John Campbell Memorial Greenway and Strongs Creek Trail Draft Master Plan

March 2014

PREPARED BY:
Local Government Commission
Alta Planning + Design
GHD, Inc.
Rails to Trails Conservancy

PREPARED FOR:
City of Fortuna

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Table of Contents

1 Executive Summary 1-1

1.1 Project Overview 1-1

1.2 Project Process 1-1

1.3 Master Plan Objectives 1-1

1.4 Phasing and Costs 1-3

2 Introduction 2-1

2.1 Project Area Description 2-1

2.2 Relevant Plans, Policies, and Projects 2-2

2.3 Community Outreach/Engagement Summary 2-7

3 Existing Conditions 3-1

3.1 Overall Conditions 3-1

3.2 Environmental Considerations 3-8

4 Design Guidelines 4-1

4.1 Overview 4-1

4.2 Trail Crossings 4-14

5 Design Recommendations 5-1

5.1 Trail Alignment Overview and Map 5-1

5.2 Trail Design Recommendations 5-3

5.3 Trail Segments and Alignments 5-4

6 Cost Estimates and Phasing 6-1

6.1 Cost Estimates 6-1

6.2 Trail Priorities and Phasing Recommendations 6-4

7 Trail Monitoring and Maintenance 7-1

7.1 Introduction 7-1

7.2 Maintenance Activities 7-1

7.3 Risk Management and Liability 7-3

7.4 Communications with Neighbors and Trail Users 7-4

7.5 Safety and Security 7-4

7.6 Estimating Annual Operations and Maintenance Costs 7-5
7.7 Identification of Roles and Responsibilities 7-6
7.8 Summary of Maintenance Practices of Similar Trails 7-6
8 Funding and Implementation 8-1
8.1 Potential Funding Sources 8-1
8.2 Project Implementation 8-9
9 Appendix 9-1
9.1 Meeting Notes 9-1
9.2 Trail Map Series 9-11
9.3 Detailed Cost Estimates 9-25

List of Figures

Figure 1-1: Trail Alignment Overview 1-2
Figure 1-2: Trail Implementation Categories 1-4
Figure 3-1: Trail Cross Section Along Creek 3-8
Figure 5-1: Trail Alignment Overview 5-2
Figure 5-2: Trail Cross Section Along Creek 5-3
Figure 5-3: Photo Showing Existing Conditions along Strongs Creek Between South Fortuna Boulevard and Redwood Way (Top) and Photo Simulation of the Trail and Greenway (Bottom) 5-4
Figure 5-4: Existing Cross Section along Riverwalk Drive, south of the River Lodge 5-5
Figure 5-5: Proposed Cross Section showing Trail along Riverwalk Drive, south of the River Lodge 5-5
Figure 5-6: Plan View of Proposed Trail Alignment through the Kemar Road/US 101 Undercrossing 5-6
Figure 5-7: Existing Cross Section through the Kemar Road/US 101 Undercrossing 5-6
Figure 5-8: Proposed Cross Section Showing the Trail along Kenmar Road under US 101 5-6
Figure 5-9: Photo Showing Existing Conditions along the Kenmar Road US 101 Undercrossing (from eastbound Kenmar Road) (Top) and Photo Simulation of the Trail Crossing Improvements (Bottom) . 5-7
Figure 5-11: Plan View of Potential US 101 Overcrossing 5-9
Figure 5-10: Photo Showing Existing Condtiions along the Strongs Creek Crossing of US 101 (Top) and Photo Simulation of Potential US 101 Pedestrian and Bicycle Overcrossing (Bottom) 5-9
Figure 5-12: Existing Cross Section along Redwood Way Bridge over Strongs Creek 5-11

Figure 5-13: Proposed Cross Section showing Trail along Redwood Way Bridge over Strongs Creek 5-11

Figure 5-14: Plan View Showing the Proposed Redwood Way Trail Crossing and a Proposed Overlook at Redwood Memorial Hosiptal 5-11

Figure 5-15: Existing Cross Section along Rohnerville Road, south of Loop Road 5-13

Figure 5-16: Proposed Cross Section showing an At-Grade Trail along Rohnerville Road, south of Loop Road 5-13

Figure 5-17: Proposed Cross Section showing an Elevated Trail along Rohnerville Road, south of Loop Road 5-14

Figure 5-18: Proposed Cross Section showing an Elevated Trail and Buffered Bike Lanes along Rohnerville Road, south of Loop Road.....5-14

Figure 5-19: Photo Showing Existing Conditions along Rohnerville Road near Strongs Creek (Top) and Photo Simulation Showing an Elevated Trail and Buffered Bike Lanes (Bottom).....5-15

Figure 6-1: Trail Implementation Categories 6-5

Figure 8-1: Coastal Zone Boundary 8-11

List of Tables

Table 3-1: Study Area Roadway Traffic Volumes, Average Speeds, and Line-of-Sight Restrictions 3-5

Table 4-1 Caltrans Class I Bikeway Design Standards 4-3

Table 4-2 ADA-Accessible Pathway Design Standards 4-6

Table 4-3 Equestrian Trails 4-8

Table 4-4 Caltrans Class II and III Bikeway Design Standards 4-9

Table 4-5 Buffered Bike Lanes 4-10

Table 4-6 Shared Lane Markings 4-11

Table 4-7 Boardwalks 4-12

Table 4-8 Trail Amenities.....4-13

Table 4-9: Path Crossing at Intersection 4-15

Table 4-10: Uncontrolled Mid-Block Crossing 4-17

Table 4-11: Crossing Beacons 4-19

Table 4-12 Option 4: Grade Separated Crossings 4-20

Table 6-1: Cost Estimates by Segment 6-2

Table 6-2: Cost Estimates by Implementation Category 6-4

Table 7-1: Sample Maintenance and Operation Costs from Other Jurisdictions 7-5

Table 9-1: Unit Costs 9-27

Table 9-2: Total Construction Costs for All Project Segments 9-29

Table 9-3: Segment 1 (Primary Alignment): Overlook Park/Trailhead to South Fortuna Boulevard Cost Estimate 9-31

Table 9-4: Segment 1a (Additive Alignment): Overlook Park/Trailhead to the Strongs Creek/Mill Creek Confluence Cost Estimate 9-32

Table 9-5: Segment 2 (Primary Alignment): South Fortuna Boulevard to Redwood Way Cost Estimate.. 9-34

Table 9-6: Segment 2A (Additive Alignment): Redwood Shopping Center Connection Cost Estimate 9-36

Table 9-7: Segment 2B (Additive Alignment): Overlook at Redwood Memorial Hospital Cost Estimate.. 9-37

Table 9-8: Segment 3 (Primary Alignment): Redwood Way Crossing Improvements Cost Estimate..... 9-38

Table 9-9: Segment 4 (Primary Alignment): Redwood Way to Rohnerville Road (incl. Rohnerville Road crossing improvements) Cost Estimate 9-40

Table 9-10: Segment 4a (Additive Alignment): Path Connection to 2nd Avenue Cost Estimate 9-41

Table 9-11: Segment 4b (Additive Alignment): Path Connection to Francesco Place Cost Estimate 9-42

Table 9-12: Segment 4c (Additive Alignment): Path Connection to Arizzi Court Cost Estimate 9-44

Table 9-13: Segment 5 (Primary Alignment): Rohnerville Road – Strongs Creek Trail Crossing to Newburg Road Cost Estimate 9-46

Table 9-14: Segment 5 (Alternate Design Option): Rohnerville Road – Strongs Creek Trail Crossing to Loop Road Cost Estimate 9-47

Table 9-15: Segment 5a (Additive Alignment): Rohnerville Road Bike Lanes Cost Estimate 9-49

Table 9-16: Segment 5b (Additive Alignment): Newburg Park Connection Cost Estimate 9-50

1 Executive Summary

1.1 Project Overview

Former Mayor John Campbell envisioned a trail through Fortuna that would link the Eel River to the Headwaters Forest Reserve. Because of his inspiration and enthusiastic support for this idea, this project has been named the John Campbell Memorial Greenway and Strongs Creek Trail Master Plan (Master Plan). The project's goal is to establish a greenway or linear park that generally follows the course of Strongs Creek from Riverwalk Drive near the Eel River to Rohnerville Road near Newburg Park. This dedicated bicycle and pedestrian trail will improve east-west connectivity, provide recreational opportunities, and serve as a convenient way to reach City parks and local shopping without having to drive. Riparian vegetation that borders Strong Creek will create a pleasant backdrop for the trail. The vision is to enhance the greenway's natural setting with trail amenities such as trailheads, benches, interpretive signage, and native plantings.

The Study Area has been divided into five segments, generally traveling from west to east (see **Figure 1-1**). The trail would extend approximately 2.5 miles from the Eel River to Newburg Park. There are two alignment types proposed: primary alignments and additive alignments. The primary alignment is the base project. The additive alignments are additional segments that would improve local connections to the base project.

Specific recommended trail improvements are described and illustrated in Chapter 5. The Appendix includes an annotated map series showing the trail alignments in detail.

1.2 Project Process

In January, 2013 the City of Fortuna was awarded a Caltrans Community-Based Transportation Planning Grant to prepare a master plan for a greenway and trail along Strongs Creek. The Master Plan was developed through an extensive engagement process with the community, project stakeholders, and multiple agencies. A Technical Advisory Committee was formed to guide the project and provide input to the project team. Over the course of one week in October 2013, the project team, consisting of agency staff and consultants, held focus group meetings, public field trips to various locations along Strongs Creek, and utilized the design charrette method of intensive input, workshops, and production sessions over a multi-day process. The result of this collaborative process is the Master Plan for a greenway and trail that incorporates the valuable ideas of many project participants.

1.3 Master Plan Objectives

The Master Plan effort accomplished the following major planning objectives:

1) A feasibility study for a crossing of US 101 which currently separates Downtown Fortuna, area schools, and residents from the River Lodge, visitor facilities, and the Eel River.
2) A framework of specific plan concepts for the greenway and trail.

Figure 1-1: Trail Alignment Overview

3) An extensive outreach process with multiple agencies, community service groups, property owners, schools, the Bear River Band of the Rohnerville Rancheria, and the public.
4) An overarching trail alignment with segments that can be implemented in over time.
5) A preliminary cost estimates for trail segments.
6) The identification of potential funding sources.
7) The identification of maintenance and operations needs.

1.4 Phasing and Costs

The Master Plan is a bold vision for a trail that will provide Fortuna with multiple benefits, including healthy recreation, economic vitality, environmental preservation and restoration. The Master Plan sets the direction for opportunistic and incremental implementation over time. While the cost estimate for the entire alignment is approximately $24 million, about half of the cost ($10.3 million) is allocated to the U.S. 101 overcrossing – Segment 1a (see **Figure 1-1**), and is tied to implementation of the Mill District Area Plan, as discussed in Chapter 5.

Phasing and costs are presented in detail in Chapter 6. These are planning-level cost estimates that include large contingency allowances for estimate accuracy, base data collection and studies, detailed design, environmental processes, contract and construction administration and other costs in addition to the basic construction costs. They also include allowances for right-of-way acquisition, though in some cases the right to locate the trail in the Streamside Management Area (SMA) defined by the General Plan would be acquired as part of development entitlements.

For strategic phasing of the trail segments, the Master Plan recommends three trail implementation categories: Categories A, B, and C (see **Figure 1-2**).

Category A: Creek Trail

Trail Segments 2 through 4, from east of Fortuna Boulevard to the west side of Rohnerville Road, offer the greatest opportunity for a high-quality trail experience, separated from roadways and enjoying the creekside environment. These segments will provide the backbone of the trail system, creating a groundswell of support for completing other portions of the trail.

Total estimated cost: $2,745,000 (not including site furnishings)

Category B: On-Road Connections

Segments 1 and 5 are important connections to the creek trail. These segments could be strategically implemented through the City's capital improvements program (CIP) with state funds such as an Active Transportation Projects grant. Key connections include:

- River Lodge to the east side of US 101 via the Kenmar undercrossing (Segment 1)
- Bicycle and pedestrian improvements along Rohnerville Road (Segment 5)

Figure 1-2: Trail Implementation Categories

Segment 1 presents a near-term solution for connecting pedestrian and cyclists under US 101 with improvements to the Kenmar Road/US 101 undercrossing. This segment extends from Overlook Park/Trailhead south along Riverwalk Drive and through the Kenmar Road/US 101 undercrossing. It then parallels Mill Creek to the confluence with Strongs Creek, then east to the intersection of South Fortuna Boulevard/Strongs Creek Drive.

> **Total estimated cost: $7,755,000 to 9,460,000 (depending on whether the at-grade or alternative design option is selected for Segment 5; not including site furnishings)**

Category C: Additive Alignments and Amenities

The following additions and amenities comprise Category C and will be added to the trail when the timing is right:

- Redwood Village trail connection (2a)
- Overlook at Redwood Memorial Hospital (2b)
- 2nd Avenue trail connection (4a)
- Francesco Place trail connection (4b)
- Arizzi Court trail connection (4c)
- Rohnerville Road bike lanes (5a)
- Newburg Park trail connection (5b)
- Trail amenities provide the opportunity for community fund raising to purchase:
    - Benches
    - Lighting
    - Trash receptacles
    - Interpretive signs
    - Supplemental planting, etc.
- U.S. 101 Overcrossing (1a), which is tied to implementation of Mill District Area Plan

> **Total estimated cost: $13,535,000 to $13,536,000 (depending on whether the at-grade or alternative design option is selected for Segment 5)**

These categories may be subdivided into smaller projects based on funding availability and other considerations. It is always advantageous to implement "low hanging fruit" portions of the trail that can be completed with minimal funding and maximum community involvement to demonstrate progress and maintain interest on the overall effort.

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2 Introduction

In January, 2013 the City of Fortuna was awarded a Caltrans Community-Based Transportation Planning Grant to prepare a master plan for a parkway and trail along Strongs Creek. This dedicated bicycle and pedestrian trail will provide recreational opportunities and serve as a convenient way to reach City parks and local shopping without having to drive. Former Mayor Campbell envisioned a trail through Fortuna that would link the Eel River to the Headwaters Forest Reserve via the Salmon Creek entry gate to the ancient forest. Because of his enthusiastic support and inspiration for this idea, the parkway has been named the John Campbell Memorial Greenway.

This master plan provides a framework of specific plan concepts for the Greenway/Trail, and clarifies the costs, next steps, and potential funding and other implementation resources.

2.1 Project Area Description

1.1.1 Strongs Creek within City limits

The project area runs along Strongs Creek, a tributary to the Eel River. The Creek has a length of approximately 1.9 miles through the City limits, extending from Riverwalk Drive near the Eel River to Rohnerville Road near Newburg Park. Federally protected wetlands border segments of Strongs Creek, which has historically been home to salmon and steelhead trout and provides land for migrating animals. Strongs Creek passes through four distinct segments, 90% of which are undeveloped land parcels:

1. The Mill District, the segment closest to US 101, through which the creek traverses a 100-year flood plain.
2. The Littlefield parcels, which contain significant wetlands, and which are being restored.
3. The Martin/Brazil/Chamberlain segment runs through private property and wetlands are presumed.
4. The Newburg Park segment will be the gateway to the Headwaters' Forest Reserve

A key aspect of the project is improving bicycle and pedestrian access across US 101 and to the Eel River, one of the city's most important visual, environmental, and recreational resources. Construction of US 101 through the western portion of the city has essentially cut off this resource from the rest of the community.

1.1.2 The Big Vision: Connect Eel River to Headwaters Forest Reserve

The ultimate vision is for a linear park and multi-use trail connecting the Eel River to the Headwaters Forest Reserve, providing improved recreational and non-motorized access within the community. The project will improve east-west connectivity, link regional trails, and bolster Strongs Creek wetland restoration efforts. This first stage planning effort covers a trail connecting the Eel River and Newburg Park. Trail connections east of Newburg Park and the Headwaters Forest Reserve would be part of future planning efforts.

2.2 Relevant Plans, Policies, and Projects

This section presents summaries of County and City planning documents pertaining to the John Campbell Memorial Greenway Master Plan or development, in general, in the study area.

2.2.1 Humboldt County

Planning Commission Approved Draft General Plan (2012)

The Humboldt County General Plan identifies goals, visions, and policies for the physical development of the County. This Plan includes 12 Elements; Land Use, Community Infrastructure and Services, Telecommunications, Circulation, Housing, Economic Development, Conservation and Open Space, Water Resources, Energy, Noise, Safety, and Air Quality. This Plan uses guiding principles to create its overall goals and objectives, which reflect the values and goals expressed by the public through the input process. This Plan seeks to preserve the County's unique character and natural resources and discourage sprawl and encourage new development. County residents expressed the need for improved roadway conditions and greater bicycle and pedestrian access. This Plan seeks to accommodate all residents by diversifying the economy to create jobs, and affordable housing in existing urbanized areas.

Document link: http://co.humboldt.ca.us/gpu/documentsplan.aspx

Safe Routes to School Program

The County's Safe Routes to School (SR2S) programs aim to make it safer for children to walk and bicycle to school. SR2S promotes walking and bicycling to school through targeted education, encouragement, enforcement, and engineering programs and projects. The County's program includes a SR2S Task Force, school maps with suggested walking routes, a parent guide (Transportation Safety Guidelines), and local data (e.g., parent survey results, walkability audit results, and other reports and activities of Humboldt's schools, cities, and towns). Humboldt County Association of Governments' (HCAOG's) Regional Safe Routes to School Prioritization Tool is a tool to inform HCAOG and individual jurisdictions which schools are poised for SR2S funding and projects.

Document link: http://hcaog.net/documents/safe-routes-school-whats-happening-humboldt

VROOM: Variety in Rural Options Of Mobility; Humboldt Regional Transportation Plan 2013 Update

The Humboldt County Association of Governments (HCAOG) is required to adopt and submit an updated Regional Transportation Plan (RTP) to the California Transportation Commission and Caltrans every five years. VROOM: Variety in Rural Options of Mobility (HCAOG's RTP 2013 update) is a long-range transportation plan that guides the development of future transportation in the region. The goal is to create and maintain an efficient, safe multi-modal transportation system and to improve the movement of residents, visitors, and goods. The Elements in this Plan include Complete Streets, Public Transportation, Aviation, Goods Movement, Finance, Trails, Tribal Transportation, and Emergency Transportation. HCAOG's Action Plan is to carry out the policies of

the Trail Element and ultimately implement the projects identified in Table Trails-1 (p. 4-1), including the John Campbell Memorial Parkway. The John Campbell Memorial Parkway project is included in HCAOG's Regional Bicycle Plan and Regional Trails Master Plan.

Document link: http://hcaog.net/documents/regional-transportation-plan-rtp-2013-update-vroom

Regional Bicycle Plan (2012)

HCAOG's Regional Bicycle Plan recommends projects and programs to help create a safe and convenient bicycling environment and encourage more residents to make trips by bicycle. Enhancing the bicycling experience helps create a more sustainable environment, reduces traffic congestion, vehicle emissions, noise, and energy consumption. The Plan is integral to the regional goals laid out in the County's General Plan. This Regional Bicycle Plan recommends 515 miles of bikeways to connect all cities and unincorporated areas in the County, and also provide connections to adjacent counties. The Plan's 2012 Update recommends six priority programs for short-term implementation. These six priority projects include Bikeway and Trails Signing, Bicycle Parking, Non-Motorized Education and Outreach, Bicycle Guide and Map, Bicycle Facility Maintenance, and Loop Detector Installation and Maintenance.

The City of Fortuna's proposed bikeway projects includes the 4.3 mile long John C. Campbell Memorial Parkway and Class I Bikeway from the River Lodge to the eastern City limit. This project is estimated at $3,314,115 (2012 dollars) and received a high project score (10 out of 12 points) (pp. 4-57 – 4-61).

Document link: http://hcaog.net/documents/2012-humboldt-regional-bicycle-plan

Regional Trails Plan (2010)

HCAOG's Regional Trails Master Plan promotes implementation of a regional, active transportation system that ensures safe and equitable access for non-motorized users. The Regional Trails Plan includes a constraints analysis, trail development strategies, trail design guidelines, and trail funding sources to facilitate active transportation system implementation in Humboldt County. The John Campbell Memorial Greenway is listed as project #17 in Table 5: Jurisdictional Prioritization of Trail Candidate Projects (p. 102).

Document link: http://hcaog.net/documents/regional-trails-master-plan-2010

2.2.2 City of Fortuna

General Plan 2030 (2010)

The Fortuna General Plan formalizes a long-term vision for the City's physical development. It outlines policies, standards, and programs to guide day-to-day decisions concerning future development. The Fortuna General Plan describes a linear park parallel to Strong Creek through primarily undeveloped land. Transportation and Circulation Element and Natural and Cultural Resources Element policies that pertain to planning for the John Campbell Memorial Greenway are outlined below.

Transportation and Circulation Element

- **Goal TC-1.** To develop a safe, convenient, and uncongested road network.
    - Policy TC-1.1 Reducing Mode Conflicts
    - Policy TC-1.3 Balanced Transportation System
    - Policy TC-1.4 Improved Level of Service (LOS)
- **Goal TC-4.** To develop safe and pleasant pedestrian ways that provide recreation opportunities as well as alternatives to the automobile.
    - Policy TC-4.6 Pedestrian Convenience
    - Policy TC-4.7 Pedestrian Trails Interconnection
    - Policy TC-4.9 Strongs Creek Parkway
- **Goal TC-5**. To provide an interconnected and effective system of bikeways, bicycle parking facilities, and trails for people wishing to walk or bicycle for commuting and/or recreational trips.
    - Policy TC-5.1 Bicycle Transportation Plan
    - Policy TC-5.2 Bicycle System
    - Policy TC-5.4 Bicyclists' Needs
    - Policy TC-5.5 Rails-to-Trails
    - Policy TC-5.6 Bicycle and Pedestrian Linkages
    - Policy TC-5.8 Trail System
    - Policy TC-5.9 New Trails
    - Policy TC-5.15 Bicycle and Pedestrian Paths
    - Policy TC-5.16 Pedestrian and Bicycle Path Linkages
    - Policy TC-5.18 Multi-Use Access

Natural and Cultural Resources Element

- **Goal NCR-2.** To protect and maintain, or relocate through mitigation, existing sensitive habitats and species, including riparian corridors, wetlands, and Environmentally Sensitive Habitat Areas (ESHA).
    - Policy NCR-2.1 Riparian Corridor Protection.
    - Policy NCR-15. The City shall prepare a streamside management/wetland protection ordinance, following collaboration with resource agencies including but not limited to CDFG, establishing setback recommendations for perennial and intermittent streams, wetlands, and riparian corridors. At a minimum, the City shall implement the following watercourse, wetland and riparian area protection measures:

- Watercourses and Riparian Areas
  a) The City shall maintain Streamside Management Areas (SMAs) of at least 50 feet around perennial streams and 25 feet around ephemeral streams, unless a biological report indicates that such SMA setbacks are not required. The buffers shall be measured from the top of the stream bank (for example, the 50 foot setback would be 50 feet from each stream bank, for a total of a 100 foot wide buffer);
  b) New development/activities within SMAs shall be limited to: (1) activities for wildlife enhancement/restoration, flood control or drainage, new fencing so long as it would not impede natural drainage or wildlife, and bank protection; (2) commercial timber management and harvest activities regulated by the Forest Practices Act; (3) road and bridge replacement or construction, when it can be demonstrated that it would not degrade fish and wildlife resources or water quality; (4) removal of vegetation for disease control or public safety; and (5) management and maintenance of trees, shrubs and other plant life; and
  c) New development within SMAs shall minimize adverse effects, including, at a minimum: retaining snags and live trees with visible evidence of use as nesting sites; replanting disturbed areas with riparian vegetation; and performing erosion control measures.
- Wetlands
  a) The City shall maintain Wetland Buffer Areas of at least 50 feet around jurisdictional wetlands, unless a biological report indicates that such Wetland Buffer Areas are not required;
  b) New development within Wetland Buffer Areas shall be limited to: fish and wildlife management; wetland restoration; removal of trees for disease control and public safety; and new fencing so long as it does not impede drainage or wildlife movement;
  c) No new development shall be permitted in Wetland Buffer Areas which degrades the wetland; and
  d) Wetland Buffer Areas disturbed by permitted activities shall be restored to the original contours and promptly replanted with native riparian vegetation.
- Combined Watercourses/Riparian Areas and Wetlands
  a) Storm water runoff to watercourses and wetlands shall not exceed the existing rate of storm runoff for a 50 year storm of 10 minute duration;
  b) Sediment in storm water runoff draining to watercourses and wetland shall be minimized through the use of sediment basins, seeding or

replacing bare soil, diversion of runoff away from graded areas and areas heavily used during construction, and limiting grading in buffer areas to the dry season (May through October);

c) Stormwater outfalls, culverts, gutters, and other similar facilities draining to watercourses and wetlands shall be dissipated; and

d) Septic systems shall not be permitted within Wetland Buffer Areas. Adjacent to these areas, septic systems shall meet County Health Department and RWQCB standards.

Document link: http://friendlyfortuna.com/DocumentCenter/Home/View/539

Municipal Code

The City's Municipal Code includes regulations that are relevant to the creation of a Greenway Master Plan. Chapter 12.20 Miscellaneous Provisions defines the City's responsibilities related to development, maintenance, and operation of street trees, shrubs, and plants on public streets (Sections 12.20.030 and 12.20.060) and the guidance on bicycle use in public parks (Section 12.24.040).

Document link: http://www.codepublishing.com/ca/fortuna/

Mill District Area Plan (2010)

The Mill District Area Plan's purpose is to formulate policies and concepts for mixed-use development. The Mill District is a 115-acre former mill site within Fortuna, and is currently the most underutilized area of the city. The General Plan Preferred Alternative selected by the City Council in 2007 proposed that it be redeveloped as a mix of land uses (i.e., commercial, residential, and open space). As part of the 2030 General Plan Update, the Mill District Area Plan seeks to provide specific guidelines and standards for the City and developers to uphold the General Plan's goal for the District as a mixed-use area and ensure its consistency with residents' goals and expectations.

Document link: http://friendlyfortuna.com/DocumentCenter/Home/View/492

Strongs Creek Culvert Replacement at Fortuna Boulevard Fisheries Restoration Grant Program (FRGP) Application

This project is relevant because the City is currently exploring options for improving or replacing the box culvert under Fortuna Blvd. This project has just started and will be monitored closely for issues pertinent to the planning of the John Campbell Memorial Greenway.

2.3 Community Outreach/Engagement Summary

A variety of participatory planning activities were utilized to engage property owners, community members and stakeholders in the planning process. A Technical Advisory Committee was formed to guide the project and provide input to the project team. Additionally, the project team held focus group meetings, public field trips to various locations along Strongs Creek, and utilized the design charrette method of intensive input, workshops, and production over a multi-day process. This chapter describes the public engagement process and summarizes stakeholder and community input received at the community workshops and events.

2.3.1 Technical Advisory Committee

A Technical Advisory Committee (TAC) was convened in June 2013 to kick off the project. The purpose of the TAC was to provide technical information relevant to the project, to coordinate with local agencies, and to act as the "eyes and ears" of the community to guide the project's outreach and engagement efforts. Group members included representatives from the City of Fortuna staff and council, the family of John Campbell, Fortuna High School and Elementary Schools, Fortuna Chamber of Commerce, California Conservation Corps, Caltrans, and the consultant team.

2.3.2 Focus Group Meetings

Leading up to the charrette events, focus group meetings were held to gather input from stakeholders sharing a common interest. The meetings were held in a small group format (less than 15 participants) to encourage honest and unrestricted sharing of ideas and concerns. Individual meetings were held with Strongs Creek property owners along the presumed route. Focus groups including high school students and administrators, community service providers, and biological/cultural representatives were convened. Detailed notes from the focus group sessions are included in the Appendix.

A flyer promoted participatory planning events and was widely circulated throughout the community

The Technical Advisory Committee met periodically throughout the planning process to offer data, coordination, and support.

Strongs Creek Property Owners

In July 2013, the City of Fortuna contacted property owners adjacent to Strongs Creek by mail inquiring as to their interest in and support for the trail and greenway project. Respondents were given an opportunity to schedule face-to-face meetings to share their opinions with the project team.

During August, 2013, members of the project team conducted ten individual property owner meetings for the parcels located on the presumed trail route along the southern bank of Strongs Creek.

Of these:

- 0 objected to the concept of a trail,
- 8 supported/did not oppose the trail,
- 2 wanted to see final designs before deciding to support the trail,
- 10 granted access to their property for field reconnaissance, and
- 2 wanted their properties to support trail amenities.

During the charrette, an alternate alignment along the northern bank of Strongs Creek east of Redwood Way was identified by stakeholders and the community. Subsequently, city staff met with an additional three property owners whose property would be affected by this route.

High School Focus Group

On October 14, the project team met with high school students, a teacher and principal to discuss youth transportation and safety needs, as well as partnership opportunities between Fortuna High School and the Strongs Creek Trail project. Student presidents from the Green Technology and Fortuna Creeks Clubs developed full-scale mock-ups of proposed trail widths along Strongs Creek. These were used during the October 15 opening workshop to assess community preference for trail layout and width. Student displays highlighting the stewardship activities of the Fortuna Creeks Club were displayed during the October 15 and 18 public workshops. Additionally, the Fortuna High School principal expressed an interest in having the woodshop class develop interpretive signage for the trail.

High School students and staff discussed creek stewardship, trail widths, and partnership opportunities.

Community Service Providers Focus Group

A group of Community Service Providers met with the project team to discuss needs and opportunities related to the trail. Representatives from Fortuna Business Improvement District, California Conservation Corps, Caltrans, Fortuna Senior Services, the Multi-Generational Center, Redwood Memorial Hospital, the City of Fortuna, and the Chamber of Commerce were in attendance. The following common themes emerged:

- The trail can be used in tourism, marketing, and economic development efforts in the City of Fortuna.
- Safe access for cyclists and pedestrians is very important, and can help improve community health.
- The trail will be an amenity for the multi-generational community.
- Connectivity between different segments of the City will be improved by the trail.
- A loop trail was seen as desirable.

Additionally, there was discussion about how to cross Highway 101. Ideas included: going under the highway through the culvert, over the highway with a pedestrian bridge, and emphasis was placed on developing an alternate route at 12th Street or Kenmar.

Representatives from community organizations discussed how the trail can support economic development, community health, recreation, and improved connectivity.

Biological and Cultural Resource Focus Group

Representatives from the Bear River Band of the Rohnerville Rancheria and California Department of Fish and Wildlife met with the project team to discuss biological and cultural resources and restrictions in the project area. Participants discussed opportunities for improving fish passage, restoration with native vegetation, and low-impact lighting. The importance of defining "top of bank" and its relation to a streamside setback, and the trail location was discussed in detail. Additionally, assessment of the area for cultural resources was identified as very important. The Bear River Band of the Rohnerville Rancheria offered to work with the City to incorporate tribal history into interpretive signage and trail amenities.

2.3.3 Field Trips

In recognition of the planning dictum that "the map is not the territory," the project team hosted two public field trips to locations along the proposed trail for purposes of increasing public knowledge of the project area and facilitating discussion about trail design.

The first field trip was held October 14, 2013 at the CCC center on Alamar Way; the location of the Strongs Creek box culvert under Highway 101. Approximately 20 people attended. Refreshments were provided by the City of Fortuna and CCC. Participants viewed the box culvert and discussed pros and cons of an undercrossing versus a pedestrian bridge. Concerns about the safety and feasibility of an undercrossing were raised. Many participants expressed that they would feel unsafe utilizing an undercrossing and would only be willing to cross the highway using a pedestrian bridge. Following discussion at this location, participants walked along Alamar Way to view potential trail connections to the de facto Eel River Levee Trail. They identified desirable improvements including sidewalks along Alamar Way and a pedestrian crossing at Riverwalk Drive and Alamar Way.

Field trip participants discussed how to cross Highway 101, improve pedestrian connections, and connect the trail to the Eel River.

On October 15, a group of 20 participants joined the project team for a field trip to the proposed Redwood Way trail crossing, near Redwood Memorial Hospital. Local media was in attendance. Elements of safe trail crossing were discussed and participants had an opportunity to view the proposed trail alignment on both sides of Redwood Way. Redwood Memorial Hospital's proximity to this trail access point was seen as beneficial to the community, to hospital staff, and to patients and their families.

2.3.4 Charrette Workshop Events

The opening workshop on October 15, 2013, officially kicked off the design charrette with food, presentations and interactive planning exercises. Over 65 people attended. A delicious chili and cornbread meal was provided by the Fortuna Dutch Oven Society, with trail-themed cupcakes provided by the CCC. After food was served, the project team presented design tools for trails, connectivity, and non-motorized transportation, as well as a virtual tour of the project area. Workshop participants joined "design tables", where they worked with fellow community-members to develop ideal trail alignment and design. Fortuna High School students provided full-scale mockups of four potential trail cross sections. After a voting exercise, the preferred trail cross section was determined to be an eight-foot wide paved multi-use trail with a six-foot wide bridle path on one side and a two-foot wide shoulder on the other side, where feasible.

Trail crossings and connection to the hospital were discussed during the second field trip.

The Fortuna Dutch Oven Society provided a chili and cornbread meal for 65 opening workshop participants.

The following evening, an Open Studio was held at the CCC campus to give stakeholders and the public a chance to see how their input was being translated into the trail's design.

On October 17, the project team met with five Caltrans representatives, as well as city staff to review the designs in progress. Preliminary concepts for a Highway 101 pedestrian bridge and alternate undercrossing at the Kenmar interchange were vetted. Opportunities for fish passage projects at the Strongs Creek box culvert were discussed.

High School students provided mock ups of various trail widths to help the community choose its preference.

The charrette's closing workshop was held October 18, 2013 at the Monday Club; at least 30 people attended. The Fortuna High School Culinary Arts Program provided hors d'oeuvres and local students set the mood with instrumental guitar. The project team presented concepts developed throughout the week, including trail route alignments, details of trail crossings, and photo simulations of the pedestrian bridge and improved Kenmar undercrossing. Those in attendance were in support of the concepts and a group of 19 individuals signed up to be "trail supporters" – folks who will work with the City to help get the trail built.

The Strongs Creek Trail Master Plan and John Campbell Memorial Greenway document has been developed based on the input described above, and the consensus that was reached through the community and agency vetting process.

Opening workshop participants worked in groups at "design tables" to identify options for trail alignment and design.

Fortuna High School students provided hors d'oeuvres and music at the closing workshop.

Attendees at the closing workshop supported concepts developed through the charrette process.

3 Existing Conditions

Strongs Creek is one of several tributaries to the Eel River that flow through the City of Fortuna. The Strongs Creek watershed extends east to west through the central portion of the City, draining a mix of developed and undeveloped areas. The watershed drains toward the Eel River via Strongs Creek and its tributaries (e.g., Rohner Creek, Jameson Creek, and Mill Creek). Within the Study Area, the creek crosses under US 101, the Northwestern Pacific Railroad (NWPRR) tracks, and four roadways (Eel River Drive, South Fortuna Boulevard, Redwood Way, and Rohnerville Road), and passes a number of land uses that could serve as destinations for trail users.

View through the box culvert under US 101 along Strongs Creek

View of the railroad bridge over Strongs Creek from the culvert under US 101

View under the railroad bridge

3.1 Overall Conditions

3.1.1 US 101

US 101 provides regional access to the City of Fortuna by a four-lane freeway that traverses the western edge of the City in a generally north-south alignment. Where it intersects the City, US 101 has two travel lanes in each direction separated by a median and center divider. US 101 separates downtown Fortuna and area schools from the River Lodge, visitor facilities, and the Eel River. Three full interchanges with US 101 serve the city at Main Street, 12th Street, and Kenmar Road. Strongs Creek passes under the freeway via a box culvert. The 40-foot long box culvert was built in 1962 and is skewed 48 degrees. The box culvert is 13 feet high and 25 feet wide.

Although many parts of Fortuna are easily accessible to pedestrians, there are deficiencies in the overall pedestrian circulation system. Limited pedestrian access across US 101 restricts pedestrian and bicycle travel between Fortuna's east and west sides. Representatives from the California Conservation Corps stated they occasionally observe pedestrians running across the freewaynear their facility on Alamar Way.

3.1.2 Northwestern Pacific Railroad

The NWPRR right-of-way, operated by the North Coast Railroad Authority (NCRA), runs generally north-south through Fortuna. It roughly parallels the east side of US 101 and includes a bridge over

Strongs Creek. However, the bridge presents a constraint to a potential undercrossing along the creek due to limited vertical clearance.

3.1.3 Potential Destinations along Strongs Creek

A trail along Strongs Creek would link the community with several key commercial, employment, and recreational facilities and services, including:

- **River Lodge Conference Center.** The 13,000 square foot River Lodge, located at 1800 Riverwalk Drive on the bank of the Eel River, is a popular regional meeting/conference facility. The City of Fortuna owns, operates, maintains and rents the conference facility for community meetings, events, and private functions.
- **California Conservation Corps.** The California Conservation Corps' Fortuna Center, located at 1500 Alamar Way, is home to about 100 residential corps members who work on natural resource projects throughout Humboldt and Del Norte counties. The center includes lodging, offices, and a dining hall for Corps members.
- **Redwood Village Shopping Center.** The Redwood Village Shopping Center is located at the southeast corner of the South Fortuna Boulevard/Redwood Way intersection and is home to retail and service establishments, including Safeway and Rite-Aid.
- **Strongs Creek Plaza Shopping Center.** Located at 1095 South Fortuna Boulevard, Strongs Creek Plaza offers dining, shopping and financial services. Starbucks Coffee and Walgreens are anchor tenants. The plaza hosts the annual Strongs Creek Holiday Open House.
- **Redwood Memorial Hospital.** Redwood Memorial Hospital is a 25 bed critical care access hospital and a full-service, acute care facility located at 3300 Renner Drive. There are nearly 1,400 individuals working for St. Joseph Health– Humboldt County, which includes St. Joseph Hospital-Eureka and Redwood Memorial Hospital, making it one of the largest employers in Humboldt County.
- **Newburg Park.** The 18.5-acre Newburg Park is located at 2700 Newburg Road. The Park includes baseball and softball fields, batting cages, an outdoor basketball court, horseshoe pits, a volleyball court, a pistol range, a cook shack, a deep BBQ pit, playgrounds, large picnic areas, soccer fields, and a BMX bike park.
- **Headwaters Forest Reserve.** The Bureau of Land Management's Headwaters Forest Reserve is 7,472 acres of public land. The Reserve has two access points: the Elk River Trailhead (accessed from Elk River Road) and the Salmon Pass Trailhead (accessed from Newburg Road). The Elk River Trailhead is open to the public year-round, while the Salmon Pass Trailhead is seasonally accessible by guided hike only.

3.1.4 Planned Development

Riverwalk District

The City seeks to promote and enhance the Riverwalk District as a local, regional, and tourist destination for shopping, recreation, lodging, conferences and civic/community activities. The Riverwalk area currently consists of the River Lodge Conference Center, hotels, motels, restaurants, and commercial recreational uses (i.e., RV campground). Scenic beauty, convenient freeway access, available vacant land, and the Riverwalk levee trail, combine to make this area a potential regional tourist destination and important source of sales tax revenue. The one-mile long Riverwalk levee trail is located on the Eel River levee and provides views and vistas of the river, agricultural fields, and coastal hills. Overlook Park, located north of the River Lodge, includes trail access, parking, and picnic tables. Improved access between the Riverwalk District and Fortuna east of US 101 could enhance tourism in this area.

Improved access to the Riverwalk District, and connection with the Riverwalk levee trail, could enhance tourism in this area.

Mill District

The Mill District is a triangular area bordered by three transportation corridors: US 101, Newburg Road, and Fortuna Boulevard. The total area contained within it is about 115 acres. Of this, approximately 42 acres borders the two roadways and is developed with older residences (former mill worker housing) and commercial uses (e.g., retail, service retail, and auto repair). The remaining 70+ acres is fenced off from the developed parcels and was home to the Pacific Lumber Company's Fortuna Saw Mill and Log Deck. The mill has been closed for several years and most of the buildings removed. The mill is for sale.

As stated in the General Plan, the Mill District provides the City with an opportunity to create a development that respects the existing character of the community, is pedestrian-friendly, and is connected with surrounding neighborhoods and districts. The City is applying for a Prop 84 Sustainable Community Planning Grant. If awarded, the City will prepare a specific plan for the entire district; tying together needed infrastructure improvements, creating connectivity, and establishing zoning and design regulations. The Strongs Creek Trail project is integral to this planning process. The southern portion of the Mill District is within a floodplain, which limits the development potential of that area.

3.1.5 Traffic Safety

The project proposes to cross the following "at-grade" crossings of vehicular roadways:

- Riverwalk Drive (at Alomar Drive)
- Kenmar Road (west of US 101 on/off ramp)
- US 101 southbound off ramp

- US 101 northbound on ramp
- Eel River Drive (access to south)
- Fortuna Blvd (at Strongs Creek Drive)
- Redwood Way (at Strongs Creek bridge)
- Rohnerville Road (south of North Loop Road)
- North Loop Road (at intersection with Rohnerville Road)
- Rohnerville Road at Newberg Road

Table 3-1 provides an overview of the traffic volumes, average speeds, and line-of-sight restrictions at the primary locations at which the trail is proposed to intersect a roadway. This data indicates that Fortuna Boulevard and Rohnerville Road are the locations in which trail users are most likely to experience higher traffic volumes and higher traffic speeds. Line-of-sight restrictions are most serious at Redwood Way and at the intersection of Rohnerville Road with Loop Road. Traffic calming measures are recommended at all the locations at which the trail crosses vehicular roadways, especially at Fortuna Boulevard, Redwood Way, and Rohnerville Road/Loop Road.

According to the California Transportation Injury Mapping System (http://tims.berkeley.edu), only one bicycle/pedestrian accident has been recorded at any of the above intersections between 2003 and 2012. This one recorded accident was at the location at which the project is proposed to cross South Fortuna Boulevard. However, the accident occurred in 2006, prior to the recent upgrade to this intersection at which time a new crosswalk and pedestrian-activated crosswalk signals were installed. This location is now significantly safer for bicyclists and pedestrians.

An analysis of general vehicular traffic accidents within the study area indicates that the following locations in the immediate project area are collision "hot spots:"

- Intersection of Riverwalk Drive and Alomar Way
- South Fortuna Boulevard at Strongs Creek Plaza
- Intersection of Rohnerville Road and Loop Road
- Three-way intersection of Kenmar Road, Ross Hill Road, and South Fortuna Boulevard
- Riverwalk Drive, 500 feet south of the Riverwalk Drive/Alomar Way intersection

The data presented above should be evaluated during final design to ensure that each of the at-grade roadway crossings is designed to protect bicyclist/pedestrians. Chapter 4 presents design guidelines that address traffic safety. Chapter 5 presents concept designs.

Table 3-1: Study Area Roadway Traffic Volumes, Average Speeds, and Line-of-Sight Restrictions

Street	Cross Street or Location	ADT	Speed Limit (mph)	50th Percentile Speed (mph)	85 Percentile Speed (mph)	Year Data Collected	Stop Controlled?	Line-of-Sight Restrictions
Riverwalk Dr.	Alomar Dr.	2,670	35	31	37	2012	No	Parked cars
Fortuna Blvd.	Strongs Creek Plaza	14,100	35	33	37	2009	Yes	None
Redwood Wy.	Strongs Creek Bridge	4,350	35	33	40	2012	No	Vertical curves; horizontal curves; parked cars; vegetation
Rohnerville Rd.	North Loop Rd.	5,600	35	36	40	2009	No	Horizontal curves; parked cars; vegetation
Rohnerville Rd.	Newburg Rd.	6,500	35	36	40	2009	No	Parked cars
Riverwalk Dr.	South of River Lodge	2,096	35	33	40	2012	No	Parked cars
US 101 Southbound Off Ramp	Kenmar Rd.	Unk.	Unk.	Unk.	Unk.	NA	Yes	Vertical Curves; undercrossing structure; vegetation
US 101 Northbound On Ramp	Kenmar Rd	Unk.	Unk.	Unk.	Unk.	NA	Yes	Vertical Curves; undercrossing structure; vegetation
Eel River Dr. (access to south)	Kenmar Rd	Unk.	Unk.	Unk.	Unk.	NA	Yes	Horizontal curves; vegetation

3.1.6 Strongs Creek

General Condition

Strongs Creek includes a riparian corridor lined with trees and vegetation that provide habitat value and a natural visual quality to land within the city's urban area and beyond to the unincorporated areas. Strongs Creek remains in its natural state, except for lower reaches of Strongs Creek, which are partially channelized. Strongs Creek is generally within private property.

The watersheds, rivers, and streams in the General Plan Planning Area function primarily as natural resources, but also serve as storm water drainages and flood conveyance channels. Both sides of Strongs Creek are within the 100-year flood plain (General Plan Figure 8-8). The City experiences localized flooding along Strongs Creek near its confluence with the Eel River at Dinsmore Drive and Loop Road. During extreme floods, the Eel River will cause flooding in the lower reaches of Strongs Creek. Other areas within the Study Area that experience localized flooding include Mill Creek along Kenmar Road. Per the 2005 Storm Drain Master Plan, development along Strongs Creek should correspond with building setbacks calculated for the 100-year floodplain.

Homeless Encampments

Homeless camps exist near Redwood Village and Strongs Creek Plaza shopping centers.

Trespassing/Vandalism

The project team observed unauthorized paths along the creek, indicating regular access along and within the creek channel. The Fish and Wildlife Service (FWS) noted abandoned shopping carts in the creek channel near Strongs Creek Plaza can obstruct stormwater flows.

Natural Assets

This Study does not include a biological resource review; however, some information can be gleaned from the City's General Plan. The General Plan notes the occurrences of 11 sensitive and special status avian species, five amphibian species, one reptile species, two fish species, and four mammal species in the General Plan Planning Area. Of the 23 sensitive and special status wildlife species, only four species are documented within Planning Area: the coastal cutthroat trout, tricolored blackbird, red-tree vole, and Northern Spotted Owl.

Fish that occur in Strongs Creek include Coastal Cutthroat Trout (Oncorhynchus clarkii clarkii) (main stem and north fork), Coho salmon (Oncorhynchus kisutch), and Steelhead (Oncorhynchus mykiss) (Strongs Creek and Mill Creek). Chinook Salmon (Oncorhynchus tshawytscha) occur in the Eel River downstream of the City and were historically present in Strongs Creek.

Fish Passage Project

The Stongs Crek trail would parallel Strongs Creek and cross South Fortuna Boulevard. The trail can either go over, across, or under the roadway. An overcrossing at this location is not feasible. An at-grade crossing is described in Chapter 5. This analysis considers the possibility of an undercrossing

under South Fortuna Boulevard. Currently, the box culvert that passes under the roadway is not suitable to serve as a bicycle/pedestrian undercrossing. However, the City is currently exploring options for modifying or replacing this culvert as a part of an on-going fish passage project.

The existing box culvert that passes under Strongs Creek at South Fortuna Boulevard has been identified and documented by California Department of Fish and Wildlife as a complete barrier to adult and juvenile salmonids at both low and high fish passage flows. The culvert consists of a leap barrier at the outfall and depth/velocity barrier within the concrete box culvert.

The crossing consists of approximately a 150-foot long concrete box culvert that is 20-feet tall and 11-feet high. The culvert is low gradient with approximately a 0.5-foot drop from the inlet to the outlet. The inlet of the culvert consists of a 35-foot apron with wing-walls. The outlet of the culvert consists of a nearly level concrete apron and a cascade riprap scour pool that creates a passage barrier.

The City is currently conducting an alternatives analysis, topographic survey, hydrology and hydraulic analyses, geomorphic characterization, 30% design plans, and a preliminary design memorandum. It is possible that one or more of the alternatives considered could include complete replacement of the culvert, in which case it would be possible to design a fish-friendly culvert that could accommodate both the flow of Strongs Creek and a bicycle/pedestrian trail. However, at this time, the two primary alternatives currently being considered are "Partial Removal of Existing Culvert Bottom" and "Tailwater Modifications." Neither option would allow for a bicycle/pedestrian facility. Therefore, the design of a trail within the culvert does not appear to be feasible. Current analysis indicates that the trail would be submerged during relatively modest stormwater flow events. Therefore, an at-grade crossing of Fortuna Blvd is identified as the preferred option in Chapter 5.

Strongs Creek as an Outdoor Classroom / Learning Laboratory

The Fortuna Creeks Project is a Fortuna High School extra-curricular stream monitoring and restoration club. Students within this nationally-recognized club collect, test and record water quality data from the Eel River and three tributaries, including Strongs Creek. Student activities include erosion control; planting riparian vegetation; and monitoring water quality, flow rates, and aquatic invertebrates.

Relationship with Adjoining Land Uses

Within the Study Area, Strongs Creek is bordered by residential, agricultural, industrial, and institutional land uses. Most of these land uses back onto the creek and, in many cases, property lines extend to the creek centerline. This land use pattern tends to limit public access to and along the creek.

Roadway Network and Connections between Neighborhoods, Shopping, and Services

East-west travel through Fortuna is constrained due to the design of the roadway network and limited US 101 and NWPRR crossings. Many collector and local streets in the vicinity of Strongs Creek dead-end or end in cul-de-sacs necessitating circuitous routes to reach nearby destinations. A

circuitous neighborhood layout with cul-de-sacs can make a short walk or bike ride into a long, roundabout trip and may discourage walking and bicycling all together.

Strongs Creek Drive was originally envisioned to connect with Redwood Way on the south side of Strongs Creek; however, the discovery of wetlands east of the current roadway terminus has limited the development potential of those properties and the potential for roadway extension.

3.2 Environmental Considerations

3.2.1 City of Fortuna Streamside Management Area and Top of Bank

As discussed above, City General Plan policy NCR-15 establishes and defines a streamside management area (SMA) of at least 50 feet around perennial streams from the top of the stream's banks. The policy indicates that property owners are not permitted to build or substantially alter the landscape in the SMA. However, City staff suggested that a trail can be developed in the SMA. Where the SMA occurs on private property, the trail would require an easement granted by the land owner. **Figure 3-1** provides a sample diagram of a trail and easement within the SMA.

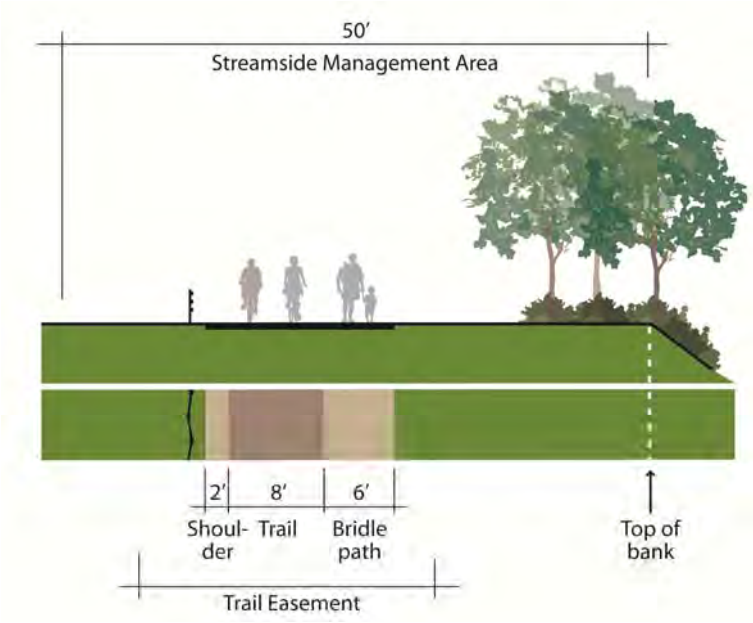


Figure 3-1: Trail Cross Section Along Creek

The topic of SMAs was discussed in detail during a design charrette meeting with Mike Van Hattem, Environmental Scientist with the California Department of Fish and Wildlife (CFWS). During that meeting, Mr. Van Hattem indicated that CFWS guidance suggests a 100 foot SMA, but that the agency generally defaults to local government policies. Mr. Van Hattem also indicated that regulatory agencies would like to see native landscaping and low-impact-design elements incorporated into project designs.

The vast majority of the project study area is adjacent to Strongs Creek and the study area intersects Mill Creek, Jameson Creek, and an unnamed tributary. Much of the study area falls within the SMA of these perennial streams. According to City staff, the "top of bank" in this area has not been officially mapped. However, precise definition of the top of bank has been contested along other creeks in other parts of the City. Generally, the "top of bank" is defined by the City as the top of the highest topographic bench or the highest topographic break line from which the creek's floodplain extends. Before the SMA can be precisely defined in the project study area, the City will need to approve or map top of bank.

3.2.2 Restoration and Bank Stabilization

Some portions of Strongs Creek are currently degraded due to direct and indirect anthropomorphic causes. Project staff observed during the course of the design charrette that garbage and human-produced debris have accumulated in some portions of the stream, including mattresses, shopping carts, concrete rubble, and scrap metal. Multiple cases of unauthorized camping/squatting were also witnessed, along with the associated consequences of camping/squatting including garbage piles, human waste, trampled vegetation, and worn foot paths. Other portions of the creek, though generally undisturbed by recent human activity, are experiencing erosion and general bank destabilization. Invasive species are also prevalent throughout the study area, including much of the Strongs Creek riparian area.

A dumped mattress, an eroded bank, and invasive Himalayan blackberry plants in the Strongs Creek riparian zone.

A meandering unauthorized footpath through the riparian corridor.

Each of these conditions present opportunities for restoration. Garbage and human-produced debris can be removed, instances of unauthorized camping/squatting can be reduced, erosion/general bank destabilization can be stabilized, and invasive species can be removed. The proposed trail project could facilitate such restoration in four primary ways:

1. Restoration as a part of construction
2. Reduced instances of dumping and camping/squatting
3. Improved opportunities for Operations and Maintenance
4. Enhanced communication regarding the need for restoration

Restoration could occur as a part of trail construction. Some of the debris in the creek is difficult and expensive to move and would be difficult to access. The process of construction a trail directly adjacent to the stream could present an opportunity to remove debris. The equipment used to bring construction materials to the project site could also be utilized to lift out heavy debris and haul it away. This would present a cost savings to the City and/or land owners. Restoration during construction could also occur as an agreement between the City and permitting agencies in order to compensate or mitigation for environmental damage caused by trail construction. For instance, a portion of the trail could theoretically fill wetlands. In order to mitigate for this impact, the City could propose to restore a portion of degraded habitat or remove invasive species.

Following trail construction, the trail would have inherent “restoration” effects. For instance, studies indicate that instances of unauthorized camping/squatting decreases following the installation of public trails; campers/squatters generally want to be out of view of the general public. Accordingly, the degradation caused by camping/squatting in the riparian corridor would be avoided. In addition, with more daily visitors keeping an eye on the corridor, it can be assumed that illegal dumping in the

creek would decrease. Finally, following the installation of an official, well-defined path, it can be assumed that there would be a reduction in meandering unauthorized footpaths through the riparian corridor.

The trail would also provide greatly enhanced opportunities for creek maintenance. Currently, the creek is difficult to access. However, a trail could be designed to structurally support the weight of a small truck or a light-weight maintenance vehicle. In this case, the trail could provide numerous access points to the riparian corridor and allow for more frequent restoration activities. Following construction of the trail, the City could more easily establish a routine maintenance schedule and plan bank stabilization projects.

Finally, the need for restoration would be better communicated following the construction of a trail. With trail users traveling along the riparian corridor on a daily basis, instances of illegal dumping or bank erosion would be reported more quickly and more frequently, further enhancing the City's ability to establish routine maintenance schedules and plan bank stabilization projects.

3.2.3 Environmental Permitting Strategy

Generally, the following environmental compliance documents are required for trail projects in riparian corridors outside the coastal zone:

- Wetland delineation
- Special status plant species surveys
- Phase I Environmental Site Assessment
- CEQA
- NEPA (if project is federally funded)
- Special studies in support of CEQA/NEPA (e.g., air quality study, noise study)
- Regulatory permits

The approach and sequence of fulfilling the environmental permitting requirements of constructing the proposed project is dependent on construction phasing. The project could theoretically be constructed as a single project and would therefore have a single set of environmental compliance documents. However, the trail could also be constructed and permitted in multiple phases over the course of many years. Completing all of these requirements throughout the entire project area would require the cooperation of all landowners and a well-established set of preliminary designs.

4 Design Guidelines

4.1 Overview

This section presents an overview of trail facility design standards and guidelines, based on appropriate Americans with Disabilities Act (ADA), Manual on Uniform Traffic Control Devices (MUTCD), Highway Design Manual (HDM), and American Association of State Highway and Transportation Officials (AASHTO)) guidelines, as supplemented by National Association of City Transportation Officials (NACTO) and Federal Highway Administration (FHWA) best practices. The purpose is to provide readers and project designers with an understanding of potential trail facility types.

Any trail along the Strongs Creek should conform to California pathway design standards. Pathway design in California is governed by many documents, the most important of which include the Caltrans Highway Design Manual (HDM), the California Manual of Uniform Traffic Control Devices (MUTCD), the California State Parks Accessibility Guidelines, and the Access Board Draft Final Accessibility Guidelines for Outdoor Developed Areas. Together these design manuals describe two types of pathways, each of which must meet different design criteria: Class I bikeways (also called multi-use paths) and ADA-accessible pathways. The design requirements for each of these are summarized below.

- **Class I Bikeways (Multi-Use Paths).** At a minimum, Class I bikeways require a minimum eight-foot-wide paved surface and a minimum of two-foot-wide clear, graded shoulders on both sides. For moderate to high-use segments, a wider paved surface of 10 feet to 12 feet (minimum) should be considered. All standards set forth in Caltrans Highway Design Manual Chapter 1000 (1003.1) shall be met in order for a Class I bikeway to serve as a transportation facility.
- **ADA-Accessible Pathways.** The surface of ADA-accessible pathways must be firm and stable, have a minimum clear tread width of 36 inches and include passing spaces at least 60 inches wide. The maximum allowed obstacle height is one-half to two inches depending on surface type. Additional provisions address openings, slopes, resting intervals, protruding objects, gates and barriers.

Design standards for ADA-accessible pathways—namely those that specify minimum tread width, frequency and width of passing spaces, surface type, maximum allowed obstacle height, and maximum grades—enable this pathway type to serve the greatest range of users. Class I bikeways are inherently also ADA-accessible pathways, as the design requirements for Class I bikeways meet or exceed design requirements of ADA-accessible pathways.

Certain portions of the Strongs Creek Trail may take the form of other facility types, such as a sidewalk and bike route. US 101 crossing options include an undercrossing or overcrossing. In California, roadway design, including bikeway design, is governed by the California HDM and the California MUTCD, which is based on the Federal Highway Administration's MUTCD. As of

December 2013, the California Department of Transportation (Caltrans) is using the CA MUTDC 2012 Edition, which incorporates the Federal Highway Administration's MUTCD 2009 Edition.

Not all of the design treatments described in this chapter are compliant with the CA MUTCD. In the event that a specific treatment is not in the California MUTCD, it may be necessary to go through experimental testing procedures. Experimental testing is overseen by the California Traffic Control Devices Committee.

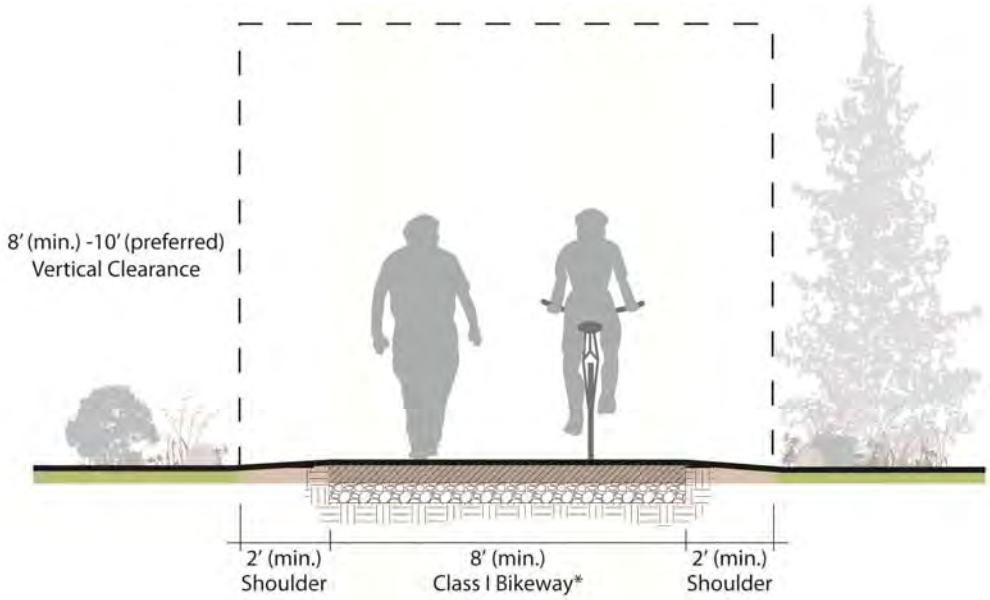
Table 4-1 Caltrans Class I Bikeway Design Standards

Description

Caltrans Class I bikeways (bike paths) are facilities with exclusive right-of-way (ROW) for bicycles and pedestrians, with cross flows by motorists minimized. Experience has shown that if significant pedestrian use is anticipated, a completely separate facility for pedestrians is necessary to minimize conflicts. The anticipated range of users and forecast level of use by different user groups should dictate the design of each specific facility. At a minimum, Class I bikeways require a minimum eight-foot-wide paved surface and a minimum of two-foot-wide clear, graded shoulders on both sides. For moderate to high-use segments, a wider paved surface of 10 feet to 12 feet (minimum) should be considered. In areas where a variety of users are expected, expanded unpaved shoulders should be included where possible. Under certain circumstances, Caltrans may approve exceptions to the Class I bikeway design standards.

Strongs Creek Trail Application. Caltrans Class I Bikeway standards are recommended for the length of the Strongs Creek Trail for improved user safety and enjoyment and eligibility for State funding for construction. At Community Workshop #1, attendees voted on their preferred trail cross section: an eight-foot wide paved trail with a six-foot wide bridle path on one side and a two-foot wide shoulder on the other side.

Graphic



This graphic is presented to illustrate classification standards and not meant as design guidelines.

Standards

Width

8 feet is the minimum allowed for a two-way bicycle path and is only recommended for low traffic situations.

10 feet is recommended in most situations and will be adequate for moderate to heavy use.

Ten-foot wide paths are also better for long-term maintenance and emergency access. When motor vehicles are driven on shared use paths, their wheels often will be at or very near the edges of the path. Since this can cause edge damage that, in turn, will reduce the effective operating width of the path, adequate edge support should be provided. Edge support can be either in the form of stabilized shoulders or constructing additional pavement width or thickness. Constructing a typical pavement width of 10 feet lessens the edge raveling problem.

Striping

A 4 inch wide yellow center line stripe to separate opposite directions of travel may be considered. This stripe should be broken where adequate passing sight distance exists, and solid in other locations or where passing by bicycles should be discouraged (AASHTO).

Separation From Highway

When two-way shared use paths are located adjacent to a roadway, wide separation between a shared use path and the adjacent highway is desirable. Bike paths closer than 5 feet from the edge of the shoulder shall include a physical barrier to prevent bicyclists from encroaching onto the highway (Caltrans). Where used, the barrier should be a minimum of 42 inches high (AASHTO).

Standards (cont.)

Lateral Clearance

A minimum 2 feet wide graded area shall be provided adjacent to the pavement (Caltrans). A 3 feet graded area is recommended to provide clearance from poles, trees, walls, fences, guardrails, or other lateral obstructions (Caltrans).

Overhead Clearance

A minimum 8 feet clearance is required (Caltrans and AASHTO). Where practical, a vertical clearance of 10 feet is desirable.

Surfacing

Hard, all-weather pavement surfaces (ex: asphalt or Portland cement concrete) are usually preferred for bikeways over those of crushed aggregate, sand, clay or stabilized earth (AASHTO). Due to the variability of site specific soil and drainage characteristics, paths should be designed in consultation with a geotechnical engineer.

Maintenance Vehicle Turnouts

The City may wish to pave occasional turnouts along the trail to provide maintenance vehicles a place to park outside the pedestrian and bicycle travelway during maintenance activities.

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 45 feet). As a general guide, the following grade restrictions and grade lengths are suggested (AASHTO):

- 5 to 6% for up to 800 feet
- 7% for up to 400 feet
- 8% for up to 300 feet
- 9% for up to 200 feet
- 10% for up to 100 feet
- 11+% for up to 50 feet

Paved maintenance vehicle turnouts, such as exist along the Steven's Creek Trail in Mountain View, enable maintenance vehicles to park off the trail.

Performance of Various Alternative Pathway Surfacing Options

Surfacing Type	Installation Requirements	Lifespan	Maintenance Requirements	Environment & Aesthetics	Bike Use & ADA
Standard Concrete	Preparation of subgrade and base, with pavement laid on top; Concrete mixer and other heavy equipment required	25-35+ yrs	Periodic inspection for uplift and settlement	Not permeable; Moderate short term toxic potential	Excellent
Standard Asphalt	Preparation of subgrade and base, with pavement laid on top; Various heavy paving equipment required	20-30+ yrs	Periodic pothole repair; Eventual resurfacing	Not permeable; Significant short term toxic potential	Excellent
Permeable Concrete	Preparation of subgrade and base, with pavement laid on top; Concrete mixer and other heavy equipment required	20-30+ yrs	Same as Concrete; Periodic sweep and vacuum	Permeable; Similar ascetics to standard concrete	Excellent – if pits/grooves are small
Permeable Asphalt	Preparation of subgrade and base, with pavement laid on top; Various heavy paving equipment required	15-20+ yrs	Same as Asphalt; Periodic sweep and vacuum	Permeable; Similar ascetics to standard asphalt	Excellent – if pits/grooves are small
Decomposed Granite	Preparation of subgrade and base, with DG laid and compacted on top; Natural resin-based binder needed to provide stable surface; Light equipment required	10-20+ yrs	Periodic surface repair	Somewhat permeable, depends on binder used; Most natural look	Good – if properly placed and maintained
Crusher Fines, Base Rock, Gravel	Preparation of subgrade and base, with crushed rock laid and compacted on top;, Light to heavy equipment required	5-10 yrs	Periodic surface repair; Sweep to maintain a consistent surface	Somewhat permeable; Moderately natural look	Fair to Poor – usually unstable, weak traction

Biological Resource Considerations

Riparian vegetation and wetland habitats associated with Strongs Creek potentially present a biological constraint to the project because these habitat types are regulated by USACE with input from USFWS, NOAA Fisheries, and RWQCB. Potential wetland features along the creek may also be subject to USACE jurisdiction. The USACE and RWQCB regulate projects that impact waterways and wetland areas. CDFG also has jurisdiction over development in riparian zones. The trail alignment should avoid these sensitive areas where feasible, or take on an alternate design, such as a boardwalk, to minimize impacts.

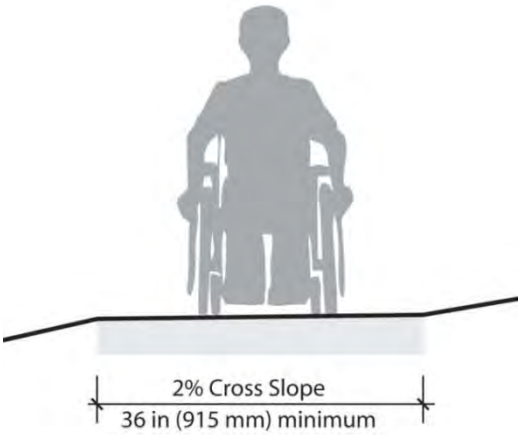
References

- Caltrans Highway Design Manual
- California MUTCD
- AASHTO Guide for the Development of Bicycle Facilities

Table 4-2 ADA-Accessible Pathway Design Standards

Description

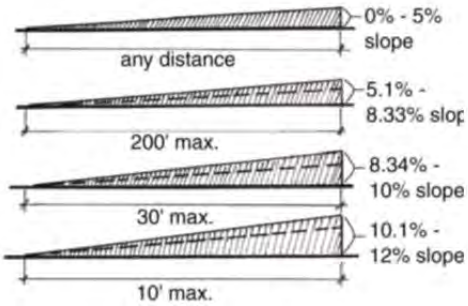
The Americans with Disabilities Act (ADA) requires that public facilities be designed so that people of all abilities can access and use them. Often, local site characteristics present constraints that make meeting ADA guidelines difficult and sometimes prohibitive. The 2013 U.S. Access Board Final Accessibility Guidelines for Outdoor Developed Areas establish accessibility guidelines pursuant to the Architectural Barriers Act (ABA) for camping facilities, picnic facilities, viewing areas, outdoor recreation access routes, trails, and beach access routes that are constructed or altered by or on behalf of the Federal government. These guidelines also apply to local agencies that are using Federal funds to design or construct a facility.



The technical provisions for ADA-accessible pathways require the surface to be firm and stable, a minimum clear tread width of 36 inches, passing spaces at least 60 inches wide and maximum obstacle heights of ½ to 2 inches depending on surface type. Additional provisions address openings, slopes, resting intervals, protruding objects, gates and barriers.

Caltrans Design Information Bulleting 82-05: Pedestrian Accessibility Guidelines for Highway Projects is the primary reference for Caltrans' ADA guidelines.

California State Parks' Accessibility Guidelines (2009) present principles for providing accessibility within the State Parks. The Guidelines include standards and recommendations for numerous facilities common to parks, including pathways. As stated in the Guidelines, every effort should be made to install and maintain accessible pathways. To this end, the Guidelines contain standards for accessible pathways such as maximum running slopes, minimum width and frequency of resting spaces, maximum acceptable gaps in the pathway surface, optimal clearances and signage requirements. The Guidelines further state that accessible pathways should represent the most significant features and environmental experiences unique to the area.



Trail gradients as recommended by the California State Parks Accessibility Guidelines

Strongs Creek Trail Application. ADA-compliance is recommended for improved accessibility of all trail users, including people using assistive devices and facilities with strollers.

The following table represents the best practices as outlined by the California State Parks Accessibility guidelines and the U.S. Access Board's Draft Final Accessibility Guidelines for Outdoor Developed Areas.

Standards

Item	Recommended Treatment	Purpose
Pathway Surface	Hard surface such as asphalt, concrete, wood, compacted gravel	Provide smooth surface that accommodates wheelchairs
Pathway Gradient (running slope)	5% maximum without landings 8.33% maximum with landings 10% maximum for a distance of 30 feet 12% maximum for a distance of 10 feet	Greater than 5% is too strenuous for wheelchair users
Pathway Cross Slope	2% maximum	Provide positive pathway drainage, avoid excessive gravitational pull to side of trail

Standards (cont.)		
Pathway Width	36" minimum, 60" passing areas	Accommodate a wide variety of users and allows for the passage of two wheelchairs
Pathway amenities, phones, drinking fountains and pedestrian- actuated buttons	Place no higher than 4' off ground	Provide access within reach of wheelchair users
Detectable pavement changes at curb ramp approaches	Place at top of ramp before entering roadways	Provide visual and/or tactile queues for visually impaired users
Trailhead Signage	Accessibility information such as pathway gradient/profile, distances, tread conditions, location of drinking fountains and rest stops	User convenience and safety
Rest Areas	On pathways specifically designated as accessible, provide rest areas or widened areas on the pathway optimally at every 300 feet	User convenience and safety

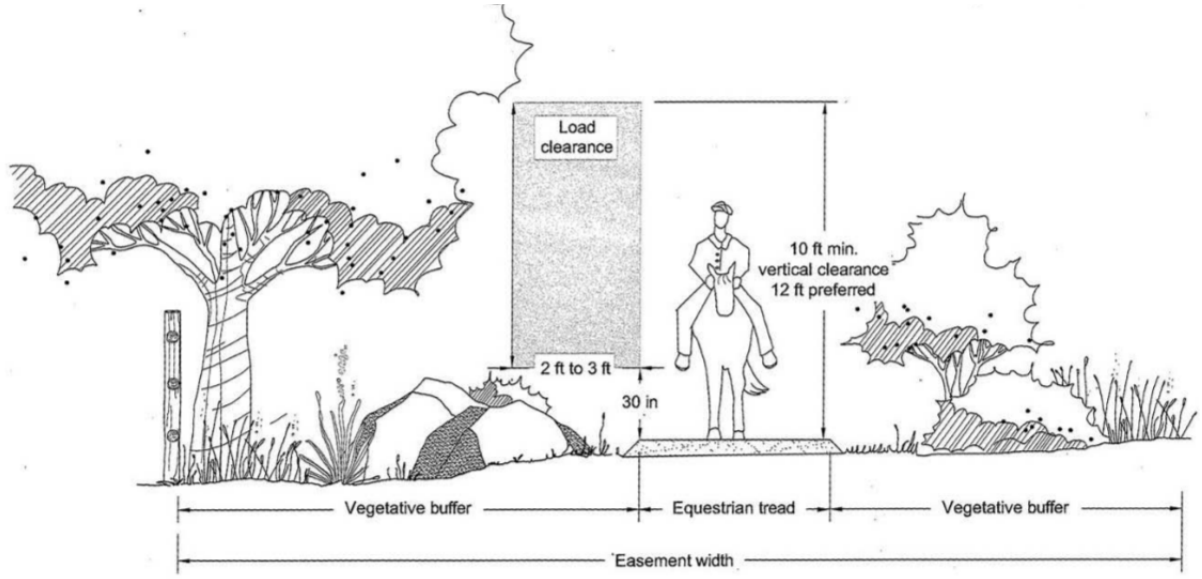
Table 4-3 Equestrian Trails

Description

The design of an equestrian trail facility should respond to the setting, needs of the trail users, level of use, and safety issues. Safety concerns for riders in rural settings involve: visibility, interactions with other trail users and natural hazards. Equestrian trails in urban settings oftentimes accommodate multiple user groups including pedestrians and cyclists and are more likely to interact with roadways and motorized vehicles.

Strongs Creek Trail Application. Portions of the Strongs Creek Trail, namely the western portion, may accommodate equestrian use.

Graphic



Standards

Tread Width

Single track treads vary from 1.5 feet in open areas to 8 feet in urban areas. Double-tracked equestrian trails are designed to be 5 to 6 feet wide in open areas and are often 8 to 12 feet wide in developed areas. A double-track tread allows for equestrians to ride side by side while also providing a comfortable passing distance. This is a common configuration for moderately developed trails in settings where right-of-way is available.

Separation

Walkers, hikers, and cyclists often share trail corridors with equestrians. In areas where conflicts seem likely, efforts are made to physically separate the different user groups. Horses have a natural flight instinct when startled. Sudden, loud noises and fast moving, quiet cyclists approaching a horse from behind can cause a horse to bolt or shy. This is a valid safety concern for riders. Design that considers the interactions of all trail users is essential for a successful design.

Trail facilities should provide enough space so that a horse feels at ease. Horses prefer to travel away from walls or barriers that they cannot see through or over.

Horizontal Clearance

USDA/FHWA suggested horizontal clearance for a standard single-track horse trail is 2 to 3 feet on both sides of the tread in less developed areas and 3 feet on both sides of the tread in moderate to highly developed areas.

Vertical Clearance

USDA/FHWA suggested vertical clearance for a standard single-track horse trail is 10 feet in less developed areas and 10 to 12 feet in moderate to highly developed areas.

Surface

Appropriate trail surfaces include: crushed gravel, compacted and stabilized native soil, decomposed granite or crusher fine material.

Average Grade

</= 5%

Max Grade

15%

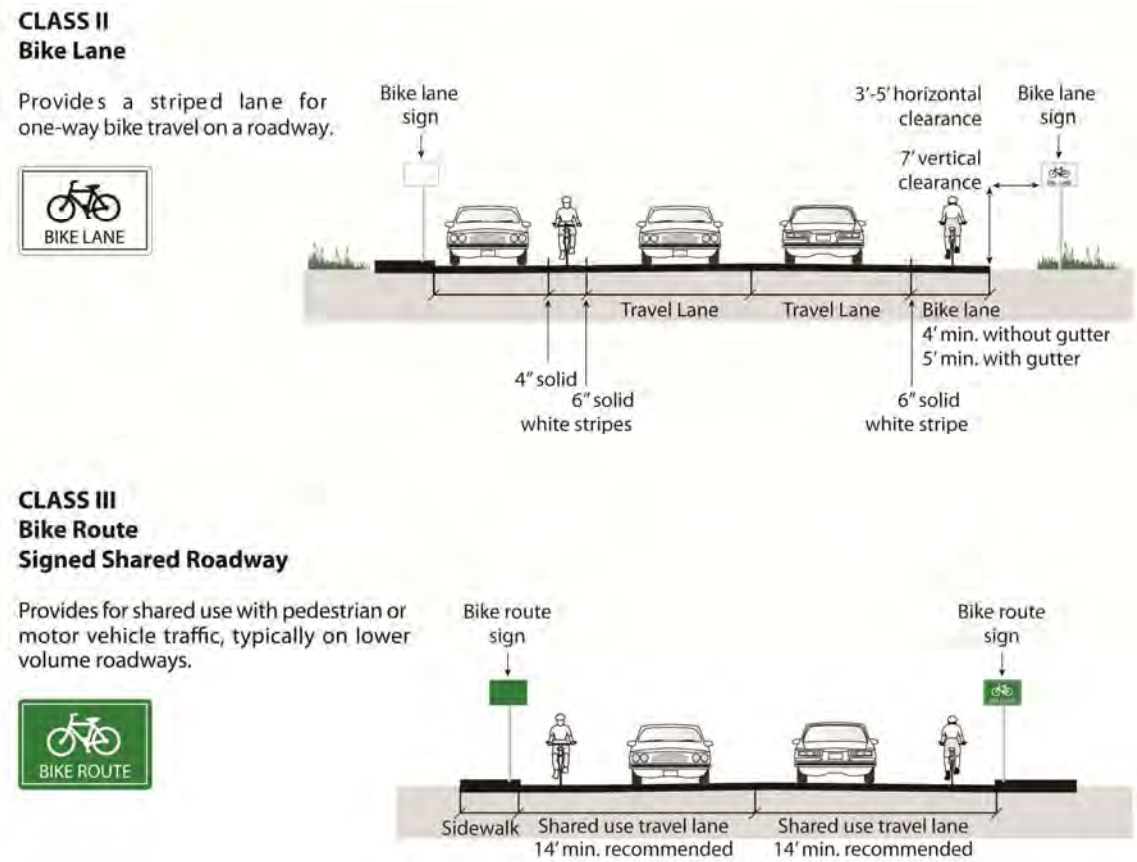
Table 4-4 Caltrans Class II and III Bikeway Design Standards

Description

In addition to Class I Bikeways (bike paths), Caltrans defines Class II Bikeways (bike lanes) and Class III Bikeways (bike routes). This document uses the generic "bike lane" and "bike route".

Strongs Creek Trail Application. Bike lanes are recommended along Rohnerville Road. The City may wish to designate Alamar Way as a bike route if or when a pedestrian and bicycle overcrossing of US 101 is constructed to help direct bicyclists to the overcrossing and alert drivers to anticipate bicyclists on the roadway.

Graphic



Design Summary

Class II Bike Lane Width with Adjacent On-Street Parking:

5' minimum recommended when parking stalls are marked

Bike Lane Width without Adjacent Parking:

4' minimum when no gutter is present (rural road sections)

5' minimum when adjacent to curb and gutter (3' more than the gutter pan width if the gutter pan is greater than 2')

Recommended Width: 6' where right-of-way allows

Class III Lane Width for Bicycle Route With Wide Outside Lane:

Fourteen feet (14') minimum is preferred. Fifteen feet (15') should be considered if heavy truck or bus traffic is present. Bike lanes should be considered on roadways with outside lanes wider than 15 feet.

References

- Caltrans Highway Design Manual
- California MUTCD
- AASHTO Guide for the Development of Bicycle Facilities

Table 4-5 Buffered Bike Lanes

Description

Bike lanes on high-volume or high-speed roadways can be dangerous or uncomfortable for cyclists. Buffered bike lanes are designed to increase the space between the bike lanes and the travel lane or parked cars.

Buffered bike lanes are appropriate on roads with high automobile traffic volumes and speed or high volumes of truck or oversized vehicles, and on bike lanes adjacent to parked cars. If there is a high frequency of right turns by motor vehicles at major intersections, buffer striping should be truncated approaching the intersection.

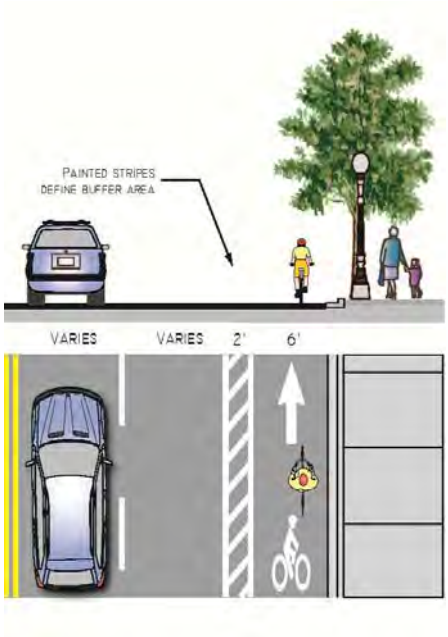
Advantages of buffered bike lanes:

- Provides cushion of space to mitigate friction with motor vehicles.
- Provides space for cyclists to pass one another without encroaching into the travel lane.
- Provides space for cyclists to avoid potential obstacles in the bike lanes, including drainage inlets, manholes, or debris.
- Parking side buffer provides cyclists with space to avoid the 'door zone' of parked cars.
- Provides motorists greater shy distances from cyclists in the bike lane.

Disadvantages / potential hazards:

- Requires additional roadway space.
- Requires additional maintenance for the buffer striping.
- Frequency of parking turnover should be considered prior to installing buffered bike lanes.

Strongs Creek Trail Application. This Plan includes the option for buffered bike lanes along Rohnerville Road to provide additional shy space between bicyclists and vehicles.



Recommended buffered bike lane design

Buffered bike lanes in San Rafael, CA

Design Summary

- Width: 6' recommended
- Minimum of 2' buffer area, 3' recommended

Guidance

- City of Portland, OR Bikeway Design Best Practices for the 2030 Bicycle Master Plan
- NACTO Urban Bikeway Design Guide

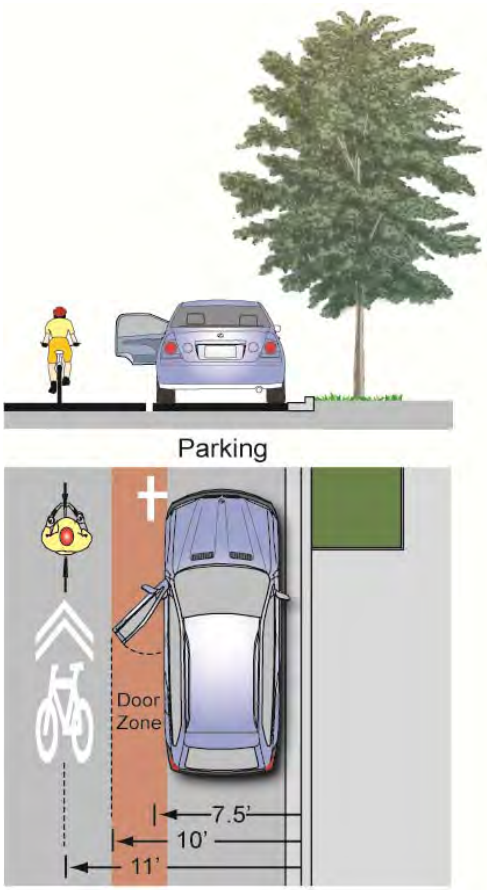
Table 4-6 Shared Lane Markings

Description

Shared lane markings are high-visibility pavement markings that help position bicyclists within the travel lane. These markings are often used on streets where dedicated bike lanes are desirable but are not possible due to physical or other constraints. Shared lane markings are placed strategically in the travel lane to alert motorists of bicycle traffic, while also encouraging cyclists to ride at an appropriate distance from the "door zone" of adjacent parked cars. Placed in a linear pattern along a corridor, shared lane markings also encourage cyclists to ride in a straight line so their movements are predictable to motorists.

Shared lane marking stencils (also called "sharrows") have been introduced for use in California as an additional treatment for Class III facilities. The stencil can serve a number of purposes, such as making motorists aware of bicycles potentially in their lane, showing bicyclists the direction of travel, and, with proper placement, reminding bicyclists to bike further from parked cars to prevent "dooring" collisions.

Strongs Creek Trail Application. If the City designates Alamar Way as a bike route, sharrows could help bicyclists position themselves in the roadway.



Shared lane marking placement guidance for streets with on-street parking.

Design Summary

- Place shared lane markings in a linear pattern along a corridor (typically every 100-200').
- Centered at least 11' from face of curb (or shoulder edge) on streets with on-street parking.
- At least 4' from face of curb (or shoulder edge) on streets without on-street parking.
- Shared lane markings should not be placed on roadways with a speed limit over 40 mph (CA MUTCD).
- Marking should be placed immediately after an intersection and spaced at intervals no greater than 250' thereafter (CA MUTCD).

Guidance

- AASHTO Guide for the Development of Bicycle Facilities
- NACTO Urban Bikeway Design Guide

Table 4-7 Boardwalks

Discussion

Boardwalks may be used in sensitive areas such as through or along wetlands. Boardwalk construction is typically much more expensive than standard paved paths. Their use should be considered in relation to environmental needs, budget, and potential user needs and management issues.

Boardwalk materials vary from treated timber to prefabricated fiberglass. Custom-built treated or recycled timber applications may be more free-form and curvilinear with increased costs associated with the construction. Prefabricated materials come in sections that are combined using generous angles to maintain appropriate user turn radii and may incorporate an anti-slip finish or anti-slip strips.

Design Example

Boardwalk through a wetland

Strongs Creek Trail Application. The trail would cross through or along wetlands (e.g., near Strongs Creek Plaza). Boadwalks could minimize adverse impacts associated with trail construction and operation to those sensitive areas.

Design Summary

Design Criteria

Design criteria for boardwalks must meet AASHTO design recommendations for paved shared-use paths. Paths should also be designed to structurally support the weight of a small truck or a light-weight maintenance vehicle.

Railings

Trails less than 30" above grade may not require a railing according to current building standards. Six inch curb rails may be used. Trails higher than 30" above grade require a 42" high rail. AASHTO recommends for 42" high railings on any structured paths.

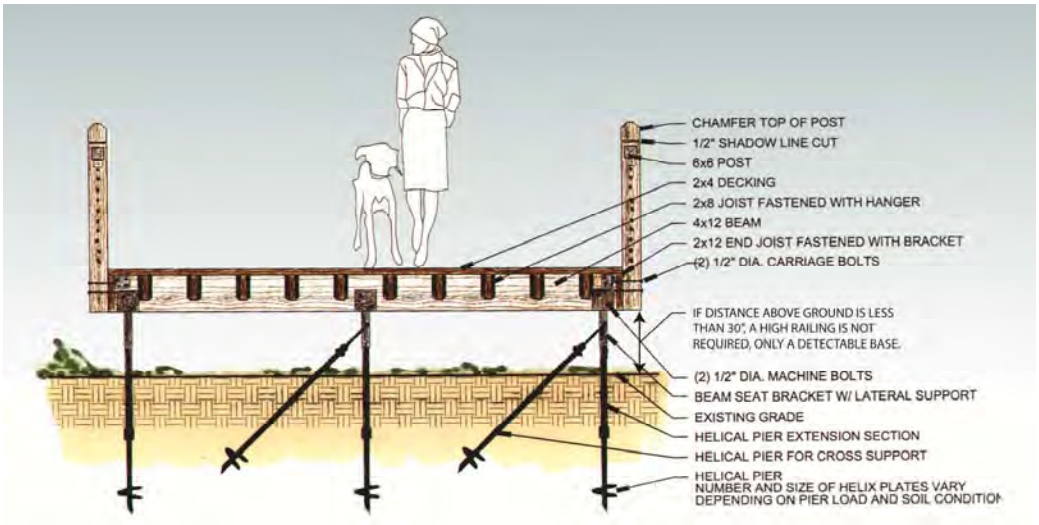
Width

Trail width should be a minimum of 10 feet when no rail is used. A 12 foot width is preferred whenever rails are used. AASHTO recommends carrying the clear area (or 2 foot space on either side of trail) across the structure. This provides an appropriate horizontal shy distance from the railing and allows for maneuvering space to avoid conflicts with users stopped on the structure.

Height from Ground

Trail height should be set to allow for small animal movement under the structure, a minimum of 6" above grade.

Graphic



Guidance

- AASHTO Guide for the Development of Bicycle Facilities
- ADAAG

Table 4-8 Trail Amenities

Description

Anticipated amenities along the trail include lighting at roadway crossings, benches, trash receptacles and dog waste clean-up bag dispensers, interpretive signage, public art, and fencing. Trail amenities can enhance the experience of using the trail, encouraging greater use of the trail and appreciation of the surrounding environment.

Lighting

The Strongs Creek Trail is not proposed to have continuous lighting. Where the trail crosses public roads at grade, supplemental lighting should be incorporated into existing street lighting for improved visibility of trail users during non-daylight hours.

Depending on the location, average maintained horizontal illumination levels of 5 lux to 22 lux should be considered (AASHTO). Where special security problems exist, higher illumination levels may be considered. Lighting fixtures should meet criteria for "dark sky friendly" lighting.

Light standards (poles) should meet the recommended horizontal and vertical clearances.

Design Example

Pedestrian-scale lighting at roadway crossing

Benches

Providing benches at key rest areas and viewpoints supports use of the trail by people of all ages, and provides an opportunity for memorial donations or service projects.

Generally a rustic bench type is recommended. The specific appropriate type will depend on managing agency standards and preferences.

Design Example

Slatted wood bench can be installed with an embedded mount with concrete footings. Concrete benches, which are very durable, require a reinforced concrete slab to keep the bench stable and prevent it from sinking into the ground.

Trash Receptacles

Trash receptacles and dog waste clean-up bag dispensers help keep the trail clean, although the ability to follow up with removal is critical. Some agencies adopt a "leave only footprints" policy and do not provide waste receptacles or pick-up. Because most of the trail would be in open space/natural habitat settings, additional trash receptacles are recommended only at trail entries.

Design Example

Interpretive Signage

Interpretive signs communicate specific messages to visitors. They are most commonly used for self-guiding trails or for wayside exhibits at points of interest, such as viewing areas. Interpretive signs serve a variety of functions, such as strengthening awareness of a site's historic, cultural, or ecological significance; inspiring a feeling of stewardship in site visitors; and demonstrating community pride in local heritage.

Design Example

Public Art	Design Example
Local artists can be commissioned to provide art for the trail system, making it unique, entertaining and memorable. Themes should draw from the local natural and cultural environment. Many trail art installations function as or are incorporated into signs, benches, shelters, or even the pavement surface.	
Fencing	**Design Example**
Fencing can serve multiple purposes along trail facilities, including access control and channeling of trail users. A split-rail fence used along the Strongs Creek Trail would help to visually tie the corridor together and help keep users on the trail. The split-rail fence should be constructed of wood or recycled plastic.	*Split rail fences*

4.2 Trail Crossings

Multi-use paths can intersect with roadways at midblock locations or as part of a roadway-roadway intersection. Common issues at intersections of shared use paths and roadways include:

- Bicyclists entering or exiting the path may travel against motor vehicle traffic;
- Motorists crossing the shared use path at driveways and intersections may not notice path users coming from their right;
- Stopped motor vehicle traffic or vehicles exiting side streets or driveways may block the path; and
- Motorists may not expect or be able to yield to fast-moving bicyclists at the intersection.

4.2.1 Treatments

There are four options for designing multi-use path crossings. These include:

- **Option 1** – Reroute to the nearest at-grade controlled intersection crossing;
- **Option 2** – Create a new at-grade midblock crossing with traffic controls where the pathway intersects with the roadway;
- **Option 3** – Create a new unprotected midblock crossing where the pathway intersects with the roadway; and
- **Option 4** – Create a grade-separated undercrossing or overcrossing of the roadway where the pathway intersects the roadway.

This section addresses treatments at each of these crossing types.

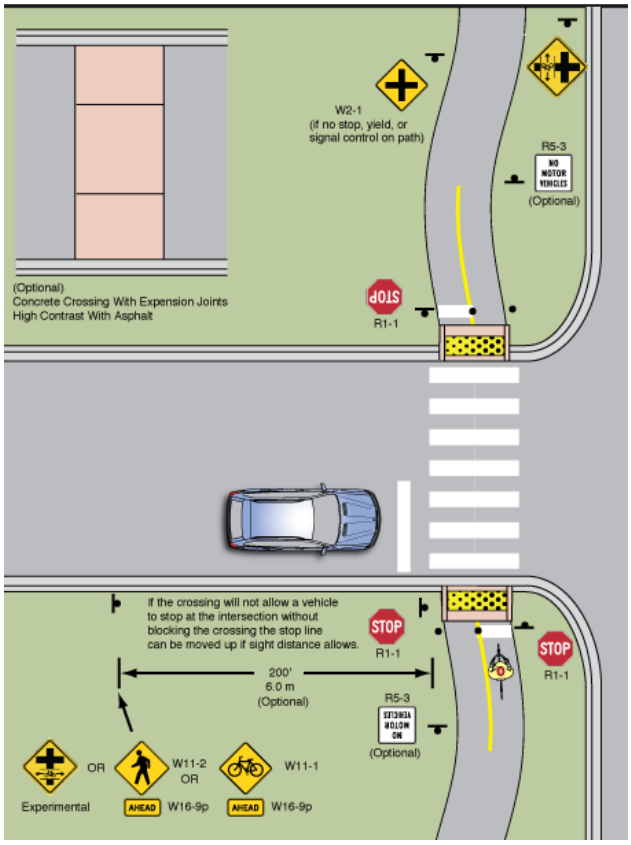
Table 4-9: Path Crossing at Intersection

Description

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 multi-use path approach, Intersection Warning signs should be used.

Strongs Creek Trail Application: The trail would include several crossings at intersections (e.g., at the US 101 on and off ramp/Kenmar Road, Alamar Way/Riverwalk Drive, and South Fortuna Boulevard/Strongs Creek Drive intersections). Signage, pavement markings, and curb extensions improve visibility of trail users. Trail speed control can slow trail users as they approach the intersection.



Recommended "Typical" At-Grade Crossing at an Intersection Where Trail is Adjacent to a Road

Design Summary

A path should cross at a signalized intersection if there is a signalized intersection within 350 feet of the path and the crossroad is crossing a major arterial with a high ADT.

Signage

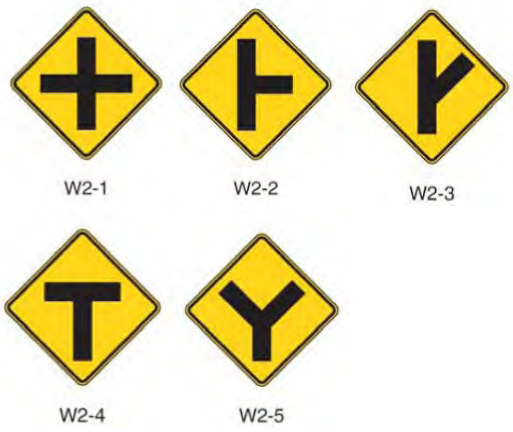
Intersection Warning (W2-1 through W2-5) signs may be used on a roadway, street, or shared-use path in advance of an intersection to indicate the presence of an intersection and the possibility of turning or entering traffic. A trail-sized stop sign (R1-1) should be placed about 5 feet before the intersection.

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. Trail 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.



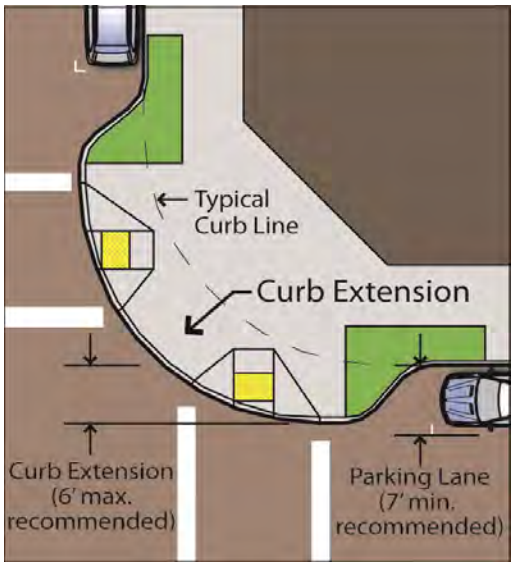
Design Summary (cont.)

Curb Extensions

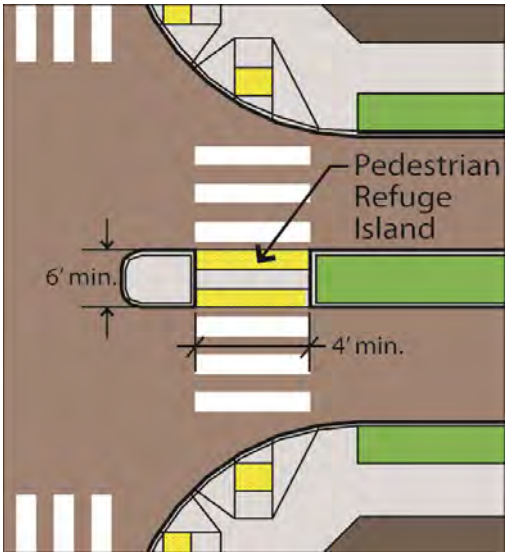
As defined by the Pedestrian and Bicycle Information Center[1], curb extensions (also referred to as bulb-outs or neckdowns) extend the sidewalk or curb line out into the parking lane, reducing the effective street width. Curb extensions improve pedestrian crossings by reducing the pedestrian crossing distance, visually and physically narrowing the roadway, improving the time that pedestrians are in the street. Curb extension placed as an intersection also prevent motorists from parking in or too close to a crosswalk or from blocking a curb ramp. Curb extensions should not extend into travel lanes or bicycle lanes.

Pedestrian Refuge Islands

Pedestrian refuge islands (also known as crossing islands, center or median islands, and pedestrian islands) are raised islands placed in the center of the street at intersections or midblock to help protect crossing pedestrians from motor vehicles. Refuge islands allow pedestrians to negotiate one direction of traffic at a time, and they enable them to stop partway across the street and wait for an adequate gap in traffic before crossing the second half of the street. Refuge islands have been demonstrated to significantly decrease the percentage of pedestrian involved crashes. The factors contributing to pedestrian safety include reduced conflicts, reduced vehicle speeds approaching the island (the approach can be designed to force a greater slowing of cars, depending on how dramatic the curvature is), greater attention called to the existence of a pedestrian crossing, opportunities for additional signs in the middle of the road, and reduced time in the roadway (referred to as "exposure time") for pedestrians.



Curb Extension



Pedestrian Refuge Island

Guidance

- Caltrans Highway Design Manual
- MUTCD – California Supplement
- AASHTO Guide for the Development of Bicycle Facilities and "A Policy on the Geometric Design of Highways and Streets"
- FHWA-RD-87-038 Investigation of Exposure-Based Pedestrian Accident Areas: Crosswalks, Sidewalks, Local Streets, and Major Arterials

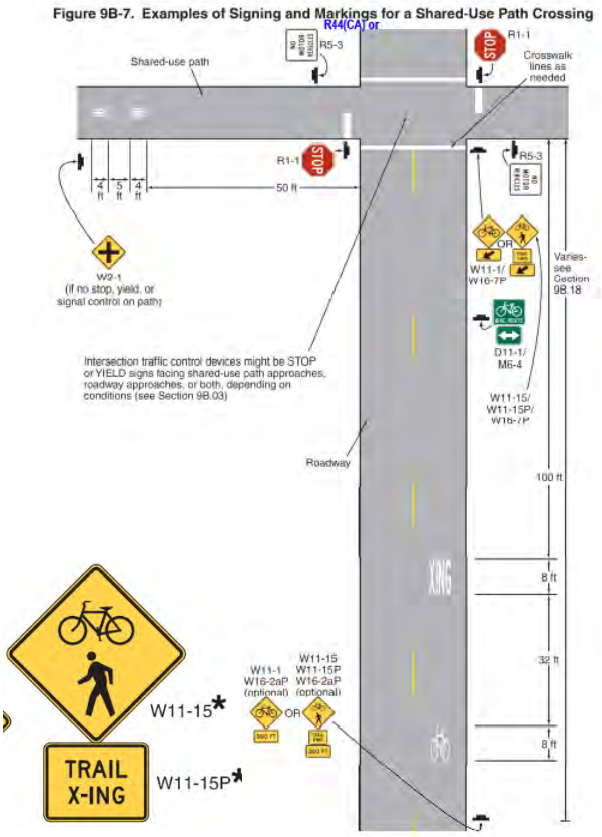
[1] www.walkinginfo.org/engineering/crossings-enhancements.cfm#curb-extensions

Table 4-10: Uncontrolled Mid-Block Crossing

Description

The table on the following page is a summary for implementing at-grade roadway crossings. The letter "C" indicates the location may be suitable for a marked crosswalk. The letter "P" indicates the location should be closely monitored and enhanced with other pedestrian crossing improvements, if necessary, before adding a marked crosswalk. The letter "N" indicates that marked crosswalks alone are insufficient without traffic-calming treatments, traffic signals with pedestrian signals when warranted, or other substantial improvement.

Strongs Creek Trail Application: The trail would include several uncontrolled mid-block crossings (e.g., at Redwood Way and Rohnerville Road). Signage, pavement markings, and other treatments can improve visibility of trail users at the crossings.



Design Summary

Placement

Mid-block crosswalks should be installed where there is significant demand for crossing and no nearby existing crosswalks.

Pavement Markings

A high visibility crosswalk should be used. Warning markings on the path and roadway should be installed.

Warning Signs

The combined Bicycle/Pedestrian Warning sign (W11-15) may be used where both bicyclists and pedestrians might be crossing the roadway. A TRAIL X-ING (W11-15P) supplemental plaque may be mounted below the W11-15 sign. A supplemental plaque with the legend AHEAD or XXX FEET may be used with the Bicycle/Pedestrian Warning sign. Bicycle/Pedestrian Warning signs, when used at the location of the crossing, shall be supplemented with a diagonal downward pointing arrow (W16-7p) plaque to show the location of the crossing. The R10-4 sign may be used where the crossing of a street by bicyclists is controlled by pedestrian signal indications.

Other Treatments

See table on the following page to determine if treatments such as raised median refuges, flashing beacons should be used.

Design Example

Guidance

- MUTCD – California Supplement
- AASHTO Guide for the Development of Bicycle Facilities
- FHWA Safety Effects of Marked Versus Unmarked Crosswalks at Uncontrolled Locations

Recommendations for installing marked crosswalks and other needed pedestrian improvements at uncontrolled locations.*

Roadway Type (Number of Travel Lanes and Median Type)	Vehicle ADT < 9,000			Vehicle ADT >9,000 to 12,000			Vehicle ADT >12,000–15,000			Vehicle ADT > 15,000		
	Speed Limit**											
	≤ 30 mi/h	35 mi/h	40 mi/h	≤ 30 mi/h	35 mi/h	40 mi/h	≤ 30 mi/h	35 mi/h	40 mi/h	≤ 30 mi/h	35 mi/h	40 mi/h
2 lanes	C	C	P	C	C	P	C	C	N	C	P	N
3 lanes	C	C	P	C	P	P	P	P	N	P	N	N
Multilane (four or more lanes) with raised median***	C	C	P	C	P	N	P	P	N	N	N	N
Multilane (four or more lanes) without a raised median	C	P	N	P	P	N	N	N	N	N	N	N

* These guidelines include intersection and midblock locations with no traffic signals or stop signs on the approach to the crossing. They do not apply to school crossings. A two-way center turn lane is not considered a median. Crosswalks should not be installed at locations that could present an increased safety risk to pedestrians, such as where there is poor sight distance, complex or confusing designs, a substantial volume of heavy trucks, or other dangers, without first providing adequate design features and/or traffic control devices. Adding crosswalks alone will not make crossings safer, nor will they necessarily result in more vehicles stopping for pedestrians. Whether or not marked crosswalks are installed, it is important to consider other pedestrian facility enhancements (e.g., raised median, traffic signal, roadway narrowing, enhanced overhead lighting, traffic-calming measures, curb extensions), as needed, to improve the safety of the crossing. These are general recommendations; good engineering judgment should be used in individual cases for deciding where to install crosswalks.

** Where the speed limit exceeds 40 mi/h, marked crosswalks alone should not be used at unsignalized locations.

*** The raised median or crossing island must be at least 4 ft wide and 6 ft long to serve adequately as a refuge area for pedestrians, in accordance with MUTCD and American Association of State Highway and Transportation Officials (AASHTO) guidelines.

C = Candidate sites for marked crosswalks. Marked crosswalks must be installed carefully and selectively. Before installing new marked crosswalks, an engineering study is needed to determine whether the location is suitable for a marked crosswalk. For an engineering study, a site review may be sufficient at some locations, while a more indepth study of pedestrian volume, vehicle speed, sight distance, vehicle mix, and other factors may be needed at other sites. It is recommended that a minimum utilization of 20 pedestrian crossings per peak hour (or 15 or more elderly and/or child pedestrians) be confirmed at a location before placing a high priority on the installation of a marked crosswalk alone.

P = Possible increase in pedestrian crash risk may occur if crosswalks are added without other pedestrian facility enhancements. These locations should be closely monitored and enhanced with other pedestrian crossing improvements, if necessary, before adding a marked crosswalk.

N = Marked crosswalks alone are insufficient, since pedestrian crash risk may be increased by providing marked crosswalks alone. Consider using other treatments, such as traffic-calming treatments, traffic signals with pedestrian signals where warranted, or other substantial crossing improvement to improve crossing safety for pedestrians.

Source: FHWA, 2005. Retrieved from: http://www.fhwa.dot.gov/publications/research/safety/04100/04100.pdf on January 6, 2014.

Table 4-11: Crossing Beacons

Discussion	Recommended Design
Beacons enhance uncontrolled crosswalks by using devices that call attention to pedestrians. This Plan recommends rectangular rapid flash beacons. **Rectangular-Shaped Rapid Flash Beacons** • Rectangular-Shaped Rapid Flash LED Beacons (RRFBs) 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. • RRFBs have been shown to have an 80 to 90 percent compliance rate in the field. • Caltrans has received approval from the FHWA for us of RRFBs on a blanket basis at uncontrolled pedestrian and school crosswalk locations in California, including State highways and all local jurisdictions' and roadways.[2] **Strongs Creek Trail Application:** This Plan recommends crossing beacons at uncontrolled mid-block crossings (e.g., at Redwood Way and Rohnerville Road) to improve visibility of trail users at the crossings.	 *Rectangular Rapid Flashing Beacon* *Image from: http://mutcd.fhwa.dot.gov/resources/interim_approval/ia11/stpetersburgrpt/intro.htm*
Design Summary	**Guidance**
• An RRFB shall only be installed to function as a Warning Beacon. • An RRFB shall supplement a W11-2 (Pedestrian) crossing warning sign with a diagonal downward arrow (W16-7p) plaque, located at or immediately adjacent to a marked crosswalk. • An RRFB shall not be used for crosswalks across approaches controlled by YIELD signs, STOP signs, or traffic control signals. • Two W11-2 crossing warning signs (each with RRFB and W16-7p plaque) shall be installed at the crosswalk, one on each side of the roadway. On a divided roadway, the left-hand side assembly should be installed on the median, if practical, rather than on the far left side of the highway.	• MUTCD – California Supplement • Interim Approval for Optional Use of Rectangular Rapid Flashing Beacons (IA-11)

[2] Approval number IA-11-83-RRBF-California Statewide.

Table 4-12 Option 4: Grade Separated Crossings

Discussion

Bicycle/pedestrian overcrossings and undercrossings provide critical non-motorized system links by joining areas separated by any number of barriers. Overcrossings and undercrossings address real or perceived safety issues by providing users a formalized means for traversing "problem areas" such as waterways or major transportation corridors.

Overcrossings should be considered when high volumes of bicycles and pedestrians are expected along a corridor and:

- Vehicle volumes/speeds are high.
- The roadway is wide.
- A signal is not feasible.
- Crossing is needed over a grade-separated facility such as a freeway or rail line.

Advantages of grade separated overcrossings include:

- Improves bicycle and pedestrian safety while reducing delay for all users.
- Eliminates barriers to bicyclists and pedestrians.

Disadvantages and potential hazards include:

- If crossing is not convenient or does not serve a direct connection it may not be well utilized.
- Overcrossings require substantial clearance to the roadway below involving up to 350 feet or greater of approach ramps at each end. Long ramps can sometimes be difficult for the disabled.
- Potential issues with vandalism, maintenance.
- High cost.

Strongs Creek Trail Application: This Plan recommends an overcrossing of US 101 near Strongs Creek and a trail along the Kenmar undercrossing of US 101.

Design Example

Design Summary

- 10 ft min. clear width for bicycle paths on structures
- 8 ft min. vertical clearance, 10 ft is desirable, especially if path will be used by maintenance vehicles.
- Min. 18'-6" vertical clearance over the freeway. If the ultimate bridge design requires falsework for construction over the freeway, additional design height may be required to meet the minimum falsework clearances.
- Min. 22'-6" vertical clearance is required over railroad tracks, which are used or proposed to be used for transporting freight cars.
- Ramp slopes should be accessible: 5% (1:20) grade or 8.33% (1:12) with landings every 30 inches of vertical rise
- If overcrossing has any scenic vistas, additional width should be provided to allow for stopped trail users
- The overcrossing/undercrossing should have a centerline stripe even if the rest of the trail does not have one
- Lighting should be considered during design process for any overcrossing or undercrossing

Guidance

- AASHTO Guide for the Development of Bicycle Facilities
- California Highway Design Manual
- Caltrans Design Information Bulletin 82-05
- Public Utilities Commission of the State of California General Order No. 26-D

5 Design Recommendations

This Chapter describes the preferred trail design cross-section and easement configuration, and proposed improvements by trail segment.

5.1 Trail Alignment Overview and Map

The Study Corridor has been divided into five segments, generally traveling from west to east (see **Figure 5-1**). The trail would extend approximately 2.5 miles from the Eel River to Newburg Park. There are two alignment types proposed: primary alignments and additive alignments. The primary alignment is the base project. The additive alignments are additional segments that would improve local connections to the base project. The specific recommended trail improvements are described in the following sections. The Appendix, includes an annotated map series showing the trail alignments in detail.

Figure 5-1: Trail Alignment Overview

5.2 Trail Design Recommendations

5.2.1 Preferred Trail Cross Section

As discussed in Section 2.3.4, *Charrette Workshop Events*, the community expressed interest in an eight foot wide paved trail with one two-foot wide shoulder and one six-foot wide bridle path (see **Figure 5-2** and **Figure 5-3**). The bridle path and shoulder would be soft surface. This sixteen foot overall trail section was selected as the preferred cross section for the trail.

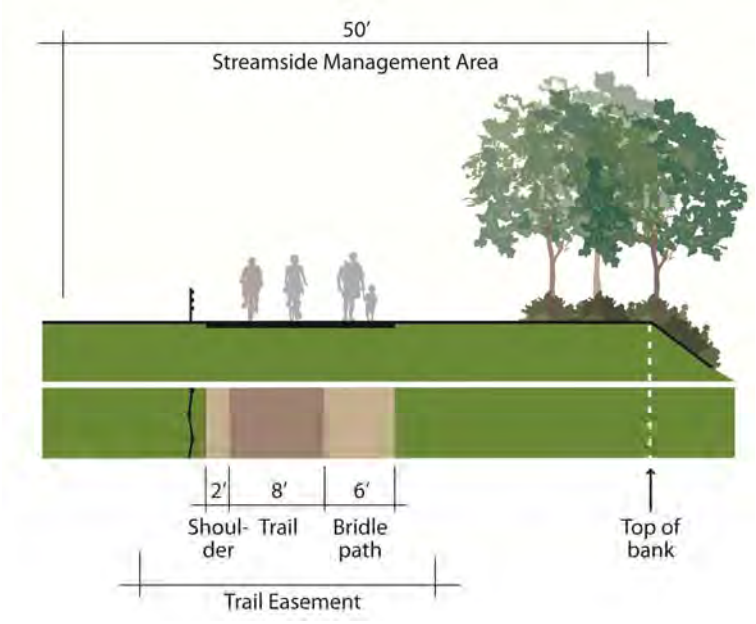


Figure 5-2: Trail Cross Section Along Creek

In constrained areas, such as along roadways and at creek crossings, the trail would narrow to a minimum of 10 feet, typically by reducing the shoulder width. On bridges and adjacent to retaining walls and other structures, it may be necessary to pave the entire trail width. The final width of the trail and paving requirements will be determined by the engineers.

5.2.2 Relationship to Strongs Creek

The Strongs Creek Trail would be located within a Greenway, which is envisioned as a vegetated buffer to be utilized by the trail for non-motorized travel. The extent of the Greenway would be defined by the City's Streamside Management Area (SMA), as defined by General Plan Policy NCR-15. The Greenway could be embellished with amenities such as additional landscaping, interpretive signage, and benches.

Generally, the Strongs Creek Trail would be located within the SMA. Per the General Plan, new development/activities within SMAs are limited to wildlife enhancement/restoration; flood control or drainage; new fencing so long as it does not impede natural drainage or movement of wildlife; bank protection; commercial timber management and harvest activities; road and bridge replacement or construction; removal of vegetation for disease control or public safety; and management and maintenance of trees, shrubs, and other plant life. The SMA is measured 50 feet from the top of each stream bank.

The trail easement width could be as little as 20 feet wide in constrained areas, and as wide as 100 feet or more depending on conditions, the types of amenities added in a given parcel, other environmental protections or setbacks, and property owner interests. For typical creek trail segments, 30 feet is a recommended minimum trail easement from top of bank. This will allow some space for minor grading for the trail, and setback from future structures or roads, and from the creek bank, which may be subject to future erosion.

Figure 5-3: Photo Showing Existing Conditions along Strongs Creek Between South Fortuna Boulevard and Redwood Way (Top) and Photo Simulation of the Trail and Greenway (Bottom)

The location of the trail and trail easement may be flexible based on site conditions. It could be entirely within the SMA, partially within the SMA, or entirely outside the SMA. In most cases, it will probably fall entirely within the SMA, but there will likely be areas in which the easement will need to extend beyond the SMA (e.g., southwest of Redwood Way) in order to connect to local streets and destinations.

5.3 Trail Segments and Alignments

Segment 1 (Primary Alignment): Overlook Park/Trailhead to South Fortuna Boulevard

Segment 1 extends from the Overlook Park/Trailhead south along Riverwalk Drive, through the Kenmar Road/US 101 undercrossing, along Mill Creek to its confluence with Strongs Creek, then east to the South Fortuna Boulevard/Strongs Creek Drive intersection. From the Overlook Park/Trailhead, the 10 foot wide Strongs Creek Trail would continue south along Riverwalk Drive in front of the River Lodge, requiring modification of the existing parking lot striping. The trail would continue south along the west side of Riverwalk Drive, with fill, retaining walls, and railings (see **Figure 5-4** and **Figure 5-5**).

As part of this Study, the project team and Caltrans reviewed two potential trail alignments through the Kenmar Road/US 101 undercrossing: the north and south sides of Kenmar Road. A trail along the north side of Kenmar Road is the preferred alignment due to heavier traffic volumes along the US 101 segment south of Fortuna, the desire to separate a trail crossing from the heavier traffic flows, and the understanding the City intends to install STOP control along westbound Kenmar Road at the Kenmar Road/US 101 southbound on and off ramp intersection.

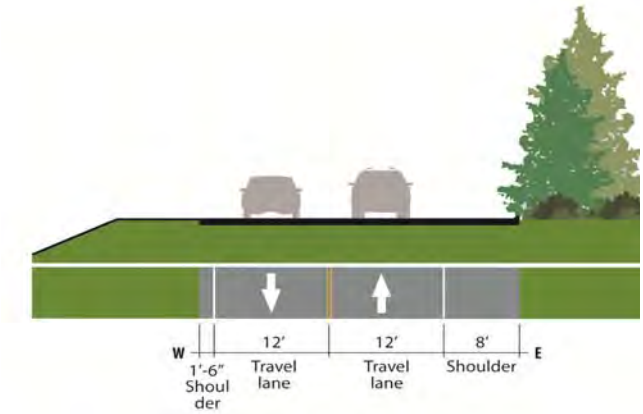


Figure 5-4: Existing Cross Section along Riverwalk Drive, south of the River Lodge

Figure 5-6 shows the northern trail alignment. Recommended crossing improvements include reducing turn radii along Kenmar Road and the US 101 on and off ramps at the trail crossings to slow approaching vehicles and shorten the crossing distance for trail users. Any modifications to the US 101 ramps will require Caltrans approval. Additional recommended crossing improvements include high visibility crosswalks, advance stop bars, and signage. Under US 101, trail construction would include an approximately 7 foot high retaining wall on the north side of Kenmar Road (see **Figure 5-7** and **Figure 5-8**). **Figure 5-9** presents a photo of existing conditions though the undercrossing viewed from Kenmar Road west of US 101 and a photo simulation of the proposed crossing improvements.

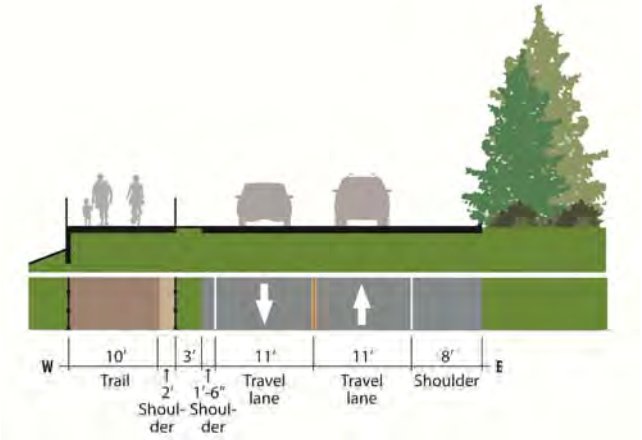


Figure 5-5: Proposed Cross Section showing Trail along Riverwalk Drive, south of the River Lodge

East of the US 101 undercrossing, the trail would cross the railroad tracks at-grade and cross Eel River Drive, then turn north and travel along the west side of Mill Creek to its confluence with Strongs Creek. From the Strongs Creek/Mill Creek confluence, the trail would cross Mill Creek along a new bridge approximately 200 feet long and continue east on the south side of Strongs Creek to the South Fortuna Boulevard/Strongs Creek Drive intersection. Trail users would cross South Fortuna Boulevard using the northern crosswalk at the signalized intersection. Recommended intersection improvements include removal of the northbound merge lane on South Fortuna Boulevard in order to shorten the crossing distance for trail users.

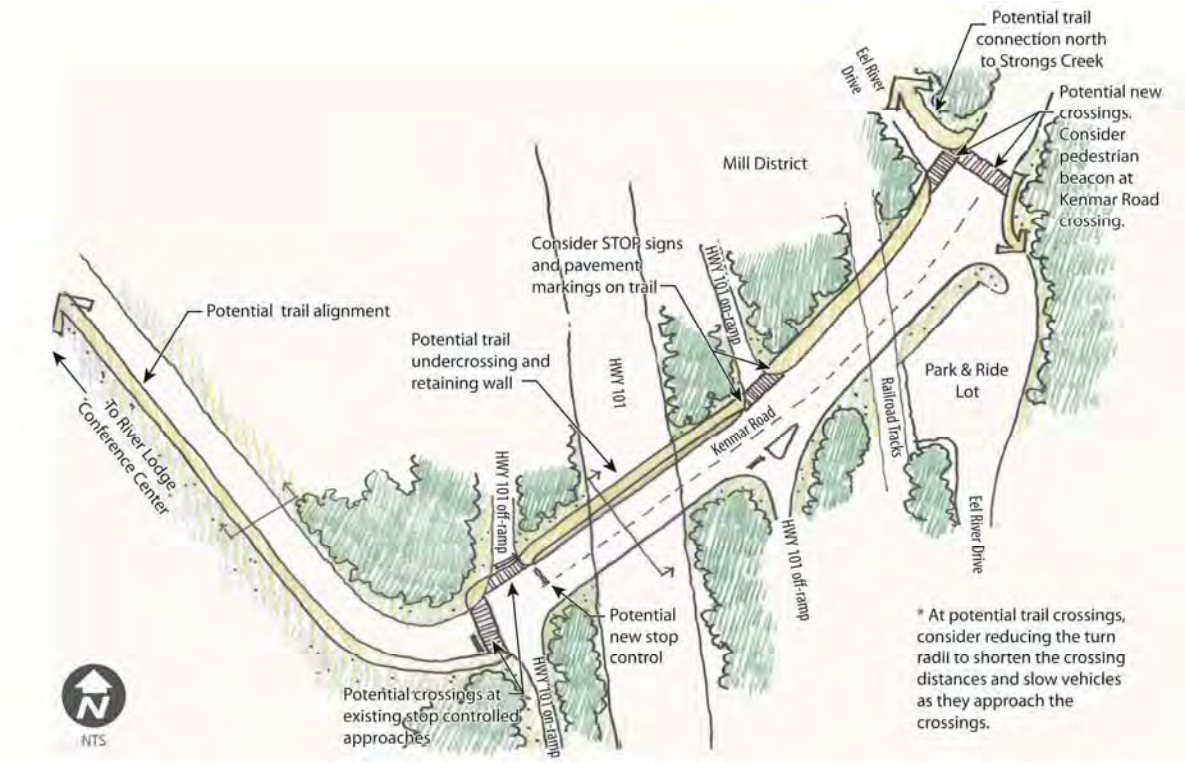


Figure 5-6: Plan View of Proposed Trail Alignment through the Kemar Road/US 101 Undercrossing

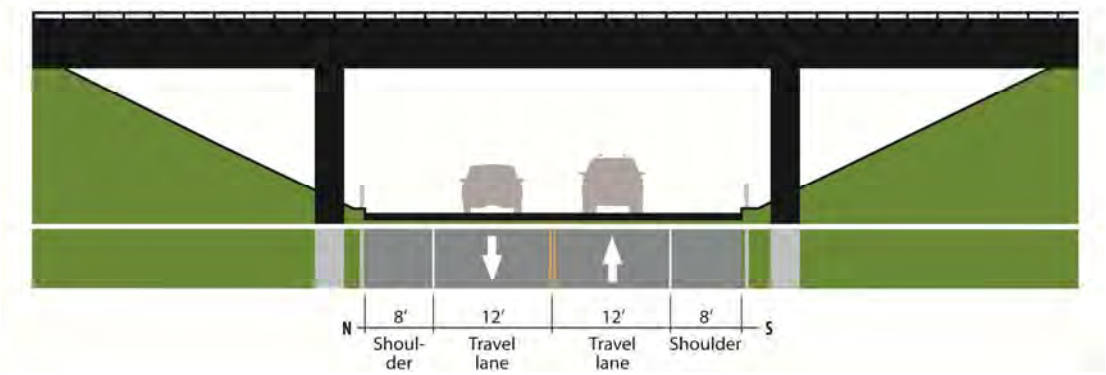


Figure 5-7: Existing Cross Section through the Kemar Road/US 101 Undercrossing

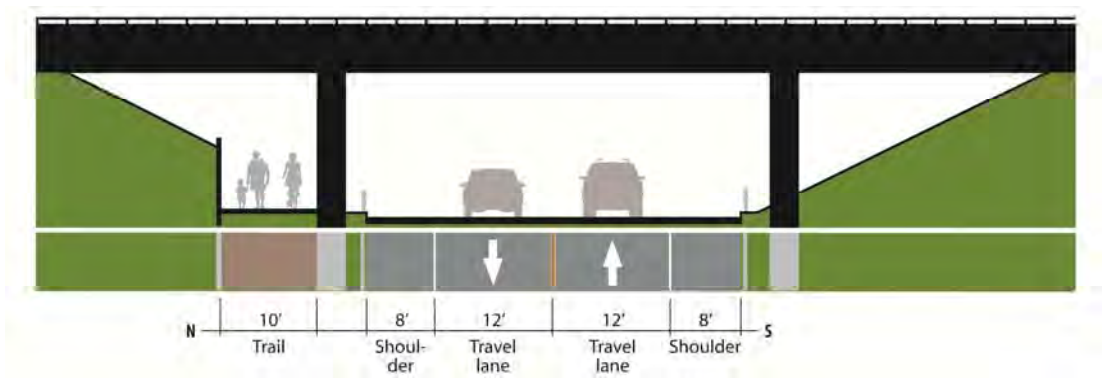


Figure 5-8: Proposed Cross Section Showing the Trail along Kenmar Road under US 101

Figure 5-9: Photo Showing Existing Conditions along the Kenmar Road US 101 Undercrossing (from eastbound Kenmar Road) (Top) and Photo Simulation of the Trail Crossing Improvements (Bottom)

Segment 1a (Additive Alignment): Overlook Park/Trailhead to the Strongs Creek/Mill Creek Confluence

The US 101 overcrossing project is encompassed in Segment 1a, which extends from the Overlook Park/Trailhead on Riverwalk Drive north along Riverwalk Drive to the Riverwalk Drive/Alamar Way intersection, then east on Alamar Drive to an overcrossing of US 101 and the railroad, then along Strongs Creek to the Strongs Creek/Mill Creek confluence within the Mill District.

As stated in the City's General Plan, the Mill District Area Plan provides the City with an opportunity to create a mixed-use development that respects the existing character of the

community; is pedestrian-friendly; and is connected with surrounding neighborhoods and districts. The Strongs Creek Trail project is integral to this development process. Respecting that until the Mill District Area Plan is developed, the cost of investing in a pedestrian and bicycle overcrossing of US 101 overcrossing is not an immediate need.

Along Riverwalk Drive, the trail would be 10 feet wide with 5 feet of horizontal separation from the roadway, per Caltrans Class I Bikeway standards. Recommended crossing improvements at the Riverwalk Drive/Alamar Way intersection include a high visibility crosswalk, signage and TRAIL XING pavement markings. Along Alamar Way, the trail would take the form of a 10 foot wide sidewalk. At the California Conservation Corps (CCC) campus, the trail would ramp up and over US 101, Strongs Creek, and the railroad tracks (see **Figure 5-11**). **Figure 5-10** presents a photo showing existing conditions along US 101 near Strongs Creek and a photo simulation of a potential pedestrian and bicycle overcrossing in this location. On the west side of US 101, the overcrossing would ramp down to grade northwest of the creek. The trail would utilize the existing Eel River Drive bridge to cross to the south side of Strongs Creek. Stair connections on either side of the overcrossing could provide for more direct pedestrian connections to Eel River Drive and Alamar Way.

The project team considered both under- and overcrossing options to cross US 101 and the NWPRR line near Strongs Creek. An overcrossing is the preferred option due to constraints associated with use of the existing box culvert under US 101, limited vertical clearance under the railroad bridge, and in response to community preference for an overcrossing. At community outreach events, attendees said they would feel more comfortable crossing over rather than under US 101 and the NWPRR line. As discussed in Section 3.1.1, Strongs Creek passes under US 101 via a box culvert that was constructed in 1962 and measures 40 feet long, 13 feet high, and 25 feet wide. A bench could be constructed within the box culvert for a trail; however, placement of structure within the culvert would restrict flow capacity. To minimize impacts on flow capacity, the uncrossing would likely be available for seasonal use only. The railroad bridge presents a constraint to a potential undercrossing along the creek due to limited vertical clearance. A trail meeting Caltrans Class I Bikeway vertical clearance requirements (i.e., 8 feet min.) would need to be placed well within the floodplain.

Figure 5-11: Plan View of Potential US 101 Overcrossing

Figure 5-10: Photo Showing Existing Condtiions along the Strongs Creek Crossing of US 101 (Top) and Photo Simulation of Potential US 101 Pedestrian and Bicycle Overcrossing (Bottom)

Segment 2 (Primary Alignment): South Fortuna Boulevard to Redwood Way

Segment 2 extends from the west side of the South Fortuna Boulevard/Strongs Creek Drive intersection to Redwood Way. Redwood Way crossing improvements are presented as Segment 3. The trail would be constructed along the south side of Strongs Creek and would traverse wetland areas over a new boardwalk. A Jameson Creek crossing would require a new bridge approximately 60 feet long . As the trail approaches Redwood Way, the trail alignment would likely extend beyond the SMA in order to minimize impacts to the creek and provide a better connection with a new trail crossing at Redwood Way.

At the Design Fair, an alternate trail route was suggested that would take trail users further from Strongs Creek and closer to Redwood Memorial Hospital. This alternate alignment responds to some resident concerns over the potential for exposure to noise and other nuisances if a trail were constructed along the creek and closer to residences located on the north side of the creek. This potential alignment is not recommended as it would take trail users further from the creek and noise impacts associated with people using the trail are anticipated to be minimal.

Segment 2A (Additive Alignment): Redwood Shopping Center Connection

Segment 2A includes a bridge connection from the Strongs Creek Trail to the Redwood Village Shopping Center to better facilitate access to the shopping center from the trail. Recommended improvements include an approximately 200 foot long bridge over Strongs Creek, a 4 foot wide sidewalk built behind the existing curb at shopping center entrance and connecting with the sidewalk along South Fortuna Boulevard. Sharrows along the shopping center access road would help alert motorists to look for bicyclists along the access road.

Segment 2B (Additive Alignment): Overlook at Redwood Memorial Hospital

A new overlook with decorative pavers, a seat wall, shade structure, and landscaping is proposed north of the Redwood Memorial Hospital parking lot. Trail connections are proposed to the Strongs Creek Trail and a new sidewalk along Redwood Way to improve circulation to and from the outlook (see **Figure 5-14**).

Figure 5-14: Plan View Showing the Proposed Redwood Way Trail Crossing and a Proposed Overlook at Redwood Memorial Hosiptal

Segment 3 (Primary Alignment): Redwood Way Crossing Improvements

Segment 3 consists of crossing improvements at Redwood Way. Recommended crossing improvements include a pedestrian refuge island, Rectangular Rapid Flashing Beacon (RRFB), high visibility crosswalk, TRAIL XING pavement markings, and signage. Additional improvements to improve connections between the trail and residences, office, and other uses along Redwood Way are recommended. These improvements include signage and striping for bike lanes along Redwood Way, new sidewalk segments, and bus stop improvements.

On the north side of Redwood Way, signs would direct trail users northwest to a bridge crossing over

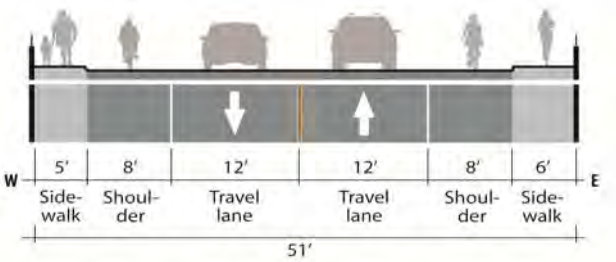


Figure 5-12: Existing Cross Section along Redwood Way Bridge over Strongs Creek

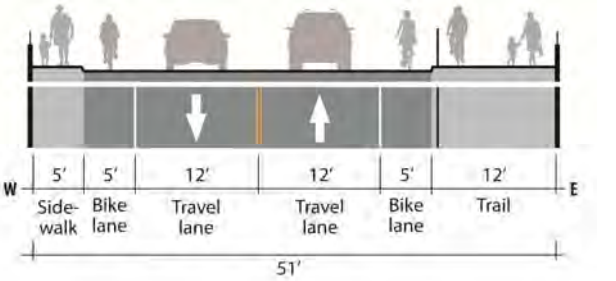


Figure 5-13: Proposed Cross Section showing Trail along Redwood Way Bridge over Strongs Creek

Strongs Creek, then east to a continuation of the trail along the north bank of Strongs Creek. **Figure 5-12** and **Figure 5-13** show the existing and proposed bridge cross sections. This route is designed to avoid impacts to the picturesque and potentially historic hay barn on the Brazil Ranch.

Segment 4 (Primary Alignment): Redwood Way to Rohnerville Road (incl. Rohnerville Road crossing improvements)

Segment 4 extends from Redwood Way to Rohnerville Road and includes a trail crossing at Rohnerville Road. The trail crosses Strongs Creek via a new bridge, approximately 120 feet long, and continues east along the south side of the creek. Recommended crossing improvements at Rohnerville Road include a high visibility crosswalk, TRAIL XING pavement markings, signage, a RRFB, and lighting.

Segment 4 Additive Alignments

The Senestraro and Barry Creek neighborhoods north of Segment 4 are primarily cul-de-sacs and dead-end streets. Travel into and out of the neighborhood occurs along circuitous routes, which can discourage pedestrian and bicycle travel. Additive alignments are recommended to improve connections between the Strongs Creek Trail and neighborhoods north of Strongs Creek.

Segment 4a (Additive Alignment): Path Connection to 2nd Avenue/Guido Avenue

Segment 4a would connect the Strongs Creek Trail to 2nd Avenue/Guido Avenue via a trail segment across a currently vacant private parcel with APN 202-071-42.

Segment 4b (Additive Alignment): Path Connection to Francesco Place

Segment 4b would connect the Strongs Creek Trail to Francesco Place via a bridge, approximately 120 feet long, and trail segment across a currently vacant private parcel with APN 202-072-19.

Segment 4c (Additive Alignment): Path Connection to Arizzi Court

Segment 6c would connect the Strongs Creek Trail to Arizzi Court via a bridge approximately 120 feet long and trail segment across a currently vacant private parcel with APN 202-072-13.

Segment 5 (Primary Alignment): Rohnerville Road – Strongs Creek Trail Crossing to Newburg Road

Segment 5 extends from the proposed Strongs Creek Trail crossing to Newburg Road along Rohnerville Road. A new crosswalk is proposed where the trail intersects Rohnerville Road. Recommended crossing improvements include a high visibility crosswalk, a RRFB, TRAIL XING pavement markings, signage, and lighting. After crossing Rohnerville Road, trail users would continue north along an at-grade trail on the east side of the roadway (see **Figure 5-15** and **Figure 5-16**). A southbound bike lane would facilitate southbound onstreet bicycle travel.

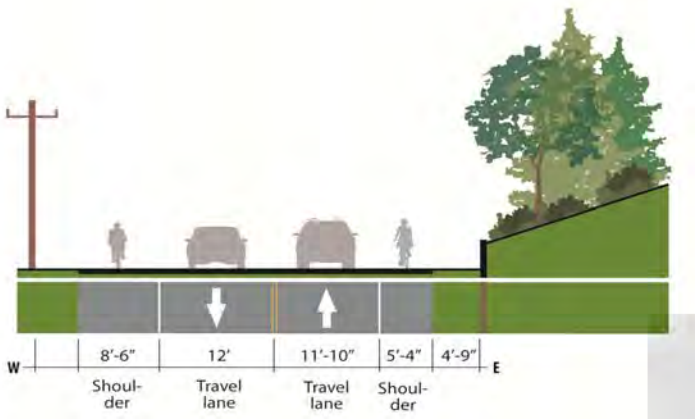


Figure 5-15: Existing Cross Section along Rohnerville Road, south of Loop Road

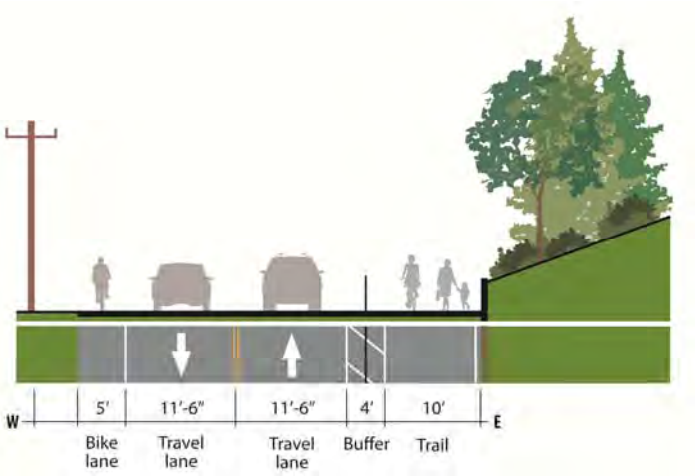


Figure 5-16: Proposed Cross Section showing an At-Grade Trail along Rohnerville Road, south of Loop Road

A stop sign at Rohnerville Road controls westbound traffic on Loop Road. Proposed trail crossing improvements include a high visibility crosswalk, advance stop bar, and signage. North of the Loop Road crossing the trail would continue northwest along the east side of Rohnerville Road, crossing Strongs Creek via a new, approximately 60 foot long bridge, and end at Newburg Road.

To improve pedestrian and bicycle access to the trail from neighborhoods west of Rohnerville Road, a new crossing is proposed at Senestrano Way. Recommended crossing improvements include a high visibility crosswalk, RRFB, TRAIL XING pavement markings and signage.

Segment 5 (Alternate Design Option): Rohnerville Road – Strongs Creek Trail Crossing to Loop Road

There is one alternate design option on a portion of the primary alignment. This is on Segment 5 between the junction of Strongs Creek with Rohnerville Road and the intersection of Loop Road and Rohnerville Road, and consists of a trail elevated approximately three feet on an embankment adjacent to the road (see **Figure 5-17**). This would require cutting into the hillside and constructing a retaining wall. The trail would slope up from street level north of the proposed roadway crossing, then return to grade at the Loop Road intersection.

Segment 5a (Additive Alignment): Rohnerville Road Bike Lanes

To improve pedestrian and bicycle connections between the trail and nearby neighborhoods and to provide an alternate, nighttime route, this study recommends on-street improvements along Redwood Way and Rohnerville Road. Bike lanes are recommended along Redwood Way from South Fortuna Boulevard to Rohnerville Road. Buffered bike lanes are recommended along Rohnerville Road from Redwood Way to Newburg Drive (see **Figure 5-18** and **Figure 5-19**).

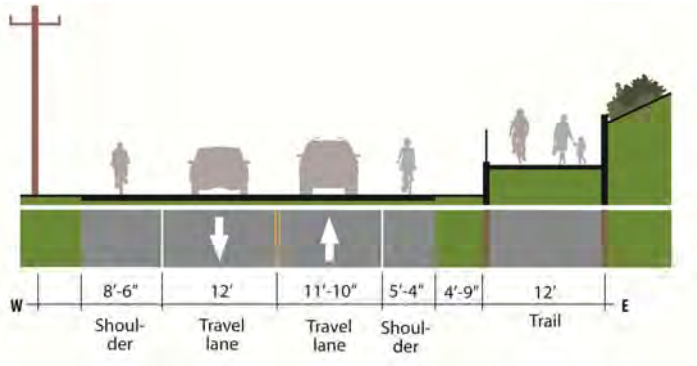


Figure 5-17: Proposed Cross Section showing an Elevated Trail along Rohnerville Road, south of Loop Road

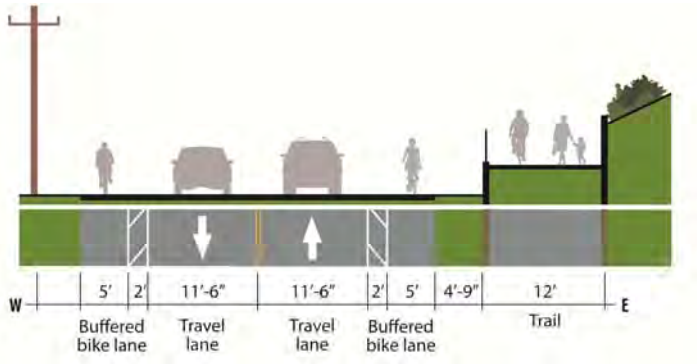


Figure 5-18: Proposed Cross Section showing an Elevated Trail and Buffered Bike Lanes along Rohnerville Road, south of Loop Road

Segment 5b (Additive Alignment): Newburg Park Connection

A new trail connection to Newburg Park is proposed along the north side of the park from Rohnerville Road to the park entrance road, connecting with a sidewalk on the west side of the park road. Construction of the trail segment into the park would include parking lot restriping and trail construction along a segment of Newburg Road.

Figure 5-19: Photo Showing Existing Conditions along Rohnerville Road near Strongs Creek (Top) and Photo Simulation Showing an Elevated Trail and Buffered Bike Lanes (Bottom)

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6 Cost Estimates and Phasing

6.1 Cost Estimates

The Master Plan is a bold vision for a trail that will provide Fortuna with multiple benefits, including healthy recreation, economic vitality, environmental preservation and restoration. The Master Plan sets the direction for opportunistic and incremental implementation over time. While the cost estimate for the entire alignment is approximately $24 million, about half of the cost ($10.3 million) is allocated to the U.S. 101 overcrossing – Segment 1a (see **Figure 1-1**), and is tied to implementation of the Mill District Area Plan, as discussed in Chapter 5.

This chapter presents planning-level cost estimates for the proposed trail improvements. Costs include planning, design, construction, and other anticipated implementation steps. Cost estimates require numerous assumptions about the details of construction and associated requirements. The estimate and assumptions reflect the extensive experience of the consultant team based on similar projects. The summary (**Table 6-1**) presents the estimated total cost for each trail segment. Detailed estimates for each segment are presented in **Section 9.3**.

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

- Construction overhead (costs the contract typically includes over and above the individual work items – calculated as a percentage of the total project cost):
  - Mobilization – 5%
  - General conditions, bonds, and insurance – 2%
  - Erosion control, including Best Management Practices (BMPs), Stormwater Pollution Prevention Plan (SWPPP) and reporting – 5%
  - Traffic control – 2%
- A contingency for the level of accuracy of the estimate is included at 20% of total construction.
- Design and other implementation costs allowances are included at the following percentages of construction cost:
  - Survey; boundary and topographic – 2.5%
  - Plans, specifications and estimates, including technical studies such as geotechnical or hazardous waste investigations – 15%
  - Environmental analysis and documentation and related permits – 10%
  - Mitigation (actual cost will be based on existing conditions and scope of proposed changes) – 2-3%
  - Construction engineering – 15%

The estimates include acquisition of right-of-way easements where necessary for the trail alignment. This would be strictly on a willing seller basis. The estimates include an approximate area of right-of-way required, and a "placeholder" cost of $2.00 per square foot for acquisition. Actual right-of-way costs would be subject to negotiation.

Table 6-1: Cost Estimates by Segment

Description		Totals
Segment 1 - Overlook Park/Trailhead to South Fortuna Boulevard (incl. South Fortuna Boulevard Crossing Improvements)		
Construction	--	$1,791,123
Survey, design, environmental, and admin	27.5%	$492,559
Right-of-Way	$107,268	$107,268
Contingency (20%)	20.0%	$358,225
Total	--	**$3,864,000**
Segment 1a - Overlook Park/Trailhead to the Strongs Creek/Mill Creek Confluence (North Alignment)		
Construction	--	$7,140,694
Survey, design, environmental, and admin	24.0%	$1,713,767
Right-of-Way	$65,728	$65,728
Contingency (20%)	20.0%	$1,428,139
Total	--	**$10,349,000**
Segment 2 - South Fortuna Boulevard to Redwood Way		
Construction	--	$855,920
Survey, design, environmental, and admin	32.0%	$273,894
Right-of-Way	$115,280	$115,280
Contingency (20%)	20.0%	$171,184
Total	--	**$1,417,000**
Segment 2a - Connection from Redwood Shopping Center		
Construction	--	$620,366
Survey, design, environmental, and admin	34.0%	$210,924
Right-of-Way	$6,376	$6,376
Contingency (20%)	20.0%	$124,073
Total	--	**$962,000**
Segment 2b - Overlook at Redwood Memorial Hospital and Connector		
Construction	--	$63,390
Survey, design, environmental, and admin	32.5%	$20,602
Right-of-Way	$5,472	$5,472
Contingency (20%)	20.0%	$12,678
Total	--	**$103,000**
Segment 3 - Redwood Way Crossing Improvements		
Construction	--	$147,713
Survey, design, environmental, and admin	35.0%	$51,700
Right-of-Way	$0	$0
Contingency (20%)	20.0%	$29,543
Total	--	**$229,000**
Segment 4 - Redwood Way to Rohnerville Road (Not incl. Rohnerville Road Crossing Improvements)		
Construction	--	$977,373
Survey, design, environmental, and admin	31.5%	$307,873
Right-of-Way	$69,732	$69,732
Contingency (20%)	20.0%	$195,475
Total	--	**$1,551,000**

Description		Totals
Segment 4a - Trail Connection through vacant lot to 2nd Avenue/Guido Avenue		
Construction	--	$52,288
Survey, design, environmental, and admin	33.5%	$17,516
Right-of-Way	$5,700	$5,700
Contingency (20%)	20.0%	$10,458
Total	--	**$86,000**
Segment 4b - Trail Connection through vacant lot to Francesco Place		
Construction	--	$279,043
Survey, design, environmental, and admin	34.0%	$94,875
Right-of-Way	$6,130	$6,130
Contingency (20%)	20.0%	$55,809
Total	--	**$436,000**
Segment 4c - Trail Connection through vacant lot to Arizzi Court		
Construction	--	$282,113
Survey, design, environmental, and admin	34.0%	$95,919
Right-of-Way	$6,690	$6,690
Contingency (20%)	20.0%	$56,423
Total	--	**$442,000**
Segment 5 - Rohnerville Road - Redwood Way to Newburg Road (Incl. Rohnerville Road Crossing Improvements)		
Construction	--	$736,935
Survey, design, environmental, and admin	28.0%	$206,342
Right-of-Way	$22,710	$22,710
Contingency (20%)	20.0%	$147,387
Total	--	**$1,114,000**
Segment 5 Alternate - Rohnerville Road - Redwood Way to Newburg Road (Similar to Segment 5, Elevated Trail)		
Construction	--	$1,863,921
Survey, design, environmental, and admin	28.5%	$531,217
Right-of-Way	$51,256	$51,256
Contingency (20%)	20.0%	$372,784
Total	--	**$2,820,000**
Segment 5a - Rohnerville Road - Redwood Way to Newburg Road Bike Lanes		
Construction	--	$132,278
Survey, design, environmental, and admin	10.0%	$13,228
Right-of-Way	$0	$0
Contingency (20%)	20.0%	$26,456
Total	--	**$172,000**
Segment 5b - Rohnerville Road - North Edge Newburg Park Trail		
Construction	--	$77,327
Survey, design, environmental, and admin	26.0%	$20,105
Right-of-Way	$0	$0
Contingency (20%)	20.0%	$15,465

Description		Totals
Total	--	$113,000
TOTAL OF BASE PROJECT (SEGMENTS 1, 2, 3, 4, AND 5) (NO ADDATIVE OR ALTERNATE ALIGNMENTS)		$11,372,000 TO $13,078,000
TOTAL OF BASE PROJECT AND ALL ADDATIVE SEGEMENTS (NOT INCL. 5 ALTERNATE)		$24,035,000 TO $25,741,000

6.2 Trail Priorities and Phasing Recommendations

6.2.1 Implementation Categories

This Plan recommends three trail implementation categories (see **Figure 6-1**):

- Category A: Creek Trail, which consists primary of trail alignments along the creek,
- Category B: On Street Connections, which consists primarily of on street connections, and
- Category C: Additive Alignments and Amenities, which includes the additive trail alignments and trail amenities.

Trail segments in Category A would be pursued first and trail segments in Category C would be pursued at a later date to be determined. These categories may be subdivided into smaller projects based on funding availability and other considerations. It is always advantageous to implement "low hanging fruit" portions of the trail that can be completed with minimal funding and maximum community involvement to demonstrate progress and maintain interest on the overall effort. Actual phasing of segments on a trail project of this type is likely to be opportunity-driven, based on grant availability, ability to forge agreements and partnerships and/or opportunities to incorporate improvements into development proposals.

Table 6-2: Cost Estimates by Implementation Category

Description	Totals
CATEGORY A: CREEK TRAIL TOTAL (not including site furnishings)	$2,745,000
CATEGORY B: ONSTREET CONNECTIONS TOTAL (depending on whether the at-grade or alternative design option is selected for Segment 5; not including site furnishings)	$7,755,000 TO $9,460,000
CATEGORY C: ADDITIVE ALIGNMENTS AND AMENITIES TOTAL (depending on whether the at-grade or alternative design option is selected for Segment 5)	$13,535,000 TO $13,536,000

Figure 6-1: Trail Implementation Categories

6.2.2 Category A: Creek Trail

Trail segments 2 through 4, from east of Fortuna Boulevard to the west side of Rohnerville Road, offer the greatest opportunity for a high-quality trail experience, separated from roadways and enjoying the creekside environment. These segments will provide the backbone of the trail system creating a groundswell of support for completing other portions of the trail. These segments traverse

the more development portions of the overall trail alignment, would facilitate off road connections between major streets, and connect existing residential areas with shopping and employment areas. Electrical conduits and pull boxes would be placed at this time, even if light fixtures are not immediately financially feasible. First use of lighting would be at road crossings with RRFBs.

6.2.3 Category B: On Street Connections

Segments 1 and 5 are important connections to the creek trail. These segments could be strategically implemented through the City's capital improvements program (CIP) with state funds such as an Active Transportation Projects grant.

Segment 1 presents a near-term solution for connecting pedestrian and cyclists under US 101 with improvements to the Kenmar Road/US 101 undercrossing. This segment extends from Overlook Park/Trailhead south along Riverwalk Drive and through the Kenmar Road/US 101 undercrossing. It then parallels Mill Creek to the confluence with Strongs Creek, then east to the intersection of South Fortuna Boulevard/Strongs Creek Drive. With implementation of the Category B improvements, pedestrians and bicyclists would be able to travel between the Riverwalk District and Newburg Park along the trail.

6.2.4 Category C: Additive Alignments and Amenities

The following additions and amenities comprise Category C and will be added to the trail when the timing is right:

- Redwood Village trail connection (2a)
- Overlook at Redwood Memorial Hospital (2b)
- 2nd Avenue trail connection (4a)
- Francesco Place trail connection (4b)
- Arizzi Court trail connection (4c)
- Rohnerville Road bike lanes (5a)
- Newburg Park trail connection (5b)
- Trail amenities provide the opportunity for community fund raising to purchase:
    - Benches
    - Lighting
    - Trash receptacles
    - Interpretive signs
    - Supplemental planting, etc.
- U.S. 101 Overcrossing (1a), which is tied to implementation of Mill District Area Plan

The overcrossing in Segment 1a is a complicated and expensive project, so it may not be feasible to secure funding and agreements and complete plans ahead of other projects. The additive alignments would facilitate better access between residents and the trail. Trail amenities would add to the experience of using the trail and appreciation of the creek.

7 Trail Monitoring and Maintenance

7.1 Introduction

Development of a maintenance and monitoring plan is an important step in developing a successful trail that becomes an attractive asset to Fortuna. A well maintained trail provides numerous benefits, but also requires considerable work. A well-maintained trail will benefit Fortuna by:

- Providing for a more positive user experience
- Protecting the City's investment in the trail by identifying and rectifying issues in a cost-effective and timely manner
- Minimizing liability concerns
- Maintaining positive relations with trail neighbors and the larger community
- Creating more local pride in the trail as a positive community resource
- Improving user safety
- Detering acts of vandalism by demonstrating the commitment of the community to the trail

This chapter will provide an overview of the major considerations in developing a maintenance and monitoring plan for the trail, examples of the range of approaches that could be considered, and a general estimate of the annual costs associated with these activities.

7.2 Maintenance Activities

The purpose of the trail maintenance plan is to outline the specific tasks, priorities, schedules, responsible parties, and budget needed to keep the trail in the desired condition. The plan should be provided to anyone involved in maintaining the trail, including agency staff and individuals involved in working with volunteers on maintenance activities. Maintenance activities are generally classified as either routine maintenance or remedial maintenance.

- Routine maintenance refers to day-to-day and regularly-scheduled tasks, including trash removal, sweeping, trimming or pruning vegetation along the trail, repairing minor cracks in the trail surface, and cleaning out culverts used for drainage.
- Remedial maintenance involves tasks that are of a larger scale, and need to be undertaken less frequently, such as resurfacing the trail, replacing a bridge, or stabilizing a stream bank. Anticipating and budgeting for these expenses can be critical to ensuring that the trail provides a high quality user experience and avoiding the additional costs in deferred maintenance.

7.2.1 Consideration of Maintenance in the Design Process

Maintenance and management needs are a critical factor in the final trail design, as they will impact the annual and long-term costs associated with the trail, and its' overall usefulness and safety. Key considerations in trail maintenance and operations that will impact design include:

- Who will do maintenance and management and what equipment and staff capabilities will they have?
- How will maintenance or emergency services vehicles access the trail?
- Which user groups will be present: Will only bicyclists and pedestrians be permitted, or will the design accommodate dog walkers, and/or equestrians?
- Amenities and facilities: Are the planned facilities, such as parking lots, restrooms, information kiosks, picnic tables, emergency callboxes, water fountains, and trash receptacles located and designed to support trail use as well as effective maintenance and operation?
- Hours of operation: Will the trail be open for use after dark? If so, some type of lighting will need to be installed. If not, what type of information and control is needed?
- Rules and restrictions for use and access: are the fences, gates, signage, and markings in place to encourage user compliance?

7.2.2 Components of the Maintenance Plan

The trail maintenance plan should include the following:

- List of maintenance tasks and a schedule that reflects maintenance priorities. Approximate frequencies should be included, where appropriate, for regular activities such as tree pruning, trash pick-up, and crack sealing.
- Inventory of features on the trail that require regular inspection, particularly structures such as bridges, retaining walls, and culverts. The inventory should also include trail amenities such as restrooms, picnic tables, benches, and information kiosks.
- Goals and standards for the quality of maintenance, so the expectations for the condition of the trail features will be clearly understood.
- Forms to be completed as part of inspections to document conditions of each item, and the date and time of the inspections.
- Identify the responsible entities for each aspect of maintenance, and provide contact information for each. This is discussed in more detail below.
- Budget for maintenance activities. If the trail maintenance budget will be incorporated into a larger budget for facility maintenance (e.g. including other trails or parks), this may impact the costs of various items, but the time and materials required for trail maintenance should be estimated.

- Emergency access and procedures should be developed in close consultation with police and fire departments; this consideration is particularly important in determining whether bollards or some other type of access control is to be used at intersections of the trail with streets, as well as the spacing between trail access points. At least once a year, and after any significant emergency or maintenance event, the policies should be reviewed with staff or volunteer groups.
- Evaluation process for the plan. The maintenance plan should not be treated as a static document. Once the trail is operational, it will be important to periodically evaluate the success of the plan. This will include reviewing the list of maintenance tasks, the schedule for carrying out these activities, and comparing the maintenance budget to what was actually needed over the course of the previous year. Feedback should be solicited from maintenance crews and/or volunteers involved in helping to carry out the plan.

7.3 Risk Management and Liability

Trail design decisions can impact not only the maintenance tasks that will be required, but also the city's potential liability exposure. The City and private landowners who own property on which the trail is located are largely protected from liability associated with trail use under California's Recreational Use Statute (California Civil Code § 840). Adhering to established trail design standards and guidelines such as the Caltrans Highway Design Manual, California Manual on Uniform Traffic Control Devices, and Americans with Disabilities Act guidelines adds to this protection, but this can be further supplemented through measures to discourage illegal or unsafe activities, such as:

- Post and enforce trail rules, regulations, and etiquette. This may include hours of use, speed limits, types of users (e.g. bicyclists, pedestrian, equestrians) permitted, and pets/leash requirements.
- Select appropriate landscaping to maximize visibility along the trail to discourage illegal activities and allow for effective patrolling.
- Post warning signs for known hazards that are not easily identified and to warn users of obstructions or detours along the trail.
- Monitor collisions; evaluate and correct any trail design elements that may have contributed to a collision.
- Evaluate reported problems and address them with appropriate measures in a timely manner. This can be facilitated by utilizing readily available technologies such as geographic positioning systems (GPS) devices and geographic information systems (GIS) mapping by workers and trail users in the field to precisely identify the location of maintenance concerns. Smart phones may even be used as a tool to help identify the location of maintenance issues.
- Ensure the provision of adequate emergency access points to the trail.

7.4 Communications with Neighbors and Trail Users

Some sections of the proposed trail will be located on public land, while others will be on private land, with public access easements allowing for trail use. Even along the publicly-owned segments, there may be privately owned parcels abutting the trail which could be impacted either directly or indirectly by trail use or maintenance activities. With the Strongs Creek Trail as Fortuna's first multi-use trail near residential areas, developing a proactive approach with regard to communications will be particularly important to help develop a greater sense of comfort in the community. A clear process should be put in place so that residents can understand how they will be notified regarding any issues concerning nearby construction activities and how to contact the appropriate person regarding their questions or concerns.

Communication with trail users will be important as well, and will facilitate management of the trail. This includes posting information about trail etiquette to guide users on how to safely share the trail with one another. In terms of notifying the public about maintenance activities, signs should be posted at the entrance to temporarily closed trail segments, and to to indicate detour routes to be used during the closure. Developing a means of communication with users will also enable the City to survey users to evaluate the impact of the trail on the local economy, travel patterns, or to solicit other types of feedback that could be used to identify needed improvements. Information kiosks are one simple and inexpensive means of distributing this type of information.

7.5 Safety and Security

There are a number of strategies that can be employed to address security and public safety for trail users.

- As noted above, high quality trail design and maintenance practices can help users to avoid problems associated with cracked pavement, tree branches, and other potential obstacles. Providing clear visibility and sight lines along the trail corridor will enable users to identify other trail users and provide sufficient reaction time.
- To reduce the likelihood of criminal activity, many communities have elected to employ security patrols as a means of getting more "eyes on the trail." Such patrols may be conducted by law enforcement personnel, park rangers, or volunteers. In addition to serving as a deterrent to criminal activity, regular patrols also help provide additional monitoring of trail conditions, so that maintenance concerns can be identified and addressed early on. If volunteers are used for patrols, their efforts should be closely coordinated with law enforcement; volunteers can play a valuable role in supporting trail safety, but they should be trained to understand their responsibilities and the role of law enforcement personnel in addressing problems.
- Creating higher trail usage adds more eyes on the trail and helps support safety efforts. In addition to the security patrols described above, the profile of a trail can be raised by using it as a site for a community bike ride or running event.

7.6 Estimating Annual Operations and Maintenance Costs

Trail operations and maintenance costs are notoriously difficult to estimate. In 2005, Rails-to-Trails Conservancy conducted a national survey of 100 trail managers to attempt to quantify these costs, but found that the results varied considerably, for a variety of reasons:

- Trail designs vary considerably in terms of materials, structures, and types and numbers of users, which impact significantly on the frequency of repair required.
- Weather and climate impact the life span of construction materials, and also influence the types of maintenance activities that are necessary.
- Many trails, especially those that rely heavily on volunteers and with limited budget, tend to conduct maintenance on an "as needed" basis, and may maintain their trails to different standards.
- Budgetary practices vary across agencies. Trail maintenance budgets may be included in a larger budget, for example as part of an overall Recreation and Parks Department maintenance budget. As a result, resources are not dedicated to maintaining a specific facility, and larger agencies can typically take advantage of economies of scale by using existing staff and equipment, or doing things more efficiently by conducting some tasks in combination with other tasks they are performing nearby.

Section 7.2 Maintenance Activities of this Plan generally describes routine and remedial maintenance activities anticipated for the John Campbell Memorial Greenway and Strongs Creek Trail. This Plan does not present maintenance and operation cost estimates for the project; however, rough estimates could be approximated based on cost estimates provided by other jurisdictions to operate and maintain similar facilities (see **Table 7-1**).

Table 7-1: Sample Maintenance and Operation Costs from Other Jurisdictions

Management Entity	Year of Estimate	Estimated Annual Cost	Maintenance and Operation Activities Included in Estimate
City of San Jose[1]	2011	$12,500/mile	Paved pathway
		$12,050/acre	Landscaping adjacent to trails
		$2,000/mile	Trail rangers
East Bay Regional Park District[2]	2011	$25,000/mile	Police patrol, vegetation management, litter pickup and a contribution to a reserve fund for eventual pathway replacement.
City of South Lake Tahoe and the Ski Run Business Improvement District[3]	2011	$14,850 to $15,350/mile	48 pedestrian lighting heads, electric bills for the lighting, water bills, mowing and fertilizing landscaping, and maintaining a 2-mile multi-use path
City of Cupertino[4]	2011	$15,000/pedestrian and bicycle overcrossing	Mary Avenue Bridge: bridge cleaning, graffiti removal, maintenance of electrical devices, and a biennial inspection

[1] Email correspondence with Yves Zsutty, Acting Division Manager, Department of Parks, Recreation & Neighborhood Services, City of San Jose, January 18, 2011.

[2] Email correspondence with Jim Townsend, Manager, Trails Development Program, EBRPD, January 13, 2011.

[3] Phone call with Gary Moore, Director, Parks and Recreation Department, South Lake Tahoe, July 27, 2009. Costs have been adjusted for inflation.

[4] Email correspondence with Roger Lee, Assistant Director of Public Works, City of Cupertino, February 3, 2011.

7.7 Identification of Roles and Responsibilities

Responsibilities for trail operations and maintenance are handled very differently across the country and even within California. There are a number of reasons for these differences: variation in the structure and responsibilities of local agencies, the fact that some trails cross jurisdictional boundaries, or even if a trail is located within a single jurisdiction there may be multiple agencies that own and have management responsibilities for the corridor. In the case of the Strongs Creek Trail, the potential trail alignments are all located entirely within the City of Fortuna, and will include both city-owned and private property, so the City will likely assume primary responsibility for managing the trail. The Public Works and Recreation and Parks Departments should be consulted to determine which of the maintenance responsibilities they should assume primary responsibility for. It will be important to solicit input from these departments in the design process as well, as they should be able to provide valuable insights regarding the impact of design choices on future maintenance needs. SWAP, High Rock, and California Conservation Corps (CCC) crews could provide low cost labor for ongoing maintenance.

However, while an agency typically assumes the lead role for maintaining trails, many communities rely on partnerships between public agencies and community-based organizations, with positive results on several levels:

- Community members tend to develop a greater sense of pride, ownership, and personal investment in the trail;
- Groups have often added new dimensions to trail projects, taking a leadership role in raising funds or supplying labor for projects such as community art or gardens; and
- Reducing public costs required for maintenance activities.

The Humboldt Trails Council is a local example of how such a public/private partnership can succeed in this way. The Council has established its Volunteer Trail Stewards program to help with trail cleanups and other basic maintenance activities, including subgroups of the Trail Stewards that focus on specific trails in the area. Prospective members are required to complete training so that they have an understanding of what they can and cannot do in their capacity as volunteers along the trail. A Fortuna-based stewardship group could potentially be formed either as a chapter of the Humboldt Trail Council group or an independent entity, and it is recommended that trail supporters in Fortuna consult with the Volunteer Trail Stewards to learn from their experience.

7.8 Summary of Maintenance Practices of Similar Trails

There is a wide range of practices used by trail managers to operate and maintain trails. This is due to a variety of factors – who owns the trail corridor, agency structures and division of responsibilities

that are already in place, types of funding sources available in a particular jurisdiction, and other issues that vary across cities, states, and counties. In 2005, Rails-to-Trails Conservancy conducted a survey of 100 trail managers to assess the range of maintenance practices on trails. Due to the wide variation in trail design and climate, for the purposes of this master plan it was decided to interview a small sample of trail managers overseeing facilities that bear some similarity to the proposed Strongs Creek Trail. The trails reviewed in this report were the Hammond Trail and Hikshari' Trail in Humboldt County; Pendleton Parkway Greenway in Pendleton, OR; and Bear Creek Greenway in Jackson County, OR.

These trails were selected based on sharing at least some of the key characteristics of the proposed Strongs Creek Trail – located in a stream corridor or along the coast, located near small cities or towns, and in a climatic zone that is similar to Fortuna that would not be overly impacted by harsh weather conditions. The selected trails have adopted somewhat different approaches in their maintenance practices, which are highlighted to demonstrate some of the options that Fortuna might consider as it moves forward into project implementation.

Trail managers were asked to provide information about various characteristics which significantly impact the maintenance requirements for trails. This includes the physical characteristics such as trail length, type of trail surface, presence of structures, lighting, and irrigation systems. Another key consideration is the provision of user amenities such as restrooms, information kiosks, and picnic areas, which also impact maintenance and operations costs.

Trail managers were also asked to indicate the parties responsible for maintaining their trails, the existence of a formal maintenance plan, participation from volunteers, funding sources used for maintenance activities, and the estimated annual cost of maintaining the trail. As in the Rails-to-Trails Conservancy report cited above, some of this information was not readily available, particularly with regard to cost, primarily because many trail maintenance activities are not accounted for as line items in agency budgets.

7.8.1 Hammond Trail, Humboldt County, CA

The Hammond Trail is the multi-use trail that is probably most familiar to Fortuna residents. The trail is 5.5 miles long, approximately 4 to 4.5 miles of which has an asphalt surface, while the remainder has a gravel surface. Key features along the trail include a 200-foot long bridge (a former railroad trestle), as well as two short bridges (each approximately 24 feet long). No lighting is provided along the trail. To help minimize maintenance costs, landscaping was limited to native plants, requiring no irrigation system to be installed.

Humboldt County Parks oversees maintenance for the trail, but as they have only five full-time staff, they rely heavily on partnerships to implement the full scale of maintenance activities. The Humboldt Trails Council, a nonprofit trails organization, has been a key partner in this effort, supporting trail maintenance activities by acting as an umbrella for groups of Volunteer Trail Stewards. Each volunteer group – of which the Hammond Trail Stewards is one – focuses its efforts on a specific trail. The Hammond Trail Stewards volunteers turn out on the first Saturday of each month, typically taking on tasks such as graffiti removal, maintaining the trail tread, and trimming overgrown vegetation. Staff works closely with the volunteers, assigning them tasks, providing tools, and

overseeing the work. It is estimated that there is an average of 10 volunteers per month, providing approximately two hours of labor apiece. More informally, volunteers conduct trail patrols, providing additional safety for trail users and also keeping an eye out for conditions that need attention. A web site has been set up to facilitate reporting these issues to the county, so volunteers can easily file this information to enable them to more easily identify areas of concern. Using the structure of the Humboldt Trails Council to oversee trail volunteer efforts – in addition to facilitating communication – is also helpful to trail managers in that the Council's insurance policy covers the volunteers while they are engaging in their activities. Volunteers are provided with guidance regarding appropriate behavior, and are directed not to intervene if they encounter any illegal activities along the trail, but instead to notify law enforcement personnel.

In addition to the trail stewards group, the county also utilizes assistance from the Sheriff's Work Alternative Program, which recruits up to two nonviolent offenders (misdemeanors only) at a time to assist with trail maintenance in exchange for a reduction in their sentence. For larger maintenance projects, such as removal of trees posing a hazard along the trail, the department contracts with other entities such as the Redwood Community Action Agency.

There is no formal maintenance plan for the Hammond Trail. Staff indicated that given the Parks Department's limited resources, they identify needs and address them based on the priorities assigned to the particular project.

Staff noted that coordination is frequently required with Caltrans due to proximity of portions of the trail to U.S. 101. While this coordination can require additional considerations to conform to Caltrans requirements, the proximity of the trail to the highway enables it to be considered as an alternative transportation route for bicyclists and pedestrians, enabling the county to access state funding sources for maintenance activities.

7.8.2 Hikshari' Trail, Eureka, CA

The Hikshari' Trail in Eureka was opened in March 2013, so there is only limited information available about maintenance practices and their effectiveness. However, given that it is located in Humboldt County, it is recommended that the City of Fortuna rely on the experience of the trail manager as a local resource. The Hikshari' Trail is 1.5 miles long, and is surfaced with asphalt. The only significant structure along the trail is a bridge over the arm of the slough. There are four trailheads, which include lighting; restrooms at one of the trailheads (which is owned by Caltrans); picnic areas at two trailheads; and interpretive signage associated with the ecology and local archaeological sites. There is no lighting on the trail itself. To help minimize maintenance costs, landscaping was limited to native plants.

The Hikshari' Trail, has basic maintenance support similar to the Hammond Trail, through a group of volunteer stewards operating through the Humboldt Trails Council. Police routinely patrol the trailhead areas. In addition to assistance from the volunteer stewards, the city contracts to bring in an inmate crew every Friday throughout the year to assist with light maintenance activities.

Maintenance activities along the Hikshari' Trail is largely the responsibility of Harbor District staff, and are paid for from the City of Eureka's Harbor Fund, which includes both revenues from the city's general fund as well as service charges such as mooring fees.

7.8.3 Pendleton River Parkway, Pendleton, OR

The Pendleton River Parkway is a three-mile long multi-use trail in Pendleton, OR, a city of 17,000 people in northeastern Oregon. Maintenance of the trail is overseen by the Parks Department. This is facilitated by the fact that the trail links together four city parks, and this is primarily where amenities that serve the trail users are located. While this helps to simplify maintenance functions for the trail, it also makes it difficult to evaluate the cost of maintaining the trail as a stand-alone facility. Maintenance activities are funded completely through the city's general fund revenues.

There is no formal maintenance plan governing care of the trail. The Parks Department has implemented an Adopt-A-Parkway program to enlist the aid of individual volunteers, organizations, or local businesses in helping to provide basic maintenance assistance along specific segments of the trail. Typically participants adopt a 300-foot section of the trail and commit to clean up litter in the area three times a year for a two-year period. Volunteers also can assist with other basic maintenance activities, through consultation with the Parks Department, such as trimming vegetation and removing graffiti. More information about the program can be found on the department's web site at http://ppd.pendleton.or.us/adopt-parkway.

The Pendleton River Parkway currently has no organized safety patrols. There was an incident along the trail that raised safety concerns and did lead to proposals for such a program, but it appears to have been an isolated incident and the patrols have not been implemented.

7.8.4 Bear Creek Greenway, Jackson County, OR

The Bear Creek Greenway is a longer trail than the other trails reviewed in this chapter, but its maintenance model has some unique characteristics and a more formalized structure than the trails discussed above. The Greenway is a 21-mile asphalt trail in southern Oregon that connects several small cities in Jackson County. The trail runs through a combination of rural areas and towns, with a range of adjacent land uses. It links together parks, residential areas, riparian corridors, and part is within a freeway right-of-way.

Due to the multi-jurisdictional nature of the trail, six jurisdictions have entered into a joint powers agreement to manage the trail, an interesting model for a partnership. The staff carrying out the maintenance activities are employees of the county parks department, but each jurisdiction contributes approximately $2,600 per year for staffing basic maintenance work. In addition, the partners contribute a total of $67,000 a year a share to cover major maintenance projects, with each jurisdiction paying based on a formula considering the mileage of trail in their jurisdiction and their population. While this maintenance fund may not be needed each year, it is a valuable resource that can be drawn on for major capital projects, and is often used as a match to leverage grant funding.

7.8.5 Conclusions

A consistent theme which we heard from trail managers – both in the RTC report and in the survey of local trail managers – is their interest in recruiting volunteers or establishing adopt-a-trail programs to assist with basic maintenance activities. While some projects have been more successful with this approach than others, everyone we contacted strongly supported the approach. Support came both from the perspective of reducing the public funds required for maintenance activities, and also as a means of cultivating a sense of stewardship for the trail, developing a local sense of pride in a valuable community resource, and as a strategy for keeping more "eyes on the trail" to promote safety for users. Additionally, the adopt-a-trail approach allows for the provision of valuable feedback to maintenance staff regarding needed repairs, discouragement of criminal activity through increased visibility and by facilitating safety patrols, and discouraged use of the trail as a site for homeless encampments. While none of these strategies are a "magic bullet" for solving these problems, trail maintenance agencies and law enforcement officers are widely supportive of these approaches.

Agency structure and geography often determined how maintenance was integrated into the management of the trail. Where trails connect parks, agencies are able to more efficiently handle responsibilities by treating the trail as an extension of the park, sharing staff and equipment. In many cases, amenities such as picnic areas and restrooms served both park and trail users, so again combining the maintenance functions created greater efficiencies. Trails that are managed by larger regional agencies also have the potential to take advantage of such economies of scale. Since these types of arrangements varied considerably, collecting comparable budget figures for trail maintenance is difficult.

In terms of funding, a range of sources were available, often depending on the resources available in a particular county. In Humboldt County, the trail managers were able to utilize inmate labor or participants in the sheriff's work alternative program.

While some trail managers have adopted formal maintenance plans and a regular schedule for carrying out various activities, others – particularly those with very limited resources – focus more on identifying priority needs and addressing those as best they can.

Another issue that became clear through speaking with trail managers was the impact that some design choices had on maintenance costs. Based on the anticipated use patterns, the extra capital expense for some items – such as restrooms, water fountains, or benches – may be important elements to include for a successful trail. Aside from amenities, other design issues were raised by trail managers as well – in particular, proximity of trees to asphalt trails and the resulting root damage to the trail surface, and the additional labor and cost of irrigation required for certain types of vegetation.

8 Funding and Implementation

8.1 Potential Funding Sources

8.1.1 Federal and State Sources

Active Transportation Program (ATP)

Overview: This new statewide funding program was created in 2013 by legislation which merged most of the major bicycle, pedestrian and trail funding programs -- including Transportation Alternatives (previously known as Transportation Enhancements), Safe Routes to School, Bicycle Transportation Account and a portion of the Recreational Trails Program -- to create the new Active Transportation Program (hereafter, "ATP"). The goals of the program include: increasing biking and walking trips; improving safety and mobility of non-motorized users; reducing greenhouse gas emissions; and enhancing public health. The current funding level is approximately $130 million per year, and will be programmed as follows:

- Regional share – 40% to Metropolitan Planning Organizations (MPOs), distributed based on total county population;
- Rural Share – 10% to small urban and rural regions with populations of 200,000 or less; and
- Statewide share – 50% for a statewide competition for projects anywhere in the state.

The text of the bill that created the ATP, SB 99, can be found here: http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201320140SB99

Eligible Applicants: Local, regional or state agencies; transit agencies; natural resource or public land agencies; tribal governments; school districts or schools. A private non-profit tax-exempt organization is eligible to apply independently for Recreational Trails Program funded projects (only about $2.8 million available per year within the ATP); otherwise, for trails or any other eligible projects, non-profits must partner with another eligible applicant.

Previously Funded Trail Projects: None, as this is a new program. The component programs that were merged into the ATP, such as Transportation Enhancements and Safe Routes to School, have funded numerous trail projects, including the Bizz Johnson trail in Lassen County; the El Dorado Trail; and the Sacramento River Trail bikeway bridge in Redding.

Application Process: The California Transportation Commission will program the Statewide and Rural shares; the MPOs will program the Regional shares and each MPO will have their own guidelines and timetable. The guidelines for the program will be finalized in March, 2014, and the first call for projects for the Statewide and Rural shares will be released March 21, 2014, with applications due May 21. This first round will program three years of funding; subsequent rounds will be held bi-annually. The timing of the MPO call for projects is not yet determined. See CTC website for more information: http://www.catc.ca.gov/programs/ATP.htm

Safe Routes to School

The Safe Routes to School state and federal program funds for California were merged into the Active Transportation Program in 2013 (see above). There is no longer a separate Safe Routes to School program.

Strategic Growth Council – Urban Greening Grant Program

Overview: The Strategic Growth Council's Urban Greening Grant Program funds projects and plans that expand and establish community green spaces, which provide multiple benefits to urban areas, such as improving public health, decreasing air and water pollution, reducing consumption of natural resources and energy, increasing reliability of local water supplies, increasing adaptability to climate change, or revitalizing urban and community centers. Priority is given to projects and plans that provide multiple benefits, serve disadvantaged communities, use existing public lands, and facilitate joint use of public resources and investments. Typical project grants range from $75,000 to $1 million.

Eligible Applicants: Cities, counties, special districts, and nonprofit organizations. The grant awards must be used for the preparation, adoption and implementation of an urban greening project that provides multiple benefits.

Previously Funded Trail Projects: Refurbishing and creating four miles of trails in San Diego that link schools, neighborhoods, and parks; creating a ¾ mile bike and pedestrian path that connects low-income neighborhoods to a Metro Station in Burbank; preparing a plan that links greenway corridors in San Pedro.

Application Process: There were three funding cycles in 2010, 2012 and 2013. It is unknown if there will be future funding cycles. Check website for more information: http://sgc.ca.gov/urban_greening_grants.html

Environmental Enhancement and Mitigation Program (EEMP)

Overview: The Environmental Enhancement and Mitigation Program, managed by the Natural Resources Agency, funds projects that reduce environmental impacts of modified or new public transportation facilities such as streets, highways, park and ride facilities, or transit stations. The three categories of projects that are eligible for funding are: "Urban Forestry Projects", "Resource Lands", and "Mitigation Projects Beyond the Scope of the Lead Agency". Although the separate trail category has been removed, trail improvement projects are still eligible for funding if they are combined with an urban forestry or resource lands project. All projects must be directly or indirectly related to offsetting environmental damage and should provide multiple benefits that reduce impacts of climate change. In 2013, the funding level was reduced from $10 million to $7 million annually. Project funding is allocated 40% to projects in northern California, and 60% to projects in southern California. Individual project grants do not exceed $350,000.

Eligible Applicants: Nonprofit organizations and local, state, and federal agencies. Joint projects between multiple agencies are accepted only if one agency leads.

Previously Funded Trail Projects: Homewood Bike Trail Project in Tahoe City; Knickerbocker Channel Multi-use Trail in the City of Big Bear Lake; Lacks Creek Recreational Trail System project in Humboldt County.

Application Process: Applications must be submitted to the office of the California Natural Resources Agency. The Draft Guidelines for the 2014 grant cycle were posted in January 2014 on their website: http://resources.ca.gov/eem/

Highway Safety Improvement Program (HSIP)

Overview: The Highway Safety Improvement Program funds construction projects that reduce traffic fatalities and serious injuries on public roads or public bicycle and pedestrians paths or trails. Eligible projects must identify a specific safety problem that will be corrected. A minimum of 90% of the project cost must be safety-related construction items and a maximum of 10% of the project cost can be used for non-safety construction items, such as landscaping. The maximum for individual project grants is $1.5 million and the minimum is $100,000. Projects are evaluated based on the Benefit/Cost ratio and the projects with the highest B/C ratio are selected for funding. Proposed projects first go through Statewide Project Selection, which allocates 70%-80% of HSIP funds. Projects that are not selected then go through District Project Selection, which allocates the remaining 20%-30% of HSIP funds. High Risk Rural Road Projects have a lower statewide B/C ratio cutoff.

Eligible applicants: City, county, or federal agencies.

Previously Funded Trail Projects: Installed guardrail along various sections of Silverado Trail in Napa County; widened shoulder and upgraded drainage along Old Oregon Trail in Redding; installed a concrete abutment on a grade separated crossing on the Clovis Old Town Trail in Clovis.

Application Process: Applications must be submitted to the respective Caltrans District Local Assistance Office and directed to the attention of the District Local Assistance Engineer. Prior to submitting an application, agencies must fill out the HSIP Application Form here: http://www.dot.ca.gov/hq/LocalPrograms/HSIP/apply_now.htm

California Coastal Conservancy

Overview: The Coastal Conservancy funds property acquisition, project planning, design, and/or construction projects that increase public access to and along the coast, protect and restore natural resources in the coastal zone, restore coastal urban waterfronts, protect coastal agriculture land, and resolve land use conflicts. The conservancy is also the lead agency in implementing the California Coastal Trail. Projects must meet the 15 goals and objectives in the Conservancy's Strategic Plan. Priority is given to projects that address landscape/habitat linkages, watershed protection, and climate change impacts other than sea level rise. There are no set minimum and maximum grant amounts. The awarded funds are based on the project needs, benefits and competing demands for existing funding.

Eligible Applicants: Cities, counties, districts, state, and federal agencies, and non-profit organizations that are compatible with the Coastal Conservancy's enabling legislation.

Previously Funded Trail Projects: Design and construction of Truesdale Vista Point trailhead and feasibility study of additional trail development in Eureka; plan and design of two trails in Mendocino County; maintenance and improvement of the Heritage Trail in Mendocino County.

Application Process: Prior to submitting an application, prospective applicants must discuss their projects with a Conservancy Program Manager, who will determine whether or not an application should be submitted. In most cases, projects that receive funding are developed over time by potential grantees working with Conservancy staff. Application submissions are accepted at any time. Periodically, there are also competitive grant rounds to fund particular projects and/or projects in specific locations.

Contact: North Coast Program Manager Karyn Gear: 510-286-4171; kgear@scc.ca.gov; http://scc.ca.gov/applying-for-grants-and-assistance/forms/

Transportation Development Account (TDA)

Overview: Transportation Development Act funds are allocated through two different sources: the State Transit Assistance fund (STA), and the Local Transportation Fund (LTF); only the LTF can fund pedestrian/bicycle projects. The Transportation Development Act allocates, by county, one-quarter cent of the state's general sales tax to the Local Transportation Fund (LTF), which provides funding for transportation improvements in each county. Counties that have unmet transit needs and with a population under 500,000 can also use LTF funds for construction and maintenance of local streets and roads. LTF funds are allocated on two levels; Regional Transportation Planning Agencies can earmark 2% for bicycle and pedestrian facilities countywide, and individual cities can earmark a percentage of their share of LTF monies for bicycle and pedestrian facilities as well. The Humboldt County Association of Governments (HCAOG) allocates 2% of its $4.4 million LTF to bicycle and pedestrians facilities statewide, and the City of Fortuna sets aside 2% of the LTF monies they receive for bicycle and pedestrian projects for the city.

Eligible Applicants: Regional Transportation Agencies in each county, which allocate LTF funds to local agencies.

Application Process: In Humboldt County, HCAOG allocates TDA funds. Currently, HCAOG is determining the application process for countywide funds, which will be announced in June 2014.

Contact: HCAOG Executive Director Marcella Clem; 707-444-8208; marcella.clem@hcaog.net; http://hcaog.net/sites/default/files/hcaog_tda_rules_adopted_sept.2012.pdf

Recreational Trails Program (RTP)

Overview: The Recreation Trails Program is a federal program that is part of MAP-21, the federal transportation bill. It funds recreation trails and trails-related projects. California's current annual allotment is approximately $5.8 million, of which 40% is included in the Active Transportation Program (see above) and the balance or approximately, $3 million is administered by the California Department of Parks and Recreation. Half of the $3 million goes to non-motorized projects, programmed through the Department's Office of Grants and Local Services and half goes to motorized projects, programmed through the Department's Off-Highway Motor Vehicle Recreation

Division. There are no set minimum and maximum grant amounts. The program funds up to 88% of the total project cost and requires that the applicant match at least 12% of the total project cost. Eligible match sources include state, local, or private funds, donated materials and services, or other federal funds. Projects must comply with the National Environmental Policy Act (NEPA) and the National Historic Preservation Act and be listed on the State Transportation Improvement Plan (STIP) or a local Transportation Improvement Plan (TIP).

Eligible Applicants: Cities, counties, districts, state, and federal agencies and non-profit organizations with management responsibilities of public lands.

Previously Funded Trail Projects: In Humboldt County, RTP has funded rehabilitation and improvement of the Burlington Nature Trail at Humboldt Redwoods State Park, replacement of the Foothill Trail Bridge, and construction of the Creekside Park Loop Trail.

Application Process: The federal funding source for RTP, MAP-21, will expire September 20, 2014. An announcement for new applications cannot be made until a re-authorization of MAP-21 is signed into law. The next RTP application filing deadline will not be earlier than 2015.

Contact: Recreational Trails Program State Administrator Richard Rendón; Office of Grants and Local Services, California State Parks; 916-651-7600; Fax 916-653-6511; rrend@parks.ca.gov; http://www.parks.ca.gov/?page_id=24324

Land & Water Conservation Fund (LWCF)

Overview: The Land and Water Conservation Fund provides grants for acquiring and developing public outdoor recreation areas and facilities, with trails being one of the priority development projects. The National Parks Service allocates LWCF grants to state agencies and, in California, the Office of Grants and Local Services within the California Department of Parks and Recreation allocates LWCF grants to local agencies. LWCF has been reauthorized until 2015. Applicants must fund the entire project and LWCF grants reimburse 50% of applicants total project cost. The maximum grant amount is $2,000,000 and the minimum is $100,000. Applicants must provide a grant request range for the highest desired and lowest acceptable amount of funding the project requires. Project planning costs incurred up to three years before the application is submitted are eligible for reimbursement. Land that is acquired or developed through LWCF is placed under federal protection to be preserved in perpetuity for public outdoor recreational use.

Eligible Applicants: Cities, counties, and districts that are authorized to acquire, develop, operate, and maintain park and recreation facilities.

Previously Funded Trail Projects: Projects recommended for 2013 funding cycle include construction of multi-use bike trails in San Francisco County and a walking trail loop in the City of Farmersville.

Application Process: Application packets must be sent to State Parks Office of Grants and Local Services (OGALS). The application deadline for local agencies is February 3, 2014. OGALS announces its funding recommendations May 30, 2014. Applications will be forwarded to National Parks Service (NPS) for final project approval no later than July 2014. OGALS issues the grants when NPS approves the projects.

Contact: Project Officer for Humboldt County Mary Baum; California Department of Parks and Recreation, Office of Grants and Local Services; (916) 651-8581; Mary.Baum@parks.ca.gov; http://www.parks.ca.gov/?page_id=21360

Habitat Conservation Fund (HCF)

Overview: The Habitat Conservation Fund (HCF), authorized through the California Wildlife Protection Act in 1990, provides grants to programs that bring urban residents into parks and to trail construction projects that protect wildlife corridors. Funds can be used either for site acquisition or enhancement, restoration, and development, not for both. The California Department of Parks and Recreation allocates $2 million annually through the Office of Grants and Local Services. There are no set minimum and maximum grant amounts. HCF grants must be matched dollar-for dollar and cannot come from other state funding sources.

Eligible Applicants: Cities, counties, and districts.

Previously Funded Trail Projects: Projects recommended for 2013/2014 funding cycle include construction of the Buckeye Trail in Monterey County, restoration of Sibley & Huckleberry Regional Preserves Trail in the East Bay Regional Parks District, and construction of the Palos Verdes Nature Preserve Trails in the City of Palos Verdes.

Application Process: The application deadline is the first workday in October. The deadline for 2014/2015 funding cycle has passed. Applications must be sent to the Office of Grants and Local Services.

Contact: Project Officer for Humboldt County Mary Baum; California Department of Parks and Recreation, Office of Grants and Local Services; (916) 651-8581;Mary.Baum@parks.ca.gov; http://www.parks.ca.gov/?page_id=21361

Wildlife Conservation Board Public Access Program

Overview: The Public Access Program, a Wildlife Conservation Board program established by the Wildlife Conservation Law of 1947, funds acquisition of land for wildlife preservation or development of facilities for public access to wildlife oriented activities, such as trails for hiking and bird watching. Applicants must demonstrate that projects address an existing wildlife-oriented public access need in the area and demonstrate an ability to manage and maintain improvements for 25 years. The Wildlife Conservation Board allocates approximately $1 million annually.

Eligible Applicants: Cities, counties, special districts, and nonprofit organizations.

Previously Funded Trail Projects: Public access to Cosumnes River Reserve in Sacramento County; public access to Rio de Los Angeles State Park in Los Angeles County; Replacement of bridge at Battle Creek Wildlife Area in Shasta and Tehama Counties.

Application Process: Prior to submitting an application, prospective applicants must discuss their projects with Wildlife Conservation Board staff, who will determine whether or not an application should be submitted and what project features need further development. Applications are accepted on a continuous basis. WCB meets in February, May, August, and November to determine which

projects to fund. Applications must be sent to: John P. Donnelly, Executive Director, Wildlife Conservation Board, 1807 13th Street, Suite 103, Sacramento, California 95811-7137

Contact: Public Access Program Manager Elizabeth Hubert; 1807 13th Street, Suite 103; Sacramento, CA 95811; Phone (916) 445-1093; Fax (916) 323-0280; Elizabeth.Hubert@wildlife.ca.gov; https://www.wcb.ca.gov/Programs/PublicAccess/Grants.aspx

California Conservation Corps (CCC)

Note: The CCC is not a funding source per se, but is included here because some funding programs, including the Active Transportation Program (described above), provide bonus points in their application process for projects that will use the CCC or a local conservation corps on their project.

Overview: The CCC is a program that employs young people ages 18-24 to work on improving California's natural resources. CCC works on projects that conserve or enhance natural resources or provide another public benefit, including construction of trails. The project site must be public land or be publically accessible. CCC crews can be contracted on an hourly basis, an annual basis, or a per-project basis. The CCC can also be listed as a project partner in grant applications.

Eligible Applicants: Non-profits and local, state and federal agencies.

Previous Trail Projects: Constructed and maintained miles of trails in Six Rivers National Forest, the King Range National Conservation Area, and the Headwaters Forest Reserve

Application Process: Call the local CCC center and discuss the project and needs with a project coordinator to determine if CCC crews can be of assistance and in what capacity.

Contact: Fortuna California Conservation Corps Center; 1500 Alamar Way, Fortuna, CA 95540; 707-725-5106; http://www.ccc.ca.gov/work/Pages/thework.aspx

8.1.2 Other Non-Traditional Funding Sources

Community Development Block Grants

The federal Community Development Block Grants (CDBG) program is administered by the Department of Housing and Urban Development to projects that create decent housing and suitable living environments and expand economic opportunities, mainly for low- and moderate-income families. Eligible projects include construction or reconstruction of streets and recreation facilities. States can award CDBG funds to "non-entitlement areas", which are cities with populations less than 50,000 and counties with populations less than 200,000, through the State Administered CDBG program.

http://portal.hud.gov/hudportal/HUD?src=/program_offices/comm_planning/communitydevelopment/programs/stateadmin

People For Bikes Community Grant Program

The People For Bikes Community Grant Program provides funding for advocacy and facility projects that improve the environment for bicycling on the community level. Typical projects include

construction of bike paths and rail trails and advocacy campaigns to build bikeways. Grants range from $5,000 to $10,000.

http://www.peopleforbikes.org/pages/community-grants

Benefit Assessments

Overview: Local governments, special districts, and park and recreation districts may create a benefit assessment district as a revenue source to pay for services and improvements in that district. Only properties that directly benefit from the services or improvements can be assessed and the assessment must be proportional to the special benefit provided to the property. Charges appear annually on property tax bills.

Implementation Process: Prior to creating a new assessment, the local agency must prepare a report outlining the project, cost, and the benefit formula, and conduct a public hearing to solicit feedback.

Special Taxes

Overview: A municipality can impose a special tax for a specific purpose, such as park and recreation or transportation and infrastructure improvements. In order to levy a special tax, a 2/3-voter approval is required.

Quimby Act

Overview: The Quimby Act allows California public agencies to impose an in-lieu of parkland fee on developers of new residential subdivisions. Quimby Act fees can be used to develop or rehabilitate parkland and recreational facilities in the neighborhood where the developer's subdivision is located or in neighborhoods elsewhere based on demonstrated need for open space (calculated as a ratio of acres per 1,000 residents). A city can also enter into a joint or shared use agreement with other public districts to create additional park and recreation access funded by Quimby Act fees.

Transient Occupancy Tax

Overview: Transient Occupancy Tax (TOT) is a fee that is charged for staying at a hotel, an inn, or other temporary lodging for less than 30 days. TOT is levied by a municipality and can be used for transportation and park and recreation facilities and maintenance.

8.1.3 In-Kind Contributions

Fortuna High School

Fortuna High School representatives have expressed interest in working with the City to design and manufacture interpretive signs for the Strongs Creek Trail. The High School English class has a 'senior assignment' through which students could write the text for signs. Potential sign topics could include:

- Salmon fry and spawning
- Alder trees are important nitrogen fixers

- Trees help keep the water cool and prevent erosion
- Currents/rapids create oxygen to support spawning

Fortuna High School art and shop classes could make the signs.

8.1.4 Potential Local Funding Sources

[Placeholder – Stephen Avis to provide write-up]

8.2 Project Implementation

This section describes the typical implementation steps that may be required to take the project from the current concepts through construction. It also describes the permits and approvals that may be required for project implementation.

8.2.1 Typical Project Implementation Steps

Once the project is scoped, funding secured, and 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.

Environmental Studies and Documentation

State and federal law and nearly all grant programs require environmental studies and findings to comply with the California Environmental Quality Act (CEQA). If federal funds or interests are

involved the document may also need to address the National Environmental Policy Act (NEPA), which has slightly different processes and document requirements. The environmental document must review and address a broad range of potential issues. Often the most complex issues to address are special status (rare, threatened, or endangered) plant and animal species that are protected under law.

Technical Studies

Technical studies are often required for design and/or to support environmental documentation. This often includes site-specific studies of biological and cultural resources, bluff retreat, hydrology, traffic, soil borings and geotechnical studies for design or foundations for bridges or other factors critical to design and/or project approval. These may be completed before, during or after Preliminary Design, depending on the purpose and type of study.

Permits

Project sponsors may need to obtain several types of permits and agreements. Potentially required permits are described in detail below. Preparing applications and completing the permitting process in areas with sensitive resources and many legal conditions and constraints can be time-consuming and expensive in settings such as along or across streams and wetlands.

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.

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.

8.2.2 Permitting and Approvals

Typically each project segment or combination of segments that is pursued as a project will involve obtaining several permits and agreements. This section summarizes the major types of permits that may be required, and the basic process for each.

Coastal Development Permit – City of Fortuna or Coastal Commission

Nearly any kind of improvement within the Coastal Zone – even signs, requires a Coastal Development Permit (CDP). The proposed improvements along Riverwalk Drive may be within the Coastal Zone (**Figure 8-1**). The recommended improvements contained in the Plan are significant and may require a full permit and hearing. This permit may be consolidated with other permits such as the Coastal Land Use Permit.

The City of Fortuna will handle the majority of CDP applications, but the Coastal Commission itself will hear appeals of a locally-approved CDP, and will directly review CDP applications in retained-jurisdiction areas. In either case the legal standard of review includes the public access and recreation policies contained in Chapter 3 of the California Coastal Act.

Figure 8-1: Coastal Zone Boundary

CCC Federal Consistency Review

California Coastal Act policies are applicable to all state agencies, and per the federal Coastal Zone Management Act of 1972, specified federal agency activities are reviewed by the California Coastal Commission (CCC) as well. These agencies include National Marine Sanctuaries, National Forests, the Federal Highway Administration, and the Bureau of Land Management (BLM). A federal consistency review step will be required for any project that includes improvements on such federal lands.

Coastal Land Use Permit

A Coastal Land Use Permit could also be required, depending on the Land Use Category and the facilities proposed. There are two potential standards of review:

- Policies of the Local Coastal Plan
- California Coastal Act Public Access Policies

A Consolidated Coastal Development Permit/Land Use Permit could streamline the process, and would use the Coastal Act standard of review.

A Master Coastal Permit could be undertaken, which would allow the projects to be implemented under one consolidated permit (and presumably one programmatic environmental document).

City Internal Review

As a city project within city limits the projects would not require formal City permits, but the plans, whether developed in-house or by and outside party would require review by the applicable departments – Planning, Engineering and Building, for compliance with codes and standards. However, the City is not exempt from the Coastal Act and its implementation through the Humboldt County Local Coastal Plan, which could require specific exhibits and reviews for Segments 1 and 2. The Coastal Zone and related requirements are described in more detail below.

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)

The project 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 or Humboldt County

Where the project involves work or permanent improvements within the state highway right-of-way (e.g., a pedestrian/bicycle overcrossing of Highway 101 and improvements to the Kenmar Road undercrossing) 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 facilities in the highway right-of-way will be adequately maintained.

8.2.3 Caltrans Project Development Process

The portions of the project that involve crossing U.S. 101 would require work in the state right-of-way and, at least for the Segment 1 overcrossing, could entail following the Caltrans project development process, which begins with feasibility studies and ends with the completion of construction. The publication *How Caltrans Builds Projects*, available on the District 1 website, provides

a more detailed description of the process for developing transportation improvement projects on the state highway system. The current Plan is a feasibility study and Master Plan, with the goal to design the project at a conceptual level. The development process is tied to the legal requirements of environmental laws and regulations; it melds engineering requirements and Caltrans' management approval steps with the environmental process.

Planning

Caltrans will need to prepare a Project Study Report (PSR) as the next stage for any of the potential improvements to move forward. Much of the information for the project-specific PSR is available from the current study, including goals, objectives, benefits and general project scope and cost. The planning-level concept and scope will be reviewed, and updated if appropriate, to define the design concept and scope, including basic design features.

The current Plan's analysis of conditions, resources, and requirements is intended to help configure the improvement concepts to avoid "fatal flaws," but the feasibility of some solutions can only be determined through detailed site-specific studies. These often include site-specific studies of biological and cultural resources, hydrology, traffic, soil borings and geotechnical studies for design of foundations for retaining walls or bridges, or other factors critical to design and/or project approval. These may be completed before, during or after Preliminary Design, depending on the purpose and type of study.

A statement of the project need and purpose will be developed from the summary description and scoring against criteria in the current study, regarding project relationship to State, regional, and local goals and objectives. Alternative solutions are evaluated that avoid or reduce significant adverse environmental impacts. The alternative selected is the one that causes the least environmental damage while still serving the essential transportation need.

Funding - Grant Applications

Funding will be needed for detailed design, surveying, property or easement acquisition, 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 Plan 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 the City of Fortuna, Caltrans, or partners.

Environmental Process

All projects initiated by Caltrans are subject to the California Environmental Quality Act (CEQA). 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). Most documents are prepared in such a manner to fulfill the requirements of both laws. CEQA was modeled after NEPA and the laws are very similar. Some differences do exist. Subtle differences in the requirements for

document preparation, some terminology differences and differences in the reviewing/permitting agencies are some examples. Both processes are done simultaneously to streamline the time it takes to obtain project approval. The process for most projects is lengthy; however, and the City appreciates the patience of the public during the project development phase (which includes the environmental process) and the construction phase. The City also appreciates public and agency input and encourages residents to become informed about the environmental process, projects in their area, and to take an active role in the review of projects.

SCOPING

Scoping helps to focus the difficult task that goes into documenting the environmental resources and impacts of a proposed project. Major scoping tasks include:

- Preliminary studies to define project alternatives
- Preliminary studies to assess potential environmental impacts
- Notifying regulating agencies of a proposed project
- At times, conducting a public open house
- Preliminary engineering design

ALTERNATIVE ANALYSIS

This is the second step in the environmental review process. Alternative analysis consists of developing a reasonable range of alternatives that satisfy the purpose of and need for the proposed project. Milestones in this phase of the environmental process include the following:

- Review scoping documents
- Develop and define new alternatives
- Engineering and environmental analysis begins
- Prepare draft project report
- Prepare draft environmental document
- Preliminary results of impact assessment
- Develop and obtain concurrence on mitigation

PUBLIC AND AGENCY REVIEW, COMMENT AND AGENCY APPROVAL

This is the stage of the environmental process where the draft environmental document is released to the reviewing agencies and the public. At this point the lead agency requests comments on the environmental document and proposed project. Milestones in the phase of the environmental process include the following:

- Circulate Draft Environmental Document
- Public/Agency Review and Comment
- Public Hearing

- Formal Response to Comments
- Identify Preferred Alternative
- Present Findings
- Final Environmental Document
- Decision Document
- Public Comment

Addressing Cultural and Historic Resources

One of the most significant aspects of the environmental process is assessing cultural and historic resources and following the prescribed procedures to protect them. An archaeological survey report must be prepared for any proposed project that includes areas that have not had an archaeological survey conducted. Where cultural or historic resources are present significant studies and mitigation could potentially be required, and the resources could be a factor in the feasibility of the project. Under Section 106 of the National Historic Preservation Act (NHPA) consultation with Native American Tribes is required. Consultation with Native American tribes and tribal organizations will need to occur regardless of project funding source (State or Federal).

Consultation should occur as early as possible during the planning stages of any project, and carry through to project completion. If federal highway funds are used for the project, the federal lead agency (in this case Caltrans) must consult with Native American tribes that have ancestral territories within the project area. Consultation must be initiated between the federal lead agency and the highest member of the tribe (Tribal Chair) along with the Tribal Historic Preservation Officer (THPO) if a Tribe has a person in this position.

The level of documentation and the amount of required investigation that would need to occur in order to comply with Section 106 of the NHPA must be determined by a Caltrans Professionally Qualified Staff (PQS) for archaeology. Upon a site visit and review of a particular project's impacts within a segment of the PCBR the Caltrans PQS will be able to make the determination as to the level of study and the documentation that will be required. The ability of PQS to make these determinations would be based on the amount of project information provided.

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9 Appendix

9.1 Meeting Notes

9.1.1 Community Service Providers

October 14, 2013

Attendees:

- Diana Rios, Fortuna Business Improvement District
- Raquel Ortega, California Conservation Corps
- Tasha Ahlstrand, Calrans
- Robert Holmlund, GHD
- Merritt Perry, City of Fortuna / GHD
- Chuck Dwelley, Fortuna Senior Services
- Trina Pocket, The Multi Generational Center
- Mike Johnson, City of Fortuna
- Erin Dunn, Fortuna Chamber of Commerce
- Laurie Watson-Stone, Redwood Memorial Hospital

Focus Group Notes

- Each participant shared their interest in a multi-use trail:
    - Tourism/marketing for Fortuna
    - Economic development
    - There should be a trail around Fortuna (connecting the river trail, behind Hillside Drive, to gas wells, to river; a giant circle)
    - Salmon ecology
    - Safe access for pedestrians and bicyclists
    - The trail alignment crosses Hwy 101, Caltrans will look at what's proposed and provide input
    - Community health; the hospital is interested what it can do to improve the health of the community; tourism marketing will help with recruiting hospital staff
    - Enhancing kids getting outside, opportunity for productive things to do and for people to do together; healthy, happy community
    - Connect the River Lodge, the shopping center, schools, the medical facility, Newburg park, and the headwaters trail

- After reviewing the challenges and opportunities of the proposed route, participants shared their thoughts:
    - Consider safety issues associated with an undercrossing. I ask myself, would I feel safe walking along an undercrossing?
    - With a pedestrian bridge, you're aware that something is there, it's eye catching. An overcrossing would bring attention to people walking.
    - An undercrossing would flood.
    - The Highway 101 crossing is key. It seems a bridge/new culvert would be very expensive. It makes sense to use the culvert that's there even though the trail would be out of commission part of the year.
    - I didn't realize there were so many issues associated with the trail.
    - Does the creek setback apply to the McKinney development? Consider the impacts on property owners. Would the trail be located within the 50 foot setback? If yes, then that's good.
    - I loved the photo-simulation; it helped visualize the trail.
    - Why is the trail named John Campbell? How will trail construction be funded? Who will pay for this?
- What do you want out of this trail? What's important to you?
    - Keep the trail away from streets and the highway. Include public access points. Anticipate locations where kids/teenagers will try to access trail and cross street.
    - The trail may cross by CCC dormitories; it is important to delineate where the public can and cannot be within CCC property (e.g., with fencing/signs). CCC is leasing the property currently.
    - Bicycling/walking along the roads is scary. Consider a physical barrier between the trail and roadway. Bicyclists wear colored vests because they're concerned with safety.
    - The service road behind CCC is a public access road. This connection could be fenced off and create a potential alternate route, which would end at river walk overcrossing of Strongs Creek.
    - The City has a 12 inch pressure sewer main in the easement area behind the CCC property. Consider maintenance/access needs.
    - There is a drainage easement behind the creek; easements create points of access.
    - CCC has garden at the floodplain at Strongs Creek, which could be removed to allow access.
- What else do we need to pay attention to as we move forward with designs?
    - Provide dog waste bags.

  - Have a phone system along the more secluded portions; provides sense of security, especially if not all of the trail is lit.
  - Consider providing trail maps.
  - Have you considered fitness stations along the trail, e.g. one every 100 yards?
  - I don't think Strongs Creek has salmon run. Years ago there were cut through trout; Dr. Niles (ecologist) used to fish the ponds. There are still some further north. Strongs Creek may support cut through trout. Be great to tie in with Elementary Schools that grow fish.
  - Consider providing bathrooms; very convenient. Would the City maintain them?
  - Resting benches would be nice.
- What kind of trail configuration would you like to see?
  - Narrowest would be 10 paved with shoulders within 50 foot wide greenway.
  - Consider that allowing equestrian use may require horse waste clean-up, a possible maintenance problem. Without horses, you don't have that additional expense.
  - There is a woman in the County who runs guided horse rides up the river trail to River Lodge, and to Starbucks. These rides are advertised as something to do in Fortuna.
  - Consider people may not use the trail if they have to pass a lot of horse droppings; if the trail is not maintained.
  - Consider City maintenance challenges; discretionary funding gets smaller and smaller. Need to consider how to maintain the trail, otherwise it loses its value. If it's hard to get people to clean up after a dog, how hard would it be to get them to clean up after a horse?
  - I don't think options that take diminish the riparian area are feasible because of resource protections. This project will need to strike a balance between resource conservation and adjacent property/property owner impacts.
- Consider low lighting of the trail for safety.
- What portions are important to light?
  - Roadway crossings
  - South Fortuna Boulevard (there are a number of encampments here)
- Hammond trail is a good, local example. People had been concerns about crime before the trail was put in, but crime has lessened since the trail was constructed.
  - How can the trail support tourism?
  - The things we've been talking about will help support tourism
  - Trail access

- Lighting
- Addressing issues right away so we stay on top of things (e.g., the Hammond trail had issues with vehicular vandalism)
- Provide informational pieces at Starbucks/Strong Creek Plaza (handouts)
- Put in signage with historical information about the Fortuna area as well as ecological resources
- If multiple businesses etc. buy into and publicize the trail, it will be more successful
- If we are going to have a bicycle/pedestrian trail, we need to provide information on bicycle/pedestrian safety. Bring awareness to bicycle/pedestrian safety, perhaps with a campaign to address safety around how people get to the trail.
- Is it going to be ADA-compliant? Important to be ADA with the senior center.
- Will benches be provided? Resting pads?
- Fortuna Senior Services has a bicycle group that does 10 mile rides around the County. There isn't an adequate trail in Fortuna currently; but this would be a great bonus. There is a weekly walking group (sometimes 30 seniors) in Rohnerville Park.
- The school cross country teams often go to Rohnerville Park. They would probably use trail every day.
- It can be hard to find places to park at Newburg Park during sporting events. More walking/biking to park could free up some space.
- How could emergency vehicles access the trail?
- It would be ideal to have access at the hospital, for people visiting, having physical therapy, on their lunch breaks, to help with recruitment of all physicians and professional staff (potential new hires ask what the community has to offer; in particular, they ask about schools and recreational opportunities), and to discourage encampments. The hospital is interested in helping people get healthier so they don't come to the hospital.
- Caltrans comments
    - Consider costs associated with these options (particularly with an over or undercrossing)
    - Consider that people don't like to have to climb up to cross
    - A trail in the box culvert is intriguing if it can be permitted; it sounds like there are issues getting to it.
    - Caltrans has a fish passage program; there may be an opportunity to build something that accommodates both fish passage and pedestrian/bicycle access
    - A new tunnel would be fantastic if funding is there

        - The South Beach trails connector project is similar project Caltrans was involved in. The preferred alternative for that project was an undercrossing.
    - Is there room on the 12th Street overpass to do an enclosed overcrossing over the highway? What would be the connectivity coming back? Could this be an interim improvement (northern route)?
    - People currently use Kenmar, but it's a harry route. There is a crosswalk, but to get to the island is a challenge. Kenmar has no pedestrian facilities.
    - How do you get people from the hotels to downtown? The 12th Street connection is the fastest
    - Riverwalk to Eel River Salvage is a potential route, but not a very scenic one
    - The Highway 101 crossing is the most challenging aspect of this project
    - People cross 12th Street on freeway
    - People cross the freeway at-grade to get to the CCC

9.1.2 Fortuna High School

October 14, 2013

Focus Group Notes

This focus group was attended by teacher Pam Halstead, student presidents of the Green Tech and Fortuna Creeks Projects club, and the High School principal.

In advance of the focus group, the Green Technology and Creeks Project Clubs worked together to develop full-scale mock-ups of trail sections.

- The Fortuna Creeks Project, a student club, began in 1989, to monitor and care for the creeks in Fortuna, including Strongs Creek. The club engages in four creek clean ups per year, plus an e-waste disposal event.
- Students would like to see a trail along Strongs Creek for jogging and transportation. The high school track and cross country team could use the trail as a running loop.
- Safety issues students would like to see addressed include: need for lighting and good visibility along the trail. Homeless encampments are an issue, especially at South Fortuna Boulevard.
- Students would like to see informational signs about the local ecosystem. Topics could include:
    - Salmon fry and spawning
    - Alder trees are important nitrogen fixers
    - Trees help keep the water cool and prevent erosion
    - Currents/rapids create oxygen to support spawning

- Signage could highlight the Pacific Lumber History (such as along the Elk River Trail)
- Fortuna High School art and shop classes can make the signs.
- Fortuna High School English class has a 'senior assignment' and they could write the text for signs.
- For the health of the creek, students and staff would like to see the trail surfaces be permeable/porous to allow for water penetration.
- Include trash/recycling facilities along the trail.

9.1.3 Biological and Cultural Resources

October 15, 2013

Attendees:

- Stephen Avis, City of Fortuna
- Mike Van Hattem, CA Department of Fish and Wildlife
- Edwin Smith, Bear River Band of the Rohnerville Rancheria
- Erica Coluns, Bear River Historic Preservation
- Rob Holmlund, Merritt Perry, Jeremy Suvella, GHD
- Nora Daley-Peng, Kristin Maravilla, Alta

Focus Group Notes

- If you go through a box culvert, how to do deal with high flows when the trail is flooded?
    - Provide alternate routes
    - Need to look at hydraulics
    - Each community handles closures differently
    - The City was recently awarded a fisheries and restoration grant
- Do you know who will do the full cultural records search? The tribe maintains its own database. There are sites in the area; one was identified as part of Littlefield project (?)
- A records search early on could help inform the trail planning
- Don't disclose sensitive sites with the public
- The tribe can be proactive in working with the City concerning incorporating tribal history into signage or benches, if the City decides they want these amenities
- FWS has new streamside setback guidance; streams should have at least a 100 foot setback and rivers should have 150 feet. Up to local governments to decide whether to implement. A 50 foot buffer is not much. Glad the City has widened the setback to 50 feet from top of bank (vs. 25 feet from centerline). Visited creek when investigating the violation associated with

other project; many shopping carts within creek. Public access can be beneficial by bringing more legitimate use to the corridor and promote enjoyment and protection of the creek. Would like to see a larger buffer, which is what the science supports. Where would the trail sit within the setback? Where you start the setback is important. There are several flow lines. Setback should start at edge of bank or edge of riparian vegetation (dripline), whichever is greater. Where does the 50 foot setback sit? 50 is not supported by the science; it's supported by the general plan (political), but FWS can probably live with it. Would prefer the trail to be as far from the creek as possible, within the 50 foot setback. As a compromise, the trail could be located in the middle of the setback. Retain the riparian vegetation. Consider spatial needs associated with a vegetated strip/swale for stormwater runoff. FWS is interested in this planning process and understands there may be a need for compromise.

- Will the landscaping stay as is – rural pasture, etc.? Consider adding shade trees within 50 foot buffer; improve habitat for birds, provide additional shade; could functionally increase the shade cover along the creek, which would improve habitat for fish. Use native vegetation. This would be seen as a benefit by FWS.
- Could invasives removal be counted toward mitigation (GHD question)?
    - FWS response: Removing invasives isn't a one-time event. Regular vegetation removal encouraged. Would prefer to see increased tree coverage.
- This is a highly disturbed landscape. FWS would like to see native trees and understory that is mowed.
- Determining top of bank; some segments of the corridor have a couple "benches". Per FWS, the top of bank is where water leaves the channel.
    - Determining top of bank will be a challenge with this project because of dense vegetation
    - FWS offered to revisit site with City/team
- Seems one of the biggest issues will be wetlands; need to try to avoid wetlands where possible. FWS will need a good wetland delineation for this project. The key to delineation is to map 3.
    - Question: Is covering wetlands a take?
    - FWS response: Depends on the baseline; need to check regulations. Opportunity for transparency, depends on type of boardwalk. If arched, get light in there, less of an impact.
- Will there be lighting? FWS would prefer to not see lighting everywhere; focus it. Consider LED lighting and shielding.
- Does the City foresee any more active management of the creek? E.g., removal of shopping carts.
- Question: Would the tribes have any ethnobotanical considerations?

- Response: Would like to see alders over cottonwoods (used for dyes) and willows (used for baskets); maybe don't include these preferences in information for the public/signage/etc. along trail.

9.1.4 Agency Vetting Meeting

October 17, 2013

Attendees:

City of Fortuna

- Mike Johnson
- Stephen Avis
- Liz Shorey

Project Team

- Alison Pernell, LGC
- Paul Zykofsky, LGC
- Nora Daley-Peng, Alta Planning + Design
- Kristin Maravilla, Alta Planning + Design
- Rob Holmlund, GHD

Caltrans

- Tasha Ahlstrand, Caltrans Planning
- Lena Ashley, Caltrans Design
- Keith Witte, Caltrans Encroachment Permits
- James Van Bonn, Encroachment Permits
- Scott Lee, Caltrans Hydraulic

Connection to Levee Trail:

There is potential for a future city park at the Eel River. If this can't be realized, then the trail connection from Alamar Drive can be accomplished through a pedestrian crossing on Riverwalk Drive, with pedestrian facilities connecting to the River Lodge, where there is levee trail access.

Riverwalk Dr/Kenmar Loop:

Creating part of a loop trail from Levee Trail to Mill District via Kenmar Rd could provide flexibility in trail segment phasing. Better to call it a first phase or segment than an interim design. The Kenmar Loop will provide more City-wide ped/bike connectivity, even if/when the Highway 101 overcrossing is built.

1964 flood created the need for the adjacent to the Eel River. Running a multi-use trail along the southwest side of Riverwalk Drive would require decking or fill. A trail on fill would require less maintenance than decking. Consider widening trail on this loop to accommodate pedestrian, cyclists, and equestrians.

Utilize planned 3 way stop at Kenmar interchange to allow trail users to safely cross the street.

Existing 14'-10" Highway 101 bridge clearance. Existing 8' shoulders.

Fit the 10' trail behind columns and provide barrier along the street.

Proposed Kenmar ped/bike facilities would require a constructability review by Caltrans. Seismic retrofit might be needed. How do you get construction equipment under the bridge? Design would need to consider drainage.

Caltrans likes the idea of T-ing up on/off ramps for ped/bike safety. Run auto-run on proposed neck downs of on/off ramps.

Group thinks the northern side trail alignment on Kenmar would have less traffic impacts than southern alignment.

Park and Ride is a Caltrans lot. Should study the need for HAWK signal with the proposed Eel River Drive crosswalk from Park and Ride to Mill District site for trailhead access to proposed Class I trail along Mill Creek.

Get advanced planning study. Check in with Rex Jackman of Caltrans on timing.

Proposed Pedestrian Overcrossing (POC) to Mill District:

Spanning Highway 101 would connect the city and make the trail become a major asset to the entire city.

Proposed footings to avoid culvert structure. Culvert is classified as bridge by Caltrans that has regular inspections. Fish passage is high priority. Margaret Lane study prioritizes as top 10 in Humboldt County. Not high on Caltrans priority list. How about alternate funding? FRGE? On a priority list for replacement. 50-60 years old.

Caltrans may study the need to widen the 12th Ave Bridge. Encroachment permits are required for any or all crossings HWY 101, 12th Ave, Kenmar Rd. This is a time consuming process.

Would POC be considered "break in access control"? POC is not an access to highway. So maybe not. Have Don Campbell at Caltrans comment on draft report.

What about designing a new underpass with culvert/bridge replacement? Advise to design POC and replacement separately and work around each other.

Railroad (RR) overcrossing FHWA requirement for height clearance is 26'. Grade of the RR is lower than highway by about 6'.

POC - Gateway opportunity – cited Willits and Arcata examples. Integrated public art and structure. Highway design manual has a gateway signage chapter. Look at guidelines for direction. Idea is to not overburden the driver with signage. Keep them focused. Caltrans will look up in the CA highway design manual.

Surface Crossings:

Fortuna Blvd – on street crossing improvements. Alt north, straight with bridge, or south. Right turn Eliminate merge lane. Shorter crossing better bicycle safety. Elimination provides room to get trail around utility pole. High visibility crosswalk might not be necessary since it is signalized. Likes

having one crossing on north side of intersection to continue on trail. If trail comes out on the south, maybe consider south crossing.

Adjacent lot – get development plan from Liz. 25' easement requirement before 50' TOB is required.

Participants agree with no pedestrian refuge at Fortuna Blvd crossing since the signal is properly timed.

Redwood Way:

Lane reconfiguration to accommodate Class I trail. Straight across crossing. Better line of slight. Stay out of the shadow of trees over bridge. Extend trail to the east to connect to bus stops and hospital.

Rohnerville Road:

Existing conditions include: west top of bank is at edge of pavement, existing utility poles with transmission line, and retaining wall to the east.

Can we narrow one lane and not the other? Could consider going down to 11'. Look at buffered bike lanes.

Loop Rd intersection – T intersection with ped/bike improvements or roundabout.

Narrow foot bridge. Explore replacement bridge with Class I width.

Look at moving property owner low fence in.

Connection to BMX Park:

Take access to main gate of Newburg Park.

Move outfield fence to allow room for trail.

Caltrans Process

Funding – PID (project initial document and PSR project study report) Would be the same in this case. This would be the transportation funding tool. Would Caltrans fund PSR? Talk Brad Mettam about if Caltrans could fund PSR?

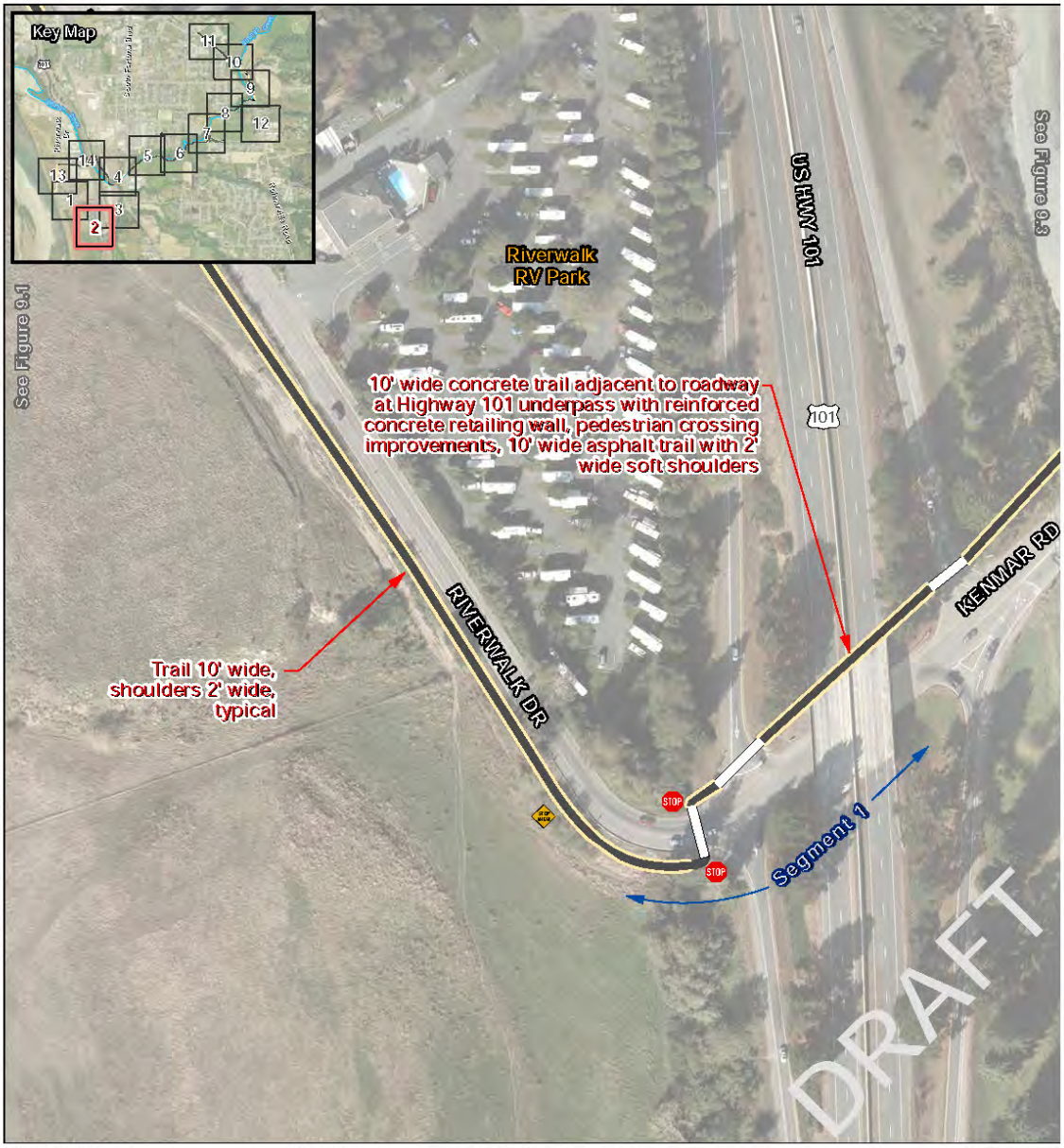
Have at least 2 alternatives e.g. No build and 1 option

How would a preferred alternative be chosen? Cost, funding source opportunities, etc.

PSR on conceptual level with alternatives within. Possibly seek funding on just segments.

Provide flow diagram of Caltrans process in draft/final report.

9.2 Trail Map Series



Primary Segments: Trail, Shoulder, Bridge, Grass, Sidewalk, ADA Ramp, Crosswalk, Railing

Additive Segments: Trail, Shoulder, Bridge, Sidewalk, Class II Bike Lane

Alternative Segments: Trail, Shoulder, Class II Bike Lane

Signs: Interpretive Sign Location, Trailhead Area, "Stop" sign, "Stop Ahead" sign, "No Motor Vehicles" sign

Other: Hospital, School, City Park

Paper Size 8.5" x 11" (ANSI A)
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Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane California I FIPS 0401 Feet

City of Fortuna
Caltrans Community Based Transportation Grant

Strongs Creek Trail Map Series

Job Number 84-1063606
Revision E
Date 28 Mar 2014

Figure 9.2

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718 Third Street Eureka CA 95501 USA T 707 443 8326 F 707 444 8330 E eureka@ghd.com W www.ghd.com

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Data source: City of Fortuna: Railing, Hospital, School, Road, Aerials, Park - Feb. 2014; GHD: Kenmar Alignment, Concept Design, Signage points - Feb 2014. Created by: gdavidson / kmcdonald / gldavidson

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City of Fortuna
Caltrans Community Based Transportation Grant

Strongs Creek Trail
Map Series

Job Number 84-1063606
Revision E
Date 28 Mar 2014

Figure 9.3

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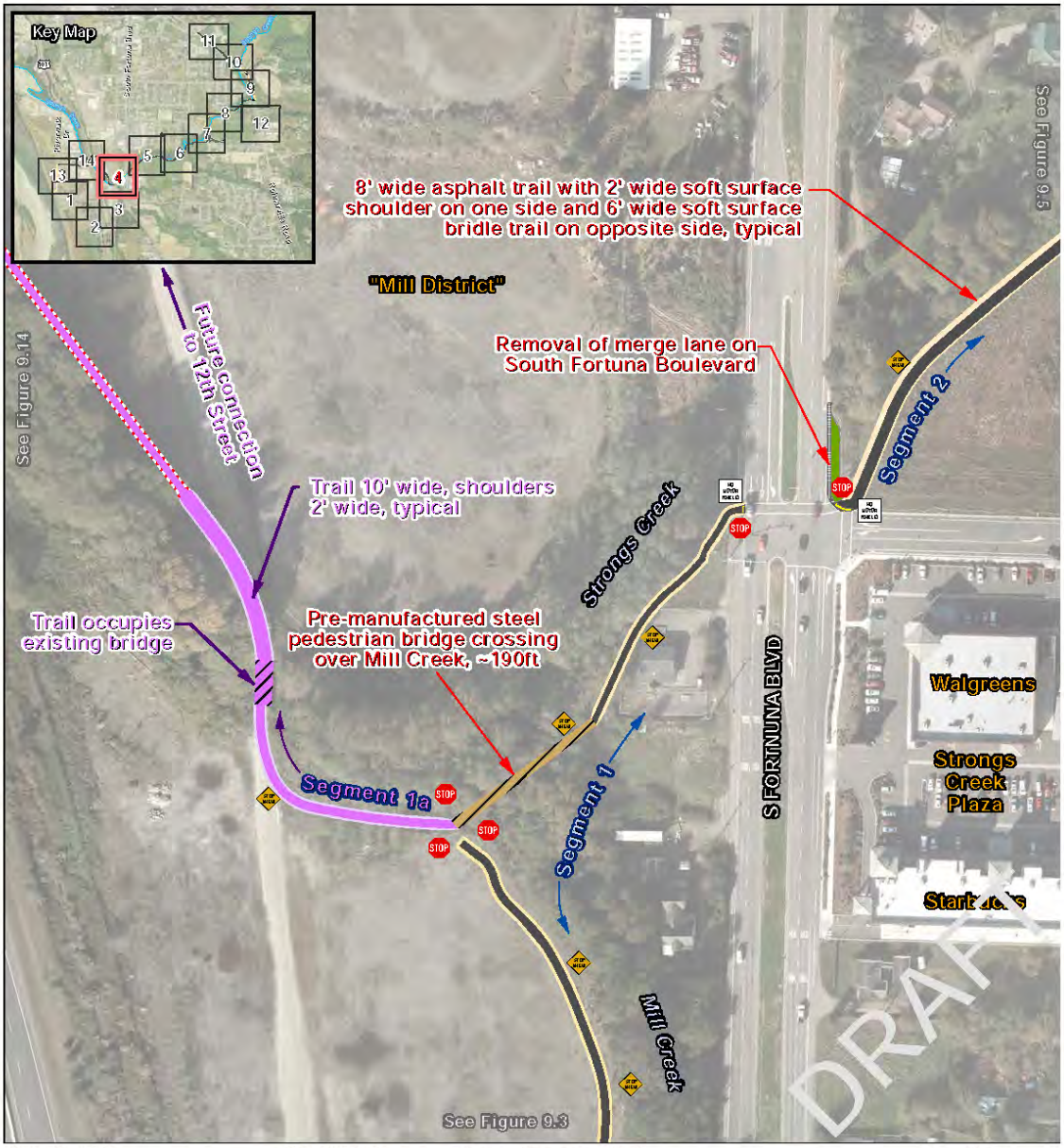

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City of Fortuna
Caltrans Community Based Transportation Grant

Strongs Creek Trail Map Series

Job Number 84-1063606
Revision E
Date 28 Mar 2014

Figure 9.4

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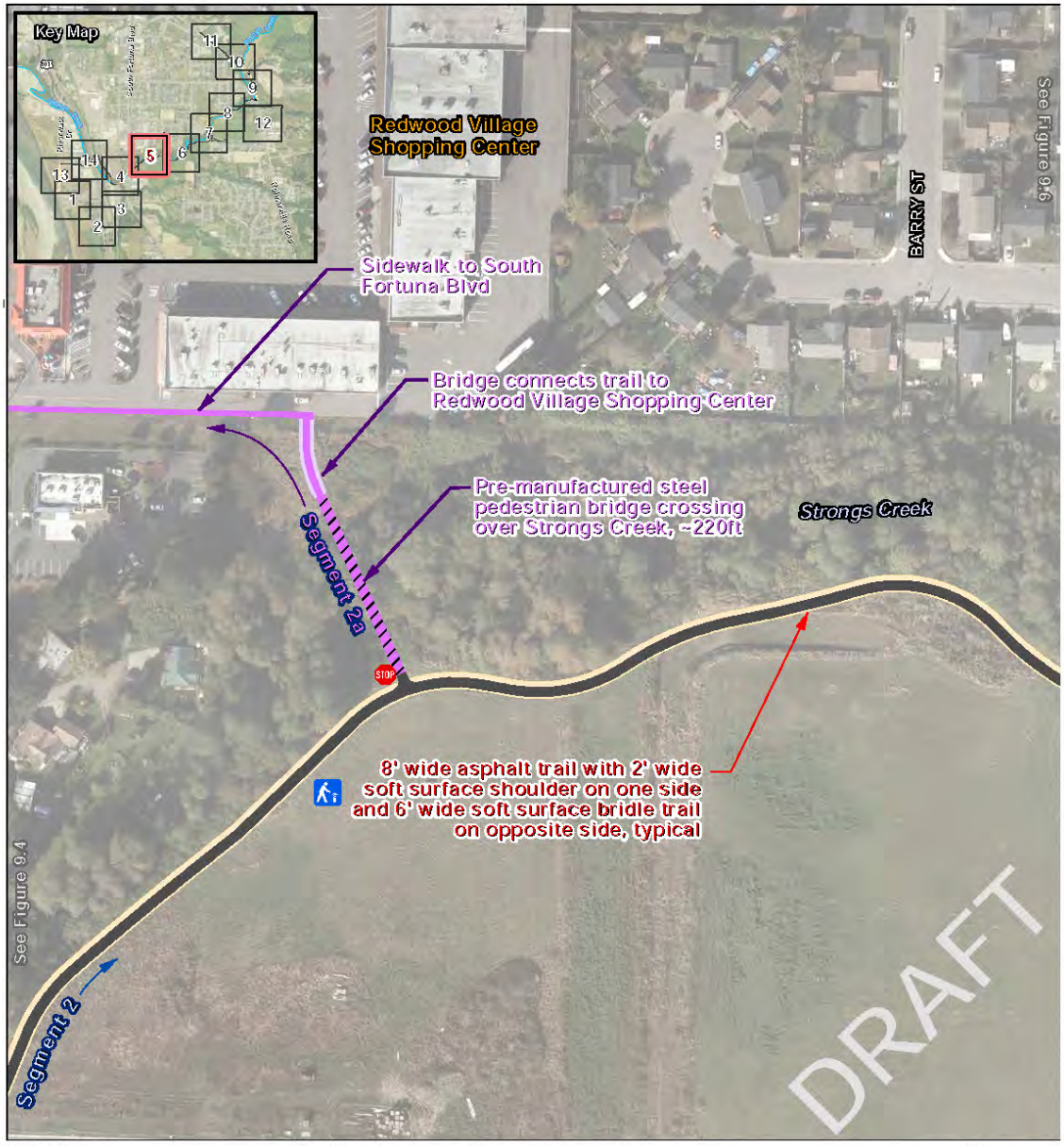

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City of Fortuna
Caltrans Community Based Transportation Grant

Strongs Creek Trail Map Series

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Revision E
Date 28 Mar 2014

Figure 9.5

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Other: Hospital, School, City Park

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Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
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Caltrans Community Based Transportation Grant

Strongs Creek Trail Map Series

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Date 28 Mar 2014

Figure 9.6

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Strongs Creek Trail
Map Series

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Figure 9.7

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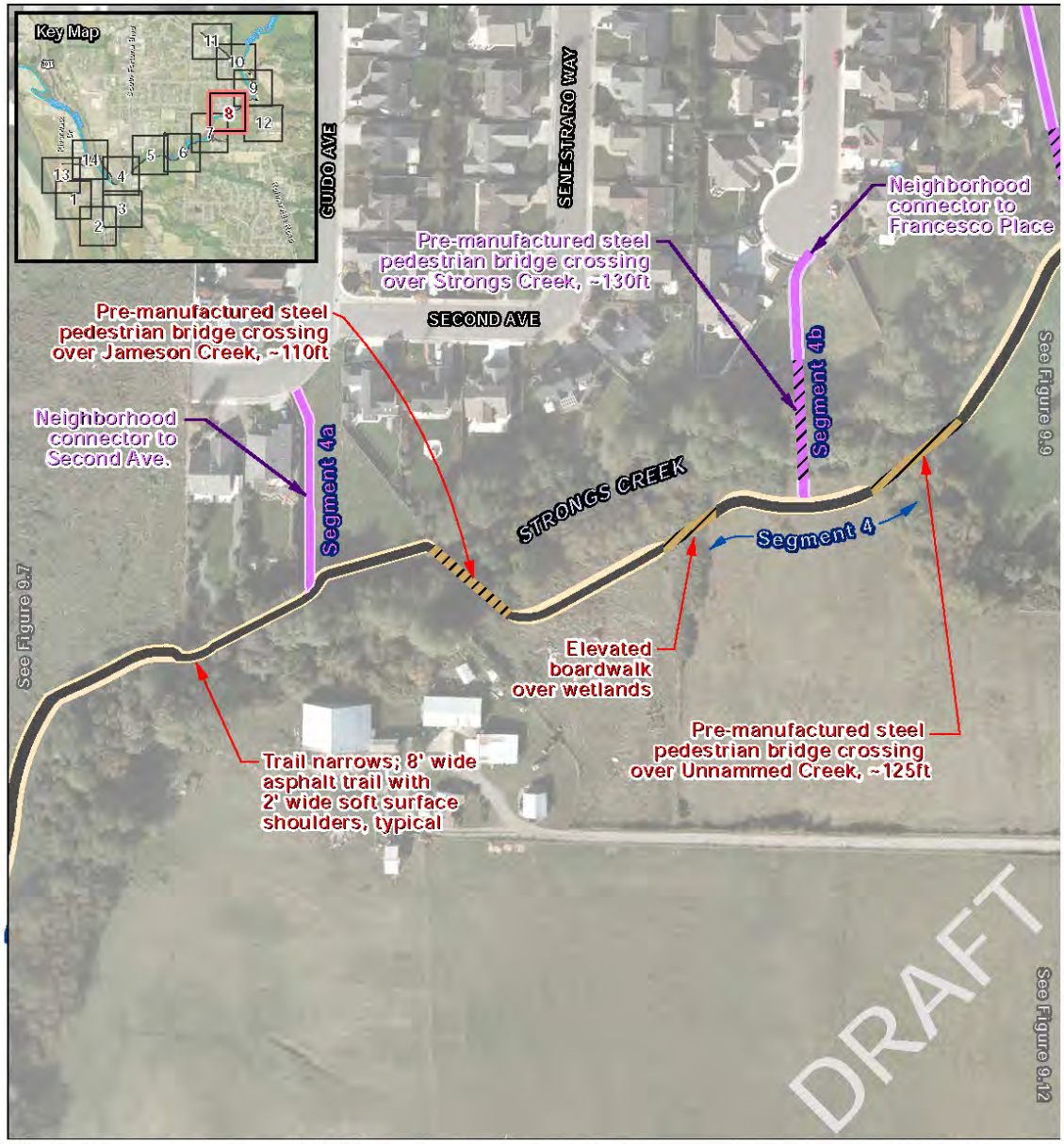

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Caltrans Community Based Transportation Grant

Strongs Creek Trail Map Series

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Figure 9.8

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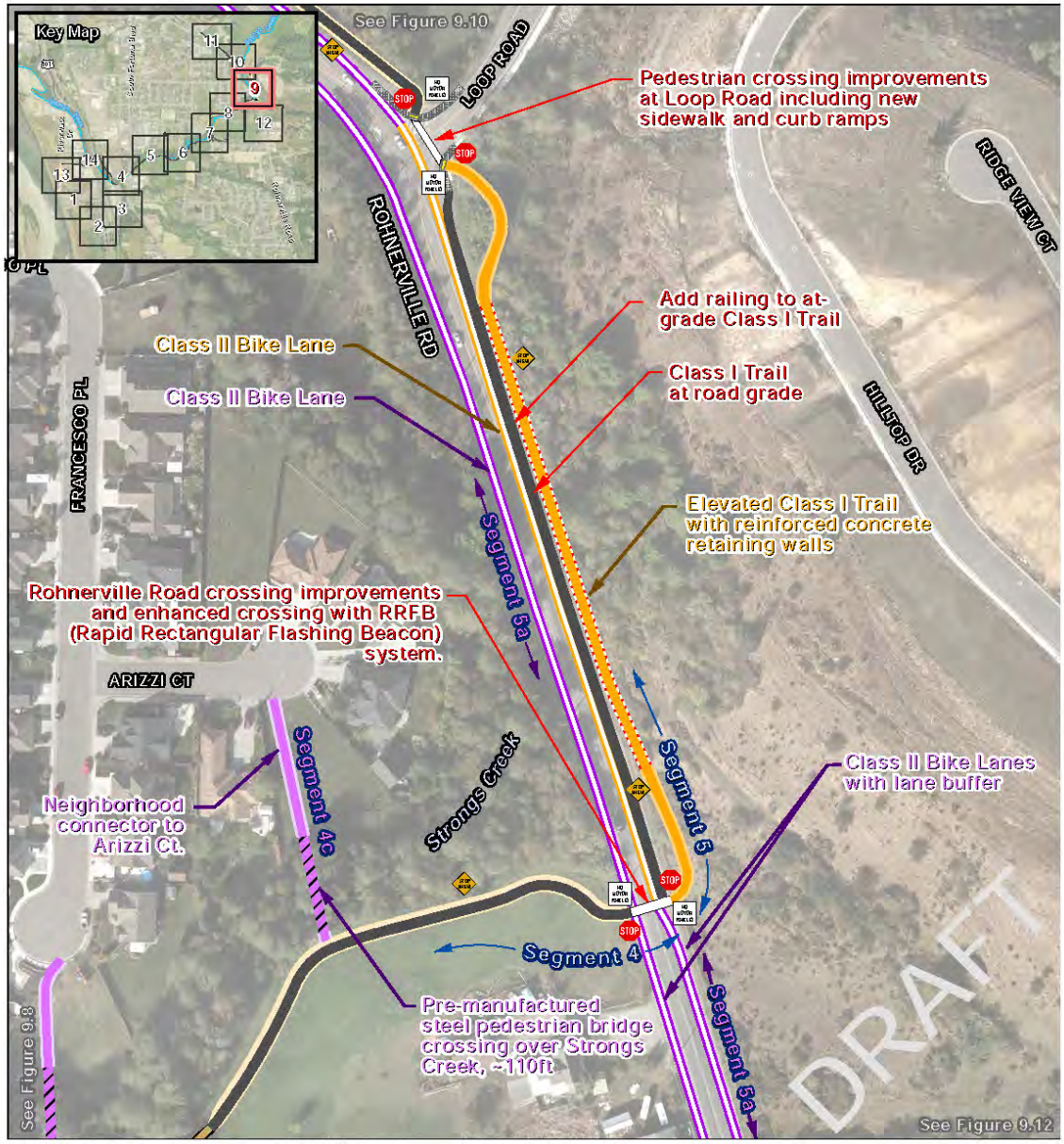

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Caltrans Community Based Transportation Grant

Strongs Creek Trail
Map Series

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Figure 9.9

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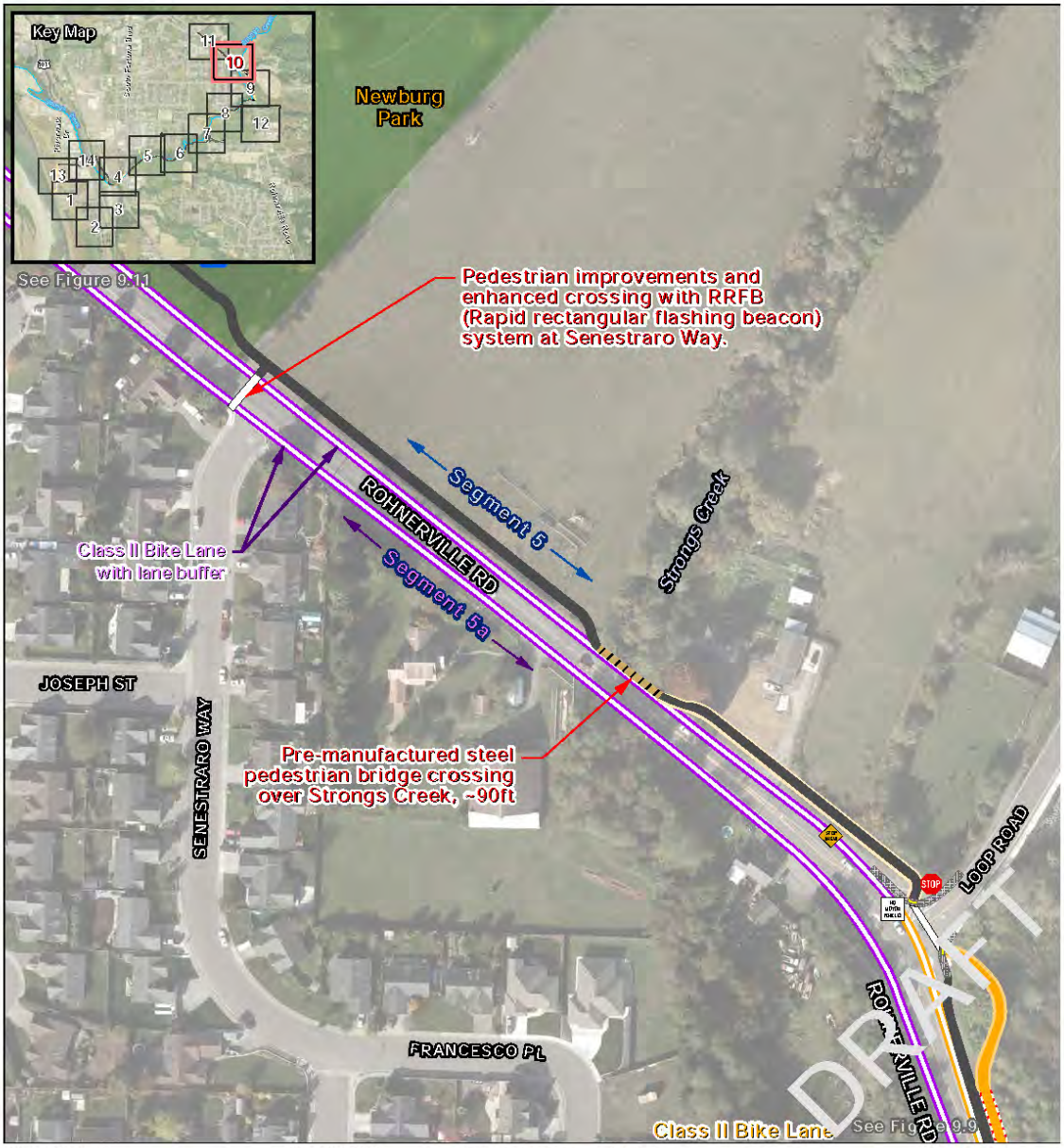

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Figure 9.10

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Figure 9.11

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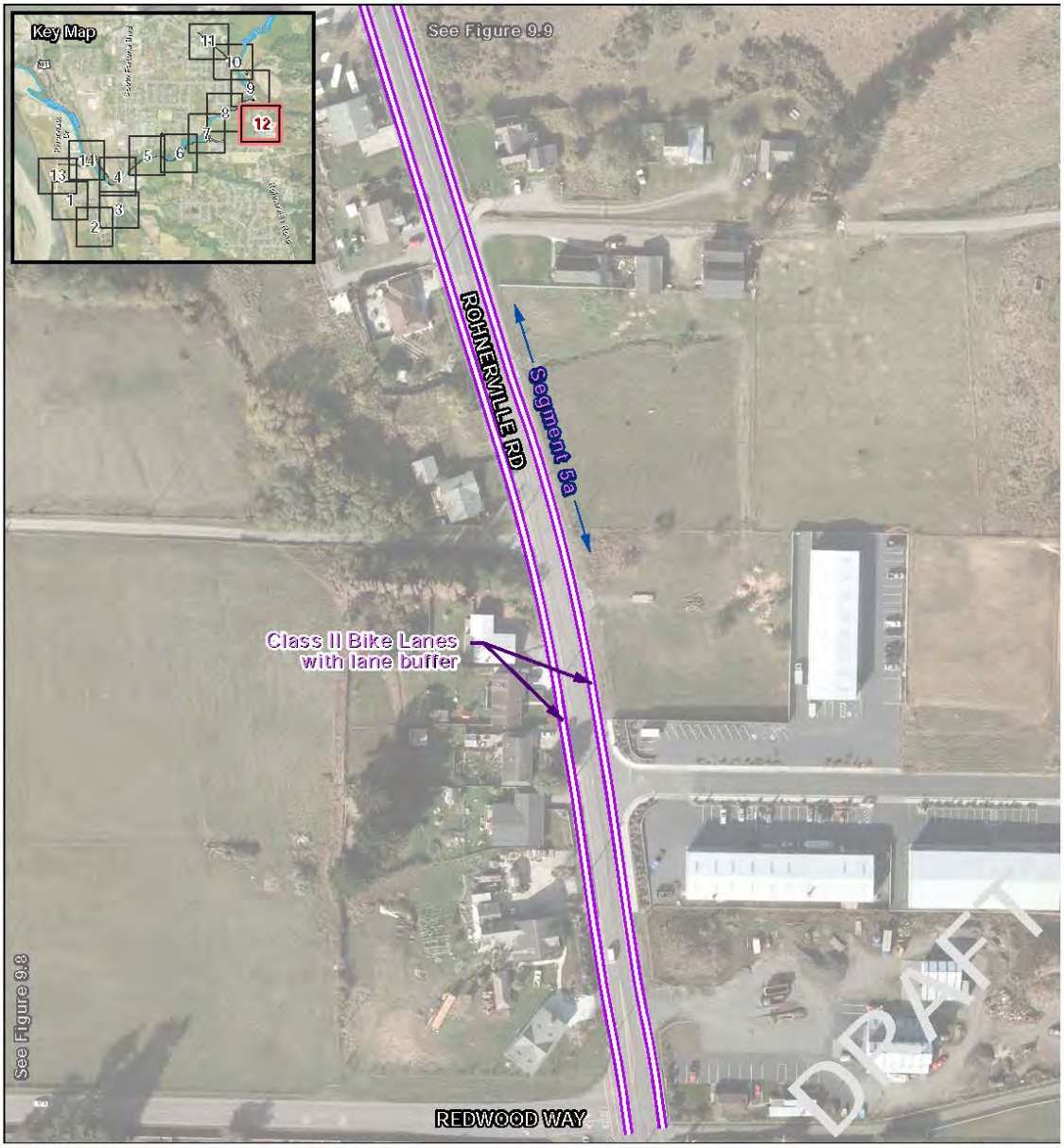

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City of Fortuna
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Figure 9.12

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Figure 9.13

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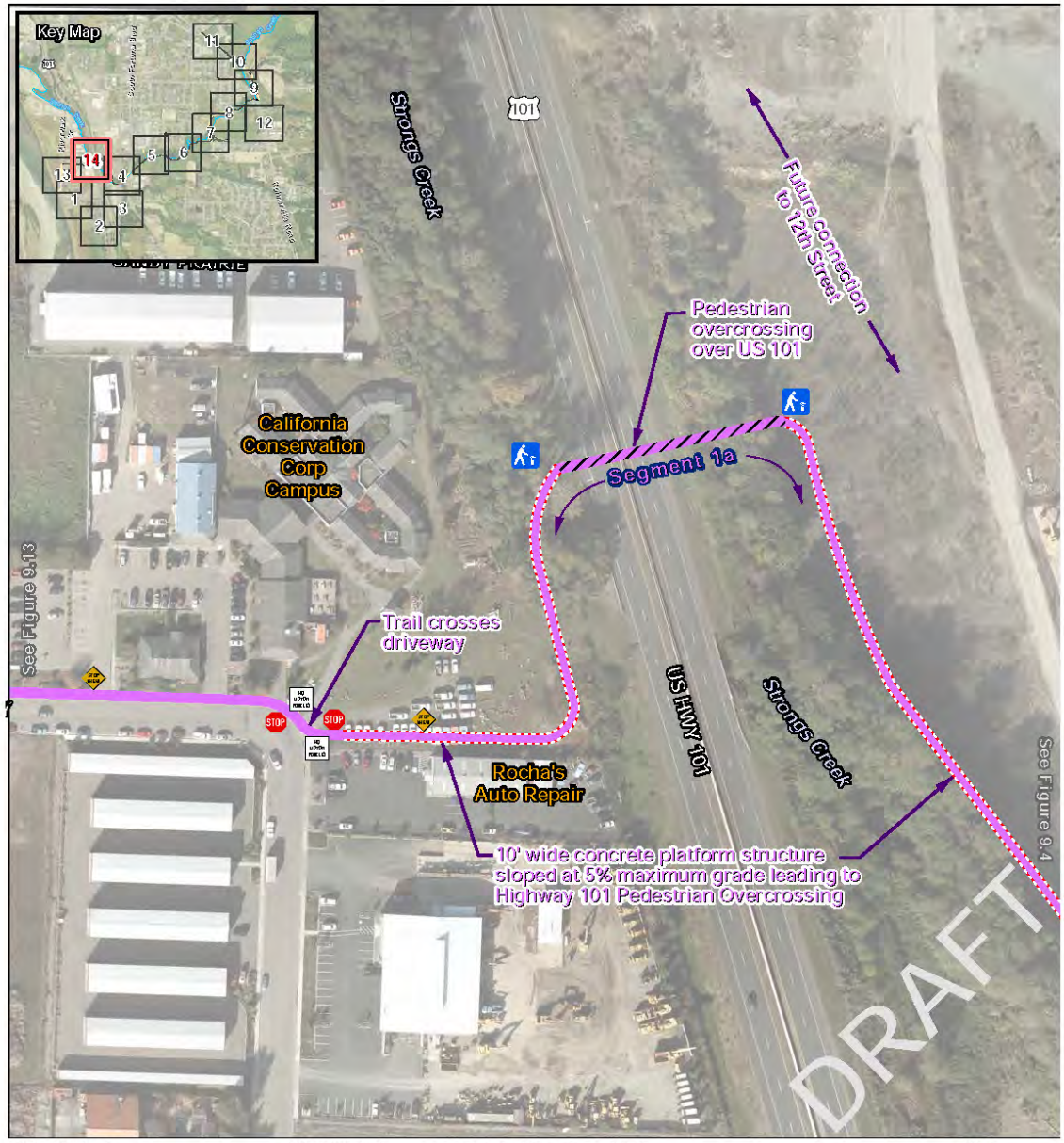

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Figure 9.14

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9.3 Detailed Cost Estimates

This section presents planning-level cost estimates for the proposed trail improvements. The costs include planning, design, construction, and other anticipated implementation steps. These cost estimates required numerous assumptions about the details of construction and associated requirements. The estimate and assumptions reflect the experience of the consultant team with other similar projects.

Table 9-1 presents the unit costs for the various trail and drainage crossing improvements that were used to create the preliminary cost estimates. **Table 9-2** presents the total construction costs for all project segments. **Table 9-3** through **Table 9-16** present the estimated total cost for each trail segment.

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

- Construction overhead (costs the contract typically includes over and above the individual work items – calculated as a percentage of the total project cost):
    - Mobilization – 5%
    - General conditions, bonds, and insurance – 2%
    - Erosion control, including all BMPs, SWPPP and reporting – 5%
    - Traffic control – 2%
- A contingency for the level of accuracy of the estimate is included at 20% of total construction.
- Design and other implementation costs allowances are included at the following percentages of construction cost:
    - Survey; boundary and topographic – 2.5%
    - Plans, specifications and estimates, including technical studies such as geotechnical or hazardous waste investigations – 15%
    - Environmental analysis and documentation and related permits – 10%
    - Mitigation (actual cost will be based on existing conditions and scope of proposed changes) – 2-3%
    - Construction engineering – 15%

The estimates include right-of-way acquisition where necessary for the trail alignment. This would be strictly on a willing seller basis. The estimates include an approximate area of right-of-way required, and a "placeholder" cost of $2.00 per square foot for acquisition. Actual right-of-way costs would be subject to negotiation.

Table 9-1: Unit Costs

No.	Description	Unit	Unit Cost
1	Mobilization - maximum of 5% of total bid price	LS	5.00%
2	General Conditions, Bonds and Insurance	LS	2.00%
3	Erosion Control - includes all BMPs, SWPPP and Reporting	LS	Varies by Segment
4	Traffic Control	LS	Varies by Segment
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	SF	$0.25
5.4	Remove Fence	LF	$10.00
5.5	Relocate Existing Utility Pole	EA	$8,000.00
5.6	Remove Existing Storm Drain Culvert	EA	$1,000.00
5.7	Remove and Relocate Existing Roadside Sign	EA	$600.00
5.8	Remove Existing Tree	EA	$2,000.00
5.9	Remove Existing Bridge	EA	$50,000.00
6	Earthwork		
6.1	Clearing and Grubbing	SF	$0.25
6.2	Excavation and Grading	CY	$18.00
6.3	Embankment, Import Borrow	CY	$30.00
6.4	Soil for new landscape areas	CY	$10.00
7	Concrete Work and Asphalt Paving - includes concrete curbs, 4" PCC sidewalk, pedestrian ramps, concrete pads, Class I Trail, bridges, retaining walls, Misc		
7.1	Construct curb & gutter	LF	$45.00
7.2	Construct Concrete curb	LF	$25.00
7.3	Construct 4" PCC sidewalk	SF	$10.00
7.4	Construct Concrete Bus Stop Pad	SF	$25.00
7.5	Construct AC Path 8' wide (Assume 0.2' thick)	Ton	$130.00
7.6	Drainage Inlet (Drop Inlet)	EA	$4,000.00
7.7	Aggregate Base (Shoulders, Under trail/sidewalks)	CY	$55.00
7.8	Curb Ramp with truncated dome surface	EA	$2,200.00
7.9	Extend existing storm drain system	EA	$1,000.00
7.10	Construct HDPE storm drain pipe	LF	$60.00
7.11	Construct Shallow Manhole	EA	$5,000.00
7.12	Modify Existing Bridge at Redwood Way (Railings, Concrete structure)	LS	$50,000.00
7.13	Provide and Install (+/- 60'x12") Pre-Manufactured Steel Bridge	LS	$135,000.00
7.14	Provide and Install (+/- 120'x12") Pre-Manufactured Steel Bridge	LS	$205,000.00
7.15	Provide and Install (+/- 200'x12") Pre-Manufactured Steel Bridge	LS	$500,000.00
7.16	Concrete Elevated Board Walk	LS	$75,000.00
7.17	Reinforced Concrete Retaining Wall (including Structural Excavation)	SF	$150.00
7.18	Highway 101 Overcrossing	EA	$6,000,000.00
7.19	Split Rail Fence	LF	$50.00
7.20	Decorative Pavers	SF	$13.00
7.21	Construct Concrete Dumpster Pad and Relocated Existing Fencing	LS	$3,500.00

No.	Description	Unit	Unit Cost
7.22	Truncated Dome Surface (on sidewalk not on ramp)	EA	$500.00
8	**Planting**		
8.1	24" box trees with root barriers, tree grates	EA	$2,200.00
8.2	15 gallon trees with protective posts and root barriers	EA	$175.00
8.3	1 gallon shrub w/groundcover planting	EA	$10.00
8.4	Irrigation meter/connection, backflow, controller, mainline, lateral line	LS	$15,000.00
9	**Site Furnishings**		
9.1	Pedestrian Light Type 1 (Streetlamp style, placed near intersections)	EA	$6,000.00
9.2	Pedestrian Light Type 2 (Solar Powered along trail at 40' intervals)	EA	$2,000.00
9.3	Trash Receptacles	EA	$2,400.00
9.4	Benches	EA	$1,100.00
9.5	Shade Structure	LS	$5,000.00
9.6	Way Finding Signs	EA	$550.00
9.7	Dry stone wall	SF	$25.00
10	**Signs and Pavement Markings - includes painted traffic lines and markings on pavement, and traffic signage.**		
10.1	High visibility crosswalk Markings	EA	$1,500.00
10.2	Advance stop bar (Limit Line) or Yield Markings	SF	$10.00
10.3	STOP pavement marking	EA	$200.00
10.4	Sharrow	EA	$115.00
10.5	Roadside Signs	EA	$550.00
10.6	4" Thermoplastic Traffic Stripe	LF	$4.00
10.7	6" Thermoplastic Traffic Stripe	LF	$6.00
10.8	RRFB System including Signal poles, signs, push buttons, Controller, Solar Panel, & RRFB's, installation	EA	$12,000.00
10.9	Private Driveway Crossing	EA	$1,000.00
11	**Right-of-Way Acquisition - includes Acquisition, Project Development Permits, Utility Relocation Assistance and Title & Escrow.**		
11.1	Right-of-Way	SF	$2.00
	SUBTOTAL		
	ESTIMATING CONTINGENCY		20%
	SURVEYING		Varies by Segment
	PLANS, SPECIFICATIONS AND ENGINEERING		Varies by Segment
	ENVIRONMENTAL PERMITTING		Varies by Segment
	MITIGATION		Varies by Segment
	CONSTRUCTION ENGINEERING		Varies by Segment

Table 9-2: Total Construction Costs for All Project Segments

Description		Totals
Segment 1 - Overlook Park/Trailhead to South Fortuna Boulevard (incl. South Fortuna Boulevard Crossing Improvements)		
Construction	--	$1,791,123
Survey, design, environmental, and admin	27.5%	$492,559
Right-of-Way	$107,268	$107,268
Contingency (20%)	20.0%	$358,225
Total	--	**$3,864,000**
Segment 1a - Overlook Park/Trailhead to the Strongs Creek/Mill Creek Confluence (North Alignment)		
Construction	--	$7,140,694
Survey, design, environmental, and admin	24.0%	$1,713,767
Right-of-Way	$65,728	$65,728
Contingency (20%)	20.0%	$1,428,139
Total	--	**$10,349,000**
Segment 2 - South Fortuna Boulevard to Redwood Way		
Construction	--	$855,920
Survey, design, environmental, and admin	32.0%	$273,894
Right-of-Way	$115,280	$115,280
Contingency (20%)	20.0%	$171,184
Total	--	**$1,417,000**
Segment 2a - Connection from Redwood Shopping Center		
Construction	--	$620,366
Survey, design, environmental, and admin	34.0%	$210,924
Right-of-Way	$6,376	$6,376
Contingency (20%)	20.0%	$124,073
Total	--	**$962,000**
Segment 2b - Overlook at Redwood Memorial Hospital and Connector		
Construction	--	$63,390
Survey, design, environmental, and admin	32.5%	$20,602
Right-of-Way	$5,472	$5,472
Contingency (20%)	20.0%	$12,678
Total	--	**$103,000**
Segment 3 - Redwood Way Crossing Improvements		
Construction	--	$147,713
Survey, design, environmental, and admin	35.0%	$51,700
Right-of-Way	$0	$0
Contingency (20%)	20.0%	$29,543
Total	--	**$229,000**
Segment 4 - Redwood Way to Rohnerville Road (Not incl. Rohnerville Road Crossing Improvements)		
Construction	--	$977,373
Survey, design, environmental, and admin	31.5%	$307,873
Right-of-Way	$69,732	$69,732
Contingency (20%)	20.0%	$195,475
Total	--	**$1,551,000**

Description		Totals
Segment 4a - Trail Connection through vacant lot to 2nd Avenue/Guido Avenue		
Construction	--	$52,288
Survey, design, environmental, and admin	33.5%	$17,516
Right-of-Way	$5,700	$5,700
Contingency (20%)	20.0%	$10,458
Total	--	**$86,000**
Segment 4b - Trail Connection through vacant lot to Francesco Place		
Construction	--	$279,043
Survey, design, environmental, and admin	34.0%	$94,875
Right-of-Way	$6,130	$6,130
Contingency (20%)	20.0%	$55,809
Total	--	**$436,000**
Segment 4c - Trail Connection through vacant lot to Arizzi Court		
Construction	--	$282,113
Survey, design, environmental, and admin	34.0%	$95,919
Right-of-Way	$6,690	$6,690
Contingency (20%)	20.0%	$56,423
Total	--	**$442,000**
Segment 5 - Rohnerville Road - Redwood Way to Newburg Road (Incl. Rohnerville Road Crossing Improvements)		
Construction	--	$736,935
Survey, design, environmental, and admin	28.0%	$206,342
Right-of-Way	$22,710	$22,710
Contingency (20%)	20.0%	$147,387
Total	--	**$1,114,000**
Segment 5 Alternate - Rohnerville Road - Redwood Way to Newburg Road (Similar to Segment 5, Elevated Trail)		
Construction	--	$1,863,921
Survey, design, environmental, and admin	28.5%	$531,217
Right-of-Way	$51,256	$51,256
Contingency (20%)	20.0%	$372,784
Total	--	**$2,820,000**
Segment 5a - Rohnerville Road - Redwood Way to Newburg Road Bike Lanes		
Construction	--	$132,278
Survey, design, environmental, and admin	10.0%	$13,228
Right-of-Way	$0	$0
Contingency (20%)	20.0%	$26,456
Total	--	**$172,000**
Segment 5b - Rohnerville Road - North Edge Newburg Park Trail		
Construction	--	$77,327
Survey, design, environmental, and admin	26.0%	$20,105
Right-of-Way	$0	$0
Contingency (20%)	20.0%	$15,465

Description		Totals
Total	--	$113,000
TOTAL OF BASE PROJECT (SEGMENTS 1, 2, 3, 4, AND 5) (NO ADDATIVE OR ALTERNATE ALIGNMENTS)		$11,372,000 TO $13,078,000
TOTAL OF BASE PROJECT AND ALL ADDATIVE SEGEMENTS (NOT INCL. 5 ALTERNATE)		$24,035,000 TO $25,741,000

Table 9-3: Segment 1 (Primary Alignment): Overlook Park/Trailhead to South Fortuna Boulevard Cost Estimate

No.	Description	Qty	Unit	Unit Cost	Cost
1	Mobilization - maximum of 5% of total bid price	1	LS	5.00%	$80,681
2	General Conditions, Bonds and Insurance	1	LS	2.00%	$32,272
3	Erosion Control - includes all BMPs, SWPPP and Reporting	1	LS	2.00%	$32,272
4	Traffic Control	1	LS	2.00%	$32,272
	Sub-total				$177,499
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	500	LF	$5.00	$2,500
5.2	Remove AC pavement	5,435	SF	$0.25	$1,359
5.4	Remove Fence	1,600	LF	$10.00	$16,000
5.6	Remove Existing Storm Drain Culvert	2	EA	$1,000.00	$2,000
5.7	Remove and Relocate Existing Roadside Sign	14	EA	$600.00	$8,400
5.8	Remove Existing Tree	5	EA	$2,000.00	$10,000
	Sub-total				$40,355
6	Earthwork				
6.1	Clearing and Grubbing	52,818	SF	$0.25	$13,205
6.2	Excavation and Grading	11,925	CY	$18.00	$214,650
6.3	Embankment, Import Borrow	3,100	CY	$30.00	$93,000
	Sub-total				$320,855
7	Concrete Work and Asphalt Paving - includes concrete curbs, 4" PCC sidewalk, pedestrian ramps, concrete pads, Class I Trail, bridges, retaining walls, Misc.				
7.1	Construct curb & gutter	585	LF	$45.00	$26,325
7.2	Construct Concrete curb		LF	$25.00	$0
7.3	Construct 4" PCC sidewalk	2,439	SF	$10.00	$24,390
7.5	Construct AC Path 8' wide (Assume 0.2' thick)	561	Ton	$130.00	$72,930
7.6	Drainage Inlet (Drop Inlet)	2	EA	$4,000.00	$8,000
7.7	Aggregate Base (Shoulders, Under trail/sidewalks)	1,522	CY	$55.00	$83,710
7.8	Curb Ramp with truncated dome surface	15	EA	$2,200.00	$33,000
7.17	Reinforced Concrete Retaining Wall (including Structural	1,400	SF	$150.00	$210,000

No.	Description	Qty	Unit	Unit Cost	Cost
	Excavation)				
7.19	Split Rail Fence	2,800	LF	$50.00	$140,000
	Sub-total				**$1,098,355**
9	**Site Furnishings**				
9.1	Pedestrian Light Type 1 (Streetlamp style, placed near intersections)	5	EA	$6,000.00	$30,000
9.2	Pedestrian Light Type 2 (Solar Powered along trail at 40' intervals)	37	EA	$2,000.00	$74,000
9.3	Trash Receptacles	5	EA	$2,400.00	$12,000
9.4	Benches	5	EA	$1,100.00	$5,500
9.6	Way Finding Signs	5	EA	$550.00	$2,750
	Sub-total				**$124,250**
10	**Signs and Pavement Markings - includes painted traffic lines and markings on pavement, and traffic signage.**				
10.2	Advance stop bar (Limit Line) or Yield Markings	60	SF	$10.00	$600
10.3	STOP pavement marking	3	EA	$200.00	$600
10.5	Roadside Signs	25	EA	$550.00	$13,750
10.6	4" Thermoplastic Traffic Stripe	965	LF	$4.00	$3,860
11	**Right-of-Way Acquisition - includes Acquisition, Project Development Permits, Utility Relocation Assistance and Title & Escrow.**				
11.1	Right-of-Way	53,634	SF	$2.00	$107,268
	Sub-total				**$0.00***
				SUBTOTAL	**$1,791,123**
				ESTIMATING CONTINGENCY 20.0%	$358,225
				SURVEYING 1.5%	$26,867
				PLANS, SPECIFICATIONS AND ENGINEERING 10.0%	$179,112
				ENVIRONMENTAL PERMITTING 5.0%	$89,556
				MITIGATION 1.0%	$17,911
				CONSTRUCTION ENGINEERING 10.0%	$179,112
				TOTAL	**$2,750,000**

*Right-of-way cost is not included in the subtotal used to determine contingencies and allowances; but is included in the Total Cost, based on a "placeholder" assumed acquisition cost of $2.00 per square foot.

Table 9-4: Segment 1a (Additive Alignment): Overlook Park/Trailhead to the Strongs Creek/Mill Creek Confluence Cost Estimate

No.	Description	Qty	Unit	Unit Cost	Cost
1	Mobilization - maximum of 5% of total bid price	1	LS	5.00%	$327,555
2	General Conditions, Bonds and Insurance	1	LS	2.00%	$131,022
3	Erosion Control - includes all BMPs, SWPPP and Reporting	1	LS	1.00%	$65,511

No.	Description	Qty	Unit	Unit Cost	Cost
4	Traffic Control	1	LS	1.00%	$65,511
	Sub-total				**$589,599**
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	1000	LF	$5.00	$5,000
5.3	Remove concrete	1600	SF	$0.25	$400
5.5	Relocate Existing Utility Pole	1	EA	$8,000.00	$8,000
5.7	Remove and Relocate Existing Roadside Sign	8	EA	$600.00	$4,800
5.8	Remove Existing Tree	10	EA	$2,000.00	$20,000
	Sub-total				**$38,200**
6	**Earthwork**				
6.1	Clearing and Grubbing	25,631	SF	$0.25	$6,408
6.2	Excavation and Grading	942	CY	$18.00	$16,958
6.3	Embankment, Import Borrow	100	CY	$30.00	$3,000
6.4	Soil for new landscape areas	900	CY	$10.00	$9,000
	Sub-total				**$35,366**
7	**Concrete Work and Asphalt Paving - includes concrete curbs, 4" PCC sidewalk, pedestrian ramps, concrete pads, Class I Trail, bridges, retaining walls, Misc**				
7.1	Construct curb & gutter	950	LF	$45.00	$42,750
7.3	Construct 4" PCC sidewalk	6920	SF	$10.00	$69,200
7.5	Construct AC Path 8' wide (Assume 0.2' thick)	215	Ton	$130.00	$28,013
7.6	Drainage Inlet (Drop Inlet)	1	EA	$4,000.00	$4,000
7.7	Aggregate Base (Shoulders, Under trail/sidewalks)	695	CY	$55.00	$38,242
7.8	Curb Ramp with truncated dome surface	2	EA	$2,200.00	$4,400
7.10	Construct HDPE storm drain pipe	50	LF	$60.00	$3,000
7.18	Highway 101 Overcrossing	1	EA	$6,000,000.00	$6,000,000
7.19	Split Rail Fence	1450	LF	$50.00	$72,500
7.21	Construct Concrete Dumpster Pad and Relocated Existing Fencing	1	LS	$3,500.00	$3,500
	Sub-total				**$6,265,605**
8	**Planting**				
8.2	15 gallon trees with protective posts and root barriers	61	EA	$175.00	$10,675
8.3	1 gallon shrub w/groundcover planting	90	EA	$10.00	$900
8.4	Irrigation meter/connection, backflow, controller, mainline, lateral line	2	LS	$15,000.00	$30,000
	Sub-total				**$41,575**
9	**Site Furnishings**				
9.1	Pedestrian Light Type 1 (Streetlamp style, placed near intersections)	8	EA	$6,000.00	$48,000
9.2	Pedestrian Light Type 2 (Solar Powered along trail at 40' intervals)	45	EA	$2,000.00	$90,000
9.3	Trash Receptacles	3	EA	$2,400.00	$7,200

No.	Description	Qty	Unit	Unit Cost	Cost
9.4	Benches	3	EA	$1,100.00	$3,300
9.6	Way Finding Signs	4	EA	$550.00	$2,200
	Sub-total				**$150,700**
10	Signs and Pavement Markings - includes painted traffic lines and markings on pavement, and traffic signage.				
10.1	High visibility crosswalk Markings	1	EA	$1,500.00	$1,500
10.2	Advance stop bar (Limit Line) or Yield Markings	75	SF	$10.00	$750
10.3	STOP pavement marking	2	EA	$200.00	$400
10.5	Roadside Signs	20	EA	$550.00	$11,000
10.6	4" Thermoplastic Traffic Stripe	1,500.00	LF	$4.00	$6,000
	Sub-total				**$19,650**
11	Right-of-Way Acquisition - includes Acquisition, Project Development Permits, Utility Relocation Assistance and Title & Escrow.				
11.1	Right-of-Way	32,864	SF	$2.00	$65,728
	Sub-total				**$0.00***
	SUBTOTAL				**$7,140,694**
	ESTIMATING CONTINGENCY			20.0%	$1,428,139
	SURVEYING			0.5%	$35,703
	PLANS, SPECIFICATIONS AND ENGINEERING			7.5%	$535,552
	ENVIRONMENTAL PERMITTING			5.0%	$357,035
	MITIGATION			1.0%	$71,407
	CONSTRUCTION ENGINEERING			10.0%	$714,069
	TOTAL				**$10,349,000**

*Right-of-way cost is not included in the subtotal used to determine contingencies and allowances; but is included in the Total Cost, based on a "placeholder" assumed acquisition cost of $2.00 per square foot.

Table 9-5: Segment 2 (Primary Alignment): South Fortuna Boulevard to Redwood Way Cost Estimate

No.	Description	Qty	Unit	Unit Cost	Cost
1	Mobilization - maximum of 5% of total bid price	1	LS	5.00%	$38,817
2	General Conditions, Bonds and Insurance	1	LS	2.00%	$15,527
3	Erosion Control - includes all BMPs, SWPPP and Reporting	1	LS	2.50%	$19,409
4	Traffic Control	1	LS	0.75%	$5,823
	Sub-total				**$79,575**
5	Sitework, Demolition and Removal - includes all demolition, site preparation for all construction; relocation or re-setting of utilities; temporary construction fencing.				
5.8	Remove Existing Tree	2	EA	$2,000.00	$4,000
	Sub-total				**$4,000**
6	Earthwork				

No.	Description	Qty	Unit	Unit Cost	Cost
6.1	Clearing and Grubbing	57,640	SF	$0.25	$14,410
6.2	Excavation and Grading	2,135	CY	$18.00	$38,427
6.3	Embankment, Import Borrow	500	CY	$30.00	$15,000
	Sub-total				**$67,837**
7	**Concrete Work and Asphalt Paving - includes concrete curbs, 4" PCC sidewalk, pedestrian ramps, concrete pads, Class I Trail, bridges, retaining walls, Misc**				
7.7	Aggregate Base (Shoulders, Under trail/sidewalks)	1690	CY	$55.00	$92,939
7.13	Provide and Install (+/- 60'x12") Pre-Manufactured Steel Bridge	1	LS	$135,000.00	$135,000
7.16	Concrete Elevated Board Walk	1	LS	$75,000.00	$75,000
7.19	Split Rail Fence	3157	LF	$50.00	$157,850
	Sub-total				**$524,508**
8	**Planting**				
	Sub-total				**$0**
9	**Site Furnishings**				
9.2	Pedestrian Light Type 2 (Solar Powered along trail at 40' intervals)	80	EA	$2,000.00	$160,000
9.3	Trash Receptacles	4	EA	$2,400.00	$9,600
9.4	Benches	4	EA	$1,100.00	$4,400
9.6	Way Finding Signs	4	EA	$550.00	$2,200
	Sub-total				**$176,200**
10	**Signs and Pavement Markings - includes painted traffic lines and markings on pavement, and traffic signage.**				
10.2	Advance stop bar (Limit Line) or Yield Markings	10	SF	$10.00	$100
10.5	Roadside Signs	6	EA	$550.00	$3,300
10.6	4" Thermoplastic Traffic Stripe	100	LF	$4.00	$400
	Sub-total				**$3,800**
11	**Right-of-Way Acquisition - includes Acquisition, Project Development Permits, Utility Relocation Assistance and Title & Escrow.**				
11.1	Right-of-Way	57,640	SF	$2.00	$115,280
	Sub-total				**$0.00***
	SUBTOTAL				**$855,920**
	ESTIMATING CONTINGENCY			20.0%	$171,184
	SURVEYING			2.5%	$21,398
	PLANS, SPECIFICATIONS AND ENGINEERING			10.0%	$85,592
	ENVIRONMENTAL PERMITTING			7.5%	$64,194
	MITIGATION			2.0%	$17,118
	CONSTRUCTION ENGINEERING			10.0%	$85,592
	TOTAL				**$1,417,000**

***Right-of-way cost is not included in the subtotal used to determine contingencies and allowances; but is included in the Total Cost, based on a "placeholder" assumed acquisition cost of $2.00 per square foot.**

Table 9-6: Segment 2A (Additive Alignment): Redwood Shopping Center Connection Cost Estimate

No.	Description	Qty	Unit	Unit Cost	Cost
1	Mobilization - maximum of 5% of total bid price	1	LS	5.00%	$28,329
2	General Conditions, Bonds and Insurance	1	LS	2.00%	$11,331
3	Erosion Control - includes all BMPs, SWPPP and Reporting	1	LS	2.00%	$11,331
4	Traffic Control	1	LS	0.50%	$2,801
	Sub-total				**$53,792**
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	60	LF	$5.00	$300
5.2	Remove AC pavement	60	SF	$0.25	$15
5.3	Remove concrete	300	SF	$0.25	$75
5.8	Remove Existing Tree	3	EA	$2,000.00	$6,000
	Sub-total				**$6,390**
6	Earthwork				
6.1	Clearing and Grubbing	5,630	SF	$0.25	$1,408
6.2	Excavation and Grading	209	CY	$18.00	$3,753
6.3	Embankment, Import Borrow	50	CY	$30.00	$1,500
	Sub-total				**$6,661**
7	Concrete Work and Asphalt Paving - includes concrete curbs, 4" PCC sidewalk, pedestrian ramps, concrete pads, Class I Trail, bridges, retaining walls, Misc.				
7.3	Construct 4" PCC sidewalk	1957	SF	$10.00	$19,570
7.5	Construct AC Path 8' wide (Assume 0.2' thick)	44	Ton	$130.00	$5,739
7.7	Aggregate Base (Shoulders, Under trail/sidewalks)	125	CY	$55.00	$6,853
7.8	Curb Ramp with truncated dome surface	2	EA	$2,200.00	$4,400
7.15	Provide and Install (+/- 200'x12") Pre-Manufactured Steel Bridge	1	LS	$500,000.00	$500,000
	Sub-total				**$536,562**
9	Site Furnishings				
9.2	Pedestrian Light Type 2 (Solar Powered along trail at 40' intervals)	5	EA	$2,000.00	$10,000
9.3	Trash Receptacles	1	EA	$2,400.00	$2,400
9.4	Benches	1	EA	$1,100.00	$1,100
9.6	Way Finding Signs	2	EA	$550.00	$1,100
	Sub-total				**$14,600**
10	Signs and Pavement Markings - includes painted traffic lines and markings on pavement, and traffic signage.				
10.2	Advance stop bar (Limit Line) or Yield Markings	5	SF	$10.00	$50
10.4	Sharrow	4	EA	$115.00	$460
10.5	Roadside Signs	3	EA	$550.00	$1,650
10.6	4" Thermoplastic Traffic Stripe	50	LF	$4.00	$200
	Sub-total				**$2,360**

No.	Description	Qty	Unit	Unit Cost	Cost
11	Right-of-Way Acquisition - includes Acquisition, Project Development Permits, Utility Relocation Assistance and Title & Escrow.				
11.1	Right-of-Way	3,188	SF	$2.00	$6,376
	Sub-total				**$0.00***
	SUBTOTAL				**$620,366**
	ESTIMATING CONTINGENCY			20.0%	$124,073
	SURVEYING			2.0%	$12,407
	PLANS, SPECIFICATIONS AND ENGINEERING			10.0%	$62,037
	ENVIRONMENTAL PERMITTING			10.0%	$62,037
	MITIGATION			2.0%	$12,407
	CONSTRUCTION ENGINEERING			10.0%	$62,037
	TOTAL				**$962,000**

*Right-of-way cost is not included in the subtotal used to determine contingencies and allowances; but is included in the Total Cost, based on a "placeholder" assumed acquisition cost of $2.00 per square foot.

Table 9-7: Segment 2B (Additive Alignment): Overlook at Redwood Memorial Hospital Cost Estimate

No.	Description	Qty	Unit	Unit Cost	Cost
1	Mobilization - maximum of 5% of total bid price	1	LS	5.00%	$2,830
2	General Conditions, Bonds and Insurance	1	LS	2.00%	$1,132
3	Erosion Control - includes all BMPs, SWPPP and Reporting	1	LS	2.50%	$1,415
4	Traffic Control	1	LS	2.50%	$1,415
	Sub-total				**$6,792**
5	Sitework, Demolition and Removal - includes all demolition, site preparation for all construction; relocation or re-setting of utilities; temporary construction fencing.				
	Sub-total				**$0**
6	Earthwork				
6.1	Clearing and Grubbing	2,736	SF	$0.25	$684
6.2	Excavation and Grading	76	CY	$18.00	$1,368
6.4	Soil for new landscape areas	25	CY	$10.00	$250
	Sub-total				**$2,302**
7	Concrete Work and Asphalt Paving - includes concrete curbs, 4" PCC sidewalk, pedestrian ramps, concrete pads, Class I Trail, bridges, retaining walls, Misc.				
7.3	Construct 4" PCC sidewalk	2380	SF	$10.00	$23,800
7.20	Decorative Pavers	357	SF	$13.00	$4,641
	Sub-total				**$28,441**
8	Planting				
8.2	15 gallon trees with protective posts and root barriers	2	EA	$175.00	$350

No.	Description	Qty	Unit	Unit Cost	Cost
8.3	1 gallon shrub w/groundcover planting	13	EA	$10.00	$130
8.4	Irrigation meter/connection, backflow, controller, mainline, lateral line	1	LS	$15,000.00	$15,000
	Sub-total				**$15,480**
9	Site Furnishings				
9.3	Trash Receptacles	1	EA	$2,400.00	$2,400
9.4	Benches	1	EA	$1,100.00	$1,100
9.5	Shade Structure	1	LS	$5,000.00	$5,000
9.7	Dry stone wall	75	SF	$25.00	$1,875
	Sub-total				**$10,375**
11	Right-of-Way Acquisition - includes Acquisition, Project Development Permits, Utility Relocation Assistance and Title & Escrow.				
11.1	Right-of-Way	2,736	SF	$2.00	$5,472
	Sub-total				**$0.00***
	SUBTOTAL				**$63,390**
	ESTIMATING CONTINGENCY			20.0%	$12,678
	SURVEYING			3.0%	$1,902
	PLANS, SPECIFICATIONS AND ENGINEERING			10.0%	$6,339
	ENVIRONMENTAL PERMITTING			7.5%	$4,754
	MITIGATION			2.0%	$1,268
	CONSTRUCTION ENGINEERING			10.0%	$6,339
	TOTAL				**$103,000**

*Right-of-way cost is not included in the subtotal used to determine contingencies and allowances; but is included in the Total Cost, based on a "placeholder" assumed acquisition cost of $2.00 per square foot.

Table 9-8: Segment 3 (Primary Alignment): Redwood Way Crossing Improvements Cost Estimate

No.	Description	Qty	Unit	Unit Cost	Cost
1	Mobilization - maximum of 5% of total bid price	1	LS	5.00%	$6,479
2	General Conditions, Bonds and Insurance	1	LS	2.00%	$2,591
3	Erosion Control - includes all BMPs, SWPPP and Reporting	1	LS	2.00%	$2,591
4	Traffic Control	1	LS	5.00%	$6,479
	Sub-total				**$18,140**
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	325	LF	$5.00	$1,625
5.2	Remove AC pavement	2000	SF	$0.25	$500
5.3	Remove concrete	500	SF	$0.25	$125
	Sub-total				**$2,250**
6	Earthwork				

No.	Description	Qty	Unit	Unit Cost	Cost
	Sub-total				$0
7	Concrete Work and Asphalt Paving - includes concrete curbs, 4" PCC sidewalk, pedestrian ramps, concrete pads, Class I Trail, bridges, retaining walls, Misc.				
7.2	Construct Concrete curb	55	LF	$25.00	$1,375
7.3	Construct 4" PCC sidewalk	338	SF	$10.00	$3,380
7.5	Construct AC Path 8' wide (Assume 0.2' thick)	49	Ton	$130.00	$6,375
7.7	Aggregate Base (Shoulders, Under trail/sidewalks)	110	CY	$55.00	$6,043
7.12	Modify Existing Bridge at Redwood Way (Railings, Concrete structure)	1	LS	$50,000.00	$50,000
7.19	Split Rail Fence	472	LF	$50.00	$23,600
	Sub-total				$90,773
9	Site Furnishings				
9.1	Pedestrian Light Type 1 (Streetlamp style, placed near intersections)	2	EA	$6,000.00	$12,000
9.3	Trash Receptacles	1	EA	$2,400.00	$2,400
9.4	Benches	1	EA	$1,100.00	$1,100
9.6	Way Finding Signs	2	EA	$550.00	$1,100
	Sub-total				$16,600
10	Signs and Pavement Markings - includes painted traffic lines and markings on pavement, and traffic signage.				
10.1	High visibility crosswalk Markings	2	EA	$1,500.00	$3,000
10.2	Advance stop bar (Limit Line) or Yield Markings	30	SF	$10.00	$300
10.5	Roadside Signs	3	EA	$550.00	$1,650
10.6	4" Thermoplastic Traffic Stripe	750	LF	$4.00	$3,000
10.8	RRFB System including Signal poles, signs, push buttons, Controller, Solar Panel, & RRFB's, installation	1	EA	$12,000.00	$12,000
	Sub-total				$19,950
11	Right-of-Way Acquisition - includes Acquisition, Project Development Permits, Utility Relocation Assistance and Title & Escrow.				
11.1	Right-of-Way		SF	$2.00	$0
	Sub-total				$0.00*
	SUBTOTAL				$147,713
	ESTIMATING CONTINGENCY			20.0%	$29,543
	SURVEYING			2.5%	$3,693
	PLANS, SPECIFICATIONS AND ENGINEERING			10.0%	$14,771
	ENVIRONMENTAL PERMITTING			5.0%	$7,386
	MITIGATION			2.5%	$3,693
	CONSTRUCTION ENGINEERING			15.0%	$22,157
	TOTAL				$229,000

*Right-of-way cost is not included in the subtotal used to determine contingencies and allowances; but is included in the Total Cost, based on a "placeholder" assumed acquisition cost of $2.00 per square foot.

Table 9-9: Segment 4 (Primary Alignment): Redwood Way to Rohnerville Road (incl. Rohnerville Road crossing improvements) Cost Estimate

No.	Description	Qty	Unit	Unit Cost	Cost
1	Mobilization - maximum of 5% of total bid price	1	LS	5.00%	$42,867
2	General Conditions, Bonds and Insurance	1	LS	2.00%	$17,147
3	Erosion Control - includes all BMPs, SWPPP and Reporting	1	LS	5.00%	$42,867
4	Traffic Control	1	LS	2.00%	$17,147
	Sub-total				**$120,028**
5	Sitework, Demolition and Removal - includes all demolition, site preparation for all construction; relocation or re-setting of utilities; temporary construction fencing.				
5.8	Remove Existing Tree	8	EA	$2,000.00	$16,000
	Sub-total				**$16,000**
6	Earthwork				
6.1	Clearing and Grubbing	38,252	SF	$0.25	$9,563
6.2	Excavation and Grading	1,417	CY	$18.00	$25,501
6.3	Embankment, Import Borrow	500	CY	$30.00	$15,000
	Sub-total				**$50,064**
7	Concrete Work and Asphalt Paving - includes concrete curbs, 4" PCC sidewalk, pedestrian ramps, concrete pads, Class I Trail, bridges, retaining walls, Misc.				
7.3	Construct 4" PCC sidewalk	100	SF	$10.00	$1,000
7.5	Construct AC Path 8' wide (Assume 0.2' thick)	366	Ton	$130.00	$47,624
7.7	Aggregate Base (Shoulders, Under trail/sidewalks)	1094	CY	$55.00	$60,156
7.14	Provide and Install (+/- 120'x12") Pre-Manufactured Steel Bridge	2	LS	$205,000.00	$410,000
7.16	Concrete Elevated Board Walk	1	LS	$75,000.00	$75,000
7.19	Split Rail Fence	1830	LF	$50.00	$91,500
	Sub-total				**$685,280**
9	Site Furnishings				
9.2	Pedestrian Light Type 2 (Solar Powered along trail at 40' intervals)	50	EA	$2,000.00	$100,000
9.3	Trash Receptacles	1	EA	$2,400.00	$2,400
9.4	Benches	1	EA	$1,100.00	$1,100
9.6	Way Finding Signs	1	EA	$550.00	$550
	Sub-total				**$104,050**
10	Signs and Pavement Markings - includes painted traffic lines and markings on pavement, and traffic signage.				
10.2	Advance stop bar (Limit Line) or Yield Markings	10	SF	$10.00	$100
10.5	Roadside Signs	3	EA	$550.00	$1,650
10.	4" Thermoplastic Traffic Stripe	50	LF	$4.00	$200

No.	Description	Qty	Unit	Unit Cost	Cost
6					
	Sub-total				**$1,950**
11	Right-of-Way Acquisition - includes Acquisition, Project Development Permits, Utility Relocation Assistance and Title & Escrow.				
11.1	Right-of-Way	34,866	SF	$2.00	$69,732
	Sub-total				**$0.00***
	SUBTOTAL				**$977,373**
	ESTIMATING CONTINGENCY			20.0%	$195,475
	SURVEYING			2.0%	$19,547
	PLANS, SPECIFICATIONS AND ENGINEERING			10.0%	$97,737
	ENVIRONMENTAL PERMITTING			7.5%	$73,303
	MITIGATION			2.0%	$19,547
	CONSTRUCTION ENGINEERING			10.0%	$97,737
	TOTAL				**$1,551,000**

*Right-of-way cost is not included in the subtotal used to determine contingencies and allowances; but is included in the Total Cost, based on a "placeholder" assumed acquisition cost of $2.00 per square foot.

Table 9-10: Segment 4a (Additive Alignment): Path Connection to 2nd Avenue Cost Estimate

No.	Description	Qty	Unit	Unit Cost	Cost
1	Mobilization - maximum of 5% of total bid price	1	LS	5.00%	$2,293
2	General Conditions, Bonds and Insurance	1	LS	2.00%	$917
3	Erosion Control - includes all BMPs, SWPPP and Reporting	1	LS	5.00%	$2,293
4	Traffic Control	1	LS	2.00%	$915
	Sub-total				**$6,419**
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	22	LF	$5.00	$110
5.2	Remove AC pavement	22	SF	$0.25	$6
5.3	Remove concrete	75	SF	$0.25	$19
	Sub-total				**$134**
6	Earthwork				
6.1	Clearing and Grubbing	2,866	SF	$0.25	$717
6.2	Excavation and Grading	106	CY	$18.00	$1,911
6.3	Embankment, Import Borrow	50	CY	$30.00	$1,500
	Sub-total				**$4,127**
7	Concrete Work and Asphalt Paving - includes concrete curbs, 4" PCC sidewalk, pedestrian ramps, concrete pads, Class I Trail, bridges, retaining walls, Misc.				
7.1	Construct curb & gutter	22	LF	$45.00	$990

No.	Description	Qty	Unit	Unit Cost	Cost
7.5	Construct AC Path 8' wide (Assume 0.2' thick)	30	Ton	$130.00	$3,948
7.7	Aggregate Base (Shoulders, Under trail/sidewalks)	80	CY	$55.00	$4,419
7.8	Curb Ramp with truncated dome surface	1	EA	$2,200.00	$2,200
7.19	Split Rail Fence	200	LF	$50.00	$10,000
	Sub-total				**$21,557**
9	**Site Furnishings**				
9.2	Pedestrian Light Type 2 (Solar Powered along trail at 40' intervals)	5	EA	$2,000.00	$10,000
9.3	Trash Receptacles	2	EA	$2,400.00	$4,800
9.4	Benches	2	EA	$1,100.00	$2,200
9.6	Way Finding Signs	2	EA	$550.00	$1,100
	Sub-total				**$18,100**
10	**Signs and Pavement Markings - includes painted traffic lines and markings on pavement, and traffic signage.**				
10.2	Advance stop bar (Limit Line) or Yield Markings	10	SF	$10.00	$100
10.5	Roadside Signs	3	EA	$550.00	$1,650
10.6	4" Thermoplastic Traffic Stripe	50	LF	$4.00	$200
	Sub-total				**$1,950**
11	**Right-of-Way Acquisition - includes Acquisition, Project Development Permits, Utility Relocation Assistance and Title & Escrow.**				
11.1	Right-of-Way	2,850	SF	$2.00	$5,700
	Sub-total				**$0.00***
				SUBTOTAL	**$52,288**
				ESTIMATING CONTINGENCY 20.0%	$10,458
				SURVEYING 3.0%	$1,569
				PLANS, SPECIFICATIONS AND ENGINEERING 10.0%	$5,229
				ENVIRONMENTAL PERMITTING 7.5%	$3,922
				MITIGATION 3.0%	$1,569
				CONSTRUCTION ENGINEERING 10.0%	$5,229
				TOTAL	**$86,000**

*Right-of-way cost is not included in the subtotal used to determine contingencies and allowances; but is included in the Total Cost, based on a "placeholder" assumed acquisition cost of $2.00 per square foot.

Table 9-11: Segment 4b (Additive Alignment): Path Connection to Francesco Place Cost Estimate

No.	Description	Qty	Unit	Unit Cost	Cost
1	Mobilization - maximum of 5% of total bid price	1	LS	5.00%	$12,687
2	General Conditions, Bonds and Insurance	1	LS	2.00%	$5,075
3	Erosion Control - includes all BMPs, SWPPP and Reporting	1	LS	2.00%	$5,075
4	Traffic Control	1	LS	1.00%	$2,476

No.	Description	Qty	Unit	Unit Cost	Cost
	Sub-total				**$25,312**
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	22	LF	$5.00	$110
5.2	Remove AC pavement	22	SF	$0.25	$6
5.3	Remove concrete	55	SF	$0.25	$14
5.8	Remove Existing Tree	3	EA	$2,000.00	$6,000
	Sub-total				**$6,129**
6	**Earthwork**				
6.1	Clearing and Grubbing	3,065	SF	$0.25	$766
6.2	Excavation and Grading	114	CY	$18.00	$2,043
6.3	Embankment, Import Borrow	50	CY	$30.00	$1,500
	Sub-total				**$4,310**
7	**Concrete Work and Asphalt Paving - includes concrete curbs, 4" PCC sidewalk, pedestrian ramps, concrete pads, Class I Trail, bridges, retaining walls, Misc.**				
7.1	Construct curb & gutter	22	LF	$45.00	$990
7.5	Construct AC Path 8' wide (Assume 0.2' thick)	38	Ton	$130.00	$4,988
7.7	Aggregate Base (Shoulders, Under trail/sidewalks)	83	CY	$55.00	$4,564
7.8	Curb Ramp with truncated dome surface	1	EA	$2,200.00	$2,200
7.14	Provide and Install (+/- 120'x12") Pre-Manufactured Steel Bridge	1	LS	$205,000.00	$205,000
7.19	Split Rail Fence	110	LF	$50.00	$5,500
	Sub-total				**$223,242**
9	**Site Furnishings**				
9.2	Pedestrian Light Type 2 (Solar Powered along trail at 40' intervals)	5	EA	$2,000.00	$10,000
9.3	Trash Receptacles	2	EA	$2,400.00	$4,800
9.4	Benches	2	EA	$1,100.00	$2,200
9.6	Way Finding Signs	2	EA	$550.00	$1,100
	Sub-total				**$18,100**
10	**Signs and Pavement Markings - includes painted traffic lines and markings on pavement, and traffic signage.**				
10.2	Advance stop bar (Limit Line) or Yield Markings	10	SF	$10.00	$100
10.5	Roadside Signs	3	EA	$550.00	$1,650
10.6	4" Thermoplastic Traffic Stripe	50	LF	$4.00	$200
	Sub-total				**$1,950**
11	**Right-of-Way Acquisition - includes Acquisition, Project Development Permits, Utility Relocation Assistance and Title & Escrow.**				
11.1	Right-of-Way	3,065	SF	$2.00	$6,130
	Sub-total				**$0.00***
				SUBTOTAL	**$279,043**
				ESTIMATING CONTINGENCY 20.0%	$55,809
				SURVEYING 2.0%	$5,581
				PLANS, SPECIFICATIONS AND ENGINEERING 10.0%	$27,904

No.	Description	Qty	Unit	Unit Cost	Cost
	ENVIRONMENTAL PERMITTING			10.0%	$27,904
	MITIGATION			2.0%	$5,581
	CONSTRUCTION ENGINEERING			10.0%	$27,904
	TOTAL				**$436,000**

*Right-of-way cost is not included in the subtotal used to determine contingencies and allowances; but is included in the Total Cost, based on a "placeholder" assumed acquisition cost of $2.00 per square foot.

Table 9-12: Segment 4c (Additive Alignment): Path Connection to Arizzi Court Cost Estimate

No.	Description	Qty	Unit	Unit Cost	Cost
1	Mobilization - maximum of 5% of total bid price	1	LS	5.00%	$12,826
2	General Conditions, Bonds and Insurance	1	LS	2.00%	$5,130
3	Erosion Control - includes all BMPs, SWPPP and Reporting	1	LS	2.00%	$5,130
4	Traffic Control	1	LS	1.00%	$2,504
	Sub-total				**$25,591**
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	27	LF	$5.00	$135
5.2	Remove AC pavement	27	SF	$0.25	$7
5.3	Remove concrete	70	SF	$0.25	$18
5.8	Remove Existing Tree	3	EA	$2,000.00	$6,000
	Sub-total				**$6,159**
6	Earthwork				
6.1	Clearing and Grubbing	3,308	SF	$0.25	$827
6.2	Excavation and Grading	123	CY	$18.00	$2,205
6.3	Embankment, Import Borrow	50	CY	$30.00	$1,500
	Sub-total				**$4,532**
7	Concrete Work and Asphalt Paving - includes concrete curbs, 4" PCC sidewalk, pedestrian ramps, concrete pads, Class I Trail, bridges, retaining walls, Misc				
7.1	Construct curb & gutter	27	LF	$45.00	$1,215
7.5	Construct AC Path 8' wide (Assume 0.2' thick)	40	Ton	$130.00	$5,138
7.7	Aggregate Base (Shoulders, Under trail/sidewalks)	91	CY	$55.00	$4,978
7.8	Curb Ramp with truncated dome surface	1	EA	$2,200.00	$2,200
7.14	Provide and Install (+/- 120'x12") Pre-Manufactured Steel Bridge	1	LS	$205,000.00	$205,000
7.19	Split Rail Fence	145	LF	$50.00	$7,250
	Sub-total				**$225,781**
9	Site Furnishings				
9.2	Pedestrian Light Type 2 (Solar Powered along trail at 40' intervals)	5	EA	$2,000.00	$10,000
9.3	Trash Receptacles	2	EA	$2,400.00	$4,800
9.4	Benches	2	EA	$1,100.00	$2,200
9.6	Way Finding Signs	2	EA	$550.00	$1,100

No.	Description	Qty	Unit	Unit Cost	Cost
	Sub-total				**$18,100**
10	**Signs and Pavement Markings - includes painted traffic lines and markings on pavement, and traffic signage.**				
10.2	Advance stop bar (Limit Line) or Yield Markings	10	SF	$10.00	$100
10.5	Roadside Signs	3	EA	$550.00	$1,650
10.6	4" Thermoplastic Traffic Stripe	50	LF	$4.00	$200
	Sub-total				**$1,950**
11	**Right-of-Way Acquisition - includes Acquisition, Project Development Permits, Utility Relocation Assistance and Title & Escrow.**				
11.1	Right-of-Way	3,345	SF	$2.00	$6,690
	Sub-total				**$0.00***
	SUBTOTAL				**$282,113**
	ESTIMATING CONTINGENCY			20.0%	$56,423
	SURVEYING			2.0%	$5,642
	PLANS, SPECIFICATIONS AND ENGINEERING			10.0%	$28,211
	ENVIRONMENTAL PERMITTING			10.0%	$28,211
	MITIGATION			2.0%	$5,642
	CONSTRUCTION ENGINEERING			10.0%	$28,211
	TOTAL				**$442,000**

*Right-of-way cost is not included in the subtotal used to determine contingencies and allowances; but is included in the Total Cost, based on a "placeholder" assumed acquisition cost of $2.00 per square foot.

Table 9-13: Segment 5 (Primary Alignment): Rohnerville Road – Strongs Creek Trail Crossing to Newburg Road Cost Estimate

No.	Description	Qty	Unit	Unit Cost	Cost
1	Mobilization - maximum of 5% of total bid price	1	LS	5.00%	$33,195
2	General Conditions, Bonds and Insurance	1	LS	2.00%	$13,278
3	Erosion Control - includes all BMPs, SWPPP and Reporting	1	LS	2.00%	$13,278
4	Traffic Control	1	LS	2.00%	$13,278
	Sub-total				**$73,030**
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	650	LF	$5.00	$3,250
5.2	Remove AC pavement	2000	SF	$0.25	$500
5.3	Remove concrete	975	SF	$0.25	$244
5.4	Remove Fence	50	LF	$10.00	$500
5.7	Remove and Relocate Existing Roadside Sign	1	EA	$600.00	$600
5.9	Remove Existing Bridge	1	EA	$50,000.00	$50,000
	Sub-total				**$55,094**
6	Earthwork				
6.1	Clearing and Grubbing	29,500	SF	$0.25	$7,375
6.2	Excavation and Grading	1,093	CY	$18.00	$19,667
6.3	Embankment, Import Borrow	500	CY	$30.00	$15,000
	Sub-total				**$42,042**
7	Concrete Work and Asphalt Paving - includes concrete curbs, 4" PCC sidewalk, pedestrian ramps, concrete pads, Class I Trail, bridges, retaining walls, Misc				
7.1	Construct curb & gutter	400	LF	$45.00	$18,000
7.3	Construct 4" PCC sidewalk	700	SF	$10.00	$7,000
7.5	Construct AC Path 8' wide (Assume 0.2' thick)	428	Ton	$130.00	$55,644
7.6	Drainage Inlet (Drop Inlet)	1	EA	$4,000.00	$4,000
7.7	Aggregate Base (Shoulders, Under trail/sidewalks)	1101	CY	$55.00	$60,576
7.8	Curb Ramp with truncated dome surface	3	EA	$2,200.00	$6,600
7.9	Extend existing storm drain system	1	EA	$1,000.00	$1,000
7.10	Construct HDPE storm drain pipe	40	LF	$60.00	$2,400
7.13	Provide and Install (+/- 60'x12") Pre-Manufactured Steel Bridge	1	LS	$135,000.00	$135,000
7.19	Split Rail Fence	1600	LF	$50.00	$80,000
7.22	Truncated Dome Surface (on sidewalk not on ramp)	2	EA	$500.00	$1,000
	Sub-total				**$371,220**
9	Site Furnishings				
9.1	Pedestrian Light Type 1 (Streetlamp style, placed near intersections)	4	EA	$6,000.00	$24,000
9.2	Pedestrian Light Type 2 (Solar Powered along trail at 40' intervals)	60	EA	$2,000.00	$120,000

No.	Description	Qty	Unit	Unit Cost	Cost
9.3	Trash Receptacles	4	EA	$2,400.00	$9,600
9.4	Benches	4	EA	$1,100.00	$4,400
9.6	Way Finding Signs	4	EA	$550.00	$2,200
	Sub-total				**$160,200**
10	**Signs and Pavement Markings - includes painted traffic lines and markings on pavement, and traffic signage.**				
10.1	High visibility crosswalk Markings	3	EA	$1,500.00	$4,500
10.2	Advance stop bar (Limit Line) or Yield Markings	70	SF	$10.00	$700
10.3	STOP pavement marking	1	EA	$200.00	$200
10.5	Roadside Signs	9	EA	$550.00	$4,950
10.8	RRFB System including Signal poles, signs, push buttons, Controller, Solar Panel, & RRFB's, installation	2	EA	$12,000.00	$24,000
10.9	Private Driveway Crossing	1	EA	$1,000.00	$1,000
	Sub-total				**$35,350**
11	**Right-of-Way Acquisition - includes Acquisition, Project Development Permits, Utility Relocation Assistance and Title & Escrow.**				
11.1	Right-of-Way	11,355	SF	$2.00	$22,710
	Sub-total				**$0.00***
				SUBTOTAL	**$736,935**
				ESTIMATING CONTINGENCY 20.0%	$147,387
				SURVEYING 2.0%	$14,739
				PLANS, SPECIFICATIONS AND ENGINEERING 10.0%	$73,693
				ENVIRONMENTAL PERMITTING 5.0%	$36,847
				MITIGATION 1.0%	$7,369
				CONSTRUCTION ENGINEERING 10.0%	$73,693
				TOTAL	**$1,114,000**

*Right-of-way cost is not included in the subtotal used to determine contingencies and allowances; but is included in the Total Cost, based on a "placeholder" assumed acquisition cost of $2.00 per square foot.

Table 9-14: Segment 5 (Alternate Design Option): Rohnerville Road – Strongs Creek Trail Crossing to Loop Road Cost Estimate

No.	Description	Qty	Unit	Unit Cost	Cost
1	Mobilization - maximum of 5% of total bid price	1	LS	5.00%	$83,960
2	General Conditions, Bonds and Insurance	1	LS	2.00%	$33,584
3	Erosion Control - includes all BMPs, SWPPP and Reporting	1	LS	2.00%	$33,584
4	Traffic Control	1	LS	2.00%	$33,584
	Sub-total				**$184,713**

No.	Description	Qty	Unit	Unit Cost	Cost
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	650	LF	$5.00	$3,250
5.2	Remove AC pavement	1928	SF	$0.25	$482
5.3	Remove concrete	1300	SF	$0.25	$325
5.4	Remove Fence	50	LF	$10.00	$500
5.7	Remove and Relocate Existing Roadside Sign	1	EA	$600.00	$600
5.8	Remove Existing Tree	10	EA	$2,000.00	$20,000
5.9	Remove Existing Bridge	1	EA	$50,000.00	$50,000
	Sub-total				**$75,157**
6	**Earthwork**				
6.1	Clearing and Grubbing	40,800	SF	$0.25	$10,200
6.2	Excavation and Grading	1,511	CY	$18.00	$27,200
6.3	Embankment, Import Borrow	500	CY	$30.00	$15,000
	Sub-total				**$52,400**
7	**Concrete Work and Asphalt Paving - includes concrete curbs, 4" PCC sidewalk, pedestrian ramps, concrete pads, Class I Trail, bridges, retaining walls, Misc.**				
7.1	Construct curb & gutter	400	LF	$45.00	$18,000
7.3	Construct 4" PCC sidewalk	700	SF	$10.00	$7,000
7.5	Construct AC Path 8' wide (Assume 0.2' thick)	457	Ton	$130.00	$59,369
7.6	Drainage Inlet (Drop Inlet)	1	EA	$4,000.00	$4,000
7.7	Aggregate Base (Shoulders, Under trail/sidewalks)	1142	CY	$55.00	$62,822
7.8	Curb Ramp with truncated dome surface	3	EA	$2,200.00	$6,600
7.9	Extend existing storm drain system	1	EA	$1,000.00	$1,000
7.10	Construct HDPE storm drain pipe	40	LF	$60.00	$2,400
7.13	Provide and Install (+/- 60'x12") Pre-Manufactured Steel Bridge	1	LS	$135,000.00	$135,000
7.17	Reinforced Concrete Retaining Wall (including Structural Excavation)	6360	SF	$150.00	$954,000
7.19	Split Rail Fence	1500	LF	$50.00	$75,000
7.22	Truncated Dome Surface (on sidewalk not on ramp)	2	EA	$500.00	$1,000
	Sub-total				**$1,326,191**
9	**Site Furnishings**				
9.1	Pedestrian Light Type 1 (Streetlamp style, placed near intersections)	4	EA	$6,000.00	$24,000
9.2	Pedestrian Light Type 2 (Solar Powered along trail at 40' intervals)	60	EA	$2,000.00	$120,000
9.3	Trash Receptacles	4	EA	$2,400.00	$9,600
9.4	Benches	4	EA	$1,100.00	$4,400
9.6	Way Finding Signs	4	EA	$550.00	$2,200
	Sub-total				**$160,200**

No.	Description	Qty	Unit	Unit Cost	Cost
10	Signs and Pavement Markings - includes painted traffic lines and markings on pavement, and traffic signage.				
10.1	High visibility crosswalk Markings	3	EA	$1,500.00	$4,500
10.2	Advance stop bar (Limit Line) or Yield Markings	70	SF	$10.00	$700
10.3	STOP pavement marking	1	EA	$200.00	$200
10.5	Roadside Signs	30	EA	$550.00	$16,500
10.6	4" Thermoplastic Traffic Stripe	2,160	LF	$4.00	$8,640
10.7	6" Thermoplastic Traffic Stripe	1,620	LF	$6.00	$9,720
10.8	RRFB System including Signal poles, signs, push buttons, Controller, Solar Panel, & RRFB's, installation	2	EA	$12,000.00	$24,000
10.9	Private Driveway Crossing	1	EA	$1,000.00	$1,000
	Sub-total				**$65,260**
11	Right-of-Way Acquisition - includes Acquisition, Project Development Permits, Utility Relocation Assistance and Title & Escrow.				
11.1	Right-of-Way	25,628	SF	$2.00	$51,256
	Sub-total				**$0.00***
	SUBTOTAL				**$1,863,921**
	ESTIMATING CONTINGENCY			20.0%	$372,784
	SURVEYING			1.5%	$27,959
	PLANS, SPECIFICATIONS AND ENGINEERING			10.0%	$186,392
	ENVIRONMENTAL PERMITTING			5.0%	$93,196
	MITIGATION			2.0%	$37,278
	CONSTRUCTION ENGINEERING			10.0%	$186,392
	TOTAL				**$2,820,000**

*Right-of-way cost is not included in the subtotal used to determine contingencies and allowances; but is included in the Total Cost, based on a "placeholder" assumed acquisition cost of $2.00 per square foot.

Table 9-15: Segment 5a (Additive Alignment): Rohnerville Road Bike Lanes Cost Estimate

No.	Description	Qty	Unit	Unit Cost	Cost
1	Mobilization - maximum of 5% of total bid price	1	LS	5.00%	$5,853
2	General Conditions, Bonds and Insurance	1	LS	2.00%	$2,341
3	Erosion Control - includes all BMPs, SWPPP and Reporting	1	LS	1.00%	$1,171
4	Traffic Control	1	LS	5.00%	$5,853
	Sub-total				**$15,218**
10	Signs and Pavement Markings - includes painted traffic lines and markings on pavement, and traffic signage.				
10.5	Roadside Signs	30	EA	$550.00	$16,500

No.	Description	Qty	Unit	Unit Cost	Cost
10.6	4" Thermoplastic Traffic Stripe	12,150	LF	$4.00	$48,600
10.7	6" Thermoplastic Traffic Stripe	8,660	LF	$6.00	$51,960
	Sub-total				**$117,060**
11	Right-of-Way Acquisition - includes Acquisition, Project Development Permits, Utility Relocation Assistance and Title & Escrow.				
11.1	Right-of-Way		SF	$2.00	$0
	Sub-total				**$0.00***
	SUBTOTAL				**$132,278**
	ESTIMATING CONTINGENCY			20.0%	$26,456
	SURVEYING			0.0%	$0
	PLANS, SPECIFICATIONS AND ENGINEERING			5.0%	$6,614
	ENVIRONMENTAL PERMITTING			0.0%	$0
	MITIGATION			0.0%	$0
	CONSTRUCTION ENGINEERING			5.0%	$6,614
	TOTAL				**$172,000**

*Right-of-way cost is not included in the subtotal used to determine contingencies and allowances; but is included in the Total Cost, based on a "placeholder" assumed acquisition cost of $2.00 per square foot.

Table 9-16: Segment 5b (Additive Alignment): Newburg Park Connection Cost Estimate

No.	Description	Qty	Unit	Unit Cost	Cost
1	Mobilization - maximum of 5% of total bid price	1	LS	5.00%	$3,452
2	General Conditions, Bonds and Insurance	1	LS	2.00%	$1,381
3	Erosion Control - includes all BMPs, SWPPP and Reporting	1	LS	2.50%	$1,726
4	Traffic Control	1	LS	2.50%	$1,726
	Sub-total				**$8,285**
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	550	LF	$5.00	$2,750
5.2	Remove AC pavement	1800	SF	$0.25	$450
5.3	Remove concrete	1700	SF	$0.25	$425
	Sub-total				**$3,625**
6	Earthwork				
6.1	Clearing and Grubbing	7,150	SF	$0.25	$1,788
6.2	Excavation and Grading	265	CY	$18.00	$4,767
6.3	Embankment, Import Borrow	50	CY	$30.00	$1,500
	Sub-total				**$8,054**
7	Concrete Work and Asphalt Paving - includes concrete curbs, 4" PCC sidewalk, pedestrian ramps, concrete pads, Class I Trail, bridges, retaining walls, Misc.				

No.	Description	Qty	Unit	Unit Cost	Cost
7.1	Construct curb & gutter	230	LF	$45.00	$10,350
7.5	Construct AC Path 8' wide (Assume 0.2' thick)	76	Ton	$130.00	$9,822
7.7	Aggregate Base (Shoulders, Under trail/sidewalks)	201	CY	$55.00	$11,031
7.8	Curb Ramp with truncated dome surface	1	EA	$2,200.00	$2,200
	Sub-total				**$33,403**
9	**Site Furnishings**				
9.1	Pedestrian Light Type 1 (Streetlamp style, placed near intersections)	2	EA	$6,000.00	$12,000
9.3	Trash Receptacles	2	EA	$2,400.00	$4,800
9.4	Benches	2	EA	$1,100.00	$2,200
9.6	Way Finding Signs	2	EA	$550.00	$1,100
	Sub-total				**$20,100**
10	**Signs and Pavement Markings - includes painted traffic lines and markings on pavement, and traffic signage.**				
10.2	Advance stop bar (Limit Line) or Yield Markings	5	SF	$10.00	$50
10.3	STOP pavement marking	1	EA	$200.00	$200
10.5	Roadside Signs	3	EA	$550.00	$1,650
10.6	4" Thermoplastic Traffic Stripe	490	LF	$4.00	$1,960
	Sub-total				**$3,860**
11	**Right-of-Way Acquisition - includes Acquisition, Project Development Permits, Utility Relocation Assistance and Title & Escrow.**				
11.1	Right-of-Way		SF	$2.00	$0
	Sub-total				**$0.00***
	SUBTOTAL				**$77,327**
	ESTIMATING CONTINGENCY			20.0%	$15,465
	SURVEYING			3.0%	$2,320
	PLANS, SPECIFICATIONS AND ENGINEERING			10.0%	$7,733
	ENVIRONMENTAL PERMITTING			2.0%	$1,547
	MITIGATION			1.0%	$773
	CONSTRUCTION ENGINEERING			10.0%	$7,733
	TOTAL				**$113,000**

***Right-of-way cost is not included in the subtotal used to determine contingencies and allowances; but is included in the Total Cost, based on a "placeholder" assumed acquisition cost of $2.00 per square foot.**