Connecting Vallejo:

The Bay Trail-Vine Trail Feasibility and Preliminary Engineering Study

Draft

March 2015

Solano Transportation Authority

City of VALLEJO California

SAN FRANCISCO Bay Trail

VINE TRAIL NAPA VALLEY

alta PLANNING + DESIGN

Parisi TRANSPORTATION CONSULTING

Acknowledgements

Technical Advisory Committee

San Francisco Bay Trail Project (project sponsor)

Maureen Gaffney, Project Manager

Napa Valley Vine Trail (project sponsor)

Philip Sales, Consultant Project Manager

California Department of Fish and Wildlife

Karen Taylor, Associate Wildlife Biologist

Caltrans District 4

Beth Thomas, Senior Transportation Planner

Sergio Ruiz, Pedestrian & Bicycle Coordination Branch

City of Vallejo

Sam Kumar, Senior Civil Engineer

Bill Tuikka, Planner

Allan Panganiban, Senior Civil Engineer

Marty Hanneman, Traffic Engineer

City of American Canyon

Brent Cooper, Community Development Director

Cheryl Braulik, Senior Civil Engineer

Greater Vallejo Recreation District

Shane McAffee, General Manager

Napa County Transportation and Planning Agency

Diana Meehan, Assistant Program Manager

Solano Transportation Authority Bicycle Advisory Committee

Benicia	Nancy Lund, Vice Chair
County of Solano	Michael Segala, Chair
Dixon	Jim Fisk
Fairfield	David Pyle
Member at Large	Barbara Wood
Rio Vista	Derek Nelson
Suisun City	Lori Wilson
Vacaville	Ray Posey
Vallejo	Mick Weninger

Project Team

Solano Transportation Authority

Sofia Recalde, Associate Planner, Project Manager (Phase 1)

Drew Hart, Associate Planner, Project Manager (Phase 2)

Alta Planning + Design

Randy Anderson, Principal in Charge

Jennifer Donlon-Wyant, Senior Associate, Consultant Project Manager

Kristin Maravilla, Senior Planner and Designer

James Powell, Designer

Emily Tracy, Planner

Parisi Transportation Consulting

David Parisi, Principal Transportation Engineer

Andrew Lee, Transportation Engineer

Creegan + D'Angelo Engineers

Hugh Miles, Engineer

MacMillan Environmental Sciences

Lucy MacMillan, Biologist

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1 Introduction

This Bay Trail and Vine Trail Feasibility Study is an investigation to evaluate and identify a preferred alignment for two well-used, multi-use regional trails—the San Francisco Bay Trail and the Napa Valley Vine Trail—through the City of Vallejo with a low stress, convenient, and family friendly facility.

The community envisions a facility that will help connect areas of the City of Vallejo that are divided by SR 29 and SR 37; provide opportunity for active transportation and recreation; and extend the amenity and economic value of waterfront access to more of the City.

1.1 Study Overview

The San Francisco Bay Trail (Bay Trail) is a planned 500 mile, multi-use trail administered by the Association of Bay Area Governments (ABAG). When complete, the trail will encircle the San Francisco Bay, linking the shorelines of 47 cities and nine counties. Currently, 338 miles of the Bay Trail are complete. The Napa Valley Vine Trail (Vine Trail) is a 47 mile multi-use trail administered by the Napa Valley Vine Trail Coalition that is planned to extend from the Ferry Terminal in the City of Vallejo to the City of Calistoga.

Portions of the Bay Trail and the Vine Trail currently exist in the City of American Canyon on separate alignments, but they terminate near the city limits of Vallejo. The Bay and Vine Trail exist in Vallejo on a shared alignment on the White Slough Trail, which is located along the south side of State Route (SR) 37 between SR 29 and Sacramento Street. The Bay and Vine Trails also exist on a shared alignment along Wilson Avenue on the Vallejo waterfront, extending from just south of SR 37 to the Vallejo Ferry Terminal. This portion is considered complete by the Bay Trail and in need of minor upgrades for the purposes of the Vine Trail.

The objective of this Bay Trail and Vine Trail Feasibility Study is to evaluate alternatives and identify a preferred alignment(s) for the two gaps in the trails in Vallejo to the north and south of the existing White Slough Path (North Area and South Area in **Figure 1-1**), providing seamless and comfortable facilities for cyclists and pedestrians. Once completed, this key connection between two cities, two counties and two major regional trail systems will help connect 390 miles of continuous bicycle and pedestrian paths, directly linking the communities of Vallejo, Benicia, Martinez, and Crockett to American Canyon, Napa, Los Carneros, Yountville, Oakville, Rutherford, St Helena, Calistoga, and to all the cities and counties on the Bay Trail system.

1.2 Stakeholder and Community Participation

Stakeholder and community participation was an integral part of the development of this study. A Technical Advisory Committee (TAC) was formed to provide input on previous and current planning efforts, identify opportunities and challenges and guide the alignment selection. The TAC was composed of representatives from:

- Solano Transportation Authority
- Solano Transportation Authority
- City of Vallejo
- City of American Canyon
- San Francisco Bay Trail
- Napa Valley Vine Trail
- Caltrans

The broad community was invited to participate in a number of events, including:

- Community Workshop on May 11, 2014
- Bicycling and Walking Tour on June 28, 2014
- Community Workshop on December 4, 2014

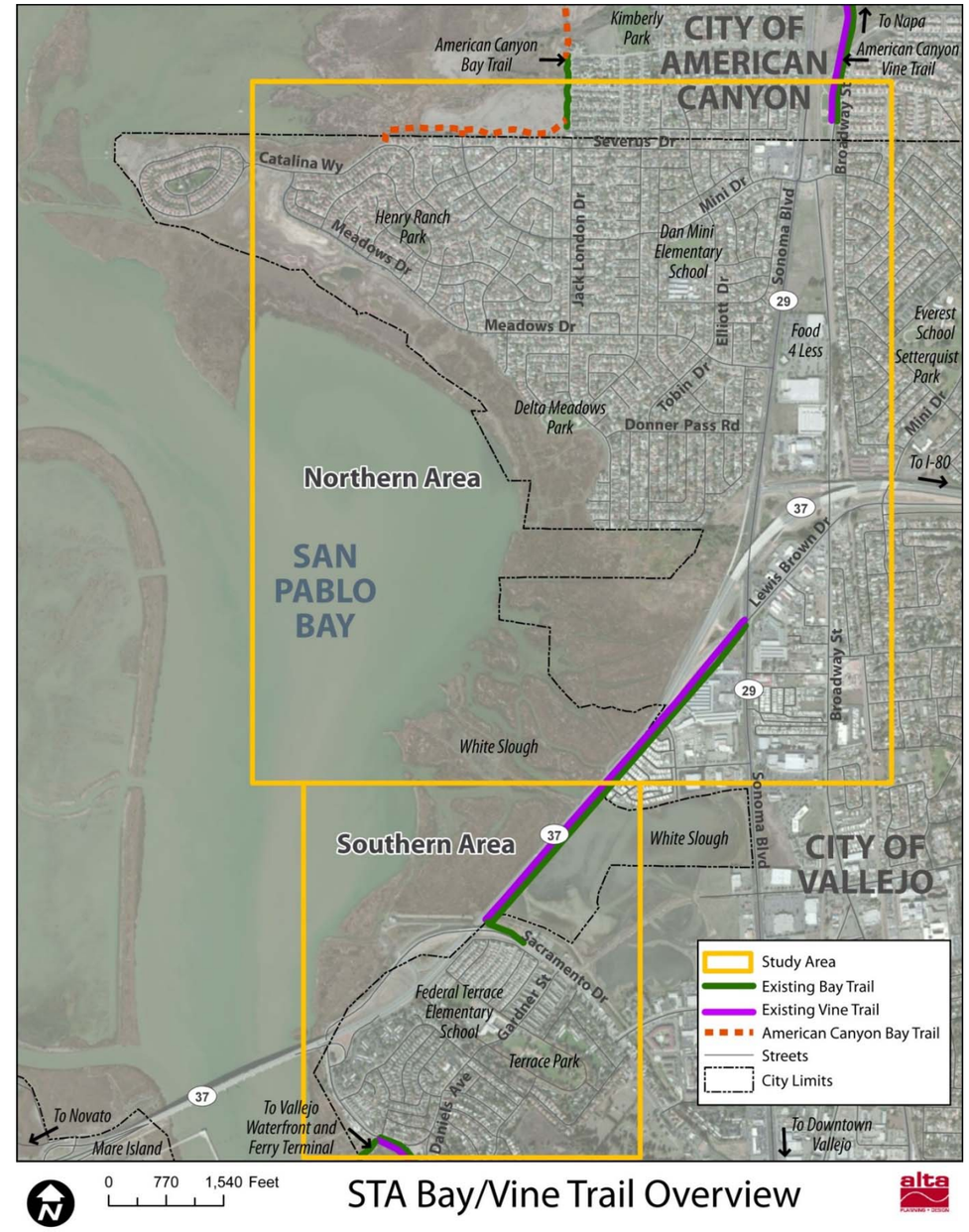

Figure 1-1: Overview of Northern and Southern Study Areas

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2 Existing Conditions

This chapter summarizes existing conditions, opportunities and challenges for implementation of the Bay and Vine Trail on these prospective routes. The study considers engineering and environmental feasibility, public support and cost. It reflects review of background documents and other current plans that are relevant, field reconnaissance observations, review in Google Earth and Streetview, and input from stakeholders and the general public from the Technical Advisory Committee.

2.1 Demographics

There are a total of 12,897 people living in the Census block groups that comprise the two study areas, according to the 2010 United States Census (see **Table 2-1**). Just over half—51 percent—are female, and 49 percent are male. The largest ethnic group represented in the area is Asians at 33 percent, followed by 26 percent Caucasian and 18 percent African American. All age groups are well represented within the community, with 14 percent of the population under 10 years old and 11 percent over 65 years old. The median household income for all of Vallejo is $51,988, according to the 2011 American Community Survey (median income data is not available at the block group level). More than two thirds of households have one or two vehicles available, at 30 and 39 percent respectively. Five percent of households have no vehicles available. Over 90 percent of the dwelling units in the study area are occupied, and 75 percent of these are home to family households. Sixty percent of households have three or fewer members.

Table 2-1: Area Demographics

Demographic	Number	Percent
Total Population	12,897	100%
Male	6,354	49%
Females	6,543	51%
Households	3,892	100%
1-person households	702	18%
2-person households	967	24%
3-person households	700	18%
4-person households	609	16%
5-person households	420	11%
6-person households	240	6%
7 or more person households	254	7%
Tenure	3,892	100%
Owned with mortgage or loan	2160	56%
Owned free and clear	360	9%
Renter Occupied	1372	35%
Occupancy	4,268	100%
Occupied	3,892	91%
Vacant	376	9%
Vehicles Available	3,892	100%
No vehicle available	211	5%
1 vehicle available	1,148	30%
2 vehicles available	1,488	39%
3 vehicles available	569	15%
4 vehicles available	341	9%
5 vehicles available	110	3%
Race	12,897	100%
White alone	3,317	26%
Black or African American alone	2,343	18%
American Indian and Alaska Native	54	1%
Asian alone	4,322	33%
Native Hawaiian and Other Pacific	166	1%
Some other race alone	1,776	14%
Two or more races	919	7%

2.2 Background and Planning Documents

The following planning documents or efforts are pertinent to the current study.

2.2.1 City of Vallejo

Land Use and Circulation Elements of the General Plan (1982)

The City's General Plan Land Use and Circulation Elements (LU&C Elements) identify goals and policies for bicycle and pedestrian facilities, noting that encouraging walking and bicycling can help reduce dependency on motor vehicles. The LU&C Elements identify three factors that influence would-be pedestrians and bicyclists: attractive bikeways and walkways, safe facilities, and routes that take people where they want to go. Bicycle and pedestrian traffic goals and key policies include:

- Bicycle Traffic. Goal: To have facilities that encourage greater use of bicycles for recreation, commuting and shopping.
    - Policy A. As evidence of the community's desire to encourage healthy and safe alternative modes of travel replacing the auto, the City shall give high priority to implementing the Vallejo Bicycle Route Plan.
    - Policy C. Follow state guidelines for signing, striping, and paving of bicycle paths and lanes. Provide tire-proof grates over draining inlets.
- Pedestrian Traffic. Goal: To have safe and pleasant access for pedestrians throughout the community.
    - Policy B. Provide safe pedestrian crossings, e.g., signalized crosswalks, and pedestrian overpasses, on major streets where day-to-day activities warrant them. Pedestrian walkways should be provided between residential neighborhoods and high use areas such as schools, parks, and commercial centers. The walkways should be safe for adjoining property owners and users.

Current City of Vallejo General Plan Update

The City of Vallejo is currently updating their General Plan for the first time since 1999. Various elements of the General Plan have been revised since then, including a Housing Element Update adopted in 2011. A working group of community residents, board members, and commissioners was assembled in 2013 to provide input to the consultant team and City staff and to act as liaisons to the community and stakeholder groups.

Recognizing that the existing General Plan does not reflect the current needs of the community, the update process aims to develop a new vision for the future of Vallejo and identify concrete steps towards implementing that vision. Four community workshops were held this past spring to gather input on overarching principles to guide the development of the General Plan. A draft is due out in 2016.

Sonoma Boulevard Specific Plan

The City of Vallejo is also undergoing a planning process to revitalize Sonoma Boulevard/SR 29 and the surrounding land uses. This specific plan area begins south of SR 37 at Redwood Street and extends to Curtola Parkway.. Preceding the Specific Plan, the 2013 Sonoma Corridor Design Plan covered the area between SR 37 and Curtola Parkway. There is likely to be minimal overlap between these efforts and the Bay Vine Trail Feasibility Study, however the street sections proposed in these plans could inform design of improvements north of SR 37, and the approach to accommodation bicycles and pedestrians in the Bay-Vine Trail Study could likewise inform improvements in the Sonoma Boulevard corridor.

2.2.2 City of American Canyon

Kimberly Park Bay Trail Project (2013)

The City of American Canyon is designing a one-mile long pedestrian and bicycle trail extending the existing trail at Wetlands Edge Road and Kensington Way to Kimberly Park and farther south, connecting to the trail segment at Catalina Way in Vallejo. This segment, shown in **Figure 2-1**, will complete the American Canyon portion of the Napa River Bay Trail, which stretches from Vallejo to Napa. The City anticipates construction will begin in late 2014 or in 2015.

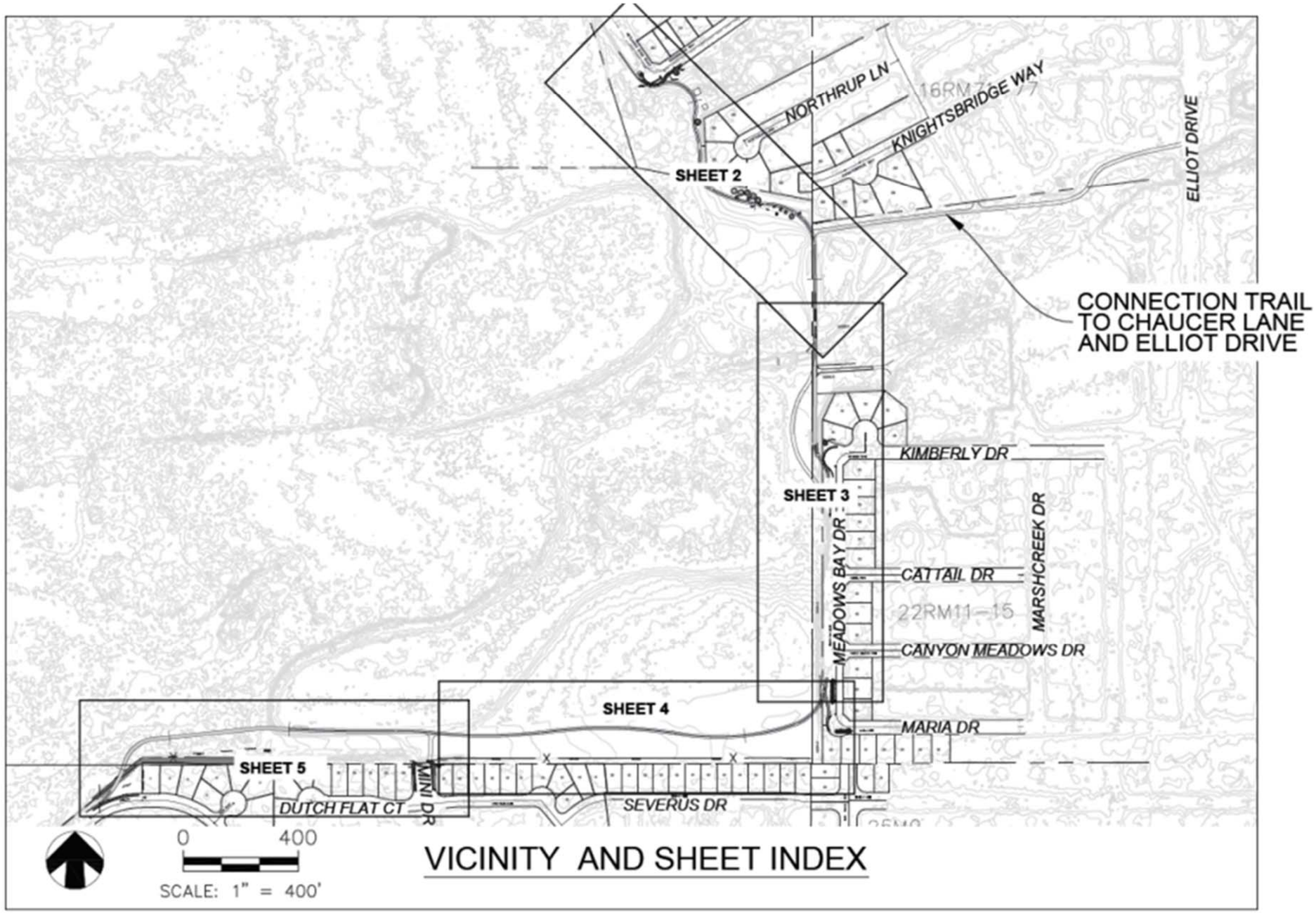

Figure 2-1: Kimberly Park Bay Trail Project

2.2.3 Napa County

SR 29 Gateway Corridor Implementation Plan (2014)

The southern portion of SR 29 is an important gateway to the Napa Valley. The SR 29 Gateway Corridor Improvement Plan, led by the Napa County Transportation and Planning Agency, seeks to minimize traffic congestion, enhance the character of communities along the corridor, and improve safety for all modes of transportation. Segments S1 and S2 of this Plan fall within the study area of the Bay Trail-Vine Trail Study. For Segment S1, south of SR 37, the Plan acknowledges and defers to the Sonoma Boulevard Specific Plan.

For Segment S2, which includes SR 37 to American Canyon Road, two alternatives were proposed. Option 1 is a parkway with shared use paths on both sides of, a robust tree canopy, and pedestrian refuges provided in the median at each intersection. This is identified as the preferred option. Option 2 alters the northbound side of the highway to include a frontage road with a contraflow bike lane, on-street parking, and a wide boulevard sidewalk.

Several guiding principles and objectives are relevant to the Bay Trail-Vine Trail Study.

- Principle 3: Reduce motorists' need to use SR 29 by managing demand and encouraging use of alternative/parallel routes for local trips.
  - Objective a. Promote alternatives to traveling in single-occupant vehicles by promoting public transit, park and ride facilities, carpooling/vanpooling, bicycle use and walking.
- Principle 4: Expand the network of pedestrian paths and supporting infrastructure to provide convenient routes to work, schools, open space, and commercial destinations.
  - Objective b. Provide safe pedestrian crossings in convenient locations. Study whether at-grade crossings or pedestrian bridges are more appropriate based on whether pedestrians will use the facility as intended and implications for traffic congestion.
  - Objective c. Create a pedestrian-oriented environment and improve streetscapes, ensuring full access to and between public areas and developments.
- Principle 5: Expand the network of bicycle paths and supporting infrastructure to provide convenient access to destinations, and promote travel by bicycle as a viable alternative to the automobile.
  - Objective b. Where practical and consistent with plans for the Vine Trail, create additional bicycle routes parallel to, but separate from, the SR 29 right-of-way. Prioritize creation of Class I multi-use paths that cater to recreational bicyclists.
  - Objective c. Ensure that bicycle travel is facilitated by clear signage and wayfinding elements, focusing on providing guidance where the bicycle paths intersect with highway interchanges and other similarly complex natural or manmade features.

2.2.4 Solano Transportation Authority

Countywide Pedestrian Transportation Plan: Active Transportation through Walking (2012)

The Solano Countywide Pedestrian Transportation Plan (Pedestrian Plan) is STA's reference document for planning and supporting pedestrian system improvements and investments in seven cities, including Vallejo, and the County of Solano. The main purpose of the Pedestrian Plan is to encourage the development of a unified regional pedestrian system (consisting of physical walking routes, wayfinding signage, and amenities such as benches and rest areas, etc.) throughout Solano County. The Pedestrian Plan contains policies that are designed to support and encourage pedestrian transportation, design standards for use in implementation efforts, and promotional strategies.

Key goals and objectives that relate to the Bay-Vine Trail Study include:

- Goal 4: Improve pedestrian safety in Solano County.
  - Objective 11 – Ensure that safety for pedestrians, especially young people, elderly people, and people with disabilities, is the highest priority among competing pedestrian improvement priorities, and a high priority among overall transportation improvement priorities.
- Goal 5: Increase the use of walking as a viable alternative to the automobile.
  - Objective 17 – Develop a regional pedestrian connections system which meets the needs of commuters and recreational travelers, helps reduce vehicle trips, and links residential neighborhoods with regional destinations countywide.
- Goal 6: Develop an integrated and coordinated transportation system that connects walking with other modes of transportation, which includes, but is not limited to, bicycling, driving, and taking public transportation.
  - Objective 20 – Maximize the multimodal connections to the pedestrian system.
- Goal 7: Provide safe access for pedestrians to all points in Solano County.

Table 3-4B of the Pedestrian Plan presents proposed pedestrian projects list, consisting of the priorities identified by each jurisdiction. **Table 2-2** presents proposed pedestrian projects in the Study Area.

The Pedestrian Plan states that a recent study commissioned by the San Francisco Bay Trail Project evaluated opportunities for improvement or realignment of some existing and planned Bay/Ridge Trail routes in Vallejo, including:

- From and along SR 37 from Wilson Avenue along SR 29 or Broadway to Meadows Drive and other local streets to connect to American Canyon and Napa County.

Table 2-2: STA Pedestrian Plan - Proposed Pedestrian Projects in the Bay-Vine Trail Study Area

Project/Segment	From/To	Description	Status
Bay Trail Completion	Various	Complete segments of the Bay Trail	Planned
Sidewalks below and north of Highway 37 Concept	Sonoma Boulevard	Improve sidewalk or multi-use path along Sonoma Boulevard	Planned
Broadway to 4 lanes and Pedestrian/Bike Path	4Alt Modes –Bike/Ped	Construct a bike/ped path along Broadway	Planned
Sonoma Blvd/ SR29 TLC Corridor	4Alt Modes –Bike/Ped	Conduct a planning study and develop a plan to improve bike/ped and transit facilities on Sonoma Blvd	Study

Countywide Bicycle Transportation Plan: The Future of Cycling | Active Travel (2012)

The Solano Countywide Bicycle Plan (Bicycle Plan) is a planning tool for the countywide bikeway network in Solano County. The main purpose of the Solano Countywide Bicycle Plan is to encourage the development of a unified bicycle system (consisting of physical bikeway routes, wayfinding signage, and associated amenities such as bicycle lockers, showers, etc.) throughout Solano County. Projects on the Proposed System map are given priority for various state and federal funding sources programmed though STA. Key goals that relate to the Bay-Vine Trail Study include:

- Goal 2. Build the bicycle transportation network by planning, designing, constructing and managing transportation facilities that will meet the needs of the cycling public.
- Goal 3. Improve bicyclist safety in Solano County.
- Goal 4. Increase the use of bicycles as a viable alternative to the automobile.
- Goal 5. Develop an integrated and coordinated transportation system that connects bicycling with other modes of transportation, which includes, but is not limited to, driving, walking, and taking public transportation.
- Goal 6. Provide safe access for bicyclists to all points in Solano County.

The Bicycle Plan lists Class II bike lanes along SR 29 as the second of two proposed priority bicycle projects in Vallejo (p. 76). **Table 2-3** presents proposed bicycle projects in the Study Area.

Table 2-3: STA Bicycle Plan - Proposed Bicycle Projects in the Bay-Vine Trail Study Area

Project/Segment	From/To	Description	Status
Bay Trail Completion	Various	Support completion of the Bay Trail and priority segments (below): ▪ Vallejo Bluff Trail; Bay Trail Plan segments 6020 and new segment paralleling Clearview Drive (short-term, unpaved) ▪ Sonoma Blvd and Curtola Pkwy Bike Lanes; Bay Trail Plan segments 6023, 6023.1 and 6023.2 ▪ Wilson Ave between White Slough multi-use path and beginning of path near SR 37 onramp; Bay Trail Plan Segment 6039	Planned
Broadway Street	Alameda Street to Napa County Line	3.8 mile Class II bicycle lanes on Broadway Street from Alameda Street to Napa County line	Planned
Sacramento Street	Valle Vista to SR 37	0.9 Class II bicycle lanes on Sacramento Street from Valle Vista Street to SR 37	Planned
Broadway to 4 lanes and Pedestrian/Bike Path	Napa County Line to Curtola Parkway	Construct a bike/ped path along Broadway	Planned

Bay Trail Focus Element – Solano Countywide Pedestrian Plan (2004)

This supporting document to an overall countywide plan for pedestrian routes was a technical study directed by STA in partnership with the Bay Trail Project. It evaluated routes through the entire City of Vallejo, including some of the same routes being evaluated in the current study (identified as segments 26 through 31 in the 2004 study), but at a much more general level and without the level of community engagement. It identified some of the same opportunities and challenges as the current study.

2.2.5 Association of Bay Area Governments

Bay Trail Plan (1989)

The Bay Trail Project is a nonprofit organization administered by the Association of Bay Area Governments (ABAG) that plans, promotes and advocates for the implementation of a continuous 500-mile bicycling and hiking path around San Francisco and San Pablo Bays (see **Figure 2-2**). Senate Bill 100 mandates that the Bay Trail:

- Provide connections to existing park and recreation facilities
- Create links to existing and proposed transportation facilities
- Be planned in such a way as to avoid effects on environmentally sensitive areas

Figure 2-2: San Francisco Bay Trail

The Bay Trail Plan includes trail alignment, design, environmental protection, transportation access, and implementation policies to guide selection of the trail route and implementation of the trail system. The goal of the program is to develop a continuous trail, which highlights the wide variety of recreational and interpretive experiences offered by the diverse bay environments and is situated as close as feasible to the shoreline, within the constraints defined by other policies of the Bay Trail Plan.

The Bay Trail Plan includes the following policies applicable to the Bay-Vine Trail Study:

- Trail Alignment Policies
  - 1. Ensure a feasible, continuous trail around the Bay.
  - 2. Minimize impacts on and conflicts with sensitive environments.
  - 3. Locate trail, where feasible, close to the shoreline.
  - 4. Provide a wide variety of views along the Bay and recognize exceptional landscapes.
  - 11. Connections to other local and regional trail and bikeway systems should be actively sought in order to provide alternatives to automobile access to the Bay Trail. In particular, opportunities should be explored for trail connections to the Bay Area Ridge Trail, which is envisioned to circle the Bay along the region's ridgelines.
- Trail Design Policies
  - 12. Provide access wherever feasible to the greatest range of trail users on each segment.
  - 13. Wherever possible, new trails should be physically separated from streets and roadways to ensure the safety of trail users.
  - 14. Create a trail that is as wide as necessary to accommodate safely the intended use, with separate alignments, where feasible, to provide alternative experiences.
  - 17. Design new segments of trail to meet the highest practical standards and regulations, depending on the nature and intensity of anticipate use, terrain, existing regulations, and standards on existing portions of the trail.
- Environmental Protection Policies
  - 23. The Committee is aware of the ecological value of wetlands; in many cases, they provide habitat for a variety of endangered species. In the San Francisco Bay Area, these areas serve as a vital link in the Pacific flyway for feeding, breeding, nesting and cover for migratory birds. To avoid impacts in wetlands habitats, the Bay Trail should not require fill in wetlands, and should be designed so that use of the trail avoids adverse impacts on wetland habitats.
  - 26. The path will not always follow the Bay shoreline; inland reaches may be more appropriate, especially for bicycle travel, in some parts of the San Francisco Bay region.
  - 27. The path should be designed to accommodate different modes of travel (such as bicycling and hiking) and differing intensities of use, possibly requiring different trail alignments for each mode of travel, in order to avoid overly intensive use of sensitive areas.

Bay Trail design guidelines specify minimum trail tread widths, horizontal and vertical clearances, shoulder widths, and cross slopes; maximum grades; and trail surface materials for various facility types, including high-use facilities (separate paths), multi-use paths, bicycle-only paths, hiking-only paths, and natural trails.

The San Francisco Bay Trail Project: Gap Analysis Study (2005)

ABAG's San Francisco Bay Trail Project: Gap Analysis Study (Gap Analysis Study) aims to identify the remaining gaps in the Bay Trail; classify the gaps by phase, county, and benefit ranking; develop cost estimates; identify strategies and actions to overcome gaps; identify long-term funding needs; and present an overall cost and timeframe for completion. The Gap Analysis Study identifies short-, mid-, and long-term projects, including the following:

Short-Term Projects by Gap Segment Number:

- 6031: Class I path along Sonoma Boulevard from marine World Parkway to Meadows Dr.
- 6032: Class I path along Broadway Street from Marine World Parkway to Ventana Drive
- 6034: Class I path along Meadows between Highway 29 and Broadway
- 6035: Class I path along Meadows Drive from Azalea Ct to Sonoma Boulevard
- 6036: Class I path along Meadows Drive from Catalina Way to Azalea Court
- 6037: Class I path along Catalina Way between Meadows Drive and county boundary

Mid-Term Projects by Gap Segment Number:

- 6033: Class I path along Sonoma Boulevard from Meadows Drive to county boundary

The Gap Analysis Study does not assign a phase for Gap Segment Numbers 6030, 6027, or 6028.

2.2.6 Napa Valley Vine Trail Coalition

Napa Valley Vine Trail Project Plan (2013)

The Napa Valley Vine Trail Project Plan (Project Plan) describes the Napa Valley Vine Trail Coalition's project to build a walking and bicycling trail connecting Napa Valley. This 47-mile Napa Valley Vine Trail is envisioned as primarily a minimum 10 foot wide shared-use path. The trail is a key link in Napa and Solano Counties, with connections to the San Francisco Bay Trail, Bay Area Ridge Trail, and the Vallejo Ferry Terminal. The Project Plan described the Napa Valley Vine Trail design and engineering; anticipated construction and maintenance costs; benefits of the trail; and potential funding sources.

The Project Plan identifies the following design goals for the Vine Trail:

- Aesthetically beautiful — respecting the context of natural materials and historic, built surroundings;
- Culturally enriching — incorporating a wealth of art, education, and interpretive information (on trail, on-line, QR codes);
- Environmentally responsible — in methods/materials of construction and designed patterns of use;
- Multimodal—recognizing that pedestrians, pets, cyclists, wheelchairs, runners, etc. all share the path;
- Economically revitalizing—giving visitors a reason to stay longer and residents a safe route for community connection;
- Useful—responsive to community needs (schools, parks, cities, seniors, businesses) to produce the fullest trail value; and
- Safe — family-friendly, accessible to all, and easy to maintain in all seasons for decades to come.

The Vine Trail is envisioned as primarily a minimum eight-foot wide shared use path (97% of the trail system). Other segments would take the form of bike lanes (1% of the trail system) or bike routes (2% of the trail system). Constructed Vine Trail segments in the Study Area include 2.5 miles in the City of Vallejo and 0.54 miles in the City of American Canyon.

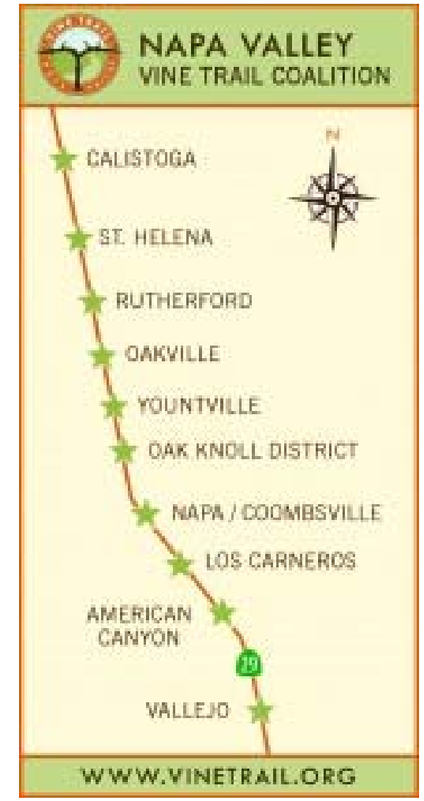

Figure 2-3: Napa Valley Vine Trail

2.2.7 BCDC - SF Bay Plan (2011)

Portions of the Bay Vine Trail Feasibility Study Area are within the jurisdiction of the San Francisco Bay Conservation and Development Commission (BCDC). Comprised of appointees from various local, state, and federal governments and agencies, the BCDC is charged with stewardship of the open water, marshes, and mudflats of San Francisco Bay, including the first 100 feet inland from the shoreline.

Trail improvements within this area will require a BCDC permit for improvements. Their San Francisco Bay Plan, adopted in 1969 and amended as recently as 2011, explicitly states that development of greenways and recreational facilities along the perimeter of the bay should be encouraged. Included maps show some concepts for future configurations of the bay that include public access. Given this, the BCDC is likely to favor improvements for the Bay Vine Trail.

2.3 Traffic Conditions

The following section discusses the conditions of the potential alignments in the context of existing traffic patterns and levels, recent crash history, and general condition of roadways.

North of the White Slough Path, the Bay Trail's targeted alignment is one that is as close to the bay as possible. It would ultimately connect to the planned Kimberly Park Bay Trail City in the City of American Canyon's western edge. The Vine Trail's targeted alignment is a more direct connection into Napa County. Its preferred route is east of Sonoma Boulevard, ultimately connecting to Veterans Memorial Park in the City of American Canyon.

Both approaches are constrained by the Sonoma Boulevard (SR-29) / SR-37 interchange complex. This area serves freeway-level demand on an at-grade corridor with many intersecting roadways, resulting in significant congestion and delay. Based on Caltrans 2012 counts, the traffic on Sonoma Boulevard north of SR 37 ranges from approximately 28,000 to 30,000 daily vehicles on an average annual basis.[1] Pre-recession counts taken in 2007 and 2008 estimated between 32,000 and 40,000 daily trips in the same area.[2] There have been two bicycle-involved crashes on Sonoma Boulevard near the SR-37 ramp intersections between 2007 and 2012; both crashes resulted in non-severe injuries.

North of the SR-29/SR-37 interchange complex, the Bay Trail's preferred route traverses collector roadways servicing the residential neighborhood adjacent to baylands areas. Meadows Drive has four lanes with a 30-35 mph speed limit, and is classified as a Major Collector by the City.[3] The available roadway capacity exceeds its traffic demand, as most segments handle less than 5,000 daily trips. At its peak traffic demand, the Meadows Drive / Sonoma Boulevard intersection handles slightly more than 6,300 daily trips. There have been two bicycle involved crashes between 2007 and 2012 on Meadows Drive. Mini Drive, which has a similar wide and fast design, also experienced two bicycle-involved crashes between 2007 and 2012.

Meadows Drive between Sonoma Boulevard and Broadway Street transitions into a commercial access driveway through the partially occupied Meadows Plaza. There are no recent traffic counts and no recorded bicycle-involved crashes here. However, the commercial access driveway does not clearly define the vehicular and bicycle through-route, and resumption of commercial activity on this site would generate a large amount of cross traffic.

Broadway Street, which is the Vine Trail's preferred alignment, runs parallel to Sonoma Boulevard. It attracts proportionally fewer regional trips because it lacks access to/from SR-37, and because Broadway has a difficult-to-navigate alignment break and at-grade rail crossing at Mini Drive. Both Broadway / Mini Drive intersections are affected by traffic queues and progression from the adjacent Sonoma Boulevard / Mini Drive intersection. The 2007-2008 counts on Broadway estimated approximately 8,000 daily trips between Mini Drive and Lewis Brown Drive. The traffic on Broadway increases south of Lewis Brown Drive, rising to approximately 14,600 daily trips.

The lower traffic volumes could make Broadway a more attractive bicycle route when compared to Sonoma Boulevard. However, the intersection break and rail crossing at Mini Drive are issues that should be resolved for the trail. Safety in this area is also a concern, as there have been four bicycle-involved crashes near the Mini Drive – Sonoma Boulevard – Broadway intersection between 2007 and 2012. Three crashes resulted in severe injuries.

The east-west connections between Sonoma Boulevard and Broadway occur on Lewis Brown Drive and Meadows Drive. Lewis Brown Drive is on the former SR-37 alignment that operated prior to the SR-29/SR-37 grade-separated interchange. The roadway has nearly 80 feet of right-of-way and has largely maintained its former highway cross-section with four through lanes, a center left-turn lane, and parking on both sides. It primarily services fronting businesses, many of which are industrial use, and local traffic between Sonoma Boulevard, Broadway Street, and Mini Drive. Most of the fronting businesses have direct parking access to/from the street since it largely lacks sidewalks and curbs. There are no recent traffic counts and no recorded bicycle-involved crashes here.

South of the existing White Slough path, most traffic on Sacramento Street and Wilson Avenue are using these streets as connections to and between SR-37 and Downtown Vallejo. The 2007-2008 counts estimated approximately 7,000 daily trips on Sacramento Street and nearly 10,000 on Wilson Avenue. There are no recorded bicycle-involved crashes here.

2.4 Environmental Conditions - Wetlands

The primary environmental constraints for these potential trail connections are wetlands and riparian areas. Much of the development in the northern study area was built on fill in bay wetlands, and is surrounded by lands owned by the State of California as part of the Napa Sonoma Marshes Wildlife Area managed by the California Department of Fish and Wildlife. The area to the north of the northern study area is part of the American Canyon unit and the area to the south of the northern study area is part of the White Slough Unit. The Wildlife Area objective is management to maintain or create a diverse ecosystem of tidal salt and brackish marshes, managed salt marshes, and ponds with some fresh water and seasonal wetland components.

The overview and focus area maps indicate areas of wetlands that potentially are under federal jurisdiction for permitting and protection. These "Mixed Wetlands" include both tidal and fresh water wetland areas. These have been identified from National Wetlands Inventory maps, and the boundaries have been adjusted by the consultant team biologist based on review of aerial photography. More detailed investigation of wetland conditions will be conducted for trail alignments that are remain from the initial round of overall feasibility review.

Construction of trails in any of the state lands would require approval from the Wildlife Area managers and other state departments, as well as environmental analysis under the California Environmental Quality Act (CEQA). Construction in wetlands areas will require all of the above, plus permits and approvals from the U.S. Army Corps of Engineers in consultation with the U.S. Fish and Wildlife Service and the National Marine Fisheries Service.

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[1] *http://traffic-counts.dot.ca.gov/2012TrafficVolumes.pdf*
[2] *http://www.ci.vallejo.ca.us/common/pages/DisplayFile.aspx?itemId=40757*
[3] *http://www.dot.ca.gov/hq/tsip/hseb/crs_maps/*

3 Design Guidelines

This chapter includes a discussion of design guidelines and federal policies that influenced the recommended alignment and design alternatives.

Walking/Bus and Bicycle Tour Participants Prepare for Alignment Review June 28, 2014

3.1 Design Guidelines

This section presents design standards and guidelines that are applicable to this study.

3.1.1 Class I Paths – Caltrans, Bay and Vine Trail Standards

The analysis of trail feasibility was based on adopted standards and best practices for "Class I" path design, as illustrated in **Figure 3-1**. The California Department of Transportation (Caltrans) Highway Design Manual, in section 1000, sets standards for bicycle facilities. These are generally used by California agencies and organizations as a basic standard. The Bay Trail organization has adopted design guidelines that are consistent with but supersede Caltrans standards, with the objective being a 10 to 12′ wide two-way trail, with 2 foot shoulders. The Vine Trail does not have formally adopted guidelines, but seeks a trail that is at least 10 feet wide.

Caltrans Standards

Width

8 feet minimum paved path width (Caltrans). AASHTO recommends a paved width of 10 feet.

Lateral and Overhead Clearances

A minimum 2 feet wide graded area shall be provided adjacent to the pavement (Caltrans). ASSHTO recommends a maximum 1:6 slope for this graded area. A 3 feet graded area is recommended to provide clearance from poles, trees, walls, fences, guardrails, or other lateral obstructions (Caltrans). Where the path is adjacent to canals, ditches or slopes down steeper than 1:3, a wider separation should be considered (AASHTO). A minimum 8 feet clearance is required (Caltrans & AASHTO). Where practical, a vertical clearance of 10 feet is desirable.

Paving

Hard, all-weather pavement surfaces (ex: asphalt or Portland cement concrete) are usually preferred over those of crushed aggregate, sand, clay or stabilized earth (AASHTO).

Maximum Grade

The maximum recommended grade is 5% (Caltrans). It is desirable that sustained grades be limited to 2% if a wide range of riders is to be accommodated. Steeper grades can be tolerated for short segments (e.g., up to about 150m).

Guidance

Caltrans Highway Design Manual (Chapter 1000 Section 1003. 1(1) and (2), and 1003.5)
AASHTO Guide for the Development of Bicycle Facilities, Chapter 2
California MUTCD Chapter 9B. Signs

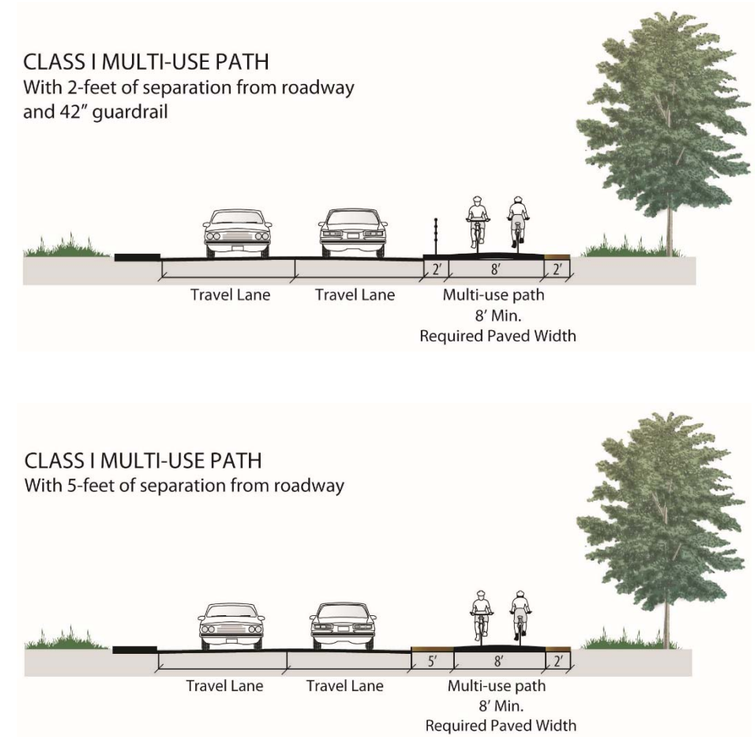


Figure 3-1: Caltrans Standards for Class I Multi-Use Path

Bay Trail Design Guidelines

Table 3-1 describes the Bay Trail design guidelines.

Table 3-1: Bay Trail Design Guidelines

Item	High-Use Facilities (separate paths)*	Multi-Use Paths*	Bicycle Only Paths*	Hiking Only Paths	Natural Trails
Min. width (one way)	8-10'	10'	8'	5'	3-5'[a]
Min. width (two way)	10-12'	10-12'	10-12'	8-10'	5'
Surface	asphalt[b]	asphalt	asphalt	hardened	natural/ boardwalks[c]
Horizontal clearance (incl. shoulders)	12-16'	14-16'	10'	9-12'	7-9'
Shoulder[d]	2'	2'	2'	2'	unspecified
Vertical clearance	10'	10'	10'	10'	unspecified
Cross slope	2% max	2% max	2% max	2% max	unspecified
Maximum grades[e]	5%	5%	5%	5%	unspecified

** Standards meet Caltrans Class I bikeway standards*
a Minimum widths that are less than 5' will be required to have 5'x5' turnouts at intervals to meet accessibility standards
b High-use pedestrian path could be hardened surface other than asphalt
c Natural surfaces may require surface hardening to provide accessibility
d Area specified is area on both sides of the trail
e Percentage grade for short distances with flat rest areas at turn outs, except where site conditions require a greater slope for short distance

Vine Trail Design Guidelines

The Vine Trail organization does not have formally adopted standards beyond the Caltrans Class I path standards (as shown to the right), but does have a policy to design for a paved path at least 10 feet wide.

Trail Intersection Crossings

Crossing intervening driveways or intersections can present significant challenges for a trail or path. **Figure 3-2** presents some solutions that have been successful in mitigating conflicts on many trail systems.

Signage

Intersection Warning (W2-1 through W2-5) signs may be used on a roadway, street, or shared-use path in advance of an intersection to indicate the presence of an intersection and the possibility of turning or entering traffic. A trail-sized stop sign (R1-1) should be placed about 5 feet before the intersection.

Crosswalk Markings

Colored and/or high visibility crosswalks should be considered.

Trail Speed Control

A chicane, or swerve in multi-use path approaching the crossing is recommended to slow bicyclist speed. Path users traveling in different directions should be separated either with physical separation (bollard or raised median) or a centerline. If a centerline is used, it should be striped for the last 100 feet of the approach.

Considerations

The evaluation of a roadway crossing involves analysis of vehicular traffic and trail user travel patterns, including speeds, street width, traffic volumes (average daily traffic, peak hour traffic), line of sight, and trail user profile (age distribution and destinations).

When engineering judgment determines that the visibility of the intersection is limited on the shared-use path approach, Intersection Warning signs should be used.

Pavement Surfacing Alternatives

In most cases a Class I path is paved with conventional asphaltic concrete (A.C.), which is typically the least expensive paved surface. Potions of the Bay-Vine Trail alignment include Class I paths that would be created by widening existing conventional concrete sidewalks. Concrete makes an excellent pathway surface that costs more than A.C. initially, but may result in a savings in long-term maintenance cost.

Permeable Pavement

Permeability is a concern when adding paved surfaces. The City of Vallejo Engineering Department has expressed interest in permeable pavement. Storm water management standards require that increased runoff is contained and treated before release into any drainage system, and these measures can be expensive in their own right. Permeable pavement, which includes special versions of both A.C. and concrete, costs more, but may be worth it in terms of more effective and less expensive storm water management. The additional cost for these options is not specifically addressed in the project cost estimates, but is covered in allowances for storm water management and other contingencies. The final decision would be made at more detailed design stages.

Decomposed Granite and other Alternatives to Pavement

Portions of the route along Catalina Way and Meadows Drive include a concept for a parallel unpaved path for running, dog walking, and other non-wheeled access. The plans indicate this would be surfaced with decomposed granite (D.G.), which is a commonly-used compactable aggregate material that prevents the trail surface from becoming muddy. But D.G. has become more difficult and expensive to obtain and has been seen to require significant maintenance over time. Various types of binding materials, frequently based on natural tree resin, can be used to make D.G. surfacing more durable, but the net cost is often more than asphalt or even concrete. Locally-sourced aggregate materials, such as quarry fines, should be investigated in the stage of detailed trail design to find the most practical solution.

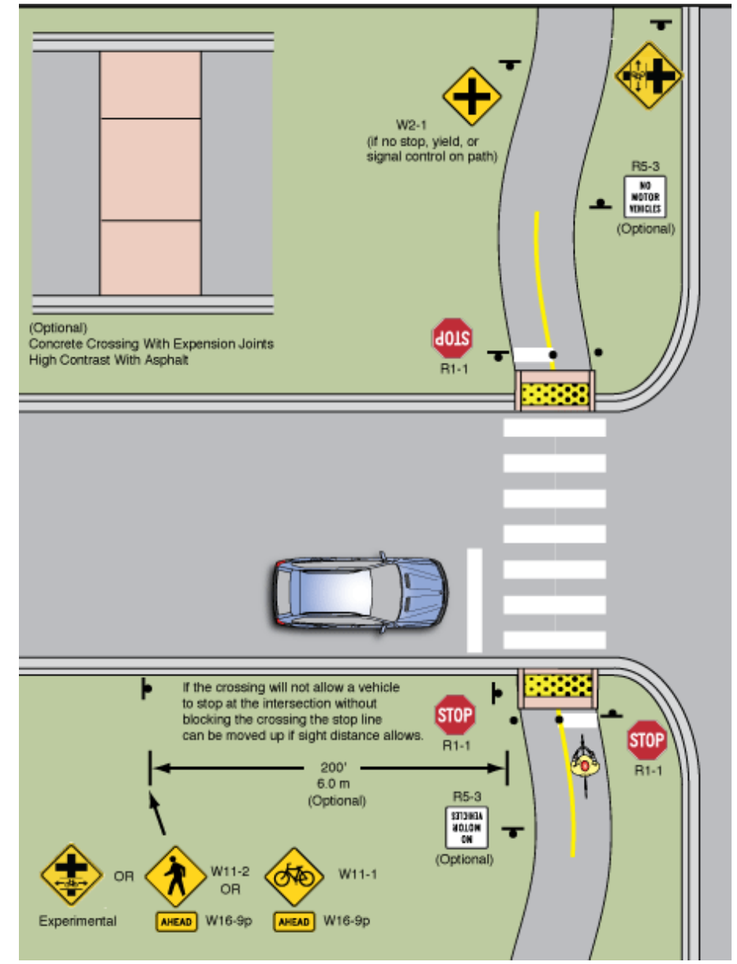


Figure 3-2: Trail Intersection Crossing Design Guidance

Trail and Cycle Track Driveway Crossings

Special design measures are needed at locations where a trail/bike path/cycle track crosses a driveway to minimize conflict and ensure visibility and awareness. These challenges have been addressed on protected bike lanes and paths throughout the nation, as illustrated by the example below from Seattle. Driveway crossings are varied in their existing configuration. The following guidelines and the design concepts in **Figure 3-3** are provided for use in addressing potential conflicts with vehicles at driveways during future more detailed stages of design.

- If raised, maintain the height of the protected bike lane/bike path/cycle track through the crossing, requiring automobiles to cross over.
- Prohibit curbside parking 30 feet prior to the crossing.
- Use colored pavement markings, colored pavement and/or shared lane markings through the conflict area.
- Place warning signage to identify the crossing

Driveway crossings on Broadway Cycle Track, First Hill Streetcar, Seattle, WA

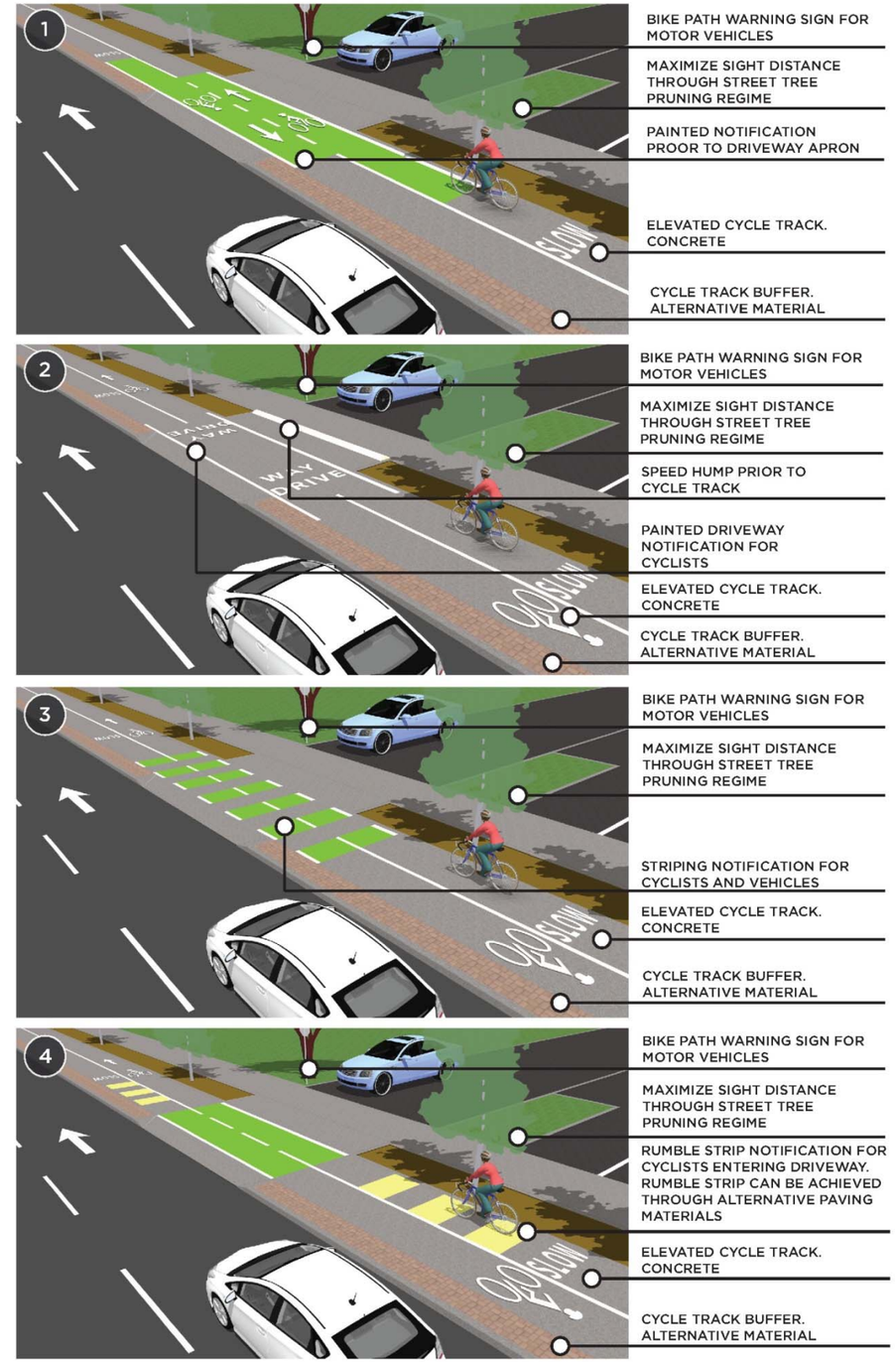


Figure 3-3: Driveway Crossing Design Concepts

3.1.2 On-Street Route Design

Interim or permanent parts of the routes may need to consist of "on-street" facilities such as bike lanes or sidewalks. This section presents some options for designing these facilities to be safe and comfortable for users.

High Visibility Crosswalks

There are a number of different marked crosswalk types, including the high visibility continental style as shown to the right. These types of crosswalks are more visible to drivers and are generally recommended at locations with high pedestrian activity, where slower pedestrians are expected (such as near schools), and where high numbers of pedestrian related collisions have occurred.

High Visibility Crosswalk

Advance Stop Lines

An advance stop line is a painted stripe in the roadway set back from the crosswalk, directing drivers to stop at least 4 feet before the crosswalk. On multi-lane roads advance stop lines increase pedestrian visibility for drivers in other travel lanes, especially important around schools, as students are harder to see than adults. Advance stop lines also discourage encroachment upon the crosswalk at a red light, leaving more free space for pedestrians to cross.

Advance Stop Lines

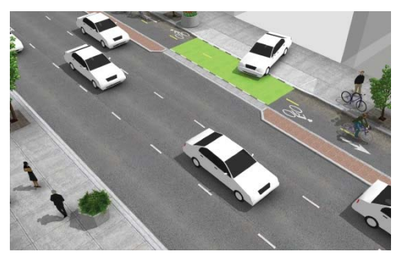
Rectangular Rapid Flashing Beacons

Rectangular rapid flashing beacons (RRFB) are pedestrian actuated devices mounted adjacent to the roadway. The beacon lights are rectangular LED lights installed below a pedestrian crosswalk sign that flash in an alternating pattern when activated. The beacon is dark when not activated. Caltrans has received approval from the Federal Highway Administration (FHWA) for use of RRFBs on a blanket basis at uncontrolled pedestrian crosswalk locations in California, including State highways and all local jurisdictions' roadways.

RRFB

Side Paths

A side path is a wide sidewalk or path, typically shared by bicyclists and pedestrians. It may or may not qualify as a Caltrans Class I Bike Path due to lack of 5-foot separation from a roadway or a vertical treatment between the path and roadway, less than standard width, or other departure from Caltrans standards. Special consideration should be made to minimize conflict and ensure visibility and awareness at intersections and driveways.



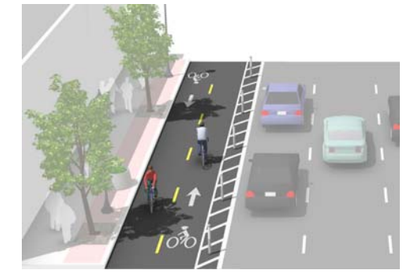
Sidepath Type Treatment

Cycle Tracks

A cycle track, also called a 'protected bike lane,' is an exclusive bike facility that provides the experience of an off-street path on street. It is physically separated from vehicle traffic and distinct from the sidewalk. The design has a number of benefits including:

- Provides dedicated and protected space for bicyclists.
- Reduces the risk of 'dooring' when compared to a standard bike lane.
- Appeals to not just experienced bicyclists, but people who bicycle on occasion and those new to bicycling.
- Low implementation costs when making use of existing pavement and drainage.

Assembly Bill 1193, Signed by Governor on September 20, 2014, amended Section 890.4 of the Streets and Highways Code to include cycle tracks as Class IV bikeways. The bill requires Caltrans to create design standards for Class IV bikeways. This document has applied design guidance from NACTO: http://nacto.org/cities-for-cycling/design-guide/cycle-tracks/two-way-cycle-tracks/



Cycle Track

Buffered Bike Lanes

A buffered bike lane is a bike lane that is buffered by a striped "shy zone" between the bike lane and the moving vehicle lane. With the shy zone, the buffered lane offers a more comfortable riding environment for bicyclists who prefer not to ride adjacent to traffic. This design has a number of benefits including:

- Provides greater shy distance between cars and bicyclists
- Provides space for bicyclists to pass each other
- Provides greater space for the bicycle travel lane without making the lane appear so wide that it may be mistaken for car use
- Appeals to not just experienced bicyclists, but people who bicycle on occasion and those new to bicycling

The recommended buffered bike lane design is the same design as a recently implemented Caltrans buffered bikeway on Sloat Boulevard in San Francisco, and is a modified version of the design guidance presented in the NACTO Urban Bikeway Design Guide. The key difference is the proposed design has an inner dashed stripe; this will permit vehicles to cross when necessary, for example to enter or exit driveways.

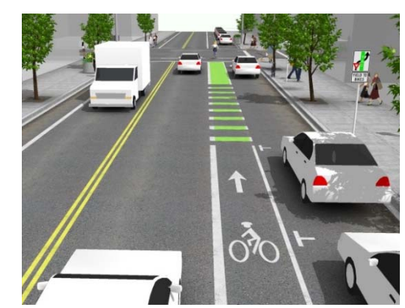
Buffered Bike Lane

Green Bike Lanes through Conflict Areas

Green bike lanes through conflict areas is the application of green coloring applied to pavement in conflict zones. Benefits of this treatment include:

- Alerts roadway users to expect bicyclists
- Assigns the right of way to bicyclists

The FHWA (Federal Highway Administration) has provided blanket approval for green colored pavement and Caltrans has also approved this treatment.



Green Bike Lanes through Conflict Areas

3.1.3 ADA Compliance – Access for People with Disabilities

The Americans with Disabilities Act (ADA) of 1990 had major significance for those who plan and design any type of publicly-used facility, including trails. The federal Architectural and Transportation Barriers Compliance Board (Access Board) is responsible for developing accessibility guidelines for new construction and alterations of facilities subject to the Americans with Disabilities Act, which applies to state and local government facilities, places of public accommodation, and commercial facilities – virtually every type of facility that is open to the public, including bicycle and pedestrian facilities, paths, and trails.

The Access Board has developed draft accessibility guidelines for public rights-of-way, including walkways and sidewalks, parking areas, and associated features. A draft version of the final guidelines has been published for Outdoor Recreation Areas, including Outdoor Recreation Access Routes between developed facilities, and trails. The Access Board has recently initiated an effort to develop guidelines for shared use paths.

Sidewalks and Pedestrian Routes

The federal guidelines for the accessibility of sidewalks, street crossings, and other elements of the public rights-of-way are contained in the Proposed Guidelines for Public Rights-of-Way, dated July 26, 2011 and available at www.access-board.gov//prowac/index.htm.

These guidelines cover facilities for pedestrian circulation and use in the right-of-way, including walkways and sidewalks, street or highway shoulders where pedestrians are not prohibited, crosswalks, islands and medians, overpasses and underpasses, on-street parking spaces and loading zones, and equipment, signals, signs, street furniture, and other appurtenances provided for pedestrians. They contain detailed guidance and links to other technical standards and guidelines, such as the Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD) 'Guide for the Planning, Design, and Operation of Pedestrian Facilities', American Association of State Highway and Transportation Officials, July 2004 and 'Designing Sidewalks and Trails for Access', FHWA/US DOT September 2001. The Guidelines are proposed rules that are expected to be adopted as law in the near future. The July 2011 Proposed Guidelines are an update of the 2005 Revised Draft Guidelines.

The Guidelines define two types of pedestrian facilities:

1. **Pedestrian Access Route:** A continuous and unobstructed walkway within a pedestrian circulation path that provides accessibility.
2. **Pedestrian Circulation Path:** A prepared exterior or interior way of passage provided for pedestrian travel.

In California, the Division of the State Architect (DSA) is the agency that develops, adopts and publishes regulations to address the state's own standards for access to people with disabilities to comply with ADA and in some cases exceed the federal standards. See: California Access Compliance Reference Manual, Division of the State Architect, 2003 or latest version.

Recreational Trails

Recreational trails can and by law must be designed for access by people with disabilities, where feasible. There are separate, more flexible standards for recreational trails from urban bicycle and pedestrian transportation facilities and routes that connect developed facilities. The standards include exceptions and exemptions for trails where meeting standards would detract from the resources that the trail is accessing, or where this is physically infeasible.

The federal guidelines are contained in the Draft Final Guidelines for Outdoor Developed Areas, dated December 18, 2009, available at www.access-board.gov/outdoor/.

These guidelines cover trails, outdoor recreation access routes, beach access routes, and picnic and camping facilities. The Guidelines are a proposed rule that is expected to be adopted as law in the near future. No changes are expected.

The Guidelines define two types of trail facilities:

1. **Outdoor Recreation Access Route:** A continuous unobstructed path designated for pedestrian use that connects accessible elements within a picnic area, camping area, or designated trailhead.
2. **Trail:** A route that is designed, constructed, or designated for recreational pedestrian use or provided as a pedestrian alternative to vehicular routes within a transportation system.

Rules for Shared Use Paths

Shared use paths (also called multi-use paths) often serve recreational purposes while providing off-road transportation routes for pedestrians, cyclists, roller skaters, and others. Currently there are no adopted federal rules or guidelines specific to the design of shared use paths for access to people with disabilities. The Access Board is initiating rulemaking to address shared use paths, and held a public information meeting on the subject at the ProWalk/ProBike 2010 Conference in September in Chattanooga, Tennessee.

The primary general design standard for shared use paths is the American Association of State Highway and Transportation Officials (AASHTO) Guidelines for Bicycle Facilities.

Comparison of Federal Standards

Table 3-2 summarizes the key federal standard dimensions for the various types of trail, bicycle, and pedestrian facilities.

Table 3-2: Key Standards for Trail, Bicycle and Pedestrian Facilities

	Class I Shared Use Path*	Pedestrian Access Route	Ramp	Outdoor Recreation Access Route **	Trail ***
Width	8′ min (low use areas) 10′ w/ 2′ shoulders ideally	48″ min with 60″ min. passing space every 200′ or less	60″ min	36″ min. with 60″ min. passing space every 1,000′ or less	36″ min. with 60″ min. passing space every 1,000′ or less
Gradient (Running Slope)	< 5% (< 1:20) any length 5-6% (1:20-16. 7) for up to 800′ 7% (1:14. 3) for up to 400′ 8% (1:12. 5) for up to 300′ 9% (1:11. 1) for up to 200′ 10% (1:10) for up to 100′ 11+% (1:9. 1) for up to 50′	1:20 (5%) max – any steeper treated as a ramp Sidewalks that abut a roadway can be as steep as the roadway and still be compliant	8. 33% (1:12) max with max 30″ rise/ 30′ length between landings at top, bottom 60″ x 60″, max 2% gradient; landing 72″ long x 60″ at change in direction	1:20 (5%) any length 1:12 (8. 33%) for up to 50′ 1:10 (10%) for up to 30′with resting intervals 60″ long, as wide as trail and max 1:33 (3. 33%) gradient	1:20 (5%) any length 1:12 (8. 33%) for up to 200′ 1:10 (10%) for up to 30′ 1:8 (12. 5%) for up to 10′ with resting intervals 60″ long, as wide as trail and max 1:20 (5%) gradient No more than 30% of the total trail length shall exceed 1:12
Cross-slope	5% max	2% max	2% max	1:33 max (3. 33%) or up to 1:20 (5%) where required for drainage	5% max
Surface	Smooth, paved	Smooth, paved	Smooth, paved	Firm and stable; there are specific standards	Firm and stable; there are specific standards
Handrails	--	--	Required on both sides of any ramp w/ rise greater than 6″	--	--

** AASHTO Guideline – there are no ADA guidelines yet*
*** All Outdoor Developed Area facilities may be exempted from the Guidelines under the following conditions (1019):*
1. Compliance is not feasible due to terrain.
2. Compliance cannot be accomplished with the prevailing construction practices.
3. Compliance would fundamentally alter the function or purpose of the facility or the setting.
4. Compliance is precluded by the: Endangered Species Act (16 U. S. C. §§ 1531 et seq.); National Environmental Policy Act (42 U. S. C. §§ 4321 et seq.); National Historic Preservation Act (16 U. S. C. §§ 470 et seq.); Wilderness Act (16 U. S. C. §§ 1131 et seq.); or other Federal, State, or local law the purpose of which is to preserve threatened or endangered species; the environment; or archaeological, cultural, historical, or other significant natural features
**** Additional exceptions to 1019 apply to an entire trail as identified in 1017. 1*

U. S. Department of Justice (DOJ) Amendment to the ADA Regulations Regarding the Use of Wheelchairs and Other Power Driven Mobility Devices 28 CFR part 35

As of March 15, 2011, a federal ADA ruling went into effect that requires managers of public facilities, including trails, to accommodate people with disabilities who wish to use various types of non-wheelchair powered vehicles for access. This issue seems to be more a concern than a common problem at this stage. By law, an assessment and policy prepared by the managing agency is the only limiting factor on the types of vehicles or devices that visitors may use. By law, the agency does not have to modify its facilities to accommodate the allowed devices, so the access requirement is different than for other ADA access.

California State Parks has adopted a policy for access by Other Power Driven Mobility Devices (OPDMDs), which are motorized accessibility devices that do not meet the definition of a wheelchair.

Federal Highway Administration (FHWA) Documents

The United States Department of Transportation (USDOT) FHWA has adopted a policy statement that bicycling and walking facilities will be incorporated into all transportation projects unless exceptional circumstances exist. FHWA references the use of the best currently available standards and guidelines such as AASHTO and the MUTCD. Furthermore, all federally funded transportation enhancement (TE) projects must be in full compliance with ADAAG.

Manual of Uniform Traffic Control Devices (MUTCD)

The MUTCD defines the standards used by road managers nationwide to install and maintain traffic control devices on all public streets, highways, bikeways, and private roads open to public traffic. The MUTCD is published by the FHWA under 23 Code of Federal Regulations (CFR), Part 655, Subpart F. The MUTCD is a compilation of national standards for all traffic control devices, including road markings, highway signs, and traffic signals. It is updated periodically to accommodate the nation's changing transportation needs and address new safety technologies, traffic control tools and traffic management techniques.

The MUTCD is the national standard, but state transportation agencies differ in how they comply with MUTCD standards. Some states adopt the MUTCD as their standard. Other states adopt the national MUTCD along with a state supplement that might prescribe which of several allowable options are selected for the state's specific purposes. Still other states, California included, use the national MUTCD as the basis for developing their own State Traffic Control Device manuals, which must be in substantial conformance to the national MUTCD. Caltrans adopted the California MUTCD (CA MUTCD) in January 2012 (see Section 4.3 of this chapter).

Designing Sidewalks and Trails for Access, Part II of II: Best Practices Design Guide

The FHWA's Designing Sidewalks and Trails for Access, Part II of II: Best Practices Design Guide (2001) is another key resource for ADA-compliant sidewalk and trail design. The Design Guide provides planning, assessment, and design guidance for trails. For the purposes of the guidebook, a trail is defined as a path of travel for recreation and/or transportation within a park, natural environment, or designated corridor that is not classified as a highway, road, street, or sidewalk. In Chapter 12 (planning) and Chapter 13 (assessment), recreation trails and shared-use paths are discussed as one unified topic. In the design chapters (Chapters 14 and 15), shared-use paths and recreation trails are discussed separately. [1]

The Vallejo Waterfront

[1] http://www.fhwa.dot.gov/environment/sidewalk2/index.htm

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4 Alignments Considered

4.1 Alignment Selection Criteria and Broad Challenges

Alignment Selection Criteria

The purpose of this study is to evaluate alternatives and identify a preferred alignment(s) for the two gaps in the Vine and Bay trails through the City of Vallejo. To reach this goal, various routes and alignments were explored with the intent to meet the objectives of the Bay Trail and the Vine Trail as well as connect northern and southern Vallejo. The Bay Trail seeks to create a route with views of and proximity to the shoreline or baylands, and to connect this to communities and destinations. The Vine Trail seeks to connect along a relatively central and direct north-south Napa Valley alignment, connecting to key local communities and destinations.

A number of criteria were developed based on input from the Vallejo community as well as the objectives of the Vine and Bay Trails. The criteria include:

- Low Stress Facility: The alignment should be able to accommodate a facility separated from vehicles.
- Community Connections: The alignment should provide direct, convenient route; connect to significant neighborhoods or community destinations.
- Bay Connections: For the Bay Trail, the alignment should strive to travel along the shoreline.
- Local Connection: For the Vine Trail, the alignment should connect to local destinations.
- Compatible with Setting: The alignment should avoid or minimize conflict with driveways, parking, privacy and perceived security.
- Public Support: The alignment should have public and local jurisdiction support.
- Minimize Environmental Challenges: The alignment should consider wetlands or riparian zones and associated permitting; potentially tree removal; impact on vehicle traffic capacity.
- Cost: The alignment should meet basic tests of cost vs. benefit, with cost considerations including environmental impact, right-of-way acquisition, and construction cost, and benefits including the ability of the facility to accommodate a wide range of users.
- Available Public Right-of-Way: The alignment can be accommodated in public ROW (no need for acquisition); or a redevelopment project affords the opportunity for access. If permission is required from another agency besides City (Caltrans, State Dept. of Fish and Wildlife) this would result in a lower rating.
    - A Cooperative Agreement with Caltrans is an alternative to an encroachment permit for work in the state right-of-way. A Cooperative Agreement is required in the case of use of state or federal funding administered through Caltrans.

The White Slough Trail

Engineering Challenges

In order to achieve a separated pathway that meets the needs of a wide range of users, several challenge points were considered and addressed, such as:

- **Use of available ROW and functional allocation of space**: The study area includes many areas that are not overseen by the City of Vallejo. Support from and coordination with these other agencies has not yet been achieved.
- **Physical barriers:** A number of physical barrier present alignment challenges. The barriers include sound walls, the rail line, and Hwy 37.
- **Connection across the Hwy 37 ramps:** Highway ramps pose engineering challenges for path crossings.
- **Crossings of and connections to busy roads:** This will be critical to the safety and utility of the potential improvements.
- **Creeks and Drainage:** Creeks and drainage culvers present challenges, pinching the available right-of-way and potential conflicts with resources and flood control operations.

A number of constraints, such as limited ROW and cost concerns, may warrant consideration of an interim phase before an ultimate alignment can be implemented.

Environmental Challenges

Some proposed trail routes are in or adjacent to wetland areas, including coastal brackish marsh or freshwater marsh habitat. There are a number of challenges aligning a trail through these wetlands, including:

Permitting

Jurisdictional wetland areas or "Waters of the United States" are protected by law and require permits from the U. S. Army Corps of Engineers for disturbance or development. Formal delineation of wetland areas according to established protocols will be required as one of the next steps for projects in or near these areas. Wetland areas have already been delineated around the SR 29/SR 37 interchange, and these areas have been reflected in the mapping for this Study.

The permits required and the process to obtain them depends on the specifics of the improvements, the habitat, and the jurisdictions:

1. Environmental technical studies – wetland delineation; wildlife field studies; cultural resources field studies; potentially traffic studies, hydrologic studies, or other studies depending on pertinent site conditions and issues.
2. Environmental analysis and documentation for the California Environmental Quality Act (CEQA), and if federal funding or jurisdiction is involved, for the national Environmental Policy Act (NEPA) which has somewhat different study and format requirements.
3. City of Vallejo grading and building permits, unless the City is the project proponent.
4. If wetlands are being impacted, a U.S. Army Corps of Engineers (USACE) Section 404 Nationwide wetlands permit – U.S. Department of Fish and Wildlife consultation and a Biological Opinion of impacts and mitigations.
5. CA Regional Water Quality Control Board project notification, with monitoring and reporting requirements.
6. CA Department of Fish and Wildlife Streambed Alteration Permit – if a creek or watercourse is involved.
7. A Bay Conservation and Development Commission (BCDC) permit for any work within 100 feet inland of the mean high tide line along the Bay.
8. Caltrans encroachment permit for any work in the state right-of-way. A cooperative agreement with Caltrans is a potential alternative to an encroachment permit. Note: if the project involved significant work in the state right-of-way such that a Local Assistance Project agreement was required, the process for environmental review and project approval would be significantly longer and more expensive.

Sensitive Habitat

The areas potentially affected by the trail routes include both freshwater marsh and brackish marsh wetland habitats. "Mixed wetland areas" shown on the map include both types. Coastal brackish marsh habitat such as the Bay wetlands in the study area provides potential habitat for a variety of special-status plant and animal species including the federal and state listed soft salty birds beak, California clapper rail, and salt marsh harvest mouse. Freshwater marsh habitat could provide habitat for the federally listed California red-legged frog and Pacific Pond turtle, which is a State Species of Special Concern. Potential impacts to these species need to be considered if there will be construction in or immediately adjacent to the wetland habitat.

Mitigation Measures

Depending on the results of more formal environmental studies, mitigation measures to avoid or minimize impacts to sensitive species and habitat may need to be developed in coordination with natural resource agencies including but not limited to the U. S. Army Corps of Engineers, U. S. Fish and Wildlife Service (USFWS), California Department of Fish and Wildlife, and San Francisco Bay Regional Water Quality Control Board.

Rare plant surveys may also be required depending on the quality of the affected habitat. Mitigation measures for potential impacts to any rare plants if found would be developed in coordination with the resource agencies with permitting authority over the project.

Design of the project to minimize fill and other impacts on wetlands and sensitive species, such as boardwalks, fencing to exclude people and dogs, or limitations on access for dogs is likely to be necessary.

Mitigation measures may include creation or restoration of on-site or off-site wetlands areas to compensate for on-site impacts, or payments into the "mitigation bank" of a major project to restore wetlands in the region.

Environmental Challenges Include Wetland Areas

4.2 Route Alternatives Evaluated

This Study reviewed a series of potential alignments between the City of Vallejo's northern border and the existing trail along the waterfront, as shown in **Figure 4-1**.

Other routes not shown on the map were considered in the early stages of the Study, such as on-street routes through residential areas. Based on feedback from community members at a public workshop on May 12, 2014, on the June 28, 2014 tour, and on feedback from the Technical Advisory Committee, the route alternatives to be formally evaluated were determined to be those illustrated in **Figure 4-1**.

Section 4.4 describes the evaluated routes and the rationale for not including them in the preferred alignment. The preferred alignments are shown in green in **Figure 4-1**.

4.3 Cost Considerations

The preliminary analysis of route alternatives identified order-of-magnitude costs for the anticipated improvements – which were not defined in enough at that point to prepare quantified detail quantified cost estimates based on unit prices (quantified cost estimates are provided for the preferred alignment in Chapter 7). Cost is a factor in the consideration of preferred and evaluated routes, but the primary drivers are feasibility and desirability.

Costs for alternative trail segments in the preliminary analysis were classified as follows:

$ = less than $100,000
$$ = $100,000 to $500,000
$$$ = $500,000 to $2 million
$$$$ = more than $2 million

Typical costs include planning, design, construction, and other anticipated implementation steps.

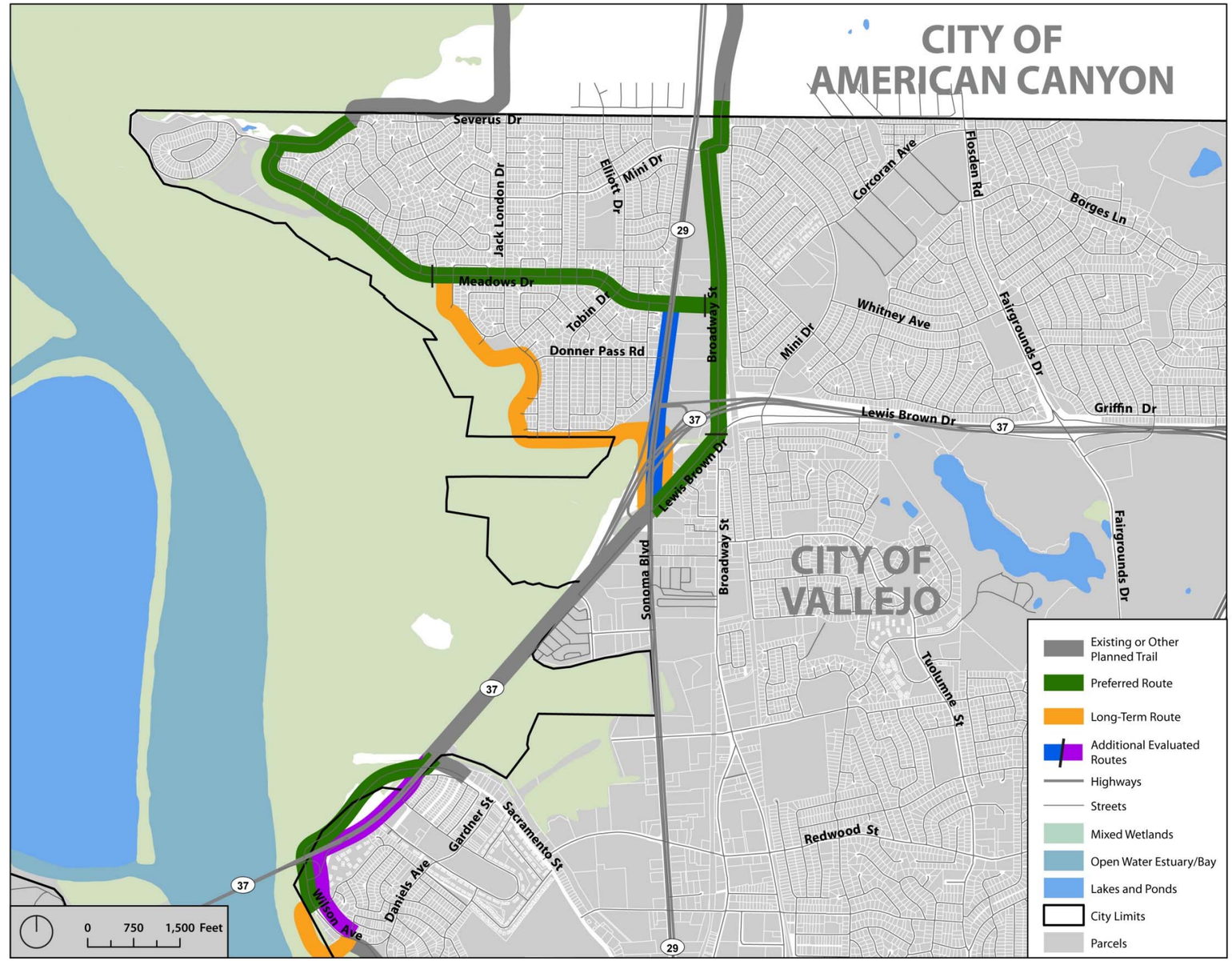

Figure 4-1: Preferred and Lower-Ranking Alignments

4.4 Lower-Ranking Route Alternatives

This section describes routes that were initially considered but not selected for further study and design because they did not perform as well against the selection criteria. These include:

- Bay Trail, from Meadows Drive extending south of the Meadows residential area and east to SR 29, then south to the White Slough Trail
- Bay Trail, from Meadows Drive at SR 29/Sonoma Boulevard south to along SR 29 to the White Slough Trail
- Vine Trail, along the south side of SR 37 from the White Slough Trail to Wilson Avenue/Lighthouse Drive

Along the east side of SR 29/Sonoma Boulevard from Meadows Drive to the White Slough Trail

This alignment (shown in blue on **Figure 4-1**) would create a trail facility on the east side of SR 29/Sonoma Boulevard between Meadows Drive and the White Slough Trail. This alignment, shown in **Figure 4-2**, has a number of challenges and is not considered a priority alignment for this study.

Challenges and opportunities are outlined below:

- High traffic volumes and speeds make this alignment less attractive to potential users.
- SR 37 ramps make this alignment less attractive to less experienced bicyclists and pedestrians.
- Continuing a Class I trail on the east side may require securing additional right-of-way for the trail on developed or undeveloped private commercial property by easement or purchase.
- North of the SR 37 overcrossing there is a drainage channel that runs under SR 29, but there appears to be room between the channel fence and the guardrail (approximately 14 feet) to continue the trail.
- South of SR 37 the trail would need to cross the eastbound on-ramp to SR 37.
- South of SR 37 eastbound ramp the trail would cross the Jack-in-the-Box and gas station driveways.
- Order-of-Magnitude Cost: $$ = $100,000 to $500,000

While none of these challenges in themselves constitute a fatal flaw, when combined they make this alignment less desirable than other alternatives.

It is also important to note that Class II bike lanes, and in some cases Class I shared-use paths, are planned for Sonoma Boulevard/SR29 in Solano and Napa counties, as described in the SR 29 Corridor Improvement Plan, the 2013 Sonoma Boulevard Corridor Design Plan, and the Sonoma Boulevard Specific Plan (currently under development).

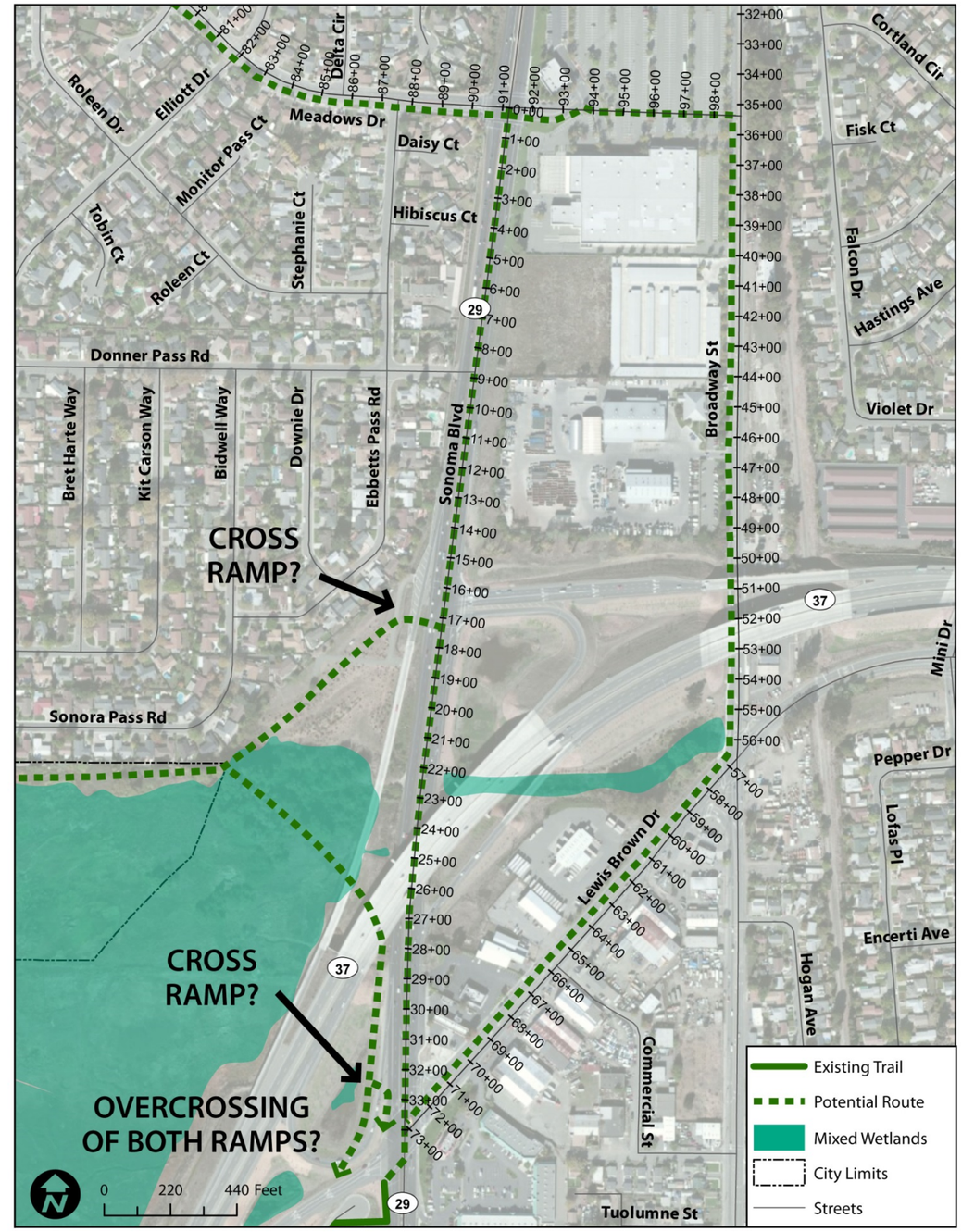

Figure 4-2: Along SR 29 south to White Slough Trail

Vine Trail along the south side of SR 37 from the White Slough Trail to Wilson Avenue/Lighthouse Drive

This alignment (shown in purple on **Figure 4-1**) would connect from the White Slough Trail under the Sacramento Street overcrossing of SR 37 and along the south side of SR 37 in the state right of way to Wilson Avenue at Light House Drive. This alignment has a number of challenges and is not considered a preferred alignment for this study (see **Figure 4-3**).

Opportunities and challenges include:

- This is a more direct route than the northern alternative along the Baylands.
- There is approximately 14 feet between the existing soundwall and the edge of the paved shoulder. The addition of a crash barrier and fence could provide a corridor for the trail while preserving a standard 8 foot shoulder. While there are precedents for such a trail (i.e. along the north side of US 101 between Mill Valley and Corte Madera), it would:
    - Require an encroachment permit and Design Exception from Caltrans due to the presence of the trail in the Clear Recovery Zone beyond the shoulder.
    - Provide a loud and hectic environment for users as opposed to the more scenic and quiet Segment 9.
- Approximately 1000 feet south of the beginning of the soundwall, the right of way widens to 60 feet or more, and there enough ROW to construct a trail to Wilson Avenue just south of the on/off ramps to 37. This would require:
- Grading of sloped landscaped area would be needed to level the right of way
- Intersection control at the SR 37 off ramp and marked crossing to bring users to the south side of Wilson Avenue where there are existing facilities.
- An alternative to routing the trail in front of the soundwall would be to create an opening in the fence between Sacramento Street and the adjacent residential neighborhood and use Fortune Street as a bypass. There are two potential points where the route could leave Fortune Street to re-enter the state right of way where it becomes wider:
- At an opening in the middle of the soundwall;
- At the west end of Fortune Street, which would require an access easement over a private residential property
- Either location would likely require retaining walls for the trail to traverse the slope.
- Order-of-Magnitude Cost: $$$ = $500,000 to $2 million

Overall, this segment is not identified as preferred because it would either place trail users in an unpleasant environment between a soundwall and a busy freeway, or be seen as intrusive if the Fortune Street bypass was used. Finally, it would be challenging to secure Caltrans approval for a trail facility in a freeway right of way.

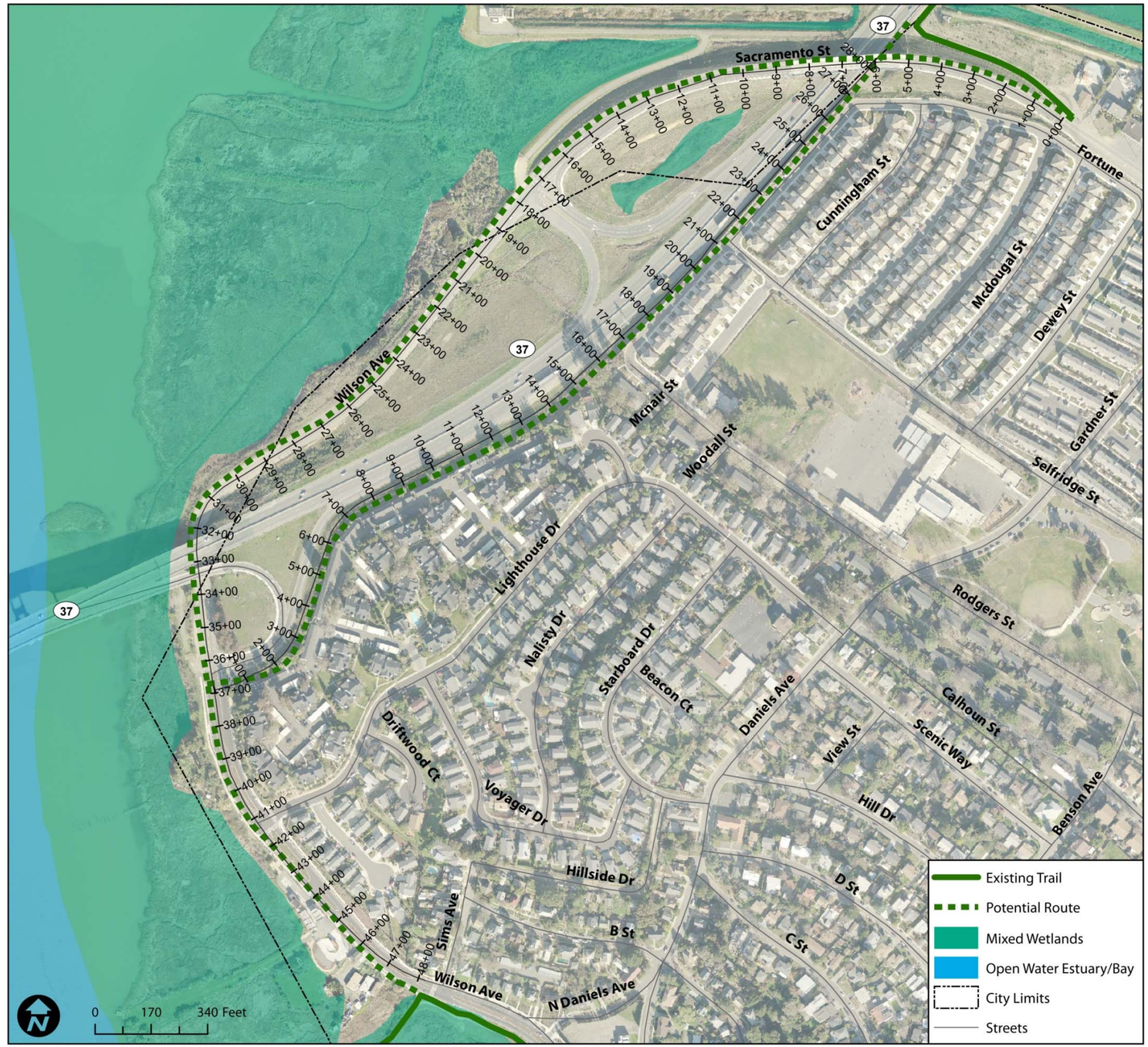

Figure 4-3: South side of SR 37 from the White Slough Trail to Wilson Avenue/Lighthouse Drive

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5 Description of Preferred Alignment

The preferred alignment includes connecting through Vallejo from the northern city limits to the White Slough Trail and continuing south to the Vallejo Waterfront.

The preferred alignment, shown in **Figure 5-1** and described in detail in the following sections, include the following segments:

- Segment 1: Bay Trail, Catalina Way and Meadows Drive from the American Canyon Trail to Sandpiper Drive
- Segment 2: Meadows Drive from Sandpiper Drive to Sonoma Boulevard and across Meadows Plaza to Broadway
- Segment 3: Broadway Street from existing path to Lewis Brown Drive
- Segment 4: Lewis Brown Drive from Broadway Street to White Slough Trail
- Segment 5: Sacramento-Wilson Avenue from White Slough Trail to Lighthouse Drive
- Segment 6 Long-Term Alignment Baylands South of Meadows Residential Area to SR 29
- Segment 7: Long-Term Alignment through Baylands west of Wilson Avenue to bypass current sidewalk-width segment

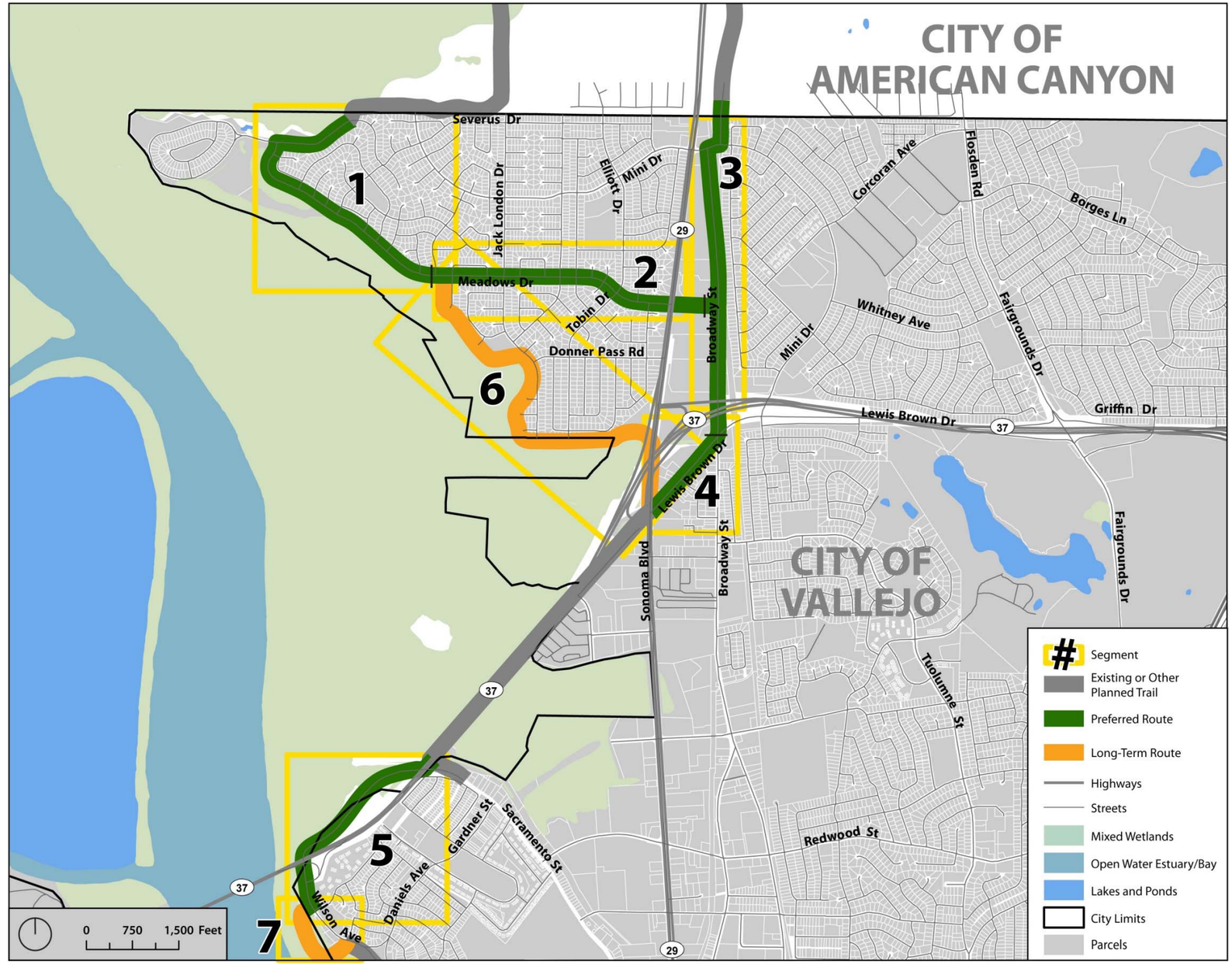


Figure 5-1: Preferred Alignment

5.1 Segment 1: Catalina Way to Sandpiper Drive

Alignment

The alignment and design concept for this segment are shown in **Figures 5-2** and **5-3** and the cross sections on this page. The figures correspond to sheets 5 and 6 of a larger-scale plan set that is provided separately (sheets 1 – 4 of the plan set are the title sheet, legend and cross sections).

Catalina Way from American Canyon Bay Trail to Meadows Drive

A 12 foot wide Class I path on the north side of Catalina Way is the preferred alignment in this area. The existing roadway is 35 feet wide and does not afford space for a path. The design concept is to create a 12 foot wide path by removing 7 feet of existing ornamental landscaping along the north side of the existing 5 foot sidewalk. The eastern portion of this segment may require short retaining walls to create additional space without impacting adjacent wetland areas.

Meadows Drive from Catalina Way to Sandpiper Drive

A two-way separated bikeway facility on the west side of Meadows Drive is the preferred alignment in this area. There is available width to construct the bikeway by reducing the number of travel lanes, as shown in the figures to the right.

Transportation Considerations

The traffic volumes on Meadows Drive could be easily accommodated with two lanes, as this segment handles less than 5,000 daily trips. Meadows Drive is approximately 60′ wide with four vehicular lanes, curbside parking, and curb and sidewalk on both sides.

The existing pavement is suitable for separated bikeway. Narrowing the road would provide traffic calming benefits to Meadows Drive, which has a 30-35 mph speed limit and is classified as a Major Collector by the City. There would be no change needed to the existing curb and sidewalk.

Environmental Considerations

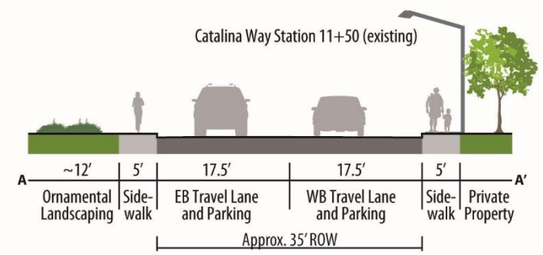
No potential wetlands appear to occur in this alignment. This alignment would occur in a densely developed residential area and expected impacts to biological resources would be minimal. Along Meadows Drive the alignment is entirely in the existing paved roadway. Along Catalina Drive, the proposed alignment involves removing a 5 foot band of ornamental landscaping along Bay wetland areas. If the ornamental trees and shrubs or grassy areas may be disturbed during work between February 1st and August 15th, preconstruction nesting bird surveys would need to be conducted to determine if nesting birds and their young are present. If active nests are found, an appropriate exclusion zone around the nest would need to be established until the young have fledged.

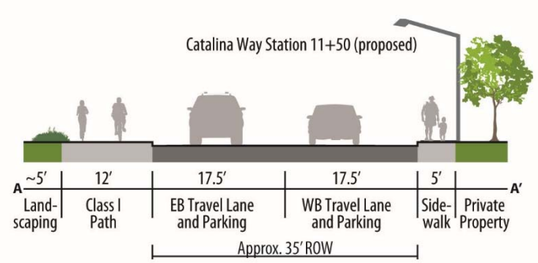
Rare plant surveys may also be required depending on the quality of the affected habitat. Mitigation measures for potential impacts to any rare plants, if found, would be developed in coordination with the resource agencies with permitting authority over the project.

Some sections would require fill or retaining walls to be constructed on slopes near jurisdictional wetlands. Depending on results of more formal environmental studies, construction work may be in or adjacent to wetland habitats that potentially support California clapper rail and California black rail. The USFWS would need to be consulted to determine if work windows should be imposed to construct outside of these birds' nesting seasons to minimize potential adverse impacts to these species during their breeding periods. Mitigation measures to avoid or minimize impacts may need to be developed in coordination with natural resource agencies.

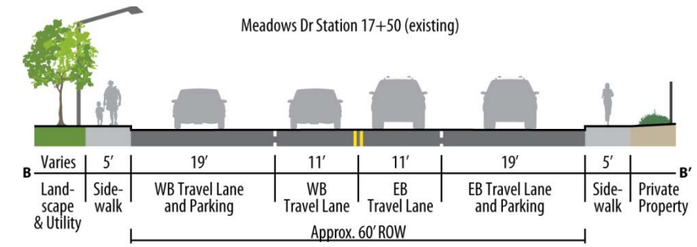
Potential Design Configuration

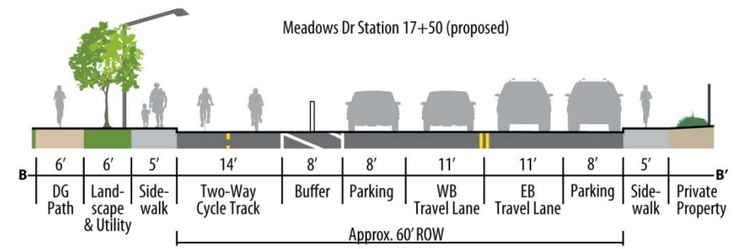
The figures below and to the right show the existing area cross section along with a potential roadway configuration. Maps showing the preferred alignment are included on the following pages, in **Figure 5-2** and **Figure 5-3**. The final design will require additional resident input and more detailed traffic and environmental analysis.



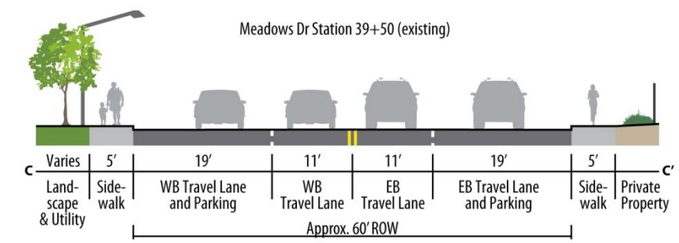


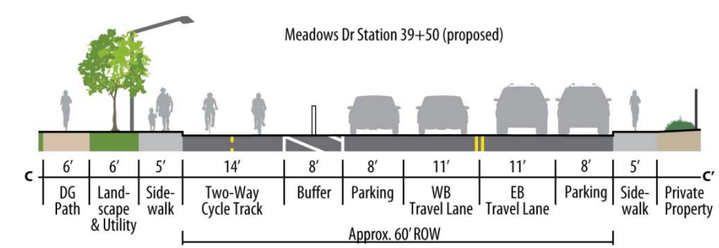
Section 5-A (see Sheet 5 of 13)





Section 5-B (see Sheet 5 of 13)





Section 6-C (see Sheet 6 of 13)

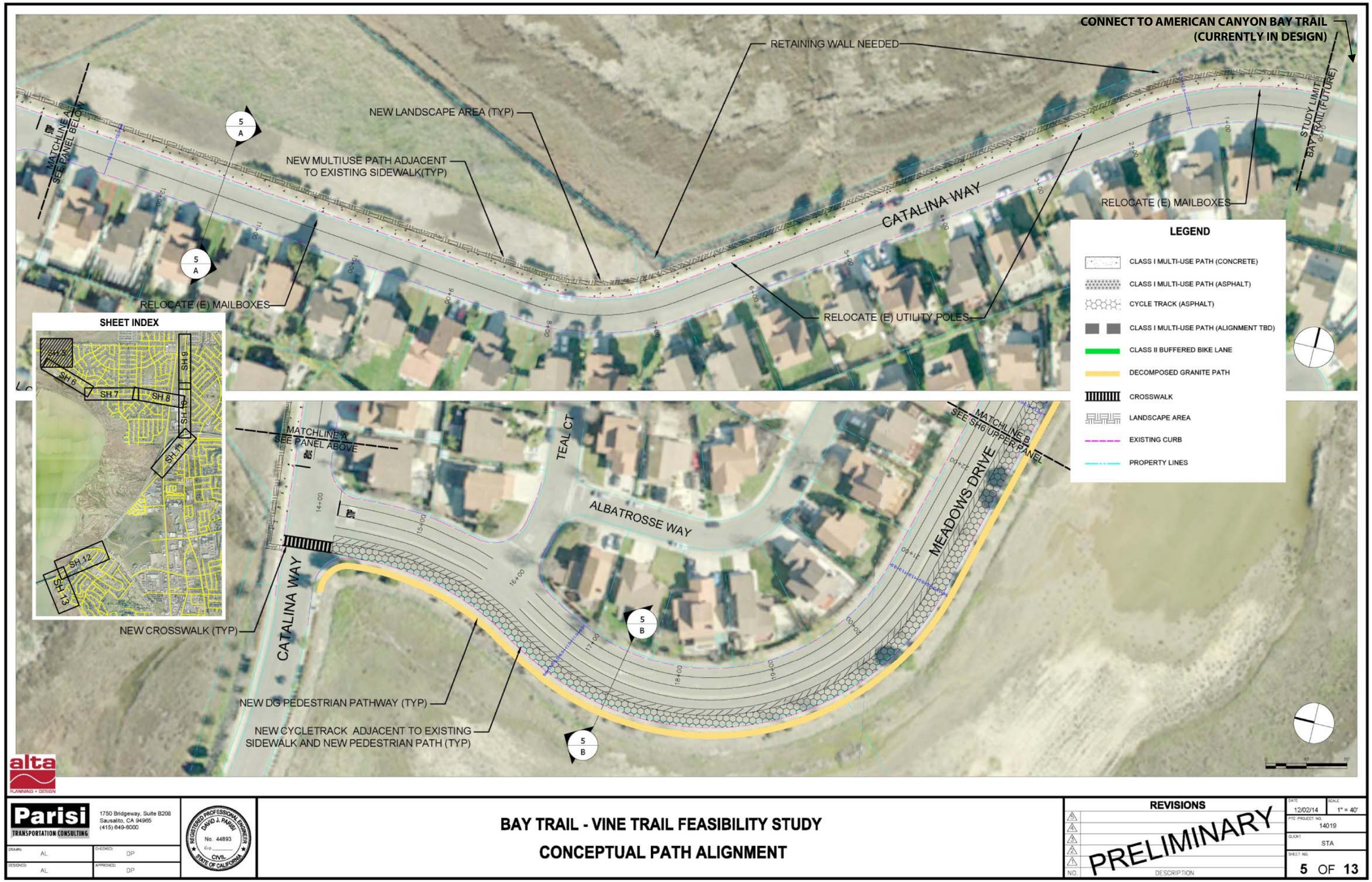


Figure 5-2: Segment 1 Detail Map A (plan set sheet 5 of 13)

Figure 5-3: Segment 1 Detail Map B (plan set sheet 6 of 13)

5.2 Segment 2: Meadows Drive East to Broadway Street

Alignment

The alignment and design concept for this segment are shown in **Figures 5-4** and **5-5** and the cross sections on this page. The figures correspond to sheets 6 and 7 of a larger-scale plan set that is provided separately.

Meadows Drive from Sandpiper Drive to Sonoma Boulevard/SR 29

Class II buffered bike lanes are recommended at this location. There is available width to construct the bikeway by reducing the number of travel lanes from four to three.

The long-term preferred alignment for this section is outboard in the Baylands south of the Meadows residential area. The combination of the permit challenges, wetland environmental impacts and mitigations make this a long term recommendations.

Meadows Drive from Sonoma Boulevard/SR 29 to Broadway Street

With the redevelopment of the former Walmart site, a separated pathway could be constructed through the parking lot bringing users to a potential signalized intersection at Broadway meeting the Vine Trail alignment on the east side of Broadway. The developer will need to secure approval for this major project from the City of Vallejo. As a condition of approval the City could require the developer to coordinate with the Bay-Vine trail project to design and construct the portion that would go through the commercial development. This would need to be designed carefully to avoid conflict with shopping traffic and pedestrian movements. The nexus and benefit to the developer is the major public investment in two regional trails that would lead directly to the commercial center and make it much easier for customers to access it by bicycling and walking.

Transportation Considerations

As with Segment 1, Meadows Drive has excess roadway capacity that could be accommodated with fewer vehicle travel lanes. This section has fronting residences on both sides of the street, with both on-street parking and driveway access. In a typical section, there are driveways every 30 to 6o feet.

Class II buffered bike lanes could be accommodated on Meadows Drive by narrowing the roadway to two travel lanes and a center turn lane. Curbside parking would remain on both sides. There would be a transition from one-way bicycle lanes to the two-way separated path at or near Sandpiper Drive.

Meadows Drive just west of Sonoma Boulevard has five vehicular lanes and is nearly 60'wide. East of Sonoma Boulevard, Meadows Drive is a commercial access road; it is approximately 65' wide with five vehicular lanes and a raised median.

Class II bike lanes could be provided on Meadow Drive by removing one westbound lane and shifting the vehicular lanes northward. The westbound Class II bike lane would run along the existing curb and sidewalk, whereas the eastbound bike lane would run between the vehicular through lane and right-turn lane.

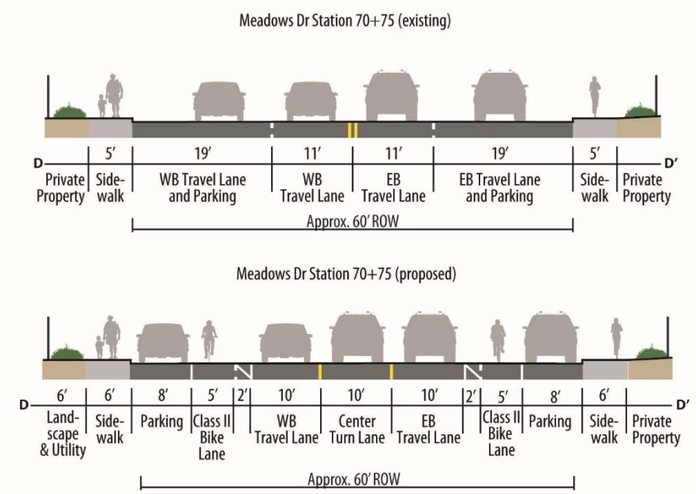
The design of the crossing of Sonoma Boulevard is a challenge, particularly westbound. A bike lane should not be placed to the right of the through/right turn lane on Meadows Drive at the westbound approach if existing vehicular signal phasing is to be used. A mixing zone with dashed green markings is not appropriate with the through lane in this major intersection. An option may be to convert one left turn lane and through-right lane to left-through lane and right turn lane. The specific design requires traffic study analysis and verification and would need to be resolved during later more detailed design stages.

Environmental Considerations

No potential wetlands appear to occur in this alignment. This alignment would occur in a residential area that is densely developed so it is expected impacts to biological resources would be minimal. However, if there are trees, shrubs or grassy areas that may be disturbed during work between February 1st and August 15th, preconstruction nesting bird surveys would need to be conducted to determine if nesting birds and their young are present. If active nests are found, an appropriate exclusion zone around the nest would need to be established until the young have fledged.

Potential Design Configuration

The figures to the right show the existing area cross section along with a potential roadway configuration. A map showing the preferred alignment is included on the following pages (**Figure 5-4** and **Figure 5-5**). The final design will require additional resident input and traffic analysis.



Section 7-D (see Sheet 7 of 13)

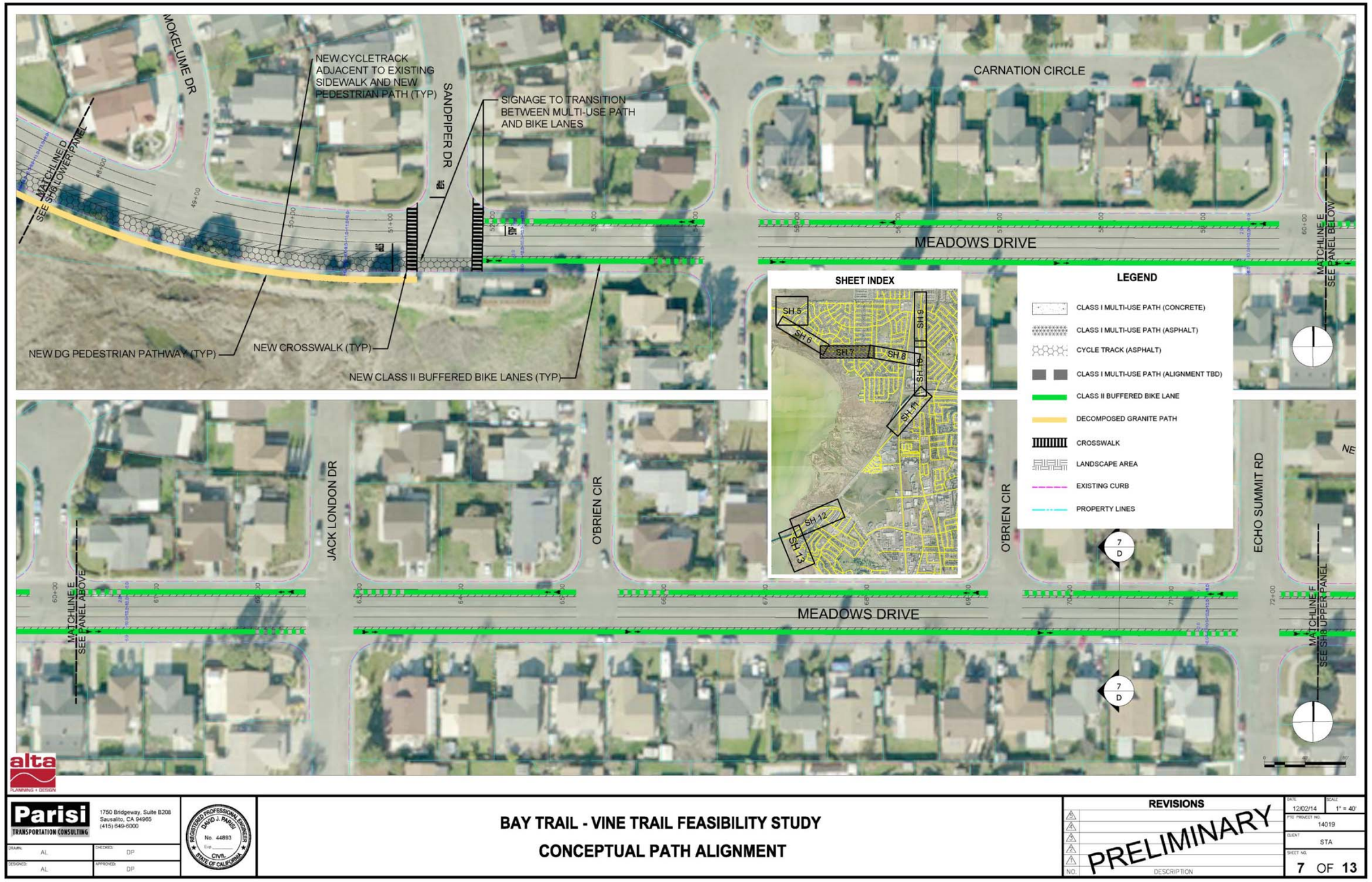


Figure 5-4: Segment 2 Detail Map A (plan set sheet 7 of 13)

Figure 5-5:Segment 2 Detail Map B (plan set sheet 8 of 13)

5.3 Segment 3: Broadway Street

Alignment

The alignment and design concept for this segment are shown in **Figures 5-6** and **5-7** and the cross sections on this page. The figures correspond to sheets 9 and 10 of a larger-scale plan set that is provided separately.

Broadway Street north of Mini Drive

A two-way separated facility on the west side of Broadway Street is the preferred alignment; it would connect directly to the section of Vine Trail in the Veterans Memorial Park.

Broadway Street south of Mini Drive

A two-way separated facility could be accommodated on the east side of Broadway to the potential signalized intersection at Meadows Plaza. At this signal, the trail would cross to the west side of Broadway where there is more available right-of-way, fewer conflicts with industrial land uses and reduces crossing exposure at Lewis Brown Drive.

Transportation Considerations

Broadway Street north of Mini Drive; Broadway south of Mini Drive

A separated two-way bicycle facility could be provided through a combination of lane narrowing and shoulder widening for both segments of Broadway, which is 30-40′ wide.

Intersection: Broadway at Mini Drive

The north and south legs of Broadway form offset T-intersections at Mini Drive. The Union Pacific Railroad runs in between the two legs of Broadway, which are 200′ apart. Mini Drive crosses the railroad at-grade immediately east of Broadway south. Mini Drive is approximately 60′ wide here with five lanes, and curb and sidewalk on both sides.

Connecting the north and south legs of Broadway through Mini Drive is critical issue for this location. The Mini Drive crossing would ideally occur at the signalized Broadway south intersection. As such, the subsequent concepts assume that a separated bikeway between Broadway north and south would be on the north side of Mini Drive.

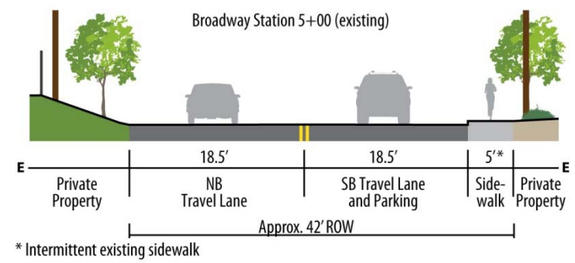
Mini Drive could be widened to the south to add a two-way bikeway and maintain the five-lane cross-section. This would require reconstructing the south side of Mini Drive, which includes curbs, sidewalks, curb ramps, signal poles, railroad crossing arms, and possible utilities.

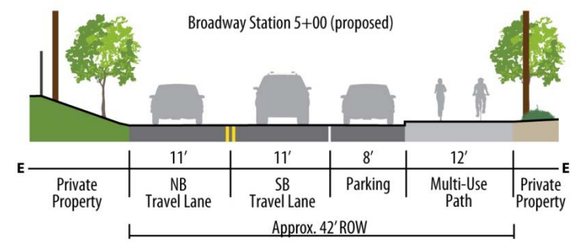
Environmental Considerations

A ditch lined with cattails occupies the east side of Broadway at the north end south of Mini. This is potential wetland, however it is proposed to remain and the path would be constructed to the east of it. This alignment would occur in a mixed commercial and residential area that is densely developed so it is expected impacts to biological resources would be minimal. The proposed improvements would occur in the existing paved roadway or dirt shoulder.

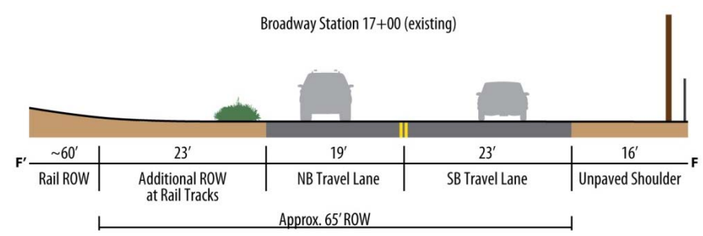
Potential Design Configuration

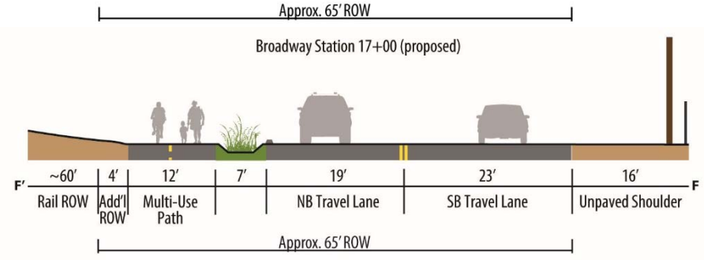
The figures to the right show the existing area cross section along with a potential roadway configuration. A map showing the preferred alignment is included on the following pages (**Figure 5-6** and **Figure 5-7**). The final design will require additional resident input and more detailed traffic and environmental analysis as well as analysis of detailed right-of-way property data.



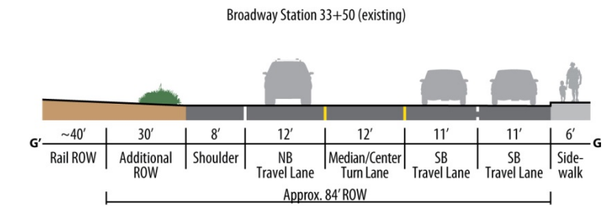


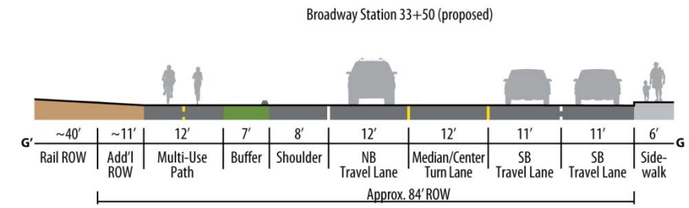
Section 9-E (see Sheet 9 of 13)



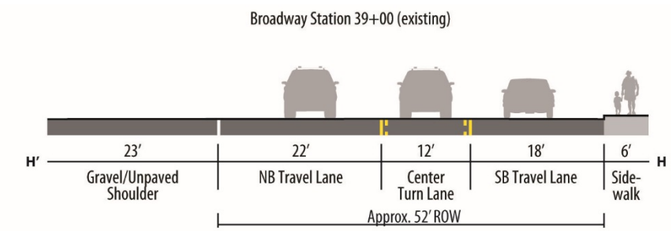


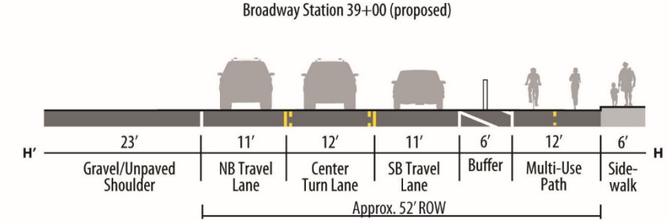
Section 9-F (see Sheet 9 of 13)





Section 10-G (see Sheet 10 of 13)





Section 10-H (see Sheet 10 of 13)

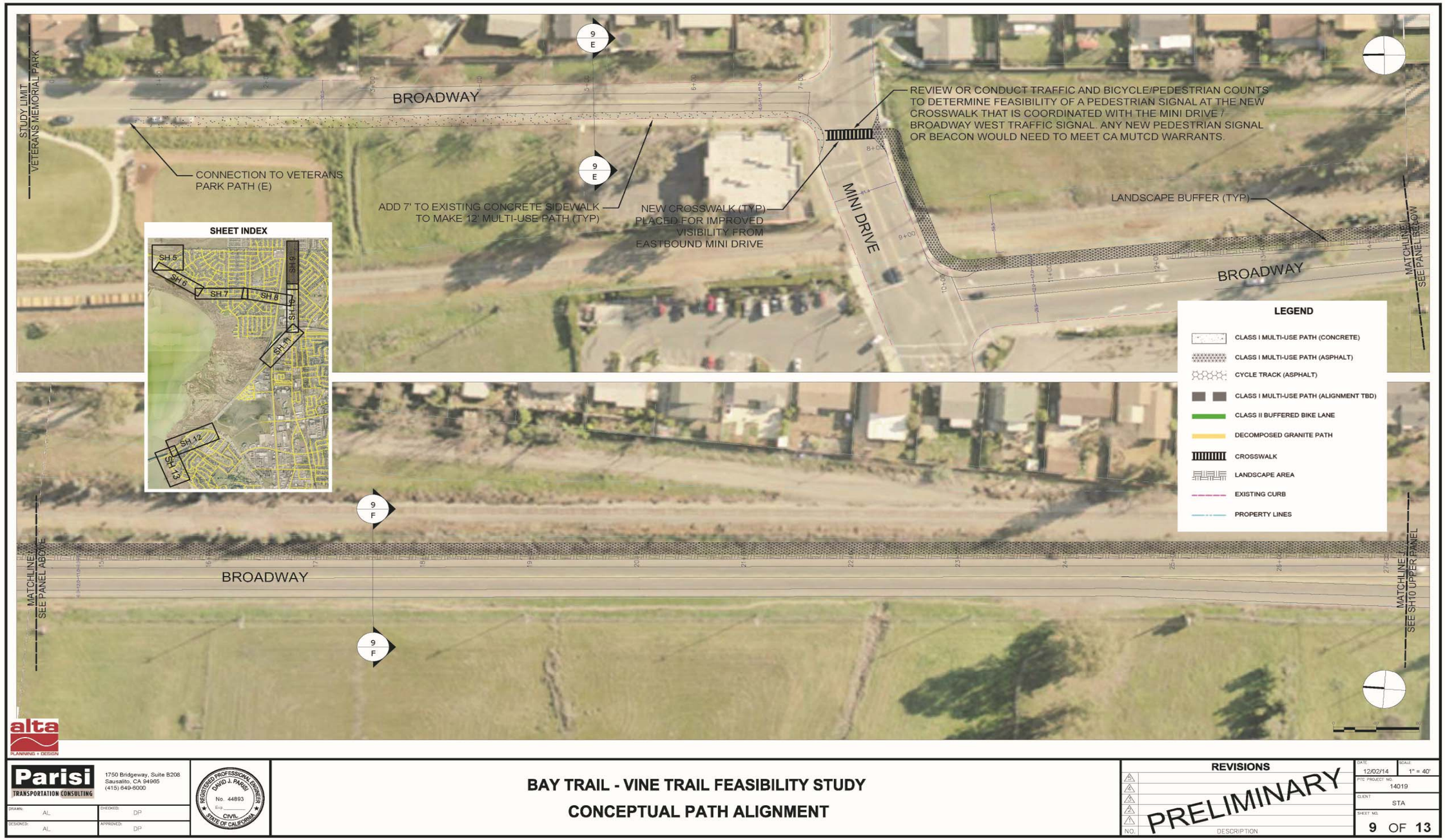


Figure 5-6: Segment 3 Detail Map A (plan set sheet 9 of 13)

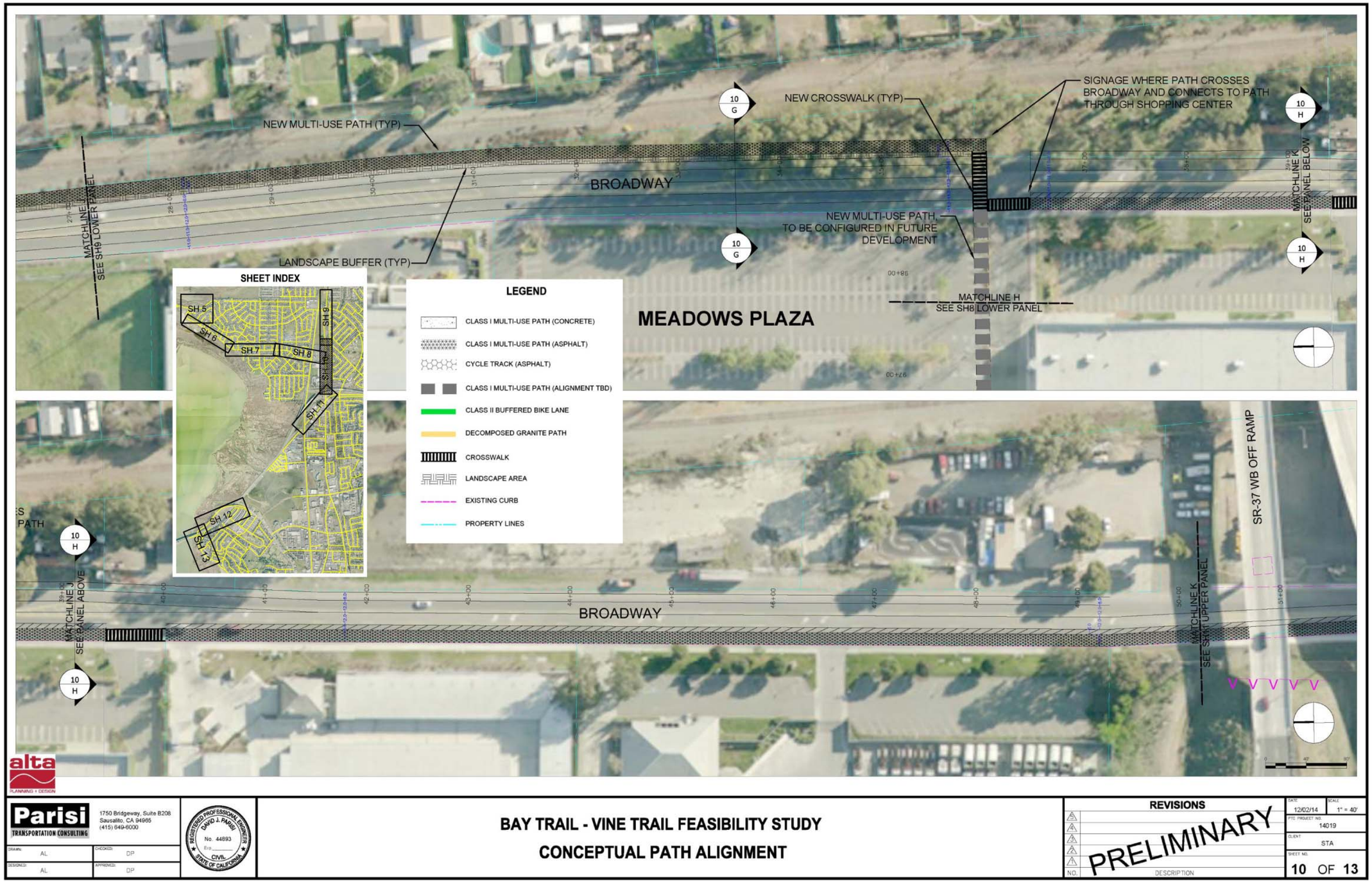


Figure 5-7: Segment 3 Detail Map B (plan set sheet 10 of 13)

5.4 Segment 4: Lewis Brown Drive to the White Slough Trail

Alignment

The alignment and design concept for this segment are shown in **Figure 5-8** and the cross sections on this page. The figure corresponds to sheet 11 of a larger-scale plan set that is provided separately.

Lewis Brown Drive, between Sonoma Boulevard and Broadway:

A two-way separated facility on the north side of Lewis Brown Drive is the preferred alignment, given the available right-of-way and lower density of uses and driveways than the south side. Lewis Brown Drive would need to be reduced from a five-lane roadway to a three-lane roadway. There is also available right-of-way to provide Class II bike lanes in both directions with the proposed "road diet."

Transportation Considerations

Lewis Brown Drive is on the former SR 37 alignment that operated prior to the SR 29/SR 37 grade-separated interchange. The roadway has nearly 80 feet of right-of-way and has largely retained its former highway cross-section with four through lanes, a center left-turn lane, and parking on both sides. Given that most traffic has diverted to SR 37 and the low density of uses fronting this street, the available roadway capacity exceeds traffic demand.

Connecting a two-way separated facility to the existing White Slough Trail would require traversing the Sonoma Boulevard / SR 37 eastbound off-ramp Lewis Brown Drive intersection. The wide approaches and skewed alignment results in several long crossings.

A dedicated signal phase could theoretically allow bicyclists to cross directly from the southwest corner (White Slough Trail) to the northeast corner (possible Lewis Brown Drive bikeway), and in the opposite direction if it was two phase. However, a new dedicated signal phase would adversely affect the traffic operations at the highly trafficked Sonoma Boulevard/SR 37 intersection. Traffic analysis to examine and refine the options should be a part of subsequent more detailed study.

Alternatively, at-grade crossings could be accommodated within the existing vehicular signal timings. Bicyclists would need to traverse two-legs of the intersection, and there would need to be improvements at each corner to provide a queuing area for bicycles. One option to examine during more detailed design stages is an actuated "No Right Turn on Red" sign at one or both corners.

Environmental Considerations

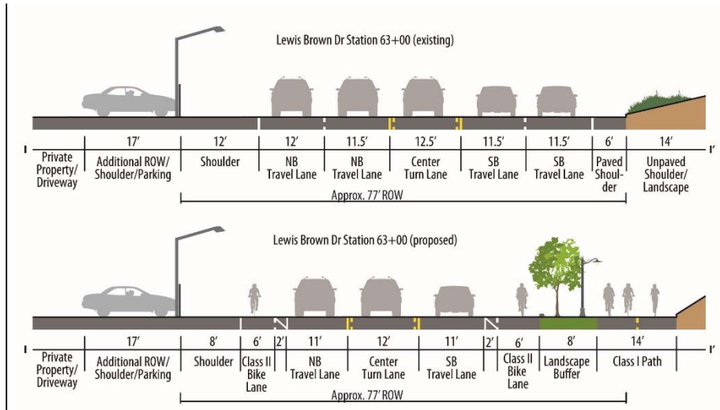
This proposed route would be constructed in commercial and industrial areas adjacent to coastal brackish marsh or freshwater marsh habitat. Coastal brackish marsh habitat provides potential habitat for a variety of special-status plant and animal species including the federal and state listed soft salty birds beak, California clapper rail, and salt marsh harvest mouse. Freshwater marsh habitat could provide habitat for the federally listed California red-legged frog and Pacific Pond turtle, which is a State Species of Special Concern. Potential impacts to these species need to be considered if there will be construction in or immediately adjacent to the wetland habitat. Depending on the results of more formal environmental studies, mitigation measures to avoid or minimize impacts may need to be developed in coordination with natural resource agencies including but not limited to the U. S. Army Corps of Engineers, U. S. Fish and Wildlife, California Department of Fish and Wildlife, and San Francisco Bay Regional Water Quality Control Board.

Mitigation measures for potential impacts to any rare plants if found would be developed in coordination with the resource agencies with permitting authority over the project.

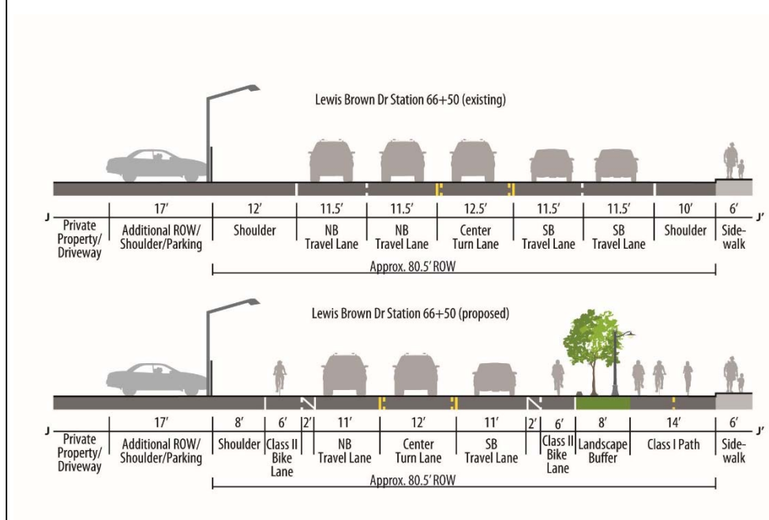
For work in upland habitats between February 1st and August 15th preconstruction nesting bird surveys would need to be conducted to avoid impacting tree and ground-nesting birds and their young. If active nests are found, an appropriate exclusion zone around the nest would be established until the young have fledged.

Potential Design Configuration

The following figures show the existing area cross section along with a potential roadway configuration. A map showing the preferred alignment is included on the following page (**Figure 5-8**). The final design will require additional resident input and more detailed traffic and environmental analysis.



Section 11-I (see Sheet 11 of 13)



Section 11-J (see Sheet 11 of 13)

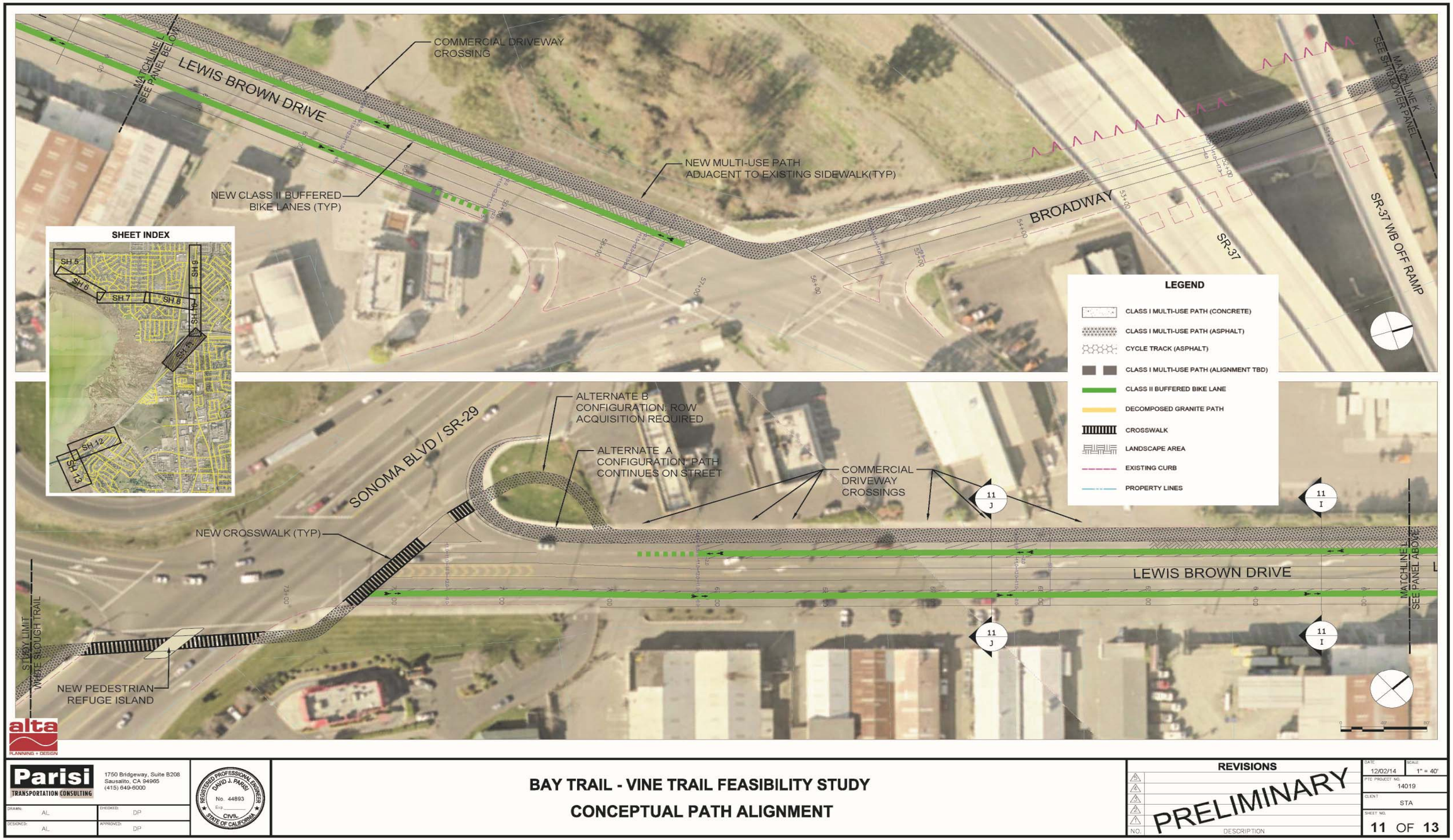


Figure 5-8: Segment 4 Detail Map (plan set sheet 11 of 13)

5.5 Segment 5: Existing White Slough Trail to Lighthouse Drive

Alignment

The alignment and design concept for this segment are shown in **Figures 5-9** and **5-10** and the cross sections on this page. The figures correspond to sheets 12 and 13 of a larger-scale plan set that is provided separately.

The preferred alignment in this area includes use of the existing sidewalk and a new Class I path on the north-west side. At the Sacramento Street overcrossing of SR 37, the design concept is to create an 8 foot Class I path separated from vehicle traffic by a 4-ft shoulder and a 2 foot wide vertical barrier. Along Wilson Avenue to Lighthouse Drive, a 12 foot wide Class I path on the outboard side is the preferred alignment. This would include widening of the existing 5′ concrete sidewalk from the SR 37 on/off ramps to Lighthouse Drive to 12′ by adding 7′ of concrete. To accommodate transition of bicyclists to/from the Class I path and the bike lanes that continue south, a new high-visibility crosswalk would be added at the north side of the Lighthouse/Wilson intersection, and pedestrian crossing signals and buttons would be added to the existing signal equipment.

Transportation Considerations

There appears to be available public right-of-way to construct the path. The existing Hwy 37 overcrossing has sufficient width to provide a Class I path provided Caltrans will accept a reduction from standard 8′ shoulders to 4′ shoulders, requiring a design exception. A short-term recommendation would be to use the existing sidewalk and bike lanes. Long-term, a bicycle and pedestrian overcrossing may be considered; however the cost for an overcrossing may be prohibitive.

The alignment would require reconfiguration of the SR 37 off ramps at Wilson Ave to provide a marked crossing on the north leg. Considerations for traffic operations need to be addressed.

A landing area on the northwest and connection to the proposed trail on the bay side would bring users to the waterfront activities and existing trail.

Environmental Considerations

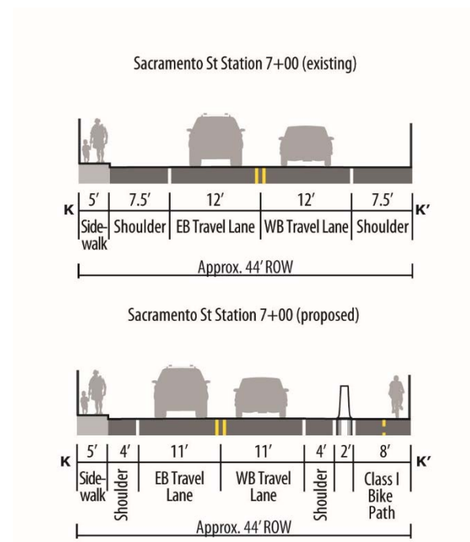
No potential wetlands appear to occur in this alignment. This alignment would occur in a disturbed area adjacent to the roadway that has revegetated with mixed native and on-native shrubs and grasses. It is expected impacts to biological resources would be minimal. However, if there are shrubs or grassy areas that may be disturbed during work between February 1st and August 15th preconstruction nesting bird surveys would need to be conducted to determine if nesting birds and their young are present. If active nests are found, an appropriate exclusion zone around the nest would need to be established until the young have fledged.

Rare plant surveys may also be required depending on the quality of the habitat to be affected. Mitigation measures for potential impacts to any rare plants if found would be developed in coordination with the resource agencies with permitting authority over the project.

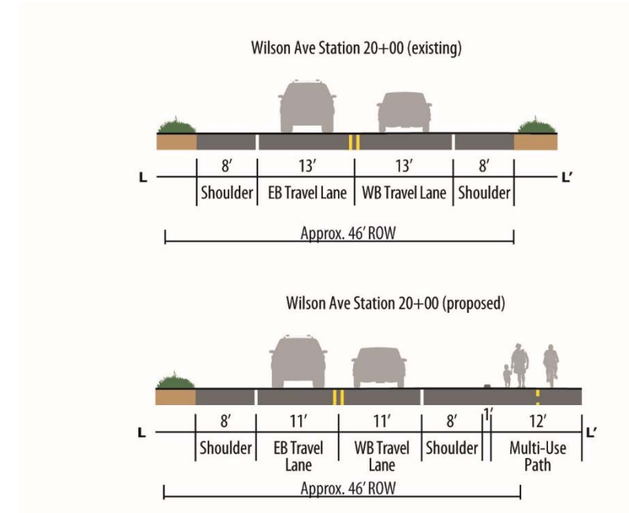
At one potential location – the north side of the proposed crosswalk at the SR 37 ramps, improvements could encroach into a drainage ditch that could potentially qualify as a jurisdictional wetland. Some sections of the trail would require fill or retaining walls to be constructed on slopes near jurisdictional wetlands. Depending on the results of more formal environmental studies, construction work may be found to occur in or adjacent to wetland habitats that potentially support California clapper rail and California black rail, the USFWS would need to be consulted to determine if work windows should be imposed to construct outside of these birds' nesting seasons to minimize potential adverse impacts to these species during their breeding periods. Mitigation measures to avoid or minimize impacts may need to be developed in coordination with natural resource agencies including but not limited to the U. S. Army Corps of Engineers, U. S. Fish and Wildlife, California Department of Fish and Wildlife, and San Francisco Bay Regional Water Quality Control Board.

Potential Design Configuration

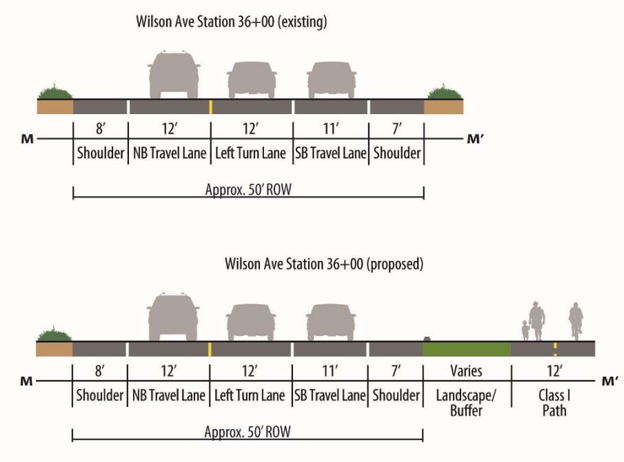
The figures to the right show the existing area cross section along with a potential roadway configuration. Maps on the following pages show the preferred alignment for this segment, in **Figure 5-9** and **Figure 5-10.** The final design will require additional resident input and more detailed traffic and environmental analysis.



Section 12-K (see Sheet 12 of 13)



Section 12-L (see Sheet 12 of 13)



Section 13-M (see Sheet 13of 13)

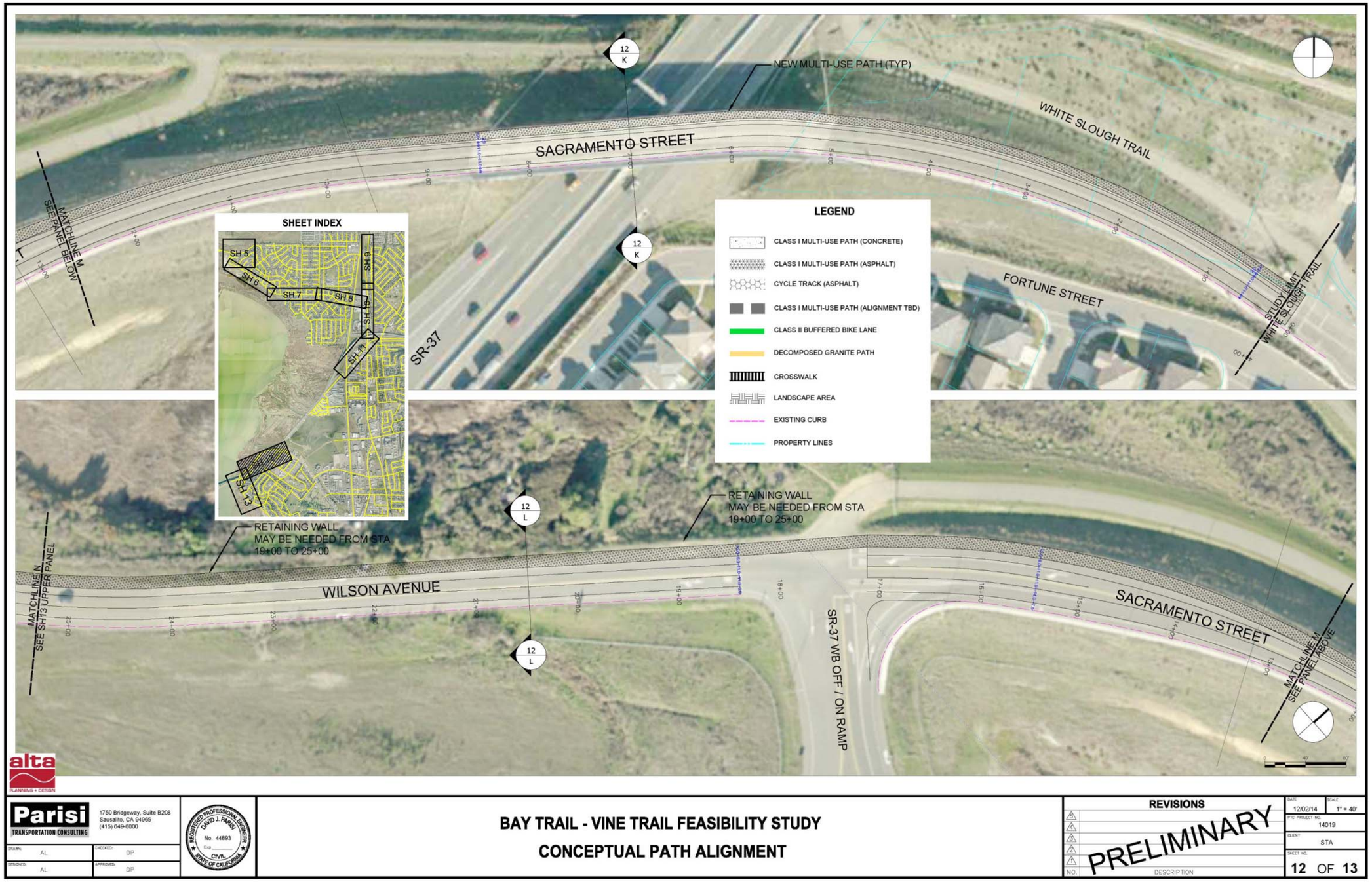


Figure 5-9: Segment 5 Detail Map A (plan set sheet 12 of 13)

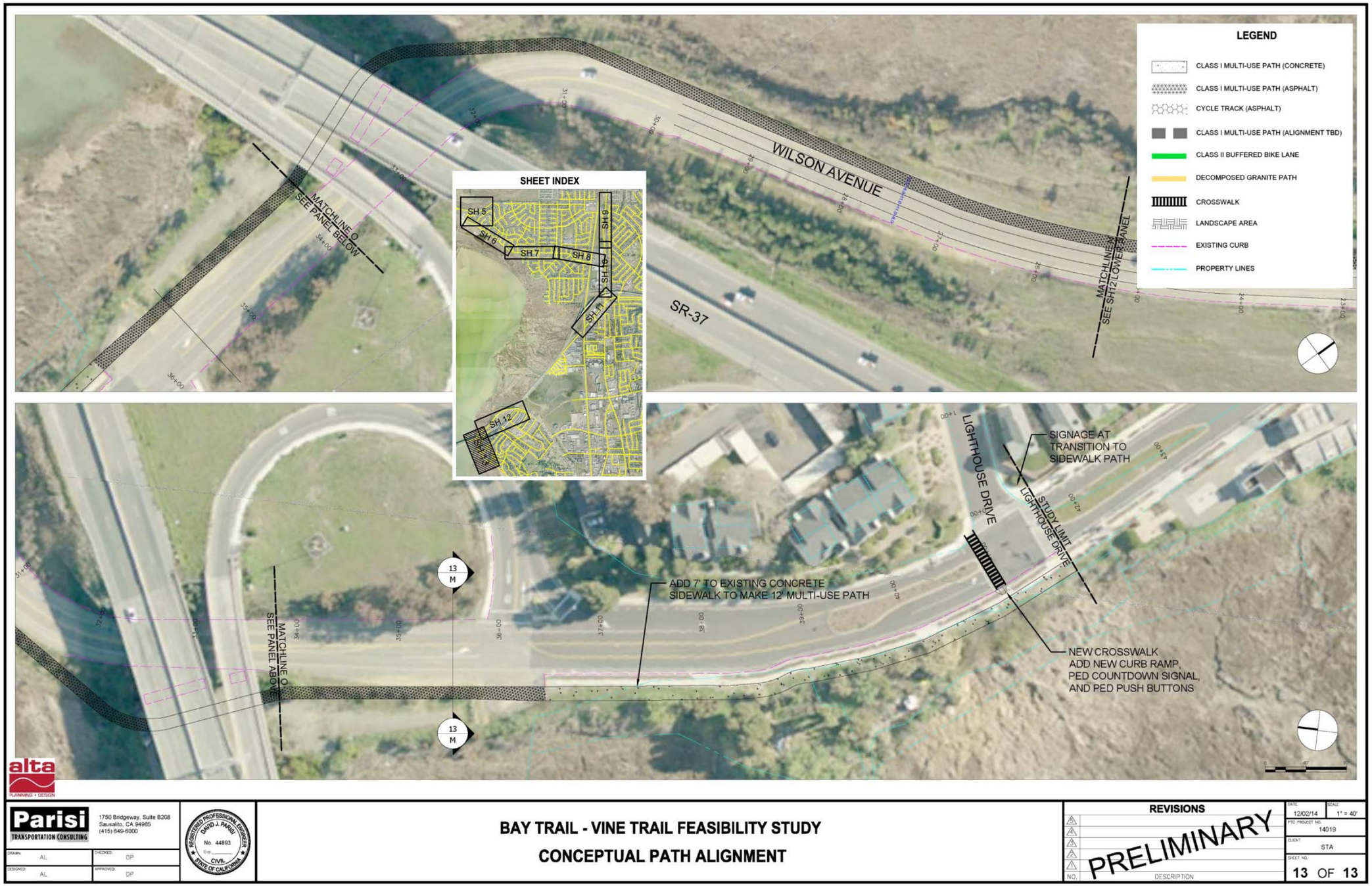


Figure 5-10: Segment 5 Detail Map B (plan set sheet 13 of 13)

5.6 Segment 6: Long-Term Alignment Baylands South of Meadows Residential Area to SR 29

This alignment (shown in orange on **Figure 5-11**) is the preferred long-term alignment for the Bay Trail. The trail would pass through upland or wetland areas that are part of the State Wildlife Refuge behind the existing homes. While this alignment would travel along the Bay and meet a number of the trail goals, it has a number of significant challenges and is not considered a possible near-term project. Challenges include:

- Impact to wetlands and potential sensitive species habitat, requiring technical studies, environmental permits, and agreement from the Wildlife Refuge managers, and potentially off-site mitigation.
- Construction of boardwalks to limit impacts on wetlands, and at least one bridge or boardwalk over a drainage channel, with associated construction and maintenance costs.
- Potential to raise safety and privacy issues with neighbors.
- Connection across SR 29 and/or SR 37 to the White Slough Trail is a major constraint. There are two potential options:
    1. The trail could be routed north to connect across SR 29 at the off-ramp from westbound SR 37 at the existing signal (see **Figure 5-12**); however there is no crosswalk at this location due to the high-speed on-ramp from southbound SR 29 to westbound SR 37. Caltrans design standards would not allow a crosswalk at such a high-speed ramp, and in general Caltrans practice is to avoid pedestrian facilities in highway ramp areas.
    2. The trail could be routed south along the west side of SR 29, under the westbound on-ramp to SR 37 to eastbound on ramp to SR 37 (see **Figure 5-13**). Here again, the route would need to cross a high speed on-ramp, with the same constraints discussed above. An alternative of constructing an under or over-crossing of the eastbound on-ramp loop and the westbound off-ramp to reach the existing end of the White Slough Trail was also considered.
- Order-of-Magnitude Cost: $$$$ = more than $2 million; includes cost for boardwalks; bridges; wetland studies, permits and mitigations; and a surface crossing of the ramp is a safe, acceptable solution can be found. If an overcrossing or tunnel is required to avoid a surface crossing of the high speed ramp, the additional cost would be in the range of $3 - $8 million, based on comparable projects.

The combination of the permit challenges, wetland environmental impacts, construction and maintenance costs, and likely neighbor concerns are factors against the short-term feasibility of this segment. However, it is the preferred long-term option.

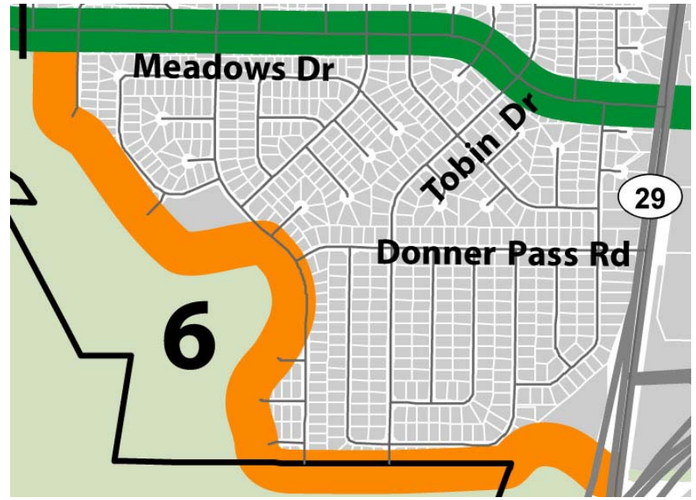


Figure 5-11: Segment 6 Bay Trail South of Meadows Neighborhood

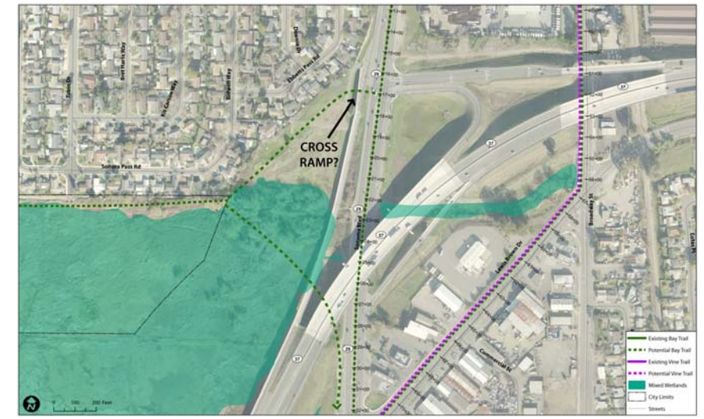


Figure 5-12: Segment 6 Bay Trail South of Meadows Neighborhood – Connection East or South

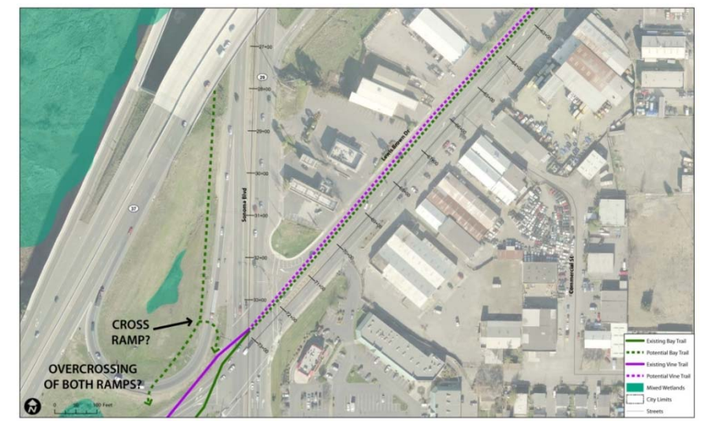


Figure 5-13: Segment 6 Bay Trail South of Meadows Neighborhood – Connection to White Slough Trail

5.7 Segment 7: Long-Term Alignment Baylands Wilson Avenue to River Park Trails

This alignment (shown in orange on **Figure 5-14**) is the preferred long-term alignment for the Bay Trail and the Vine Trail on this portion of the Vallejo waterfront. A Class I trail would extend from the end of short-term Segment 5 at Lighthouse Drive and pass through upland or wetland areas that are City or state land behind the existing convenience store and residences on the west side of Wilson Avenue to bypass the existing portion of Wilson Avenue that has only sidewalks. This would entail crossing one drainage channel with a small bridge. The trail would connect to the Class I trail in the Vallejo River Park where it currently ends near Sims Avenue. This alignment has a number of significant challenges, and is not considered a possible near-term project.

Challenges include:

- Impact to wetlands and potential sensitive species habitat, requiring technical studies, environmental permits, and agreement from the Wildlife Refuge managers, and potentially off-site mitigation.
- Construction of boardwalks to limit impacts on wetlands, and at least one bridge or boardwalk over a drainage channel, with associated construction and maintenance costs.
- Order-of-Magnitude Cost: up to $2 million; includes cost for boardwalks; bridge; and wetland studies, permits and mitigations, based on comparable projects.

If this preferred route should prove infeasible, another option may be to narrow the medians in Wilson Avenue to convert the sidewalk fronting the convenience store to Class I width.

Figure 5-14: Segment 7 Long-Term Alignment Baylands Wilson Avenue to River Park Trails

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6 Cost Estimates

This chapter presents the costs, phasing, implementation steps and funding strategy for recommended or potential trail projects.

6.1 Preliminary Cost Estimates

Planning-level cost estimates were prepared for the proposed trail improvements. The summary (**Table 6-1**) presents the estimated total cost for each trail segment. Detailed estimates are presented in **Appendix A**.

The cost estimates include planning, design, construction, and other anticipated implementation steps. The cost estimates required numerous assumptions about the details of construction and associated requirements. The estimate and assumptions reflect data available to the consultant team based on similar projects.

The estimates include cost "placeholders" for each stage of project implementation, based on factors of the construction cost, including:

- A contingency for the level of accuracy of the estimate is included at 20% of total construction. This includes construction overhead costs (mobilization, traffic control, SWPPP, and insurance).
- Design and other implementation costs allowances are included at the following percentages of construction cost:
  - Survey; boundary and topographic – 5%
  - Plans, specifications and estimates, including technical studies such as geotechnical or hazardous waste investigations – 25%
  - Environmental analysis and documentation and related permits – 1% - 15% depending on exposure to sensitive resources
  - Mitigation (actual cost will be based on existing conditions and scope of proposed changes) – 0% up to 20% depending on exposure to wetlands
  - Construction engineering – 15%

6.2 Maintenance Cost and Funding

Maintenance cost will be a very important consideration for the City of Vallejo, which would be responsible for the facilities. Added maintenance will be relatively low because many of the alignments consist of re-striping of existing paved areas that already must be maintained, but a higher standard of maintenance will be required to support these significant regional trail alignments and due to the additional signs and landscaping. **Table 6-2** provides a "placeholder" set of maintenance requirement and cost assumptions for the near-term segments.

Existing or new Landscape Maintenance Districts (LMDs) may be an option for funding maintenance of the trails. They are already being used to pay for maintenance. The Landscape Maintenance District (LMD) section City of Vallejo's Engineering Division oversees the 26 LMDs and 1 Community Facilities District (CFD) in Vallejo, including some that are on the proposed trail route. The LMD section is responsible for monitoring the contracts of each LMD and inspecting work done to ensure each region's fund is used to the greatest benefit of local residents.

An LMD is a financing vehicle utilized to make certain improvements to particular neighborhoods within the community. Fourteen LMDs are established in accordance with the Improvement Act of 1911. Property owners in these LMDs are assessed a percentage of the value of their home. Twelve LMDs are established in accordance with the California State Highway Code Landscape and Lighting Act of 1972. Property owners in these LMDs are assessed a fee based on the size of the parcel of land they occupy.

Both types of LMDs receive annual Engineering Reports, which recommend the fee required to maintain or upgrade existing LMD benefits. These findings are submitted to the City Council for a Public Hearing.

The maintenance of an added path could increase cost, but the small reduction in landscape might offset this. For example the Sandpiper LMD current has an annual budget of $19,550 for contract maintenance and $12,000 for water.

Table 6-1: Cost Estimates by Segment

Description		Totals
Segment 1: Bay Trail, Catalina Way and Meadows Drive from the American Canyon Trail to Sandpiper Drive	Construction	$554,100
Survey, design, environmental, admin and contingency	66.0%	$366,100
	Total	**$921,000**
Segment 2: Bike Lanes - Meadows Drive from Sandpiper Drive to Sonoma Boulevard and across Meadows Plaza to Broadway	Construction	$58,150
Survey, design, environmental, admin and contingency	70.0%	$41,038
	Total	**$100,000**
Segment 3: Broadway Street from existing path to Lewis Brown Drive	Construction	$914,475
Survey, design, environmental, admin and contingency	77.5%	$709,000
	Total	**$1,624,000**
Segment 4: Lewis Brown Drive from Broadway Street to White Slough Trail	Construction	$593,900
Survey, design, environmental, admin and contingency	77.5%	$460,400
	Total	**$1,055,000**
Segment 5: Sacramento-Wilson Avenue from White Slough Trail to Lighthouse Drive	Construction	$584,650
Survey, design, environmental, admin and contingency	100.0%	$584,650
	Total	**$1,170,000**
	Total for all near-term segments	**$4,870,000**
Segment 6 Long-term Alignment Baylands South of Meadows Residential Area to SR 29 with at-grade crossing of high speed ramp		**$2,000,000**
Segment 6 Long-term Alignment Baylands South of Meadows Residential Area to SR 29 with grade-separated crossing of high speed ramp		**$5,000,000 - $10,000,000**
Segment 7 Long-term Alignment Baylands		**$2,000,000**
Total for all long-term segments		**$9 million to $14 million**

Table 6-2: Maintenance Cost Estimates by Segment

Description	Unit	Annual Maintenance Unit Cost	Cost Notes	Quantity	Total Annual Maintenance Cost
Segment 1: Bay Trail, Catalina Way and Meadows Drive from the American Canyon Trail to Sandpiper Drive					
Class I Trail	miles	$5,000.00	1, 2, 3	0.27	$1,350
Cycle Track	miles	$5,000.00	1, 2, 3	0.71	$3,550
Informal DG Trail	miles	$1,000.00	4	0.71	$710
Segment 2: Meadows Drive from Sandpiper Drive to Sonoma Boulevard and across Meadows Plaza to Broadway					
Bike Lanes	miles	$5,000.00	1, 2, 3	0.69	$3,450
Segment 3: Broadway Street from existing path to Lewis Brown Drive					
Class I Trail	miles	$5,000.00	1, 2, 3	0.52	$2,600
Cycle Track	miles	$5,000.00	1, 2, 3	0.54	$2,700
Landscaping	square feet	$1.00	5	21,350	$21,350
Segment 4: Lewis Brown Drive from Broadway Street to White Slough Trail					
Class I Trail	miles	$5,000.00	1, 2, 3	0.36	$1,800
Landscaping	square feet	$1.00	5	11,900	$11,900
Segment 5: Sacramento-Wilson Avenue from White Slough Trail to Lighthouse Drive					
Class I Trail	miles	$5,000.00	1, 2, 3	0.68	$3,400
Landscaping	square feet	$1.00	5	5,400	$5,400
Total for all near-term segments					**$58,210**

Notes:
Estimate based upon conceptual designs and is to be used for planning purposes only.
Maintenance cost items:
1. 2 x annual sweeping
2. Repaint pavement markings every 10 years
3. Repair damaged signs as required
4. Repair Decomposed Granite (DG) surface as required
5. Low-maintenance plantings; drip irrigation

7 Typical Project Implementation Steps

This chapter describes the typical implementation steps that may be required to take a Bay or Vine Trail project from the current concepts through construction. It also describes the permits and approvals that may be required for project implementation.

7.1 Funding - Grant Applications

Funding will be needed for detailed design, surveying, property or easement acquisition (if required), environmental documents, preparation of construction and permit documents, and for construction. Often the funding is phased, covering only a part of the implementation process. A basic map, description, photos, and cost estimate for the proposed project must be prepared, at a minimum, to support a grant application and to compete for public or private funding. The trail concepts and costs in this Study provide good starting material for preparing grant applications and project funding proposals. Funding for the improvements could come from a number of potential funding sources secured by STA, the City of Vallejo, Caltrans, the Bay Trail or Vine Trail organizations, and other partners.

7.2 Environmental Process

All projects are subject to the California Environmental Quality Act (CEQA). A public agency must comply with CEQA when it undertakes an activity defined by CEQA as a "project." A project is an activity undertaken by a public agency or a private activity which must receive some discretionary approval (meaning that an agency has the authority to deny the requested permit or approval) which may cause either a direct physical change in the environment or a reasonably foreseeable indirect effect on the environment.

The environmental review required imposes both procedural and substantive requirements. At a minimum, an initial review of the project and its environmental effects must be conducted (Initial Study). Depending on the potential effects, a further, and more substantial, review may be conducted in the form of a Mitigated Negative Declaration or Environmental Impact Report (EIR). A project may not be approved as submitted if feasible alternatives or mitigation measures are necessary to substantially lessen the significant environmental effects of the project.

Some of the short-term improvements may be categorically exempt from CEQA. AB 2245, signed by the governor in 2012, exempts from CEQA the restriping of streets and highways for bicycle lanes in an urbanized area where the project is consistent with a prepared bicycle transportation plan. A lead agency (in this case the City of Vallejo) would be required to take specified actions with regard to making an assessment of traffic and safety impact and holding hearings before determining a project is exempt.

Projects that require federal approval, change access control on an access-controlled highway, or use federal funding are subject to the National Environmental Policy Act (NEPA). In this case most documents are prepared in such a manner to fulfill the requirements of both laws.

7.3 Base Data and Design

This process typically starts before the environmental documents are prepared. Typically the designs are developed at an approximately 30% level to provide the basis for environmental review. Once the environmental review process is completed, it can move through the more detailed stages of design and into construction. A general description of elements and steps is provided below.

Site Survey - Base Maps and Information

Detailed CAD base maps with right-of-way/property lines, topography (contour lines and/or spot elevations) and features such as roads, trees, buildings and fences must be prepared by a land surveyor or civil engineer covering the improvements and adjacent areas. The pertinent codes, policies, adjacent plans, utilities, and other background information must be analyzed to prepare specific design parameters for the project.

Project Agreements - Right-of-Way Acquisition/Permission

If acquisition or permission for use of property for the improvements is required, this will need to be secured, at least tentatively, before significant study or design work can begin, and typically must be finalized before preliminary design (when the feasible/desired alignment is defined) or at least before preparation of construction documents.

Preliminary Design

More detailed plans would be developed, with disciplines participating depending on the scope of improvements. These plans would have relatively accurate locations, dimensions, materials and features, to allow a correspondingly detailed preliminary cost estimate, but they would not have all the information required for bidding and constructing the project. The preliminary plans would be the basis for environmental documents and public and agency review of the project.

Construction Documents

The preliminary plan drawings and descriptions will need to be translated into detailed construction plans, specifications and estimate that can be used to obtain permits that require such detail, and for bidding by contractors.

7.4 Permitting and Approvals

Segments or combination of segments that are pursued as a project may involve obtaining special permits and agreements, depending on environmental setting, facility ownership, and jurisdiction. This section summarizes the major types of permits that may be required and the basic process for each.

City of Vallejo Review and Approval

Even if it is a City-sponsored project, review and approval of the plans by responsible City departments will be required, often including further public participation to refine the designs.

U.S. Army Corps of Engineers (USACE) Permit

A Section 404 Permit application to the USACE for placement of fill, including consultation with the U.S. Fish and Wildlife Service, may be required to satisfy the requirements of Section 404(b)(1) of the Clean Water Act (CWA).

A Jurisdictional Delineation Report, or wetland delineation is part of the technical studies required in any location where there is potential for wetlands to occur. This maps and obtains USACE concurrence on jurisdictional "Waters of the U.S.," including wetlands (if present), and/or "Waters of the State".

Section 401 Water Quality Certification - Regional Water Quality Control Board (RWQCB)

Many projects will be required to prepare a RWQCB CWA Section 401 Water Quality Certification (WQC) notification/application to the local RWQCB, which may include a Storm Water Pollution Prevention Plan (SWPPP). The issuance of the WQC is necessary prior to the issuance of an USACE CWA Section 404(b)(1) permit.

Streambed Alteration Agreement – California Department of Fish and Game (CDFG)

A Section 1602 Lake or Streambed Notification/Application for a Streambed Alteration Agreement will need to be submitted to CDFG for any work that may impact a stream or related riparian habitat.

Encroachment Permit - Caltrans

Where the project involves work or permanent improvements within the state highway right-of-way or county road right-of-way that would be built or maintained by others, an encroachment permit from Caltrans or the county will be required. This typically requires a maintenance agreement with either a public agency or a non-profit organization to ensure that the Bay or Vine Trail facilities in the highway right-of-way will be adequately maintained.

7.5 Contracting and Construction

When all permits and approvals are in place, and funding secured, the project can go to bid.

Bidding and Contracting

Contract bid documents for the project must be prepared, and the project must be advertised for public bid. The bids must be analyzed, and the sponsoring agency must award a construction contract to the lowest responsible bidder.

Construction

In addition to the work of the contractor, construction of a public project entails responsible agency and/or consultant staff to oversee the contractor and administer the project, including any grant-imposed procedures or paperwork.

8 Funding Sources

This chapter describes various sources of funding available to plan and construct bicycle facilities. The trail connector described in this feasibility study can be funded through multiple sources, and not all sources apply to all segments.

The following sections cover federal, state, regional, and local sources of funding, as well as some non-traditional funding sources that have been used by local agencies to fund bicycle projects.

8.1 Federal Sources

8.1.1 Moving Ahead for Progress in the Twenty-First Century (MAP-21)

The largest source of federal funding for bicyclists was the US DOT's Federal-Aid Highway Program, which Congress reauthorized roughly every six years since the passage of the Federal-Aid Road Act of 1916. The latest act, Moving Ahead for Progress in the Twenty-First Century (MAP-21) was enacted in July 2012 for a 2-year period as Public Law 112-141. The Act replaced the Safe, Accountable, Flexible, Efficient Transportation Equity Act – a Legacy for Users (SAFETEA-LU), which was valid from August 2005 - June 2012. SAFETEA-LU contained dedicated programs including Transportation Enhancements, Safe Routes to School, and Recreational Trails, which were all commonly tapped sources of funding to make non-motorized improvements nationwide. MAP-21 combined these programs into a single source called 'Transportation Alternatives' programs (TAP). Reauthorization of the federal highway bill is anticipated; however, as of December 2014, the format and shape of the funding is unknown.

More information on TAP, including eligible activities, can be found below and at: http://www.fhwa.dot.gov/map21/guidance/guidetap.cfm

In California (see Section 8.2.1 Active Transportation Program), federal monies are administered through the California Department of Transportation (Caltrans) and Metropolitan Planning Organizations (MPOs). Most, but not all, of these programs are oriented toward transportation versus recreation, with an emphasis on reducing auto trips and providing inter-modal connections. Federal funding is intended for capital improvements and safety and education programs, and projects must relate to the surface transportation system. Regional MPO money from MAP-21 is utilized in the One Bay Area Grant (OBAG) Program grants (see Section 8.3.1 One Bay Area Grant Program).

There are a number of programs identified within MAP-21 applicable to bicycle projects. These programs are discussed below.

More information: http://www.fhwa.dot.gov/map21/summaryinfo.cfm

Transportation Alternatives

Transportation Alternatives (TA) is a new funding source under MAP-21 that consolidates three formerly separate programs under SAFETEA-LU: Transportation Enhancements (TE), Safe Routes to School (SR2S), and the Recreational Trails Program (RTP). These funds may be used for a variety of pedestrian, bicycle, and streetscape projects including sidewalks, bikeways, multi-use paths, and rail-trails. TA funds may also be used for selected education and encouragement programming such as Safe Routes to School, despite the fact that TA does not provide a guaranteed set-aside for this activity as SAFETEA-LU did. MAP-21 provides $85 million nationally for the RTP. Complete eligibilities for TA include:

1. **Transportation Alternatives** as defined by Section 1103 (a)(29). This category includes the construction, planning, and design of a range of bicycle and pedestrian infrastructure including "on–road and off–road trail facilities for pedestrians, bicyclists, and other active forms of transportation, including sidewalks, bicycle infrastructure, pedestrian and bicycle signals, traffic calming techniques, lighting and other safety–related infrastructure, and transportation projects to achieve compliance with the Americans with Disabilities Act of 1990." Infrastructure projects and systems that provide "Safe Routes for Non-Drivers" is a new eligible activity.

   For the complete list of eligible activities, visit: http://www.fhwa.dot.gov/environment/transportation_enhancements/legislation/map21.cfm

2. **Recreational Trails.** TA funds may be used to develop and maintain recreational trails and trail-related facilities for both active and motorized recreational trail uses. Examples of trail uses include hiking, bicycling, in-line skating, equestrian use, and other active and motorized uses. These funds are available for both paved and unpaved trails, but may not be used to improve roads for general passenger vehicle use or to provide shoulders or sidewalks along roads.

   Recreational Trails Program funds may be used for:

   - Maintenance and restoration of existing trails
   - Purchase and lease of trail construction and maintenance equipment
   - Construction of new trails, including unpaved trails
   - Acquisition or easements of property for trails
   - State administrative costs related to this program (limited to seven percent of a state's funds)
   - Operation of educational programs to promote safety and environmental protection related to trails (limited to five percent of a state's funds)

   Under MAP-21, dedicated funding for the RTP continues at FY 2009 levels – roughly $85 million annually. California will receive $5,756,189 in RTP funds per year through FY2014.

   More info: http://www.fhwa.dot.gov/environment/recreational_trails/funding/apportionments_obligations/recfunds_2009.cfm

3. **Safe Routes to School** In 2013, Governor Brown signed legislation creating the Active Transportation Program (ATP). This program consolidated the Federal and California Safe Routes to School programs, which are intended to achieve the same basic goal of increasing the number of children walking and bicycling to school by making it safer for them to do so. All projects must be within two miles of primary or middle schools (K-8).

The Safe Routes to School Program funds non-motorized facilities in conjunction with improving access to schools through the Caltrans Safe Routes to School Coordinator.

More info: http://www.dot.ca.gov/hq/LocalPrograms/atp/

Eligible projects may include:

- **Engineering improvements.** These physical improvements are designed to reduce potential bicycle and pedestrian conflicts with motor vehicles. Physical improvements may also reduce motor vehicle traffic volumes around schools, establish safer and more accessible crossings, or construct walkways, trails or bikeways. Eligible improvements include sidewalk improvements, traffic calming/speed reduction, pedestrian and bicycle crossing improvements, on-street bicycle facilities, off-street bicycle and pedestrian facilities, and secure bicycle parking facilities.
- **Education and Encouragement Efforts.** These programs are designed to teach children safe bicycling and walking skills while educating them about the health benefits, and environmental impacts. Projects and programs may include creation, distribution and implementation of educational materials; safety based field trips; interactive bicycle/pedestrian safety video games; and promotional events and activities (e.g., assemblies, bicycle rodeos, walking school buses).
- **Enforcement Efforts.** These programs aim to ensure that traffic laws near schools are obeyed. Law enforcement activities apply to cyclists, pedestrians and motor vehicles alike. Projects may include development of a crossing guard program, enforcement equipment, photo enforcement, and pedestrian sting operations.

4. **Planning, designing, or constructing roadways within the right-of-way of former Interstate routes or divided highways.** At the time of writing, detailed guidance from the Federal Highway Administration on this new eligible activity was not available.

Average annual funds available through TA over the life of MAP-21 equal $814 million nationally, which is based on a 2% set-aside of total MAP-21 authorizations. Projected MAP-21 apportionments for California total $3,546,492,430 for FY 2013 and $3,576,886,247 for FY 2014 (*http://www.fhwa.dot.gov/MAP21/funding.cfm*). The 2% set-aside for TA funds in California will be about $71,000,000 for the next two fiscal cycles. State DOTs may elect to transfer up to 50% of TA funds to other highway programs, so the amount listed above represents the maximum potential funding.

TA funds are typically allocated through MPOs and require a 20 percent local match.

Surface Transportation Program (STP)

The Surface Transportation Program (STP) in the San Francisco Bay Area is rolled into OBAG grants (see Section 8.3.1). A wide variety of bicycle and pedestrian improvements are eligible, including on-street bicycle facilities, off-street trails, sidewalks, crosswalks, bicycle and pedestrian signals, parking, and other ancillary facilities. Modification of sidewalks to comply with the requirements of the Americans with Disabilities Act (ADA) is also an eligible activity. Unlike most highway projects, STP-funded bicycle and pedestrian facilities may be located on local and collector roads which are not part of the Federal-aid Highway System. Fifty percent of each state's STP funds are suballocated geographically by population. These funds are funneled through Caltrans to the MPOs in the state. The remaining 50% may be spent in any area of the state.

Highway Safety Improvement Program (HSIP)

MAP-21 doubles the amount of funding available through the Highway Safety Improvement Program (HSIP) relative to SAFETEA-LU. HSIP provides $2.4 billion nationally for projects and programs that help communities achieve significant reductions in traffic fatalities and serious injuries on all public roads, bikeways, and walkways. MAP-21 preserves the Railway-Highway Crossings Program within HSIP but discontinues the High-Risk Rural roads set-aside unless safety statistics demonstrate that fatalities are increasing on these roads HSIP is a data-driven funding program and eligible projects must be identified through analysis of crash experience, crash potential, crash rate, or other similar metrics. Infrastructure and non-infrastructure projects are eligible for HSIP funds. Bicycle and pedestrian safety improvements, enforcement activities, traffic calming projects, and crossing treatments for active transportation users in school zones are examples of eligible projects. All HSIP projects must be consistent with the state's Strategic Highway Safety Plan. As of the writing of this Study (December 2014), the state is updating the Strategic Highway Safety Plan.

Last updated in 2006, the California SHSP is located here: http://www.dot.ca.gov/hq/traffops/survey/SHSP/SHSP_Final_Draft_Print_Version.pdf

Pilot Transit-Oriented Development Planning

MAP-21 establishes a new pilot program to promote planning for Transit-Oriented Development. At the time of writing the details of this program are not fully clear, although the bill text states that the Secretary of Transportation may make grants available for the planning of projects that seek to "facilitate multimodal connectivity and accessibility," and "increase access to transit hubs for pedestrian and bicycle traffic."

More info: http://www.dot.gov/tiger

8.1.2 Congestion Mitigation and Air Quality Improvement Program (CMAQ)

The Congestion Mitigation and Air Quality Improvement Program (CMAQ) provides funding for projects and programs in air quality nonattainment and maintenance areas for ozone, carbon monoxide, and particulate matter which reduce transportation related emissions. These federal dollars can be used to build bicycle and pedestrian facilities that reduce travel by automobile. Purely recreational facilities are not eligible.

To be funded under this program, projects and programs must come from a transportation plan (or State (STIP) or Regional (RTIP) Transportation Improvement Program) that conforms to the SIP and must be consistent with the conformity provisions of Section 176 of the Clean Air Act.

CMAQ funding in the San Francisco Bay Area is included in the OBAG Program (see Section 8.3.1). Examples of eligible projects include enhancements to existing transit services, rideshare and vanpool programs, projects that encourage bicycle and pedestrian transportation options, traffic light synchronization projects that improve air quality, grade separation projects, and construction of high-occupancy vehicle (HOV) lanes.

8.1.3 Partnership for Sustainable Communities

Founded in 2009, the Partnership for Sustainable Communities is a joint project of the Environmental Protection Agency (EPA), the U.S. Department of Housing and Urban Development (HUD), and the U.S. Department of Transportation (USDOT). The partnership aims to "improve access to affordable housing, more transportation options, and lower transportation costs while protecting the environment in communities nationwide." The Partnership is based on five Livability Principles, one of which explicitly addresses the need for bicycle and pedestrian infrastructure ("Provide more transportation choices: Develop safe, reliable, and economical transportation choices to decrease household transportation costs, reduce our nation's dependence on foreign oil, improve air quality, reduce greenhouse gas emissions, and promote public health").

The Partnership is not a formal agency with a regular annual grant program. Nevertheless, it is an important effort that has already led to some new grant opportunities (including the TIGER grants). The City of Vallejo should track Partnership communications and be prepared to respond proactively to announcements of new grant programs.

More info: http://www.epa.gov/smartgrowth/partnership/

8.1.4 Federal Transit Act

Section 25 of the 1964 Urban Mass Transportation Act states that: "For the purposes of this Act a project to provide access for bicycles to mass transportation facilities, to provide shelters and parking facilities for bicycles in and around mass transportation facilities, or to install racks or other equipment for transporting bicycles on mass transportation vehicles shall be deemed to be a construction project eligible for assistance under sections 3, 9 and 18 of this Act." The Federal share for such projects is 90 percent and the remaining 10 percent must come from sources other than Federal funds or fare box revenues. Typical funded projects have included bike lockers at transit stations and bike parking near major bus stops. To date, no projects to provide bikeways for quicker, safer or easier access to transit stations have been requested or funded.

8.1.5 TIGER Grants

The Transportation Investment Generating Economic Recovery, or TIGER, Discretionary Grant program of the U.S. Department of Transportation provides a unique opportunity for the DOT to invest in road, rail, transit and port projects that promise to achieve critical national objectives. Since 2009, Congress has dedicated more than $4.1 billion for six rounds of grants to fund projects that have a significant impact on the Nation, a region or a metropolitan area. A variety of project types have been awarded, including over $153 million for 12 bicycle and pedestrian projects, including a grant for implementation of a portion of the Napa Valley Vine Trail.

8.1.6 Community Transformation Grants

Community Transformation Grants administered through the Center for Disease Control support community–level efforts to reduce chronic diseases such as heart disease, cancer, stroke, and diabetes. Active transportation infrastructure and programs that promote healthy lifestyles are a good fit for this program, particularly if the benefits of such improvements accrue to population groups experiencing the greatest burden of chronic disease.

More info: http://www.cdc.gov/communitytransformation/

8.2 State Sources

8.2.1 Active Transportation Program (ATP)

In 2013, Governor Brown signed legislation creating the Active Transportation Program (ATP). This program is a consolidation of the Federal Transportation Alternatives Program (TAP), California's Bicycle Transportation Account (BTA), and Federal and California Safe Routes to School (SRTS) programs.

The ATP program is administered by Caltrans Division of Local Assistance, Office of Active Transportation and Special Programs.

The ATP program goals include:

- Increase the proportion of trips accomplished by biking and walking,
- Increase safety and mobility for nonmotorized users,
- Advance the active transportation efforts of regional agencies to achieve greenhouse gas reduction goals,
- Enhance public health,
- Ensure that disadvantaged communities fully share in the benefits of the program, and
- Provide a broad spectrum of projects to benefit many types of active transportation users.

As of this Plan (May 2014), the first call for projects is awarded. The Cycle 2 statewide call for projects is anticipated in Spring 2015.

The California Transportation Commission ATP Guidelines are available here: http://www.catc.ca.gov/meetings/agenda/2014Agenda/2014_03/03_4.12.pdf

Eligible bicycle, pedestrian and Safe Routes to School projects include:

- Infrastructure Projects: Capital improvements that will further program goals. This category typically includes planning, design, and construction.
- Non-Infrastructure Projects: Education, encouragement, enforcement, and planning activities that further program goals. The focus of this category is on pilot and start-up projects that can demonstrate funding for ongoing efforts.
- Infrastructure projects with non-infrastructure components

The minimum request for non-SRTS projects is $250,000. There is no minimum for SRTS projects.

The local match requirement for non-SRTS projects is 11.47%. There is no local match requirement for projects benefiting a disadvantage community, stand along non-infrastructure projects and SRTS projects.

Annual funds will be approximately $130 million for fiscal year 2013-2014. In the initial program, a minimum of $24 million per year is available for SRTS projects, with at least $7.2 million for non-infrastructure grants.

More info: http://www.dot.ca.gov/hq/LocalPrograms/atp/

8.2.2 State Highway Account

Section 157.4 of the Streets and Highways Code requires Caltrans to set aside $360,000 for the construction of non-motorized facilities that will be used in conjunction with the State highway system. The Office of Bicycle Facilities also administers the State Highway Account fund. Funding is divided into different project categories. Minor B projects (less than $42,000) are funded by a lump sum allocation by the CTC and are used at the discretion of each Caltrans District office. Minor A projects (estimated to cost between $42,000 and $300,000) must be approved by the CTC. Major projects (more than $300,000) must be included in the State Transportation Improvement Program and approved by the CTC. Funded projects have included fencing and bicycle warning signs related to rail corridors.

8.2.3 Climate Ready Grant Program - California State Coastal Conservancy

Climate Ready grants are intended to encourage local governments and non-governmental organizations to advance planning and implementation of on-the-ground actions that reduce greenhouse gas emissions and lessen the impacts of climate change on California's coastal communities. The grant program makes eligible "development of multi-use trails with clearly identified GHG reduction goals; (and) protecting and managing open space lands with clearly identified GHG reduction goals." A total of $1,500,000 is available on a competitive basis, with a minimum award of $50,000 and a maximum of $200,000. The size of awarded grants will be based on each project's needs, its overall benefits, and the extent of competing demands for funds.

More info: http://scc.ca.gov/2013/04/24/grant-opportunities/

8.2.4 Office of Traffic Safety (OTS) Grants

Office of Traffic Safety grants are supported by Federal funding under the National Highway Safety Act. In California, the grants are administered by the Office of Traffic Safety.

Grants are used to establish new traffic safety programs, expand ongoing programs or address deficiencies in current programs. Bicycle safety is included in the list of traffic safety priority areas. Eligible grantees are governmental agencies, state colleges, state universities, local city and county government agencies, school districts, fire departments, and public emergency services providers. Grant funding cannot replace existing program expenditures, nor can traffic safety funds be used for program maintenance, research, rehabilitation, or construction. Grants are awarded on a competitive basis, and priority is given to agencies with the greatest need. Evaluation criteria to assess need include potential traffic safety impact, collision statistics and rankings, seriousness of problems, and performance on previous OTS grants.

The California application deadline is January of each year. There is no maximum cap to the amount requested, but all items in the proposal must be justified to meet the objectives of the proposal.

More info: http://www.ots.ca.gov/

8.3 Regional & Local Sources

8.3.1 One Bay Area Grant (OBAG) Program

This funding source managed by the Metropolitan Transportation Commission (MTC) establishes program commitments and policies for investing roughly $800 million over the four-year period that includes fiscal years 2012/13 – 2015/16. The OBAG program is a new funding approach that integrates the region's federal transportation program with California's climate law (Senate Bill 375, Steinberg, 2008) and the Sustainable Communities Strategy. Funding distribution to the counties will consider progress toward achieving local land-use and housing policies based on specifically designated allocation areas and design policies (Complete Streets).

The OBAG program allows flexibility to invest in transportation categories such as Transportation for Livable Communities, bicycle and pedestrian improvements, local streets and roads preservation, and planning activities, while also providing specific funding opportunities for Safe Routes to School (SR2S) and Priority Conservation Areas.

More info: http://www.mtc.ca.gov/funding/onebayarea/

While the previous round of OBAG grants funded projects through FY 2015-16, there is the opportunity for MTC to issue a new call for OBAG applications after the 205-16 financial year.

8.3.2 San Francisco Bay Trail Project

The Bay Trail Project is a non-profit founded in 1990 that is governed by a 28-member volunteer board of directors. The Bay Trail Project is administered by a small paid staff under the auspices of the Association of Bay Area Governments (ABAG) at ABAG's offices in Oakland. The Bay Trail Project receives private donations and public grants, and in turn makes project grants for studies, design, and implementation, including part of the funding for the current study. *More info: http://www.baytrail.org/*

8.3.3 Napa Valley Vine Trail

The Napa Valley Vine Trail Coalition is a very active nonprofit that has secured private donations and public grant funding to implement other segments of the Vine Trail, and that provided part of the funding for the current study. *More info: http://vinetrail.org/*

8.3.4 Transportation Fund for Clean Air

In Solano County, the Bay Area Air Quality Management District administers the Bay Area Regional Transportation Fund for Clean Air program (TFCA). Funds are provided by a $4 surcharge on motor vehicles registered in the Bay Area, which generates approximately $22 million per year for the program. Projects can be submitted through two channels: the Regional Fund, which administers approximately 60 percent of the TFCA revenue, and the County Program Manager Fund, which administers the remaining 40 percent. Eligible projects include bicycle facility improvements such as bikeways and bicycle parking.

More info: http://www.baaqmd.gov/Divisions/Strategic-Incentives/Funding-Sources/TFCA.aspx

8.3.5 Developer Impact Fees

As a condition for development approval, municipalities can require developers to provide certain infrastructure improvements, which can include bikeway projects. These projects have commonly provided Class 2 facilities for portions of on street, previously planned routes. They can also be used to provide bicycle parking or shower and locker facilities. The type of facility that should be required to be built by developers should reflect the greatest need for the particular project and its local area. Legal challenges to these types of fees have resulted in the requirement to illustrate a clear nexus between the particular project and the mandated improvement and cost.

8.3.6 New Construction

Future road widening and construction projects are one means of providing on street bicycle facilities. To ensure that roadway construction projects provide bike lanes where needed, it is important that the review process includes input pertaining to consistency with the proposed system. In addition, California's 2008 Complete Streets Act and Caltrans's Deputy Directive 64 require that the needs of all roadway users be considered during "all phases of state highway projects, from planning to construction to maintenance and repair."

More info: http://www.dot.ca.gov/hq/tpp/offices/ocp/complete_streets.html

8.3.7 Restoration

Cable TV and telephone companies sometimes need new cable routes within public rights of way. Recently, this has most commonly occurred during expansion of fiber optic networks. Since these projects require a significant amount of advance planning and disruption of curb lanes, it may be possible to request reimbursement for affected bicycle facilities to mitigate construction impacts. In cases where cable routes cross undeveloped areas, it may be possible to provide for new bikeway facilities following completion of the cable trenching, such as sharing the use of maintenance roads.

8.4 Private Sources

Private funding sources can be acquired by applying through the advocacy groups such as the League of American Bicyclists and the Bikes Belong Coalition. Most of the private funding comes from foundations wanting to enhance and improve bicycle facilities and advocacy. Grant applications will typically be through the advocacy groups as they leverage funding from federal, state and private sources. Below are several examples of private funding opportunities available.

8.4.1 Bikes Belong Grant Program

The Bikes Belong Coalition of bicycle suppliers and retailers has awarded $1.2 million and leveraged an additional $470 million since its inception in 1999. The program funds corridor improvements, mountain bike trails, BMX parks, trails, and park access. It is funded by the Bikes Belong Employee Pro Purchase Program.

More info: http://www.bikesbelong.org/grants/

8.4.2 Bank of America Charitable Foundation, Inc.

The Bank of America Charitable Foundation is one of the largest in the nation. The primary grants program is called Neighborhood Excellence, which seeks to identify critical issues in local communities. Another program that applies to greenways is the Community Development Programs, and specifically the Program Related Investments. This program targets low and moderate income communities and serves to encourage entrepreneurial business development.

More info: http://www.bankofamerica.com/foundation

8.4.3 Robert Wood Johnson Foundation

The Robert Wood Johnson Foundation was established as a national philanthropy in 1972 and today it is the largest U.S. foundation devoted to improving the health and health care of all Americans. Grant making is concentrated in four areas:

- To assure that all Americans have access to basic health care at a reasonable cost
- To improve care and support for people with chronic health conditions
- To promote healthy communities and lifestyles
- To reduce the personal, social and economic harm caused by substance abuse: tobacco, alcohol, and illicit drugs

More info: http://www.rwjf.org/applications/

8.4.4 Community Action for a Renewed Environment (CARE)

CARE is a competitive grant program that offers an innovative way for a community to organize and take action to re-duce toxic pollution in its local environment. Through CARE, a community creates a partnership that implements solutions to reduce releases of toxic pollutants and minimize people's exposure to them. By providing financial and technical assistance, EPA helps CARE communities get on the path to a renewed environment. Transportation and "smart-growth" types of projects are eligible. Grants range between $90,000 and $275,000.

More information: http://www.epa.gov/care/

8.4.5 Corporate Donations

Corporate donations are often received in the form of liquid investments (i.e. cash, stock, bonds) and in the form of land. Employers recognize that creating places to bike and walk is one way to build community and attract a quality work force. Bicycling and outdoor recreation businesses often support local projects and programs. Municipalities typically create funds to facilitate and simplify a transaction from a corporation's donation to the given municipality. Donations are mainly received when a widely supported capital improvement program is implemented. Such donations can improve capital budgets and/or projects.

8.5 Other Sources

Local sales taxes, fees and permits may be implemented as new funding sources for bicycle projects. However, any of these potential sources would require a local election. Volunteer programs may be developed to substantially reduce the cost of implementing some routes, particularly multi use paths. For example, a local college design class may use such a multi-use route as a student project, working with a local landscape architectural or engineering firm. Work parties could be formed to help clear the right of way for the route. A local construction company may donate or discount services beyond what the volunteers can do. A challenge grant program with local businesses may be a good source of local funding, in which the businesses can “adopt” a route or segment of one to help construct and maintain it.

Appendix A. Preliminary Cost Estimates

This Appendix presents preliminary cost estimates for the trail alignment. Planning-level cost estimates were prepared for the proposed trail improvements. **Table A-1** presents unit costs used in the estimates. The summary (**Table A-2**: Cost Estimates by Segment presents the estimated total cost for each trail segment. Detailed estimates are presented in **Table A-3** through **Table A-7**.

The cost estimates include planning, design, construction, and other anticipated implementation steps. The cost estimates required numerous assumptions about the details of construction and associated requirements. The estimate and assumptions reflect data available to the consultant team based on similar projects.

The estimates include cost "placeholders" for each stage of project implementation, based on factors of the construction cost, including:

- A contingency for the level of accuracy of the estimate is included at 20% of total construction. This includes construction overhead costs (mobilization, traffic control, SWPPP, and insurance).
- Design and other implementation costs allowances are included at the following percentages of construction cost:
  - Survey; boundary and topographic – 5%
  - Plans, specifications and estimates, including technical studies such as geotechnical or hazardous waste investigations – 25%
  - Environmental analysis and documentation and related permits – 1% - 15% depending on exposure to sensitive resources
  - Mitigation (actual cost will be based on existing conditions and scope of proposed changes) – 0% - 2.5% (for segments with improvements within the existing right-of-way); 5% for projects with potential impacts to drainage ditches, and 20% (for segments with improvements that are adjacent to wetlands)
  - Construction engineering – 15%

Table A-1 Unit Costs

No.	Description	Unit	Cost or Percentage
1	**Mobilization**	LS	5.00%
2	**General Conditions, Bonds and Insurance**	LS	2.00%
3	**Erosion Control - includes all BMPs, SWPPP and Reporting**	LS	5.00%
4	**Traffic Control** (except as noted)	LS	10.00%
5	**Sitework, Demolition and Removal** - includes all demolition, site preparation for all construction; relocation or re-setting of utilities; temporary construction fencing		
5.1	Sawcut pavement	LF	$5.00
5.2	Remove AC pavement	SF	$0.25
5.3	Remove concrete pavement	SF	$0.25
5.4	Tree Removal	EA	$500.00
5.5	Relocate Existing Street Light	EA	$8,000.00
5.6	Remove and Relocate Existing Mailboxes	EA	$500.00
5.7	Remove Existing Storm Drain Culvert	EA	$1,000.00
5.8	Remove and Relocate Existing Roadside Sign	EA	$300.00
5.9	Remove Existing Striping (No Lead Present)	LF	$1.00
6	**Earthwork**		
6.1	Clearing and Grubbing	SF	$0.25
6.2	Excavation and Grading	CY	$50.00
6.3	Embankment, Import Borrow	CY	$30.00
6.4	Soil for new landscape areas	CY	$50.00
7	**Concrete Work and Asphalt Paving** - includes concrete curbs, 4" PCC sidewalk, Type I pedestrian ramps, concrete pads, Class I Trail		
7.1	Construct curb & gutter	LF	$55.00
7.2	Construct AC curb	LF	$30.00
7.3	Construct 4" PCC sidewalk	SF	$15.00
7.4	Construct AC Path	SF	$10.00
7.5	Construct new inlet to existing storm drain	EA	$2,000.00
7.6	Aggregate base and shoulder Rock	CY	$50.00
7.7	Curb Ramp with truncated dome surface-Remove & Replace	EA	$7,500.00
7.8	Curb extension- 6" vertical w/gutter	LF	$25.00
7.9	Concrete block retaining wall- 3' high	LF	$150.00
7.10	Construct shallow manhole	EA	$4,000.00
7.11	Hot mix asphalt	SF	$2.00
7.12	Construct Median Island	SF	$25.00
8	**Quarry fines trail with base rock, binder, and compaction**	SF	$5.00
9	**Planting**		
9.1	24" box trees with root barriers, tree grates, and irrigation	EA	$1,700.00
9.2	15 gallon trees with protective posts and root barriers, irrigation	EA	$1,400.00
9.3	Landscaping (1 gallon shrubs, 15 gallon trees, irrigation)	SF	$6.50
9.4	Irrigation meter/connection, backflow, and controller	EA	$15,000.00
10	**Site Furnishings**		
10.1	Benches (bench, footings)	EA	$1,000.00
10.2	Pedestrian light Type 1 (streetlamp style, placed near intersections)	EA	$6,000.00
10.3	Pedestrian light Type 2 (minor pathway lighting)	EA	$2,000.00
10.4	Chain link fence - 4' vinyl coated	LF	$25.00
11	**Signs and Pavement Markings** - includes painted traffic lines and markings on pavement, and traffic signage		
11.1	High visibility crosswalk	EA	$1,750.00
11.2	Repaint stop bars and markings	EA	$800.00
11.3	Bike lane striping and signage	MI	$10,000.00
11.4	Miscellaneous Class I trail striping, signage and bollards	MI	$5,000.00
11.5	Cycletrack striping, signage, and flexible delineator posts	MI	$80,000.00
11.6	Public street crossing	EA	$5,000.00
11.7	Miscellaneous 4" thermoplastic stripe	LF	$1.00
12	**Signal Work**		
12.1	Ped countdown signal (2) + Ped push button assemblies (2) – modification to existing signal	LS	$50,000.00
12.2	Pedestrian signal/beacon	EA	$75,000.00
13	**Right-of-Way Acquisition** - includes Acquisition, Project Development Permits, Utility Relocation Assistance and Title & Escrow		
13.1	Right-of-Way	SF	$2.50

Table A-2: Cost Estimates by Segment

PLANNING-LEVEL ESTIMATE OF PROBABLE CONSTRUCTION COST - March 2015

REVIEWED BY: RA - Alta; HM - Creegan + D'Angelo PREPARED BY: JP - Alta

Note: Estimate based upon conceptual designs and is to be used for planning purposes only.

Description		Totals
Segment 1: Bay Trail, Catalina Way and Meadows Drive from the American Canyon Trail to Sandpiper Drive	Construction	$554,100
Survey, design, environmental, admin and contingency	66.0%	$366,100
	Total	**$921,000**
Segment 2: Bike Lanes - Meadows Drive from Sandpiper Drive to Sonoma Boulevard and across Meadows Plaza to Broadway	Construction	$58,150
Survey, design, environmental, admin and contingency	70.0%	$41,038
	Total	**$100,000**
Segment 3: Broadway Street from existing path to Lewis Brown Drive	Construction	$914,475
Survey, design, environmental, admin and contingency	77.5%	$709,000
	Total	**$1,624,000**
Segment 4: Lewis Brown Drive from Broadway Street to White Slough Trail	Construction	$593,900
Survey, design, environmental, admin and contingency	77.5%	$460,400
	Total	**$1,055,000**
Segment 5: Sacramento-Wilson Avenue from White Slough Trail to Lighthouse Drive	Construction	$584,650
Survey, design, environmental, admin and contingency	100.0%	$584,650
	Total	**$1,170,000**
	Total for all near-term segments	**$4,870,000**
Segment 6 Long-term Alignment Baylands South of Meadows Residential Area to SR 29 with at-grade crossing of high speed ramp		**$2,000,000**
Segment 6 Long-term Alignment Baylands South of Meadows Residential Area to SR 29 with grade-separated crossing of high speed ramp		**$5,000,000 - $10,000,000**
Segment 7 Long-term Alignment Baylands		**$2,000,000**
Total for all long-term segments		**$9 million to $14 million**

Table A-3: Segment 1 Cost Estimates

Segment 1: Bay Trail, Catalina Way and Meadows Drive from the American Canyon Trail to Sandpiper Drive

Catalina Way from American Canyon Bay Trail to Meadows Drive; Meadows Drive from Catalina Way to Sandpiper Drive

PLANNING-LEVEL ESTIMATE OF PROBABLE CONSTRUCTION COST - March 2015

REVIEWED BY: RA - Alta; HM - Creegan + D'Angelo PREPARED BY: JP - Alta

Note: Estimate based upon conceptual designs and is to be used for planning purposes only.

		Multiplier	LF	QTY			COST	SUB TOTAL
1	**Mobilization**			1	LS	5.00%	$25,000	
2	**General Conditions, Bonds and Insurance**			1	LS	2.00%	$10,000	
3	**Erosion Control - includes all BMPs, SWPPP and Reporting**			1	LS	2.00%	$10,000	Note 1
4	**Traffic Control (except as noted)**			1	LS	2.00%	$10,000	Note 2
	Sub-total							**$55,000**
5	**Sitework, Demolition and Removal - includes all demolition, site preparation for all construction; relocation or re-setting of utilities; temporary construction fencing**							
5.1	Relocate Existing Street Light			3	EA	$8,000.00	$24,000	
5.2	Remove and Relocate Existing Mailboxes			2	EA	$500.00	$1,000	
5.3	Remove and Relocate Existing Roadside Sign			1	EA	$300.00	$300	
5.4	Remove Existing Striping (No Lead Present)	3	3750	11250	LF	$1.00	$3,750	
	Sub-total							**$29,050**
6	**Earthwork**							
6.1	Clearing and Grubbing	6	3750	22,500	SF	$0.25	$5,625	
6.2	Soil for new landscape areas				CY	$50.00	$0	
	Sub-total							**$5,625**
7	**Concrete Work and Asphalt Paving - includes concrete curbs, 4" PCC sidewalk, Type I pedestrian ramps, concrete pads, Class I Trail**							
7.1	Construct 4" PCC sidewalk	7	1400	9800	SF	$15.00	$147,000	
7.2	Curb Ramp with truncated dome surface-Remove & Replace			1	EA	$7,500.00	$7,500	
7.3	Concrete block retaining wall- 3' high			570	LF	$150.00	$85,500	
	Sub-total							**$240,000**
8	**Quarry fines trail with base rock, binder, and compaction**	6	3750	22,500	SF	$5.00	$112,500	**$112,500**
9	**Planting**							
9.1	Landscaping (1 gallon shrubs, 15 gallon trees, irrigation)	5	1400	7,000	SF	$6.50	$45,500	
	Sub-total							**$45,500**
10	**Signs and Pavement Markings - includes painted traffic lines and markings on pavement, and traffic signage**							
10.1	High visibility crosswalk			2	EA	$1,750.00	$3,500	
10.2	Repaint stop bars and markings			1	EA	$800.00	$800	
10.3	Miscellaneous Class I trail striping, signage and bollards		1400	0.27	MI	$5,000.00	$1,400	
10.4	Cycletrack striping, signage, and flexible delineator posts		3750	0.71	MI	$80,000.00	$56,900	
10.5	Miscellaneous 4" thermoplastic stripe			3,750	LF	$1.00	$3,800	
	Sub-total							**$66,400**
						Total Construction		**$554,100**
						CONTINGENCY	20.0%	$110,900
1. Assume minimal erosion control required						SURVEYING	5.0%	$27,800
2. Assume limited traffic control required						PLANS, SPECIFICATIONS AND ENGINEERING	25.0%	$138,600
3. Assume Cat. Ex. For bike facility; minor modification						ENVIRONMENTAL AND PERMITTING	1.0%	$5,600
4. Assume no impact						MITIGATION	0.0%	$0
						CONSTRUCTION ENGINEERING	15.0%	$83,200
						Total Project		**$921,000**

Table A-4: Segment 2 Cost Estimates

Segment 2: Bike Lanes - Meadows Drive from Sandpiper Drive to Sonoma Boulevard and across Meadows Plaza to Broadway

Meadows Drive from Sandpiper Drive to Sonoma Boulevard/Hwy 29 (shopping center portion assumed to be paid for by private redevelopment project)

PLANNING-LEVEL ESTIMATE OF PROBABLE CONSTRUCTION COST - March 2015

REVIEWED BY: RA - Alta; HM - Creegan + D'Angelo PREPARED BY: JP - Alta

Note: Estimate based upon conceptual designs and is to be used for planning purposes only.

		Multiplier	LF	QTY			COST	SUB TOTAL
1	**Mobilization**			1	LS	5.00%	$2,400	
2	**General Conditions, Bonds and Insurance**			1	LS	2.00%	$1,000	
3	**Erosion Control - includes all BMPs, SWPPP and Reporting**			1	LS	5.00%	$2,400	
4	**Traffic Control (except as noted)**			1	LS	10.00%	$4,800	
	Sub-total							**$10,600**
5	**Sitework, Demolition and Removal - includes all demolition, site preparation for all construction; relocation or re-setting of utilities; temporary construction fencing**							
5.1	Sawcut pavement			140	LF	$5.00	$700	
5.2	Remove AC pavement			140	SF	$0.25	$100	
5.3	Remove Existing Striping (No Lead Present)			3650	LF	$1.00	$3,700	
	Sub-total							**$4,500**
6	**Concrete Work and Asphalt Paving - includes concrete curbs, 4" PCC sidewalk, Type I pedestrian ramps, concrete pads, Class I Trail**							
6.1	Construct Median Island			550	SF	$25.00	$13,750	
	Sub-total							**$13,750**
7	**Signs and Pavement Markings - includes painted traffic lines and markings on pavement, and traffic signage**							
7.1	High visibility crosswalk			3	EA	$1,750.00	$5,300	
7.2	Repaint stop bars and markings			3	EA	$800.00	$2,400	
7.3	Bike lane striping and signage		3650	0.69	MI	$10,000.00	$7,000	
7.4	Miscellaneous 4" thermoplastic stripe	4	3650	14,600	LF	$1.00	$14,600	
	Sub-total							**$29,300**
						Total Construction		**$58,150**
						CONTINGENCY	20.0%	$11,700
						SURVEYING	5.0%	$3,000
						PLANS, SPECIFICATIONS AND ENGINEERING	25.0%	$14,538
1. Assume Cat. Ex. For bike facility; minor modification						ENVIRONMENTAL AND PERMITTING	5.0%	$3,000
2. Assume no impact						MITIGATION	0.0%	$0
						CONSTRUCTION ENGINEERING	15.0%	$8,800
						Total Project		**$100,000**

Table A-5: Segment 3 Cost Estimates

Segment 3: Broadway Street from existing path to Lewis Brown Drive

Vine Trail in Veterans Memorial Park, South past Mini Drive to Lewis Brown Drive

PLANNING-LEVEL ESTIMATE OF PROBABLE CONSTRUCTION COST - March 2015

REVIEWED BY: RA - Alta; HM - Creegan + D'Angelo PREPARED BY: JP - Alta

Note: Estimate based upon conceptual designs and is to be used for planning purposes only.

		Multiplier	LF	QTY			COST	SUB TOTAL
1	**Mobilization**			1	LS	5.00%	$37,500	
2	**General Conditions, Bonds and Insurance**			1	LS	2.00%	$15,000	
3	**Erosion Control - includes all BMPs, SWPPP and Reporting**			1	LS	5.00%	$37,500	
4	**Traffic Control (except as noted)**			1	LS	10.00%	$75,000	
	Sub-total							**$165,000**
5	**Sitework, Demolition and Removal - includes all demolition, site preparation for all construction; relocation or re-setting of utilities; temporary construction fencing**							
5.1	Sawcut pavement			2825	LF	$5.00	$14,200	
5.2	Remove AC pavement	4	2400	9600	SF	$0.25	$2,400	
5.3	Tree Removal			3	EA	$500.00	$1,500	
5.4	Remove and Relocate Existing Roadside Sign			1	EA	$300.00	$300	
5.5	Remove Existing Striping (No Lead Present)	4	3100	12400	LF	$1.00	$12,400	
	Sub-total							**$30,800**
6	**Earthwork**							
6.1	Clearing and Grubbing	4	2600	10,400	SF	$0.25	$2,600	
6.2	Excavation and Grading			193	CY	$50.00	$9,700	
6.3	Soil for new landscape areas			193	CY	$50.00	$9,700	
	Sub-total							**$22,000**
7	**Concrete Work and Asphalt Paving - includes concrete curbs, 4" PCC sidewalk, Type I pedestrian ramps, concrete pads, Class I Trail**							
7.1	Construct 4" PCC sidewalk			7125	SF	$15.00	$106,875	
7.2	Construct AC Path	12	2400	28800	SF	$10.00	$288,000	
7.3	Curb Ramp with truncated dome surface-Remove & Replace			3	EA	$7,500.00	$22,500	
	Sub-total							**$417,375**
8	**Planting**							
8.1	Landscaping (1 gallon shrubs, 15 gallon trees, irrigation)			21,350	SF	$6.50	$138,800	
8.2	Irrigation meter/connection, backflow, and controller			1	EA	$15,000.00	$15,000	
	Sub-total							**$153,800**
9	**Signs and Pavement Markings - includes painted traffic lines and markings on pavement, and traffic signage**							
9.1	High visibility crosswalk			2	EA	$1,750.00	$3,500	
9.2	Miscellaneous Class I trail striping, signage and bollards		3175	0.60	MI	$5,000.00	$3,100	
9.3	Cycletrack striping, signage, and flexible delineator posts		2150	0.41	MI	$80,000.00	$32,600	
9.4	Miscellaneous 4" thermoplastic stripe	4	2825	11,300	LF	$1.00	$11,300	
	Sub-total							**$50,500**
10	**Signal Work**							
10.1	Pedestrian signal/beacon			1	EA	$75,000.00	$75,000	
	Sub-total							**$75,000**
						Total Construction		**$914,475**
						CONTINGENCY	20.0%	$182,900
						SURVEYING	5.0%	$45,800
						PLANS, SPECIFICATIONS AND ENGINEERING	25.0%	$228,700
						ENVIRONMENTAL AND PERMITTING	10.0%	$91,500
						MITIGATION	2.5%	$22,900
						CONSTRUCTION ENGINEERING	15.0%	$137,200
						Total Project		**$1,624,000**

Table A-6: Segment 4 Cost Estimates

Segment 4: Lewis Brown Drive from Broadway Street to White Slough Trail

Lewis Brown Drive, between Sonoma Boulevard and Broadway

PLANNING-LEVEL ESTIMATE OF PROBABLE CONSTRUCTION COST - March 2015

REVIEWED BY: RA - Alta; HM - Creegan + D'Angelo PREPARED BY: JP - Alta

Note: Estimate based upon conceptual designs and is to be used for planning purposes only.

		Multiplier	LF	QTY			COST	SUB TOTAL
1	**Mobilization**			1	LS	5.00%	$23,600	
2	**General Conditions, Bonds and Insurance**			1	LS	2.00%	$9,500	
3	**Erosion Control - includes all BMPs, SWPPP and Reporting**			1	LS	5.00%	$23,600	
4	**Traffic Control (except as noted)**			1	LS	10.00%	$47,200	
	Sub-total							**$ 103,900**
5	**Sitework, Demolition and Removal - includes all demolition, site preparation for all construction; relocation or re-setting of utilities; temporary construction fencing**							
5.1	Sawcut pavement			1825	LF	$5.00	$9,200	
5.2	Remove AC pavement	9	1700	15425	SF	$0.25	$3,900	
5.3	Remove Existing Striping (No Lead Present)	5	1700	8500	LF	$1.00	$8,500	
	Sub-total							**$ 21,600**
6	**Earthwork**							
6.1	Clearing and Grubbing	9	1700	15300	SF	$0.25	$3,900	
6.2	Excavation and Grading			283	CY	$50.00	$14,200	
	Sub-total							**$ 18,100**
7	**Concrete Work and Asphalt Paving - includes concrete curbs, 4" PCC sidewalk, Type I pedestrian ramps, concrete pads, Class I Trail**							
7.1	Construct AC Path	14	1700	23800	SF	$10.00	$238,000	
7.2	Curb Ramp with truncated dome surface-Remove & Replace			5	EA	$7,500.00	$37,500	
7.3	Construct Median Island			800	SF	$25.00	$20,000	
	Sub-total							**$295,500**
9	**Planting**							
9.1	Landscaping (1 gallon shrubs, 15 gallon trees, irrigation)	7	1700	11,900	SF	$6.50	$77,400	
9.2	Irrigation meter/connection, backflow, and controller			1	EA	$15,000.00	$15,000	
	Sub-total							**$92,400**
10	**Site Furnishings**							
10.1	Pedestrian light Type 2 (minor pathway lighting)	100	1700	17	EA	$2,000.00	$34,000	
	Sub-total							**$34,000**
11	**Signs and Pavement Markings - includes painted traffic lines and markings on pavement, and traffic signage**							
11.1	High visibility crosswalk			2	EA	$1,750.00	$3,500	
11.2	Miscellaneous Class I trail striping, signage and bollards		1880	0.36	MI	$5,000.00	$1,800	
11.3	Miscellaneous 4" thermoplastic stripe	3	1700	5,100	LF	$1.00	$5,100	
	Sub-total							**$10,400**
13	**Right-of-Way Acquisition - includes Acquisition, Project Development Permits, Utility Relocation Assistance and Title & Escrow**							
13.1	Right-of-Way			7200	SF	$2.50	$18,000	
	Sub-total							**$18,000**
						Total Construction		**$593,900**
						CONTINGENCY	20.0%	$118,800
						SURVEYING	5.0%	$29,700
						PLANS, SPECIFICATIONS AND ENGINEERING	25.0%	$148,500
						ENVIRONMENTAL AND PERMITTING	10.0%	$59,400
						MITIGATION	2.5%	$14,900
						CONSTRUCTION ENGINEERING	15.0%	$89,100
						Total Project		**$1,055,000**

Table A-7: Segment 5 Cost Estimates

Segment 5: Sacramento-Wilson Avenue from White Slough Trail to Lighthouse Drive

Sacramento Street from White Slough trail to Highway 37 Ramps; Wilson Avenue from Highway 37 to Sims Avenue

PLANNING-LEVEL ESTIMATE OF PROBABLE CONSTRUCTION COST - March 2015

REVIEWED BY: RA - Alta; HM - Creegan + D'Angelo PREPARED BY: JP - Alta

Note: Estimate based upon conceptual designs and is to be used for planning purposes only.

		Multiplier	LF	QTY			COST	SUB TOTAL
1	**Mobilization**			1	LS	5.00%	$24,000	
2	**General Conditions, Bonds and Insurance**			1	LS	2.00%	$9,600	
3	**Erosion Control - includes all BMPs, SWPPP and Reporting**			1	LS	5.00%	$24,000	
4	**Traffic Control (except as noted)**			1	LS	10.00%	$48,000	
	Sub-total							**$105,600**
5	**Sitework, Demolition and Removal - includes all demolition, site preparation for all construction; relocation or re-setting of utilities; temporary construction fencing**							
5.1	Sawcut pavement			1800	LF	$5.00	$9,000	
5.2	Remove AC pavement	3	1800	5400	SF	$0.25	$1,400	
5.3	Relocate Existing Street Light			1	EA	$8,000.00	$8,000	
5.4	Remove and Relocate Existing Roadside Sign			4	EA	$300.00	$1,200	
5.5	Remove Existing Striping (No Lead Present)	4	3600	14400	LF	$1.00	$14,400	
	Sub-total							**$34,000**
6	**Concrete Work and Asphalt Paving - includes concrete curbs, 4" PCC sidewalk, Type I pedestrian ramps, concrete pads, Class I Trail**							
6.1	Construct AC curb			1450	LF	$30.00	$43,500	
6.2	Construct 4" PCC sidewalk	7	450	3150	SF	$15.00	$47,250	
6.3	Construct AC Path	12	1800	21600	SF	$10.00	$216,000	
6.4	Curb Ramp with truncated dome surface-Remove & Replace			2	EA	$7,500.00	$15,000	
	Sub-total							**$321,750**
7	**Planting**							
7.1	Landscaping (1 gallon shrubs, 15 gallon trees, irrigation)	3	1800	5,400	SF	$6.50	$35,100	
7.2	Irrigation meter/connection, backflow, and controller			1	EA	$15,000.00	$15,000	
	Sub-total							**$50,100**
8	**Signal Work**				LF	$25.00		
8.1	Ped countdown signal (2) + Ped push button assemblies (2) – modification to existing signal			1		$50,000.00	$50,000	**$50,000**
9	**Signs and Pavement Markings - includes painted traffic lines and markings on pavement, and traffic signage**							
9.1	High visibility crosswalk			3	EA	$1,750.00	$5,300	
9.2	Miscellaneous Class I trail striping, signage and bollards		3600	0.68	MI	$5,000.00	$3,500	
9.3	Miscellaneous 4" thermoplastic stripe	4	3600	14,400	LF	$1.00	$14,400	
	Sub-total							**$23,200**
						Total Construction		**$584,650**
						CONTINGENCY	20.0%	$116,930
						SURVEYING	5.0%	$29,233
						PLANS, SPECIFICATIONS AND ENGINEERING	25.0%	$146,163
						ENVIRONMENTAL AND PERMITTING	15.0%	$87,698
						MITIGATION	20.0%	$116,930
						CONSTRUCTION ENGINEERING	15.0%	$87,698
						Total Project	**TOTAL**	**$1,170,000**