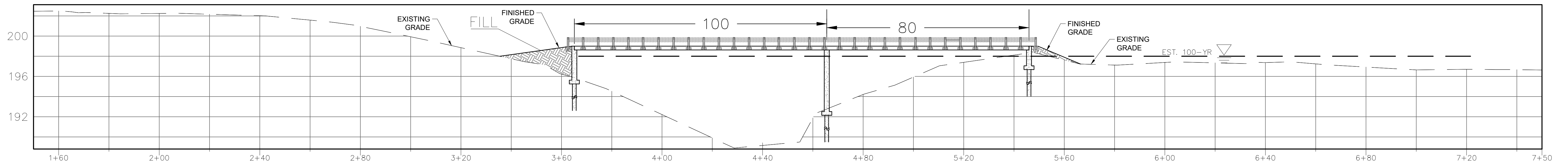
EROSION CONTROL MARSH CREEK TRAIL
VINEYARD PARKWAY TO ROUND VALLEY REGIONAL PRESERVE
CONTRA COSTA COUNTY
PROJECT NO. 1800108

SHEET NO. 17
OF: 18
CONTRACT NO.




PLAN VIEW

MARSH CREEK BRIDGE PROFILE



PROFILE VIEW

PRELIMINARY ENGINEERING DESIGN - NOT FOR CONSTRUCTION

<p>REVISIONS</p> <p>DATE</p>	 <p>EAST BAY REGIONAL PARK DISTRICT 2950 PERALTA OAKS COURT, OAKLAND, CA 94605 WWW.EBPARKS.ORG 888-327-2757</p>
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 <p>QUESTA ENGINEERING CORP. P.O. Box 70356 1220 Brickyard Cove Road Point Richmond, CA 94807</p>	<p>Civil Environmental & Water Resources</p> <p>APPROVED</p> <p>design:</p> <p>operations:</p>
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scale: AS NOTED
 drawn: CC & OR
 checked: MH
 date: 12/7/2020

SITE PLAN AND PROFILE - BRIDGE STA. 74+00 TO 80+00
MARSH CREEK TRAIL
 VINEYARD PARKWAY TO ROUND VALLEY REGIONAL PRESERVE
 CONTRA COSTA COUNTY
 PROJECT NO. 1800108

SHEET NO. **9**
 OF: **18**

CONTRACT NO.

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