Town of Tiburon

FINAL

Bay Trail Gap Study Appendix 1

June 20, 2012

PREPARED FOR:
Town of Tiburon, Marin County, and Association of Bay Area Governments

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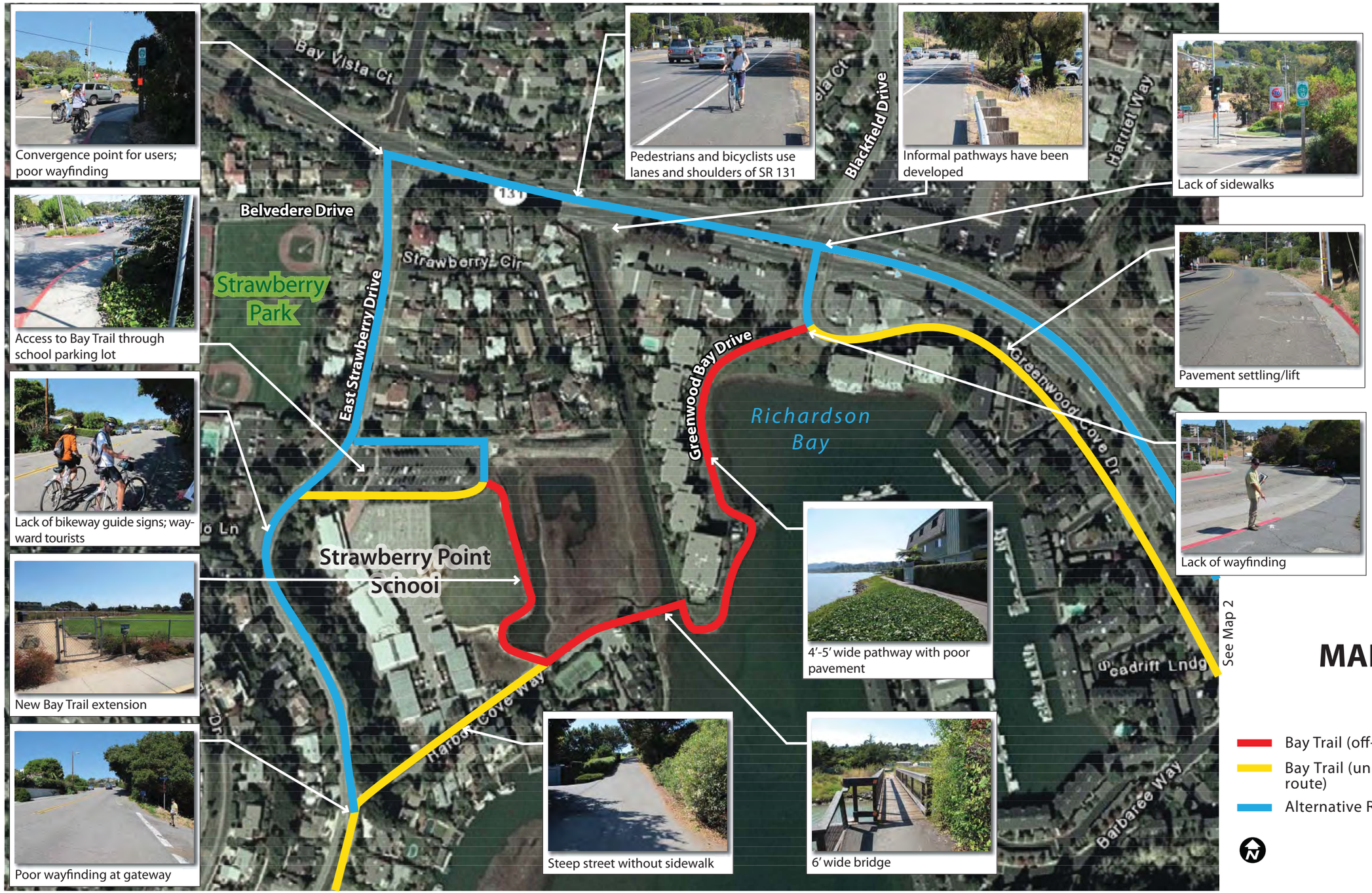
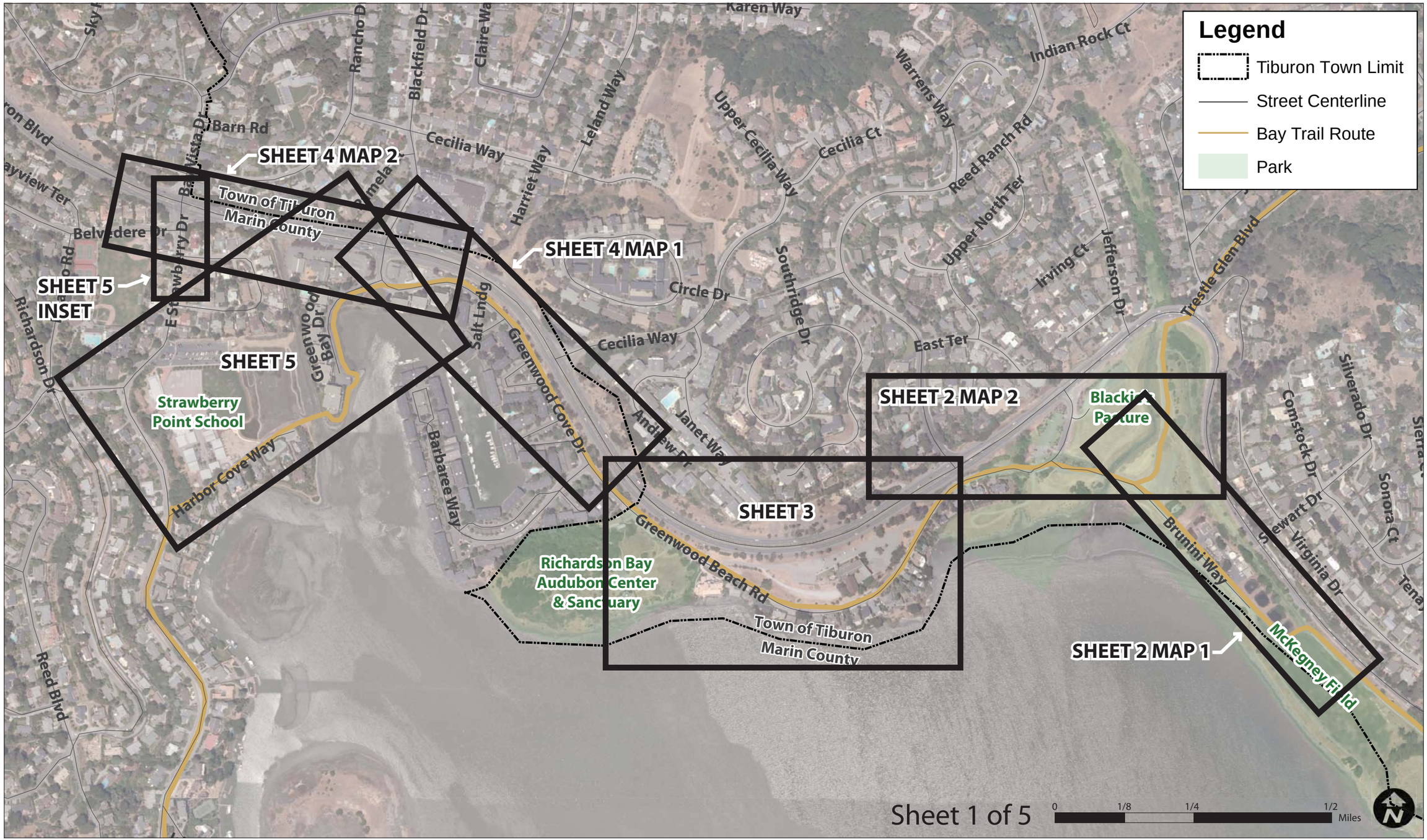
MAP 1

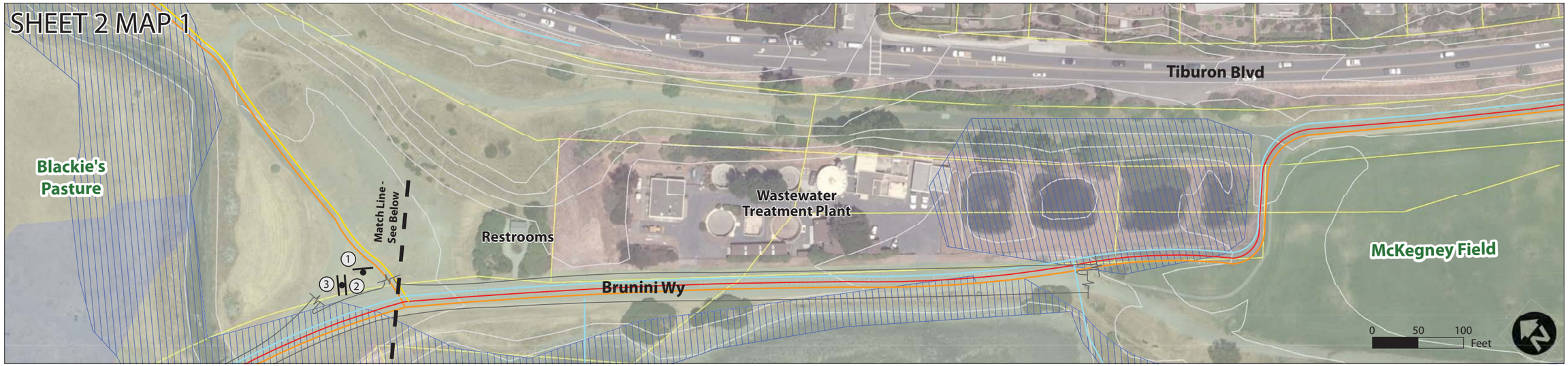
- Bay Trail (off-street)
- Bay Trail (unimproved route)
- Alternative Routing

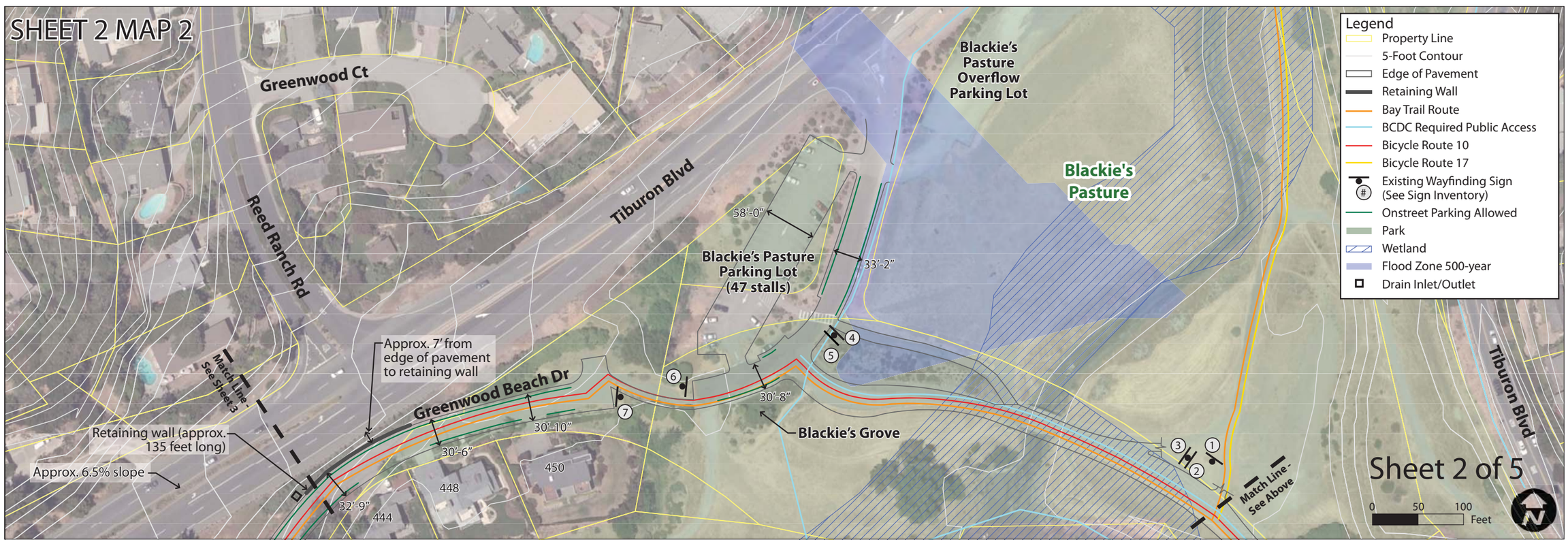
MAP 2

- Bay Trail (off-street)
- Bay Trail (unimproved route)
- Alternative Routing

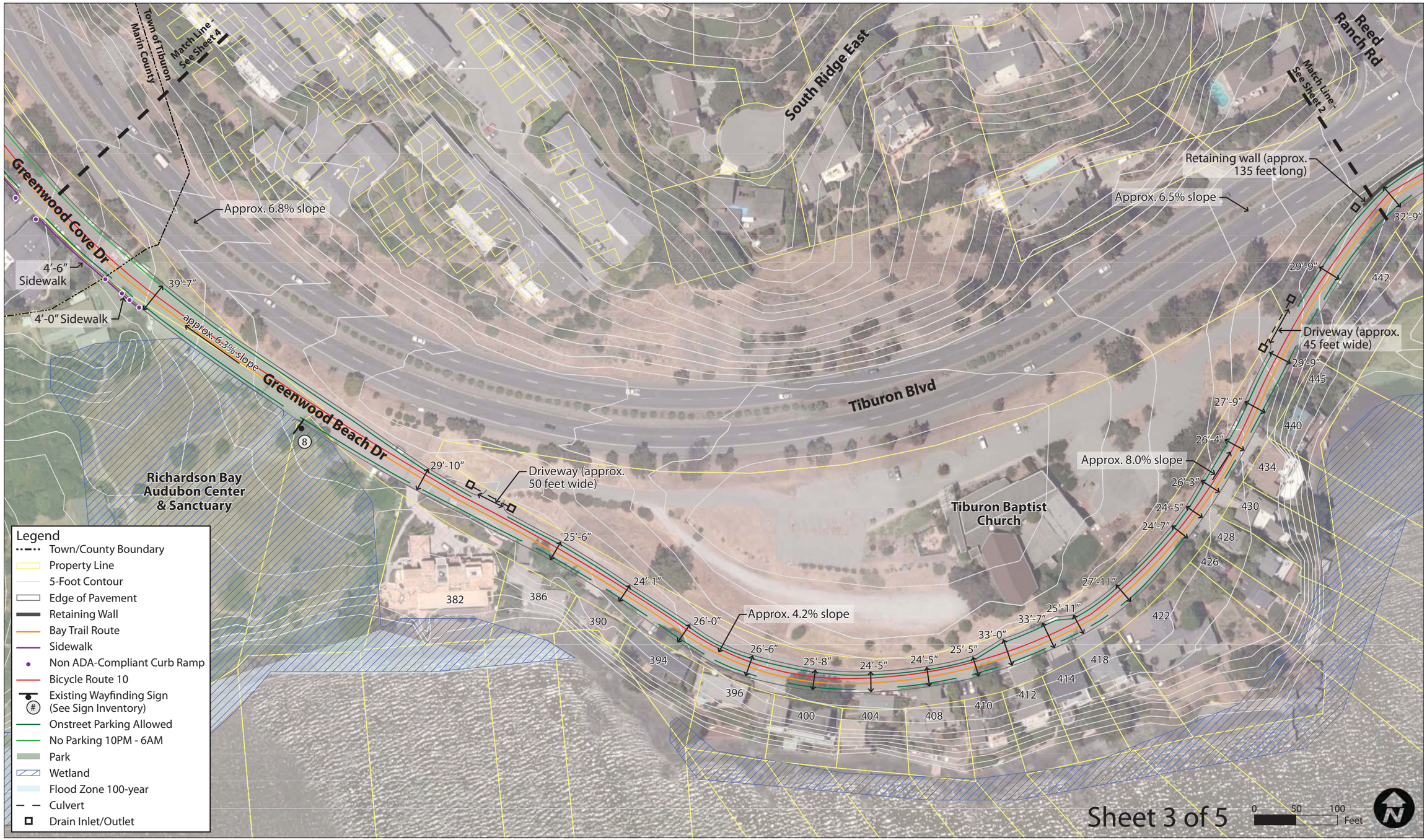

Convergence point for users; poor wayfinding
Pedestrians and bicyclists use lanes and shoulders of SR 131
Informal pathways have been developed
Lack of sidewalks
Access to Bay Trail through school parking lot
Pavement settling/lift
Lack of bikeway guide signs; wayward tourists
Lack of wayfinding
New Bay Trail extension
4'-5' wide pathway with poor pavement
Poor wayfinding at gateway
Steep street without sidewalk
6' wide bridge
Bay Vista Ct
Blackfield Drive
Harriet Way
Belvedere Drive
Strawberry Cir
Strawberry Park
East Strawberry Drive
Greenwood Bay Drive
Richardson Bay
Greenwood Cove Dr
Strawberry Point School
Harbor Cove Way
Barbaree Way
See Map 2
MAP 3
Bay Trail (off-street)
Bay Trail (unimproved route)
Alternative Routing

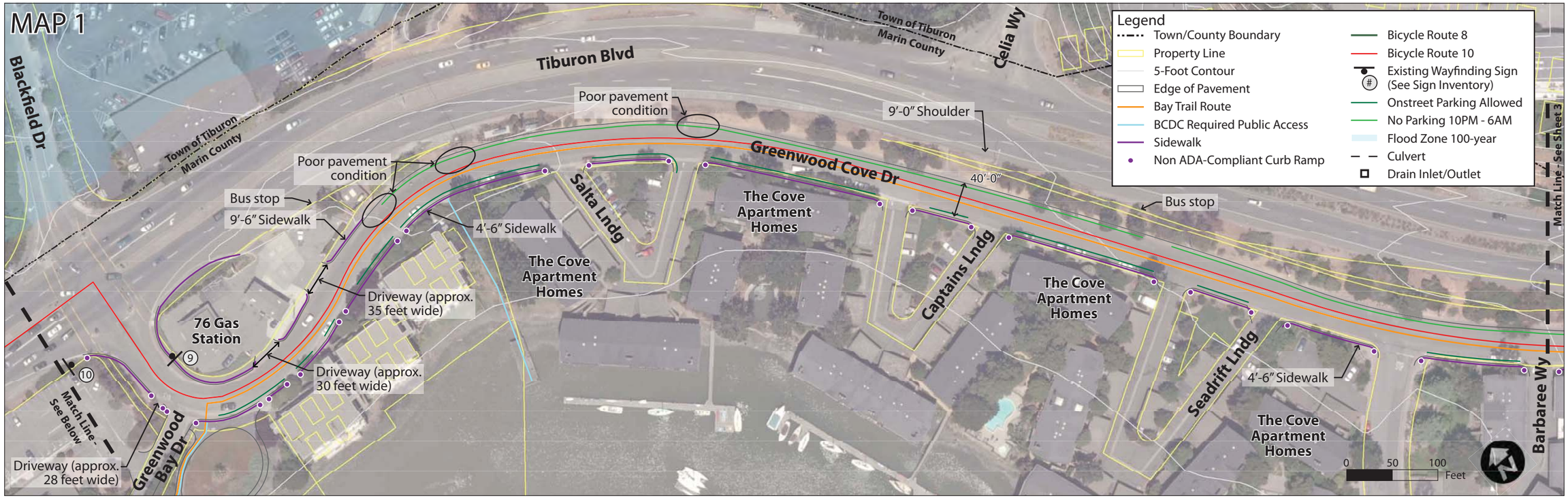

Legend
Tiburon Town Limit
Street Centerline
Bay Trail Route
Park
SHEET 4 MAP 2
SHEET 4 MAP 1
SHEET 5 INSET
SHEET 5
SHEET 2 MAP 2
SHEET 2 MAP 1
SHEET 3
Town of Tiburon
Marin County
Strawberry Point School
Richardson Bay Audubon Center & Sanctuary
Blackie's Pasture
McKegney Field
Karen Way
Indian Rock Ct
Warrens Way
Leland Way
Upper Cecilia Way
Cecilia Ct
Reed Ranch Rd
Upper North Ter
Irving Ct
Jefferson Dr
Trestle Glen Blvd
Southridge Dr
Circle Dr
East Ter
Cecilia Way
Harriet Way
Claire Way
Blackfield Dr
Rancho Dr
Barn Rd
Bay Vista Dr
Belvedere Dr
Bayview Ter
Strawberry Dr
Richardson Dr
Greenwood Bay Dr
Salt Lndg
Greenwood Cove Dr
Andrew Dr
Janet Way
Barbaree Way
Harbor Cove Way
Greenwood Beach Rd
Brunini Way
Stewart Dr
Virginia Dr
Comstock Dr
Silverado Dr
Sonora Ct
Reed Blvd
Sky
Sierra
Tenay
Sheet 1 of 5
0
1/8
1/4
1/2
Miles
N

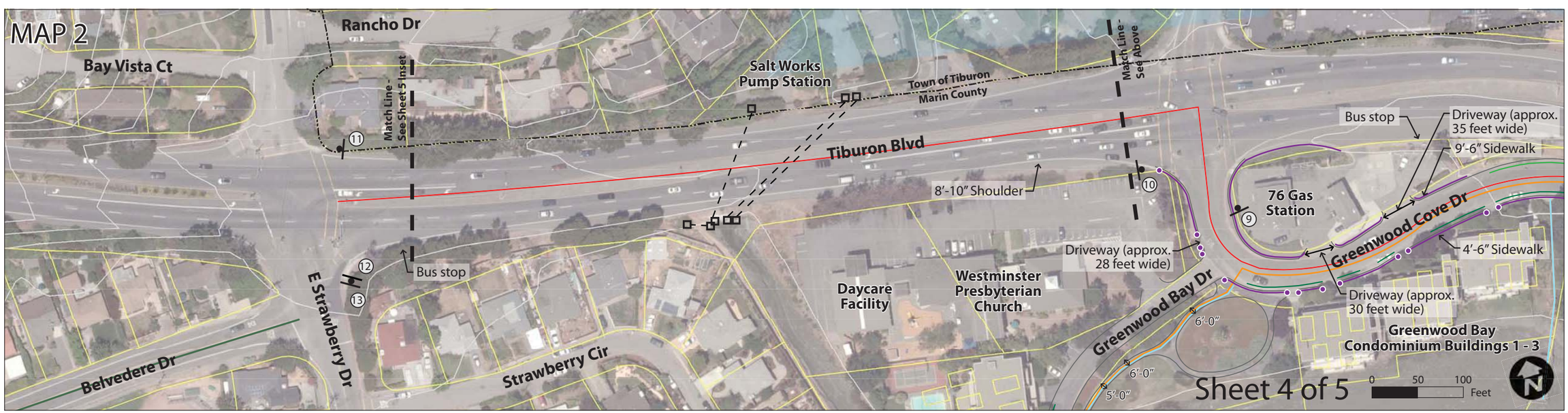

SHEET 2 MAP 1
Blackie's Pasture
Match Line - See Below
Restrooms
Wastewater Treatment Plant
Tiburon Blvd
McKegney Field
Brunini Wy
0 50 100 Feet


SHEET 2 MAP 2
Greenwood Ct
Reed Ranch Rd
Tiburon Blvd
Blackie's Pasture Overflow Parking Lot
Blackie's Pasture
58'-0"
33'-2"
Blackie's Pasture Parking Lot (47 stalls)
Approx. 7' from edge of pavement to retaining wall
Match Line - See Sheet 3
Greenwood Beach Dr
30'-8"
30'-10"
30'-6"
Blackie's Grove
Retaining wall (approx. 135 feet long)
Approx. 6.5% slope
32'-9"
444
448
450
Match Line - See Above
Tiburon Blvd
Legend
Property Line
5-Foot Contour
Edge of Pavement
Retaining Wall
Bay Trail Route
BCDC Required Public Access
Bicycle Route 10
Bicycle Route 17
Existing Wayfinding Sign (See Sign Inventory)
Onstreet Parking Allowed
Park
Wetland
Flood Zone 500-year
Drain Inlet/Outlet
Sheet 2 of 5
0 50 100 Feet

Appendix 1B. Existing Conditions, Opportunities, and Constraints Maps




MAP 1
Legend
Town/County Boundary
Property Line
5-Foot Contour
Edge of Pavement
Bay Trail Route
BCDC Required Public Access
Sidewalk
Non ADA-Compliant Curb Ramp
Bicycle Route 8
Bicycle Route 10
Existing Wayfinding Sign (See Sign Inventory)
Onstreet Parking Allowed
No Parking 10PM - 6AM
Flood Zone 100-year
Culvert
Drain Inlet/Outlet
Tiburon Blvd
Town of Tiburon
Marin County
Blackfield Dr
Celia Wy
Poor pavement condition
9'-0" Shoulder
Greenwood Cove Dr
40'-0"
Bus stop
9'-6" Sidewalk
4'-6" Sidewalk
Salta Lndg
The Cove Apartment Homes
Captains Lndg
Driveway (approx. 35 feet wide)
76 Gas Station
Driveway (approx. 30 feet wide)
Seadrift Lndg
Barbaree Wy
Match Line - See Below
Greenwood Bay Dr
Driveway (approx. 28 feet wide)
Match Line - See Sheet 3
0 50 100 Feet


MAP 2
Rancho Dr
Bay Vista Ct
Match Line - See Sheet 5 Inset
Salt Works Pump Station
Town of Tiburon
Marin County
Match Line - See Above
Tiburon Blvd
Bus stop
Driveway (approx. 35 feet wide)
9'-6" Sidewalk
8'-10" Shoulder
76 Gas Station
Greenwood Cove Dr
4'-6" Sidewalk
Driveway (approx. 28 feet wide)
Driveway (approx. 30 feet wide)
E Strawberry Dr
Daycare Facility
Westminster Presbyterian Church
Greenwood Bay Dr
6'-0"
Greenwood Bay Condominium Buildings 1 - 3
Belvedere Dr
Strawberry Cir
5'-0"
Sheet 4 of 5
0 50 100 Feet

Ricardo Ln
E Strawberry Dr
Strawberry Cir
Match Line - See Inset
Match Line - See Sheet 5
Belvedere Dr
Tiburon Blvd
Marin County
Town of Tiburon
Bus stop
Match Line - See Sheet 4
INSET
4'-6" Sidewalk
Strawberry Point School
Westminster Presbyterian Church
Match Line - See Sheet 4
Tiburon Blvd
Town of Tiburon
Marin County
76 Gas Station
Greenwood Cove Dr
Greenwood Bay Condominium Buildings 4 - 9
Greenwood Bay Dr
5'-0"
6'-0"
6'-0"
23'-3"
5'-5"
Path; poor pavement condition
E Strawberry Dr
20'-0"
Harbor Cove Way
Approx. 20% to 25% slope
26
28
30
32
40
50
61
70
Public Dock
4'-0" Path; poor pavement and drainage
18'-0"
Footbridge (3'-8" min. tread)
5'-5"
6'-0"
Tight turn radii
Sheet 5 of 5
0
50
100
Feet
Legend
Town/County Boundary
Property Line
5-Foot Contour
Edge of Pavement
Bay Trail Route
BCDC Required Public Access
Sidewalk
Non ADA-Compliant Curb Ramp
Bicycle Route 8
Bicycle Route 10
Existing Wayfinding Sign (See Sign Inventory)
Onstreet Parking Allowed
Flood Zone 100-year

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Appendix 1C. Parking Survey and Pedestrian, Bicycle, and Vehicular Count Results

Table C-1: Parking Survey Results along Greenwood Beach Road and Greenwood Cove Drive (March 2012)

Study Segent No.	Street	Side of Street	Number of Parked Vehicles		
			Saturday March 10, 2012 1:00PM	Sunday March 11, 2012 10:30AM	Monday March 12, 2012 8:30PM
3	Greenwood Beach Road	North	2	2	1
4	Greenwood Cove Drive	North	0	0	4
4	Greenwood Cove Drive	South	16	20	24

[1] The parking capacity on the south side of Greenwood Cove Drive is approximatley 52 vehicles.

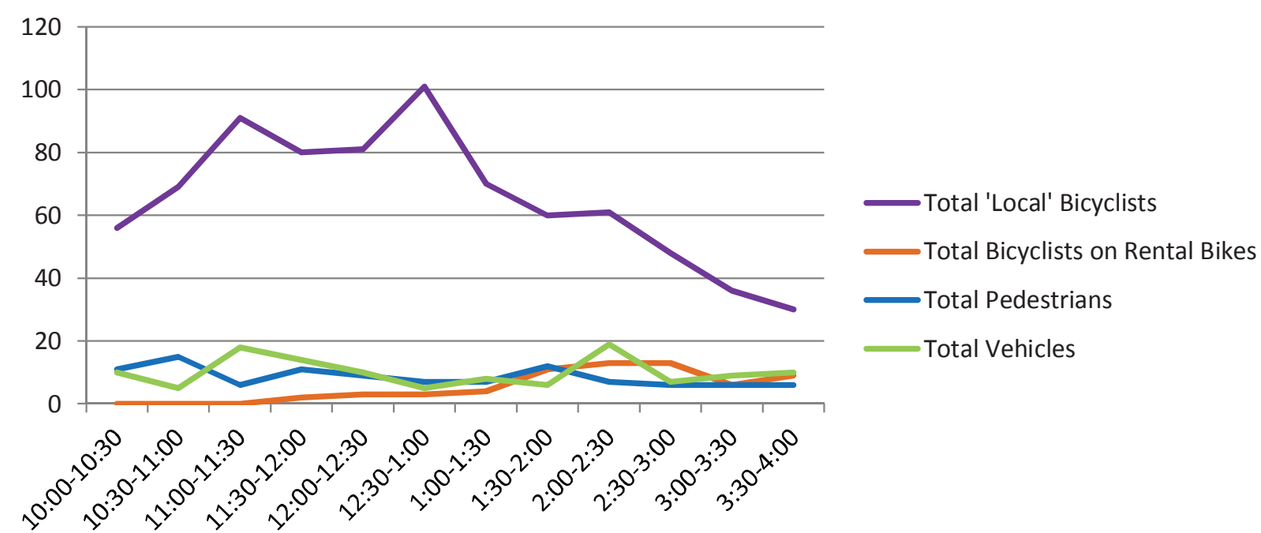
Table C-2: Greenwood Beach Road Bicycle, Pedestrian, and Vehicle Count Results (May 26, 2012)

Time Period	Bicyclists[1]				Pedestrians[2]		Vehicles	
	'Local'		On Rental Bikes					
	Eastbound	Westbound	Eastbound	Westbound	Eastbound	Westbound	Eastbound	Westbound
10:00-10:30	32	24			9	2	7	3
10:30-11:00	27	42			6	9	3	2
11:00-11:30	35	56			4	2	10	8
11:30-12:00	37	43	2		8	3	5	9
12:00-12:30	42	39	3		3	6	6	4
12:30-1:00	45	56	3		1	6	3	2
1:00-1:30	32	38	4		5	2	6	2
1:30-2:00	22	38	11		8	4	4	2
2:00-2:30	35	26	13		4	3	9	10
2:30-3:00	20	28	13		2	4	4	3
3:00-3:30	15	21	5	1	4	2	6	3
3:30-4:00	15	15	7	2	1	5	7	3
Sub Total	**357**	**426**	**61**	**3**	**55**	**48**	**70**	**51**
Total by User Group	**847**				**103**		**121**	

[1] 64 bicyclists riding rental bikes (approximatley 8% of all bicyclists) were observed during the count period. Bikes counted as rental bikes were those fitted with a bike bag with rental agency logo and map. Approximately 95% of bicyclists on rental bikes were traveling east.

[2] Pedestrians include people in wheelchairs or using another assistive device, children in strollers, skateboarders, rollerbalders, etc.

Figure C-1: Distribution of Bicyclists, Pedestrians, and Vehicles along Greenwood Beach Road (May 26, 2012)



Preliminary Environmental Analysis

The Town of Tiburon aims to meet its project objectives for the Bay Trail Gap Closure project while minimizing environmental impacts. To achieve these objectives, the Town has prepared a Preliminary Environmental Analysis which identifies the potential impacts of the route alternatives, approaches to mitigation to reduce impacts to less-than-significant levels, and, the permits that would be required for each alternative; this preliminary information enables Town staff, decision-makers and the public to make informed decisions while minimizing unforeseen information that could affect project feasibility. This Preliminary Environmental Study identifies key environmental issues that would result from project, and then differentiates between the impacts that would be associated with the different alignment options.

Rationale for a Preliminary Environmental Analysis

- Identifies environmental impacts early in the process;
- Allows environmental impacts to be considered when selecting an alternative for further study;
- Reduces the potential for unforeseen issues that could affect the feasibility of the selected alignment; and
- Identifies approaches to mitigation, permits that would be required for each alternative alignment and an estimation of the time required to obtain required permits.

1. Summary Of Findings

1.1 Aesthetics & Visual Quality

Setting

The project alignment(s) are located in the vicinity of the waterfront along the Tiburon peninsula. The area is characterized by views across San Francisco Bay. One of the Town of Tiburon's key aesthetic objectives is to keep viewsheds open, and for the Bay Trail alignment to take advantage of these views. The following Tiburon general plan policies are relevant to the project:

- OSC-31: The preservation of visual qualities, views and the view potential of the natural and built environment shall be a major consideration of the Town in any development project review.
- OSC-32: The Town shall protect visual access to the bayfront and scenic vistas of water and district shorelines through its land use and development review procedures, to the greatest extent feasible.
- LU-H: To protect and preserve existing neighborhood character and identity.
- LU-11: Property owners cherish their views. Development, new construction and associated landscaping shall be so situated or kept low to interfere minimally with existing primary views.
- LU-16: Outside lighting shall be allowed for safety purposes. The Town shall limit excessive light spillover and glare resulting from site lighting.

As indicated above, one of the Town of Tiburon's key objectives is to keep viewsheds[1] open and for the Bay Trail alignment to take advantage of these views. Key views are from: (1) the narrow trail along the Greenwood Cove marina; (2) the Lyford House adjacent to the Audubon facility; (3) the vicinity of the Baptist Church; and, (4) the trail along Blackie's Pasture where the route joins the existing Class I trail.

[1] A "viewshed" is the region visible to an observer.

Preliminary Evaluation of Impacts

Options for the project alignments utilize existing roadways and adjacent right-of-ways. All improvements would be at or close to existing grade and would not interfere with any views of San Francisco Bay or other viewsheds. Signs developed for wayfinding would be done in a manner that is unobtrusive and consistent with existing signage along the route. Removal of eucalyptus trees along Segment 5 would result in some visual impact related to privacy for residents of homes south of Tiburon Boulevard. Any trees removed would require replacement, generally with native species. This impact would not be considered potentially significant, but would likely be a concern to neighbors. The Consultant would work with neighbors on the tree replacement plan for this location. Impacts related to aesthetics and visual quality would be less-than-significant. The project would generally result in a beneficial impact by providing greater access to visual resources including views of San Francisco Bay along the Tiburon waterfront.

1.2 Agricultural Resources & Forestland

Setting

The project is located within an urbanized corridor of the Tiburon Peninsula, within the Town of Tiburon and Marin County. There are no agricultural lands in the project vicinity. While there are notable open space lands along the ridgelines, and these open spaces contain some oak woodlands, they do not contain broader forestlands.

Preliminary Evaluation of Impacts

No agricultural or forest land is located in the project planning area. Therefore, the project would not result in impacts to agricultural resources or forestland. The proposed alignments are all located within the urbanized corridor adjacent to or in the vicinity of Tiburon Boulevard. No mitigation measures would be required.

1.3 Air Quality

Setting

The project site is located along the waterfront of the Town of Tiburon and Marin County, and within the Richardson Bay Planning Area of Marin County. The Bay Area Air Quality Management District (BAAQMD) regulates air quality at the regional level. Air pollutants of concern emitted in Marin County and the wider Bay Area include ozone, particulate matter (PM_{10}) and toxic air contaminants (TACs). Currently the Bay Area is classified as a federal and State nonattainment area for ozone. While there have been no exceedances of federal or State ozone standards in Marin County, the Bay Area as a whole has experienced unhealthy ozone levels on 19 days annually.[i] Motor vehicles are the largest source of ozone precursors emissions (nitrogen oxides and reactive organic gases) in the Bay Area.

The county is classified as nonattainment for PM_{10} by the California Air Resources Board. Common sources of PM_{10} include combustion, industrial processes, grading and construction, and motor vehicles. The greatest quantity of PM_{10} emissions associated with motor vehicle uses is generated by re-suspended road dust. Reduction in motor vehicle miles traveled are necessary to reduce PM emissions.

$PM_{2.5}$ is the very fine particulate fraction of PM_{10}. $PM_{2.5}$ is a complex mixture of suspended particulates and liquid droplets in the atmosphere. These particles usually originate from incomplete combustion of fossil fuels or biomass. Bay Area 2.5 levels are elevated in the winter months. Elevated winter $PM_{2.5}$ levels result from a combination of conducive weather patterns and increased wood burning emissions. In 2008, the USEPA,

proposed the first attainment designations for $PM_{2.5}$ under the National Ambient Air Quality Standards (NAAQS) of the Clean Air Act. Attainment status has two components: daily (24-hour) and annual average ambient $PM_{2.5}$ levels. The Bay Area currently attains the annual standard but does not attain the 24-hour standard. As a result, the District will be required to develop a State Implementation Plan (SIP), tentatively scheduled for 2013.[ii]

Preliminary Evaluation of Impacts

Closing the gap in the Bay Trail along the Tiburon waterfront would result in more people using non-motorized transportation; as a result, the impacts of the project related to air quality would generally be beneficial. Mitigation measures to reduce emissions from construction equipment would be required during the construction period. Mitigation would focus on reducing fugitive dust and emissions through use of best available control technology for construction equipment and applying water to project sites, as needed to control dust. Project area roadways would also be swept of debris and mud from tire tracks. Any trucks leaving the project site with soil or other debris would be covered. With mitigation, impacts of the project would be less-than-significant.

Over the long term, air quality impacts as experienced by bicyclists and pedestrians would be greater along Tiburon Boulevard, given the additional traffic levels and associated emissions. The California Air Resources Board has recommended setback distances of 500 feet for sensitive receptors from common sources of Toxic Air Contaminants including freeways and busy arterial roadways. While Greenwood Beach Road does not provide the full 500 feet recommended, it does provide a buffer which helps to reduce the impact.[iii]

The project is consistent with the *Sustainable Marin* policy to: Promote transit-oriented development and alternative modes of transportation.[iv]

1.4 Biological Resources

Setting

The project alignments under consideration are within urbanized corridors near the biologically rich shoreline of the Tiburon Peninsula. There are two wildlife refuges in Tiburon: (1) Tiburon Audubon Center and Sanctuary; and (2) the Mount Tamalpais Game Refuge which covers Richardson Bay and Surrounding Areas including part of Strawberry Point. The Tiburon Audubon Center and Sanctuary has 11 acres of land and 900 submerged acres which are closed to boating and other public recreational use for six months of the year. The Mount Tamalpais Game Refuge covers portions of Richardson Bay and the Strawberry Peninsula and extends up into Blackie's Pasture.[v]

The Project area contains a number of the 'Prime Open Space Characteristics' identified in the general plan including: 'water and shoreline areas'; 'flood prone areas'; 'wildlife and wildlife habitat; and, 'views'.

An existing (but unidentified) creek crosses the alignment at the junction of Greenwood Beach Road and Blackie's Pasture. The creek flows within a culvert at this location.

Apart from the wetlands that extend up through Blackie's Pasture and along the bluffs west to Lyford House and the nearby marina, there are no sensitive species habitat areas mapped within the project area. Tiburon's sensitive habitat areas are along the undeveloped ridges.[vi]

Agencies with Jurisdiction in the Project Area

The following agencies have jurisdiction over biological resources present within the wider project area:

U.S. Army Corps of Engineers (USACE): San Francisco Bay consists of a navigable waterway and contains wetlands in many areas. USACE regulates discharge of fill into water bodies including wetlands. Nationwide permits cover routine activities such as road crossings and recreational facilities.

Bay Conservation and Development Commission (BCDC): BCDC has jurisdiction over dredging and filling, and the 100-foot band around the Bay. BCDC is required to increase public access to the Bay with each development to the maximum extent feasible. Permits are required for work conducted within the 100-foot shoreline band. Once an application submitted to BCDC is deemed complete, it is submitted to the Commission for consideration. If approved, permits are generally issued within 90 days of the application being deemed complete.[vii]

United States Fish and Wildlife Service (USFWS): The USFWS has jurisdiction over wetlands and endangered species. Under USFWS's definition of wetlands, swamps, freshwater, brackish water; saltwater marshes, bogs; vernal pools; periodically inundated saltflats; intertidal mudflats; wet meadows; wet pastures; springs and seeps; portions of lakes, ponds, rivers and streams; and all other areas that are periodically or permanently covered with shallow water, or dominated by hydrophytic vegetation, or soils which are are dominantly hydrophytic in nature are considered wetlands." viii

California Department of Fish and Game (CDFG): At the state level, CDFG administers the California Endangered Species Act and has jurisdiction over sensitive species and their habitat. The CDFG also requires Streambed Alteration Agreements for projects affecting the banks of streams. Following CEQA compliance, Streambed Alteration Agreements are generally issued within 60-90 days. [ix]

In Policy OSC-20, the Tiburon General Plan requires that: *Buffer zones of 100 feet shall be maintained from wetlands to the extent possible.* For development projects, the Town also requires a buffer of 50 feet on each side of perennial, intermittent and ephemeral streams on properties less than five acres in size, and buffers of 100 feet on each side of these streams for larger properties (Policy OSC-22).

In the project area, wetlands are located at the water's edge extending from the Marina area, in vicinity of Lyford House, and extending up through the majority of Blackie's pasture.[x] Other sensitive species' habitats are located up on the ridges, at substantial distances from the project alignment(s). Tiburon General Plan Table 3.3-1 lists the special status species and special communities known to exist in the planning area. There is movement among the animal species, particularly birds, and many sensitive species such as the Great egret, Snowy egret, Great blue heron and Northern harrier and can be seen in the project vicinity.

Tiburon General Plan Policy LU-3 also expresses the Town's commitment to protect its biological resources: *The Town shall strive to preserve to the greatest extent feasible wildlife habitat in the open spaces, shoreline, marshes, mudflats, woodlands, and other biologically sensitive areas.*

Preliminary Evaluation of Impacts

The proposed project alignments under consideration are located in already disturbed areas. Segment 1 is located within existing parkland where most of the alignment would utilize the existing path. The point of connection with Greenwood Beach Road already has a paved path over the existing creek (this creek does is not identified on the Richardson Bay Watershed Map), so no impacts would occur to the creek zone. For Segment 3, along Greenwood Beach Road, some vegetation would need to be removed in areas where the road is widened and/or a retaining wall is installed. Vegetation in this location is primarily ruderal and its removal

for project components would not be significant. Heritage[2] and oak trees would be avoided as is feasible. Greenwood Cove Drive already consists of a wide alignment where most improvements are proposed within the existing right-of-way. If a path is installed between Greenwood Cove Drive and Tiburon Boulevard, it would be designed to avoid significant trees, which are generally oaks in this location. Segment 5 follows Tiburon Boulevard between Blackfield Drive and Strawberry Drive. The path would require a bicycle/pedestrian bridge over the slough, but it would not require work within the banks of this waterway. By avoiding impacts to the banks of the slough, a Streambed Alteration Agreement may not be required from the CDFG. This alignment would also require removal of several eucalyptus trees that currently line the roadway. Eucalyptus trees are exotic trees; however, they do provide some nesting habitat (as well as a visual buffer between the houses and Tiburon Boulevard.) Mitigation would include surveying trees for active nests prior to construction, maintaining buffers around active nests until the young have fledged, and replacing trees removed with native species. Segment 6 involves resurfacing an existing path and reworking the subgrade or replacing the subgrade as needed. Permit number 1973.015 was issued for the construction of the condominiums on Greenwood Bay Drive. The permit requires public access to be maintained along the shoreline. A new permit would be required to resurface the path because it lies within the 100-foot shoreline band.[xi] Segment 8 connects with Blackie's Pasture just east of an unnamed creek. A Streambed Alteration Agreement would be required from the California Department of Fish and Game if the trail affects the creek or its banks. With implementation of mitigation measures, impacts are anticipated to be less-than-significant.

1.5 Cultural Resources

Setting

The project area is within the territory of the Coast Miwok Indians. Archaeological discoveries in the wider area include rock carvings and grinding sites on Ring Mountain. About 30 of the boulders on Ring Mountain contain Indian petroglyphs. Morter holes and other artifacts have been dated to nearly 2400 years old.[xii] Historic resources in the project area are limited to the Lyford House which is listed on the National Register of Historic Places. The Lyford House was built in 1876 on a dairy ranch at nearby Strawberry Point and barged over to its new location at the Audubon Center on Greenwood Beach Road.

Preliminary Evaluation of Environmental Impacts

Proposed improvements are generally located within the existing roadway right-of-ways which have been previously disturbed. While no cultural resources are known to exist within the right-of-ways, there is always the chance that unforeseen resources could be encountered during project construction. The impact associated with cultural resources is anticipated to be less-than-significant. Standard mitigation measures for protecting cultural resources would further reduce the likelihood of disturbing resources in the event of accidental discovery. The project would not affect historical resources in the project area. The effect of improving non-motorized connections to locations such as the Lyford House would be a beneficial impact of the project. No further mitigation is anticipated.

1.6 Greenhouse Gas Emissions

Setting

The principal greenhouse gases (GHGs) contributing to global warming are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O) and fluorinated compounds. These gases allow visible and ultraviolet light from the sun to pass through the atmosphere, but they prevent heat from escaping back out into space.[xiii] Among the implications of global warming are rising sea levels, and, depending on the location, potential adverse impacts to water supply, water quality, agriculture, forestry and habitats.

Preliminary Evaluation of Impacts

Over the short-term, the project would result in some emissions of GHGs during project construction; however, the project would result in reduced emissions over the long term by providing greater opportunities for non-motorized travel. Approaches to mitigation would be comparable to those described under Air Quality (See Section 1.3, above). In addition, incentives for using non-motorized transportation along this and other corridors would further reduce generation of greenhouse gases. Project impacts would be less-than-significant.

1.7 Geology & Soils

Setting

The Tiburon Peninsula is located between the San Andreas Fault Zone and the North Hayward/Rodgers Creek Faults. Ground shaking is the most potentially devastating geological hazard in Marin County due to the potential damage.[xiv]

In the Richardson Bay Planning Area, new development underlain by artificial fill over marsh deposits at locations such as Paradise Cay, Strawberry Point and some areas in Marin City close to Richardson Bay would experience significant seismic shaking amplification. These areas also have high to very-high liquefaction susceptibility.[xv]

Preliminary Evaluation of Impacts

The proposed project is within the seismically active Bay Area and is therefore subject to ground shaking during the life of the project. The alignments under consideration contain some areas that are susceptible to liquefaction: Blackie's Pasture and vicinity are identified as having 'high' liquefaction potential; and, an area of Greenwood Beach Road near the Audubon Center is identified as having 'moderate' liquefaction potential.[xvi] There are no 'Principal Debris-Flow Source Areas' along the project alignment. The closest source area is along the bluff west of the Lyford House.[xvii] All of the bayfront areas such as Blackie's Pasture would be subject to inundation in the event of a tsunami, although the level of inundation would be less than for coastal areas along the Pacific Ocean.

Any improvements along Greenwood Beach Road that require cutting into the slope would require a retaining wall. Best management practices would be required to reduce erosion and associated sedimentation. With these mitigation measures, impacts associated with geology and soils would be anticipated to be less-than-significant.

1.8 Hazards & Hazardous Materials

Setting

No known hazards are located in the vicinity of the proposed project. It should be noted that Richardson Bay is an impaired water body for: Chlordane, DDT, Dieldrin, Dioxin compounds, Exotic species, Furan compounds, Mercury, Nickel, PCBs, PCBs (dioxin-like), and Selenium.[xviii] Some of these constituents may therefore be found in soils in the project vicinity.

[2] The Tiburon Municipal Code defines a *Heritage* tree as any tree which has a trunk of 60 inches measured 24 inches above the ground level.

The project would not result in impacts related to hazardous materials. Standard measures would be implemented during construction to ensure containment of all products used during construction. No additional mitigation would be required.

1.9 Hydrology & Water Quality

Setting

Within the Town of Tiburon, the waterfront from the Town boundary on the west extending to Trestle Glen Boulevard on the east is subject to flooding during the 100-year flood (Zone A). Blackie's Pasture, particularly in the vicinity of an un-named creek is subject to flooding in both the 100-year storm, and the 500-year storm (Zone B).[xix] Some flooding occurs along the waterfront extending from Lyford House/Audubon Center to Blackie's pasture.

When watershed flooding (following severe runoff-inducing rainfall) occurs in conjunction with high bay tides, the extent of and depth of overbank flooding can increase due to an upward adjustment in the floodwater surface, resulting from an increase in the surface elevation of bay water.[xx] Global climate change and the resultant rise in sea level may exacerbate flooding in the future.[xxi]

Within San Francisco Bay, tsunami wave heights could also affect the project area; they would be less than those along the Pacific Ocean coastline and vary according by location within the Bay. The wave runup height for the 100-year recurrence interval is approximately five feet NGVD (National Geodetic Vertical Datum) at Richardson Bay. For the 500-year storm, the wave run-up would be approximately eight feet.[xxii]

As indicated above in the discussion of Hazardous Materials, Richardson Bay is an impaired water body for: Chlordane, DDT, Dieldrin, Dioxin compounds, Exotic species, Furan compounds, Mercury, Nickel, PCBs, PCBs (dioxin-like), and Selenium.[xxiii]

Preliminary Evaluation of Impacts

Impacts to hydrology and water quality could result from project grading for components such as any required retaining walls (Segment 3, Option 2; and Segment 5, Options 1 and 2), path construction (Segment 4, Option 2). Best management practices would be required to avoid erosion and associated sedimentation. With best management practices, impacts would be less-than-significant.

1.10 Land Use & Planning

Setting

The project consists of a part of the Bay Trail which encircles San Francisco Bay. The Project is located within the Richardson Bay Planning Area as identified in the Marin Countywide Plan.[xxiv] The majority of the alignment is within the Town of Tiburon. The following Tiburon General Plan policy is relevant to the proposed project:

LU-G: To provide facilities that encourage use of the shoreline compatible with surrounding uses and consistent with balancing the objectives of preservation of shoreline resources while also maximizing public access to the waterfront where not in conflict with other uses or with private uses which are of public benefit.

Preliminary Evaluation of Impacts

The alignment following Greenwood Cove/Greenwood Beach Road connects Strawberry Drive and Blackie's Pasture in a manner that provides many amenities for recreation users—views of the Bay, low speed roadways, and access to the Audubon Center. Some existing residents already believe that too many people are using the roadway under very constrained (narrow) conditions. The alignment following Tiburon Boulevard brings bicyclists and pedestrians into close proximity to a high-speed arterial roadway with adverse conditions including noise and vehicle emissions. This alignment may serve experienced cyclists but would likely receive less use by recreation users due to these conditions. Selection of a lower speed roadway alignment would mitigate this conflict for recreation users.

1.11 Mineral Resources

Setting

Eight sites in the North Bay region are identified as having significant mineral resources. All but one of the sites are identified as Class 2 Mineral Resource Zones (MRZs). The single non-MRZ-Class 2 site identified in Marin County is Ring Mountain which is identified as a *Scientific Resource Zone* (and therefore not a production zone).[xxv]

Preliminary Evaluation of Impacts

The project would not result in impacts related to mineral resources. No mitigation would be required.

1.12 Noise

Setting

Existing and projected noise contours in the project vicinity include: (1) 65 dBA along Tiburon Boulevard; and (2) 60 dBA along most of Greenwood Beach / Greenwood Cove Road. Noise levels of 60 dBA are typical of a suburban expressway at a distance of 90 meters (270 feet).

Greenwood Cove/Greenwood Beach Road is already heavily used by cyclists, joggers, dog walkers, roller bladers, skate boarders and other non-motorized and recreation users. The sound of people talking, dogs barking, and skate boarders skating, etc., is part of the existing noise environment (ambient conditions).

Preliminary Evaluation of Impacts

Even though the alignment is already heavily used, use of Segment 3 for closing the gap in the Bay Trail would add some additional recreation and commuter users. Noise might increase slightly over the existing condition. While the additional increment of noise would not be expected to be potentially significant, measures such as including signs notifying path users that they are passing through a residential area and to be considerate about noise levels would further reduce the level of impact.

1.13 Population & Housing

Setting

The project is proposed within an already heavily urbanized corridor of the Tiburon Peninsula.

Preliminary Evaluation of Impacts

The project would not result in direct impacts to population or housing. Availability of trails for recreation and commuter use is one of many factors potential residents might consider in their decision to locate in Tiburon versus another part of the Bay Area. No mitigation would be required.

1.14 Public Services

Setting

Increase in use of recreation areas requires additional police/fire/emergency services and park personnel to address garbage. Restrooms are provided at the eastern side of Blackie's Pasture adjacent to the Bay Trail.

Preliminary Evaluation of Impacts

The Bay Trail corridor is already heavily used by all types of recreation users. Closing the gap in the project vicinity would contribute incrementally to service calls related to police, fire and emergency services. Restroom use would also increase at Blackie's Pasture. While impacts related to public services would not be potentially significant, some additional service may be required, as addressed in periodic updates of the Tiburon General Plan and Countywide Plan. No additional mitigation would be required.

1.15 Recreation

Setting

The Greenwood Beach Road corridor already experiences extensive use by bicyclists, hikers, joggers, dog walkers, skateboarders and other recreation users.

Preliminary Evaluation of Impacts

The project would enhance an existing recreation corridor, and connect key features such as Blackie's Pasture and Lyford House / Audubon Center. Improvements would also include some potential separation of users (Segment 3, Option 2) which would enhance safety and predictability for the different users of the corridor. Improvements in wayfinding signage would also enhance the recreation experience along the corridor. Option 8 would result in exposure of bicyclists and pedestrians to a much higher speed roadway corridor, detracting from the recreation experience. Mitigation would include selection of a lower speed roadway alignment for recreation users. With this mitigation, impacts would be anticipated to be less-than-significant.

1.16 Transportation, Traffic & Circulation

Setting

The Greenwood Cove/Greenwood Beach Road corridor currently accommodates non-motorized as well as motorized transportation.

Preliminary Evaluation of Impacts

The project would support multi-use of Greenwood Cove/Greenwood Beach Road. It is already used by a wide variety of users and this project would make general use of the alignment official. Some conflicts between motorized and non-motorized travel would continue to exist on the alignment. For Segment 3, partial separation (Option 1) and separation (Option 2) would both improve safety along the roadway alignment. Impacts related to transportation, traffic and circulation would be anticipated to be less-than-significant. Effective wayfinding signs to maximize predictability for all users would further reduce the level of impact related to non-motorized transportation.

1.17 Utilities & Service Systems

Setting

The only lighting along the corridor consists of street lighting. Some drainage facilities are also located along Greenwood Beach Road below the Baptist Church.

Preliminary Evaluation of Impacts

No night lighting would be provided along the path alignment. Some storm drains may require relocation along Greenwood Cove/Greenwood Beach Road. These changes would not result in significant utility or service system impacts. Standard practices such as marking all the utilities on plan drawings and in the field would be required to avoid conflicts. Some mitigation may be required pertaining to biological resources (See Section 1.4 above), but would not require mitigation related to utilities and service systems.

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[i] Nichols * Berman, *Marin Countywide Plan EIR*, Air Quality, November 2007, p. 4.3-6.

[ii] Bay Area Air Quality Management District *Fine Particulate Matter Data Analysis and Modeling in the Bay Area*, October 2009, pp. 1-2.

[iii] Nichols * Berman, *Marin Countywide Plan EIR*, Exhibit 4.3-4: CARB Recommended Setback Distances for Common Sources of Toxic Air Contaminants, p. 4.3-10.

[iv] *Sustainable Marin Plan, Nature, Built Environment and People*, Summary of the 2007 Marin Countywide Plan, Natural Systems & Agriculture Element, p. 36.

[v] *Tiburon General Plan*, Figure 3.3-1: Existing Open Space and Protected Resources.

[vi] *Tiburon General Plan*, Figure 3.3-1: Existing Open Space and Protected Resources.

[vi] Tiburon General Plan, Figure 7.1-3: Sensitive Receptors.

[vii] Susan Moffat, Coastal Analyst, Bay Conservation and Development Commission, telephone communication, May 8, 2012.

[viii] *Tiburon General Plan*, p. 3-10.

[ix] Adam McKannay, Environmental Specialist, California Department of Fish and Game, telephone communication, May 8, 2012.

[x] Tiburon General Plan, Figure 3.3-1: Prime Open Space Characteristics.

[xi] Susan Moffat, Coastal Analyst, Bay Conservation and Development Commission, telephone communication and follow-up email, March 9, 2012.

[xii] Rademacher, Horst, Bay Nature Magazine, Ring Mountain Rocks!, April 1, 2007.

[xiii] Bay Area Air Quality Management District, February 17, 2012, (http://www.baaqmd.gov/Divisions/Planning-and-Research/Climate-Protection-Program/Science-of-Climate-Change.aspx)

[xiv] Nichols*Berman, *Marin Countywide Plan EIR*, Geology, p. 4.7-4.

[xv] Nichols*Berman, Marin Countywide Plan EIR, Geology, p. 4.7-26.

[xvi] *Tiburon General Plan*, Figure 6.3-1: Susceptibility to Liquefaction.

[xvii] *Town of Tiburon General Plan*, Figure 6.3-3: Principal Debris Flow Source Areas.

[xviii] Nichols*Berman, *Marin Countywide Plan EIR*, Section 303(d) list included in Exhibit 4.5-1 of the, p. 4.5-9.

[xix] Tiburon 2020, Tiburon General Plan, (September 2005), Diagram 6.3-4: Flood Areas.

[xx] Nichols*Berman, *Marin Countywide Plan EIR*, Hydrology, Water Quality and Flood Hazards, p, 4.5-4.

[xxi] Nichols*Berman, *Marin Countywide Plan EIR*, Hydrology, Water Quality and Flood Hazard, p. 4.5-5.

[xxii] Nichols*Berman, *Marin Countywide Plan EIR*, p. 4.7-37.

[xxiii] Nichols*Berman, *Marin Countywide Plan EIR*, Section 303(d) list included in Exhibit 4.5-1 of the, p. 4.5-9.

[xxiv] Nichols * Berman, *Marin Countywide Plan, EIR*, p. 3.0-44, Exhibit 3.0-11: Marin County Planning Areas (November 2007).

[xxv] *Marin Countywide Plan*, Mineral Resources, November 6, 2007, p. 3-97.

Table E-1: Segment 1 Option A

ITEM	DESCRIPTION OF ITEMS	QUANTITY	UNIT	UNIT PRICE	TOTAL
Construction Items					
1	Mobilization	1	LS	$2,000.00	$2,000
2	Traffic Control System	1	LS	$1,000.00	$1,000
3	Construction Area Signs	1	LS	$2,000.00	$2,000
4	Remove Painted Traffic Stripe	3,843	LF	$0.70	$2,690
5	Thermoplastic Traffic Stripe, Detail 38A	3,132	LF	$1.00	$3,132
6	Thermoplastic Markings	606	SF	$4.00	$2,424
				Subtotal Construction Cost	**$13,246**
				25% Contingency	**$3,312**
				Total Construction Cost	**$16,558**
				15% Engineering Cost	**$2,484**
				10% Construction Management Cost	**$1,656**
				4% Administration Cost	**$662**
				Total Cost	**$21,360**

Table E-2: Segment 1 Option B

ITEM	DESCRIPTION OF ITEMS	QUANTITY	UNIT	UNIT PRICE	TOTAL
Construction Items					
1	Mobilization	1	LS	$2,500.00	$2,500
2	Traffic Control System	1	LS	$1,000.00	$1,000
3	Construction Area Signs	1	LS	$2,000.00	$2,000
4	Remove Painted Traffic Stripe	3,843	LF	$0.70	$2,690
5	Thermoplastic Traffic Stripe, Detail 38A	3,132	LF	$1.00	$3,132
6	Thermoplastic Markings	1,008	SF	$4.00	$4,032
				Subtotal Construction Cost	**$15,354**
				25% Contingency	**$3,839**
				Total Construction Cost	**$19,193**
				15% Engineering Cost	**$2,879**
				10% Construction Management Cost	**$1,919**
				4% Administration Cost	**$768**
				Total Cost	**$24,759**

Appendix 1E. Preliminary Cost Estimates

Table E-3: Segment 2 Option A

ITEM	DESCRIPTION OF ITEMS	QUANTITY	UNIT	UNIT PRICE	TOTAL
Construction Items					
1	Mobilization	1	LS	$2,600.00	$2,600
2	Clearing and Grubbing	1	LS	$1,000.00	$1,000
3	Water Pollution Control	1	LS	$2,000.00	$2,000
4	Traffic Control System	1	LS	$2,000.00	$2,000
5	Construction Area Signs	1	LS	$1,000.00	$1,000
6	Remove AC Berm	20	LF	$3.00	$60
7	Remove Fence	20	LF	$8.00	$160
8	Roadway Excavation (F)	35	CY	$50.00	$1,750
9	Hot Mix Asphalt (Type A)	19	TON	$300.00	$5,700
10	Class 2 Aggregate Base	18	CY	$80.00	$1,440
11	Wood Fence	15	LF	$30.00	$450
12	Thermoplastic Traffic Stripe, Detail 1	1,085	LF	$0.80	$868
13	Thermoplastic 24" Crosswalk Stripe	84	LF	$8.00	$672
14	Relocate Sign Panel on New Post	6	EA	$200.00	$1,200
				Subtotal Construction Cost	**$20,900**
				25% Contingency	**$5,225**
				Total Construction Cost	**$26,125**
				15% Engineering Cost	**$3,919**
				10% Construction Management Cost	**$2,613**
				4% Administration Cost	**$1,045**
				Total Cost	**$33,702**

Table E-4: Segment 2 Option B

ITEM	DESCRIPTION OF ITEMS	QUANTITY	UNIT	UNIT PRICE	TOTAL
Construction Items					
1	Mobilization	1	LS	$3,500.00	$3,500
2	Clearing and Grubbing	1	LS	$1,000.00	$1,000
3	Water Pollution Control	1	LS	$2,000.00	$2,000
4	Traffic Control System	1	LS	$2,000.00	$2,000
5	Construction Area Signs	1	LS	$1,000.00	$1,000
6	Remove AC Berm	20	LF	$3.00	$60
7	Remove Fence	90	LF	$8.00	$720
8	Roadway Excavation (F)	48	CY	$50.00	$2,400
9	Hot Mix Asphalt (Type A)	28	TON	$300.00	$8,400
10	Class 2 Aggregate Base	27	CY	$80.00	$2,160
11	Wood Fence	85	LF	$30.00	$2,550
12	Thermoplastic Traffic Stripe, Detail 1	1,085	LF	$0.80	$868
13	Thermoplastic 24" Crosswalk Stripe	84	LF	$8.00	$672
14	Relocate Sign Panel on New Post	6	EA	$200.00	$1,200
				Subtotal Construction Cost	**$28,530**
				25% Contingency	**$7,133**
				Total Construction Cost	**$35,663**
				15% Engineering Cost	**$5,349**
				10% Construction Management Cost	**$3,566**
				4% Administration Cost	**$1,427**
				Total Cost	**$46,005**

Table E-5: Segment 2 Option C

ITEM	DESCRIPTION OF ITEMS	QUANTITY	UNIT	UNIT PRICE	TOTAL
Construction Items					
1	Mobilization	1	LS	$3,400.00	$3,400
2	Clearing and Grubbing	1	LS	$1,000.00	$1,000
3	Water Pollution Control	1	LS	$2,000.00	$2,000
4	Traffic Control System	1	LS	$2,000.00	$2,000
5	Construction Area Signs	1	LS	$1,000.00	$1,000
6	Remove AC Berm	20	LF	$3.00	$60
7	Roadway Excavation (F)	52	CY	$50.00	$2,600
8	Hot Mix Asphalt (Type A)	45	TON	$300.00	$13,500
9	Class 2 Aggregate Base	22	CY	$80.00	$1,760
				Subtotal Construction Cost	**$27,320**
				25% Contingency	**$6,830**
				Total Construction Cost	**$34,150**
				15% Engineering Cost	**$5,123**
				10% Construction Management Cost	**$3,415**
				4% Administration Cost	**$1,366**
				Total Cost	**$44,054**

Table E-6: Segment 3 Option A

ITEM	DESCRIPTION OF ITEMS	QUANTITY	UNIT	UNIT PRICE	TOTAL
Construction Items					
1	Mobilization	1	LS	$220,000.00	$220,000
2	Clearing and Grubbing	1	LS	$8,000.00	$8,000
3	Water Pollution Control	1	LS	$7,000.00	$7,000
4	Traffic Control System	1	LS	$5,000.00	$5,000
5	Construction Area Signs	1	LS	$2,000.00	$2,000
6	Roadway Excavation (F)	1,478	CY	$50.00	$73,900
7	Remove Curb & Gutter	350	LF	$6.00	$2,100
8	Remove AC Berm	50	LF	$3.00	$150
9	Remove Culvert	150	LF	$15.00	$2,250
10	Remove Existing PCC Ditch	9	CY	$83.00	$747
11	Remove Painted Traffic Stripe	2,260	LF	$0.70	$1,582
12	Hot Mix Asphalt (Type A)	527	TON	$125.00	$65,875
13	Class 2 Aggregate Base	160	CY	$55.00	$8,800
14	Thermoplastic Traffic Stripe, Detail 1	2,260	LF	$0.80	$1,808
15	Thermoplastic Traffic Stripe, Detail 27B	2,260	LF	$0.80	$1,808
16	Thermoplastic Marking, Sharrow	26	EA	$100.00	$2,600
17	Relocate Sign Panel on New Post	2	EA	$200.00	$400
18	Install Slot Drain	1250	LF	$150.00	$187,500
19	Retaining Wall, Subdrain (Perforated) and PCC Ditch	11,466	SF	$100.00	$1,146,600
20	PCC Ditch	100	LF	$400.00	$40,000
21	Catch Basin (Drop Inlet)	2	EA	$4,000.00	$8,000
22	HDPE Storm Drain	300	LF	$45.00	$13,500
23	Concrete Apron and Headwall (Type B)	2	LS	$2,500.00	$5,000
				Subtotal Construction Cost	**$1,804,620**
				25% Contingency	**$451,155**
				Total Construction Cost	**$2,255,775**
				15% Engineering Cost	**$338,366**
				10% Construction Management Cost	**$225,578**
				4% Administration Cost	**$90,231**
				Total Cost	**$2,909,950**

Table E-7: Segment 3 Option B

ITEM	DESCRIPTION OF ITEMS	QUANTITY	UNIT	UNIT PRICE	TOTAL
Construction Items					
1	Mobilization	1	LS	$180,000.00	$180,000
2	Clearing and Grubbing	1	LS	$12,000.00	$12,000
3	Water Pollution Control	1	LS	$7,000.00	$7,000
4	Traffic Control System	1	LS	$5,000.00	$5,000
5	Construction Area Signs	1	LS	$2,000.00	$2,000
6	Roadway Excavation (F)	1,420	CY	$50.00	$71,000
7	Remove Curb & Gutter	350	LF	$6.00	$2,100
8	Remove AC Berm	50	LF	$3.00	$150
9	Remove Culvert	150	LF	$15.00	$2,250
10	Remove Existing PCC Ditch	9	CY	$83.00	$747
11	Remove Painted Traffic Stripe	2,260	LF	$0.70	$1,582
12	Hot Mix Asphalt (Type A)	180	TON	$125.00	$22,500
13	Class 2 Aggregate Base	227	CY	$55.00	$12,485
14	Thermoplastic Traffic Stripe, Detail 1	2,260	LF	$0.80	$1,808
15	Thermoplastic Sharrow	26	EA	$100.00	$2,600
16	Relocate Sign Panel on New Post	2	EA	$200.00	$400
17	PCC Path	11,915	SF	$10.00	$119,150
18	PCC Curb and Gutter (Type D)	2,166	LF	$30.00	$64,980
19	Retaining Wall, Subdrain (Perforated) and PCC Ditch	9,093	SF	$100.00	$909,300
20	PCC Ditch	100	LF	$400.00	$40,000
21	Catch Basin (Drop Inlet)	2	EA	$4,000.00	$8,000
22	Catch Basin (Type A)	4	EA	$4,000.00	$16,000
23	HDPE Storm Drain	300	LF	$45.00	$13,500
24	Concrete Apron and Headwall (Type B)	1	LS	$2,500.00	$2,500
				Subtotal Construction Cost	**$1,497,052**
				25% Contingency	**$374,263**
				Total Construction Cost	**$1,871,315**
				15% Engineering Cost	**$280,697**
				10% Construction Management Cost	**$187,132**
				4% Administration Cost	**$74,853**
				Total Cost	**$2,413,997**

Table E-8: Segment 3 Option C

ITEM	DESCRIPTION OF ITEMS	QUANTITY	UNIT	UNIT PRICE	TOTAL
Construction Items					
1	Mobilization	1	LS	$120,000.00	$120,000
2	Clearing and Grubbing	1	LS	$6,000.00	$6,000
3	Water Pollution Control	1	LS	$7,000.00	$7,000
4	Traffic Control System	1	LS	$5,000.00	$5,000
5	Construction Area Signs	1	LS	$2,000.00	$2,000
6	Roadway Excavation (F)	600	CY	$50.00	$30,000
7	Remove Curb & Gutter	350	LF	$6.00	$2,100
8	Remove AC Berm	50	LF	$3.00	$150
9	Remove Culvert	150	LF	$15.00	$2,250
10	Remove Existing PCC Ditch	9	CY	$83.00	$747
11	Remove Painted Traffic Stripe	2,260	LF	$0.70	$1,582
12	Hot Mix Asphalt (Type A)	1	TON	$300.00	$300
13	Class 2 Aggregate Base	227	CY	$55.00	$12,485
14	Thermoplastic Traffic Stripe, Detail 1	2,260	LF	$0.80	$1,808
15	Thermoplastic Sharrow	26	EA	$100.00	$2,600
16	Relocate Sign Panel on New Post	2	EA	$200.00	$400
17	PCC Path	11,915	SF	$10.00	$119,150
18	PCC Curb and Gutter (Type D)	2166	LF	$30.00	$64,980
19	Retaining Wall, Subdrain (Perforated) and PCC Ditch	5,207	SF	$100.00	$520,700
20	PCC Ditch	100	LF	$400.00	$40,000
21	Catch Basin (Drop Inlet)	2	EA	$4,000.00	$8,000
22	Catch Basin (Type A)	4	EA	$4,000.00	$16,000
23	HDPE Storm Drain	300	LF	$45.00	$13,500
24	Concrete Apron and Headwall (Type B)	1	LS	$2,500.00	$2,500
				Subtotal Construction Cost	**$979,252**
				25% Contingency	**$244,813**
				Total Construction Cost	**$1,224,065**
				15% Engineering Cost	**$183,610**
				10% Construction Management Cost	**$122,407**
				4% Administration Cost	**$48,963**
				Total Cost	**$1,579,045**

Appendix 1E. Preliminary Cost Estimates

Table E-9: Segment 4 Option A

ITEM	DESCRIPTION OF ITEMS	QUANTITY	UNIT	UNIT PRICE	TOTAL
Construction Items					
1	Mobilization	1	LS	$2,100.00	$2,100
3	Traffic Control System	1	LS	$4,000.00	$4,000
4	Construction Area Signs	1	LS	$2,000.00	$2,000
5	Remove Painted Traffic Stripe	1,800	LF	$0.70	$1,260
6	Thermoplastic Traffic Stripe (Detail 21)	1,800	LF	$1.50	$2,700
7	Thermoplastic Sharrows	18	EA	$100.00	$1,800
8	Paint Curb	800	LF	$4.00	$3,200
				Subtotal Construction Cost	**$17,060**
				25% Contingency	**$4,265**
				Total Construction Cost	**$21,325**
				15% Engineering Cost	**$3,199**
				10% Construction Management Cost	**$2,133**
				4% Administration Cost	**$853**
				Total Cost	**$27,510**

Table E-10: Segment 4 Option B

ITEM	DESCRIPTION OF ITEMS	QUANTITY	UNIT	UNIT PRICE	TOTAL
Construction Items					
1	Mobilization	1	LS	$41,000.00	$41,000
2	Clearing and Grubbing	1	LS	$12,000.00	$12,000
3	Water Pollution Control	1	LS	$7,000.00	$7,000
4	Traffic Control System	1	LS	$5,000.00	$5,000
5	Construction Area Signs	1	LS	$2,000.00	$2,000
6	Roadway Excavation (F)	450	CY	$50.00	$22,500
7	Remove Drainage Inlets	3	EA	$500.00	$1,500
8	Remove Painted Traffic Stripe	1,800	LF	$0.70	$1,260
9	HMA Path	214	TON	$150.00	$32,100
10	Class 2 Aggregate Base	102	CY	$55.00	$5,610
11	Retaining Wall, Subdrain (Perforated) and PCC Ditch	1,120	SF	$100.00	$112,000
12	Thermoplastic Traffic Stripe (Detail 21)	1,800	LF	$1.50	$2,700
13	Thermoplastic Sharrows	18	EA	$100.00	$1,800
14	Catch Basin (Type A)	4	EA	$4,000.00	$16,000
15	HDPE Storm Drain, Reconnect	160	LF	$45.00	$7,200
16	Metal Beam Guardrail	1,300	LF	$30.00	$39,000
17	Reconstruction Culvert Storm System	1	LS	$20,000.00	$20,000
				Subtotal Construction Cost	**$328,670**
				25% Contingency	**$82,168**
				Total Construction Cost	**$410,838**
				15% Engineering Cost	**$61,626**
				10% Construction Management Cost	**$41,084**
				4% Administration Cost	**$16,434**
				Total Cost	**$529,982**

Table E-11: Segment 4 Option C

ITEM	DESCRIPTION OF ITEMS	QUANTITY	UNIT	UNIT PRICE	TOTAL
Construction Items					
1	Mobilization	1	LS	$3,000.00	$3,000
2	Traffic Control System	1	LS	$5,000.00	$5,000
3	Construction Area Signs	1	LS	$2,000.00	$2,000
4	Remove Painted Traffic Stripe	1,800	LF	$0.70	$1,260
5	Thermoplastic Traffic Stripe (Detail 21)	1,800	LF	$1.50	$2,700
6	Thermoplastic Traffic Stripe (Detail 27B)	1,800	LF	$0.80	$1,440
7	Thermoplastic Traffic Stripe (Detail 39)	3,600	LF	$1.20	$4,320
8	Thermoplastic Markings	324	SF	$4.00	$1,296
9	Paint Curb	800	LF	$4.00	$3,200
				Subtotal Construction Cost	**$24,216**
				25% Contingency	**$6,054**
				Total Construction Cost	**$30,270**
				15% Engineering Cost	**$4,541**
				10% Construction Management Cost	**$3,027**
				4% Administration Cost	**$1,211**
				Total Cost	**$39,049**

Table E-12: Segment 4 Option D

ITEM	DESCRIPTION OF ITEMS	QUANTITY	UNIT	UNIT PRICE	TOTAL
Construction Items					
1	Mobilization	1	LS	$41,000.00	$41,000
2	Clearing and Grubbing	1	LS	$12,000.00	$12,000
3	Water Pollution Control	1	LS	$7,000.00	$7,000
4	Traffic Control System	1	LS	$5,000.00	$5,000
5	Construction Area Signs	1	LS	$2,000.00	$2,000
6	Roadway Excavation (F)	450	CY	$50.00	$22,500
7	Remove Drainage Inlets	3	EA	$500.00	$1,500
8	Remove Painted Traffic Stripe	1,800	LF	$0.70	$1,260
9	HMA Path	214	TON	$125.00	$26,750
10	Class 2 Aggregate Base	102	CY	$55.00	$5,610
11	Retaining Wall, Subdrain (Perforated) and PCC Ditch	1,120	SF	$100.00	$112,000
12	Thermoplastic Traffic Stripe (Detail 21)	1,800	LF	$1.50	$2,700
13	Thermoplastic Traffic Stripe (Detail 27B)	1,800	LF	$0.80	$1,440
14	Thermoplastic Traffic Stripe (Detail 39)	3,600	LF	$1.20	$4,320
15	Thermoplastic Markings	324	SF	$4.00	$1,296
16	Catch Basin (Type A)	4	EA	$4,000.00	$16,000
17	HDPE Storm Drain, Reconnect	160	LF	$45.00	$7,200
18	Metal Beam Guardrail	1,300	LF	$30.00	$39,000
19	Reconstruction Culvert Storm System	1	LS	$20,000.00	$20,000
				Subtotal Construction Cost	**$328,576**
				25% Contingency	**$82,144**
				Total Construction Cost	**$410,720**
				15% Engineering Cost	**$61,608**
				10% Construction Management Cost	**$41,072**
				4% Administration Cost	**$16,429**
				Total Cost	**$529,829**

Table E-13: Segment 5 Option A

ITEM	DESCRIPTION OF ITEMS	QUANTITY	UNIT	UNIT PRICE	TOTAL
Construction Items					
1	Mobilization	1	LS	$160,000.00	$160,000
2	Clearing and Grubbing	1	LS	$12,000.00	$12,000
3	Water Pollution Control	1	LS	$7,000.00	$7,000
4	Traffic Control System	1	LS	$5,000.00	$5,000
5	Construction Area Signs	1	LS	$2,000.00	$2,000
6	Roadway Excavation (F)	129	CY	$50.00	$6,450
7	Borrow /Import	114	CY	$80.00	$9,120
8	Remove Sidewalk, Curb & Gutter	10	CY	$130.00	$1,300
9	Remove Curb & Gutter	114	LF	$6.00	$684
10	Remove AC Berm	615	LF	$3.00	$1,845
11	Hot Mix Asphalt (Type A)	49	TON	$300.00	$14,700
12	Class 2 Aggregate Base	100	CY	$55.00	$5,500
13	8' Pedestrian Path, PCC	6,825	SF	$10.00	$68,250
14	Curb and Gutter	621	LF	$30.00	$18,630
15	Thermoplastic Traffic Stripe, Detail 27B	930	LF	$0.80	$744
16	Relocate Sign Panel on New Post	2	EA	$200.00	$400
17	Relocate Pavement markers	2	EA	$50.00	$100
18	Retaining Wall	5215	SF	$100.00	$521,500
19	Retaining Wall Railing	850	LF	$60.00	$51,000
20	Install 10' X 100' Pedestrian Bridge	1	LS	$350,000.00	$350,000
21	Reconstruct Bus Stop	1	LS	$4,000.00	$4,000
22	Reconstruct Metal Beam Railing	100	LF	$50.00	$5,000
23	Landscape Work	1	LS	$50,000.00	$50,000
				Subtotal Construction Cost	**$1,295,223**
				25% Contingency	**$323,806**
				Total Construction Cost	**$1,619,029**
				15% Engineering Cost	**$242,854**
				10% Construction Management Cost	**$161,903**
				4% Administration Cost	**$64,761**
				Total Cost	**$2,088,547**

Table E-14: Segment 5 Option B

ITEM	DESCRIPTION OF ITEMS	QUANTITY	UNIT	UNIT PRICE	TOTAL
Construction Items					
1	Mobilization	1	LS	$190,000.00	$190,000
2	Clearing and Grubbing	1	LS	$12,000.00	$12,000
3	Water Pollution Control	1	LS	$7,000.00	$7,000
4	Traffic Control System	1	LS	$5,000.00	$5,000
5	Construction Area Signs	1	LS	$2,000.00	$2,000
6	Roadway Excavation (F)	73	CY	$50.00	$3,650
7	Borrow /Import	642	CY	$80.00	$51,360
8	Remove Sidewalk, Curb & Gutter	10	CY	$130.00	$1,300
9	Remove Curb & Gutter	326	LF	$6.00	$1,956
10	Remove AC Berm	615	LF	$3.00	$1,845
11	Class 2 Aggregate Base	150	CY	$55.00	$8,250
12	12' Pedestrian Path, PCC	10,920	SF	$10.00	$109,200
13	Thermoplastic Traffic Stripe, Detail 27B	930	LF	$0.80	$744
14	Relocate Sign Panel on New Post	2	EA	$200.00	$400
15	Relocate Pavement markers	2	EA	$50.00	$100
16	Retaining Wall	7080	SF	$100.00	$708,000
17	Retaining Wall Railing	735	LF	$60.00	$44,100
18	Install 10' X 100' Pedestrian Bridge	1	LS	$350,000.00	$350,000
19	Reconstruct Bus Stop	1	LS	$4,000.00	$4,000
20	Reconstruct Metal Beam Railing	820	LF	$30.00	$24,600
21	Landscape Work	1	LS	$50,000.00	$50,000
				Subtotal Construction Cost	**$1,575,505**
				25% Contingency	**$393,876**
				Total Construction Cost	**$1,969,381**
				15% Engineering Cost	**$295,407**
				10% Construction Management Cost	**$196,938**
				4% Administration Cost	**$78,775**
				Total Cost	**$2,540,501**

Table E-15: Segment 6

ITEM	DESCRIPTION OF ITEMS	QUANTITY	UNIT	UNIT PRICE	TOTAL
Construction Items					
1	Mobilization	1	LS	$6,500.00	$6,500
2	Water Pollution Control	1	LS	$12,000.00	$12,000
3	Traffic Control System	1	LS	$3,500.00	$3,500
4	Construction Area Signs	1	LS	$2,000.00	$2,000
5	Roadway Excavation (F)	161	CY	$75.00	$12,075
6	Hot Mix Asphalt (Type A)	133	TON	$300.00	$39,900
7	Class 2 Aggregate Base	97	CY	$75.00	$7,275
				Subtotal Construction Cost	**$83,250**
				25% Contingency	**$20,813**
				Total Construction Cost	**$104,063**
				15% Engineering Cost	**$15,609**
				10% Construction Management Cost	**$10,406**
				4% Administration Cost	**$4,163**
				Total Cost	**$134,241**

Table E-16: Segment 8 Option A1

ITEM	DESCRIPTION OF ITEMS	QUANTITY	UNIT	UNIT PRICE	TOTAL
Construction Items					
1	Mobilization	1	LS	$220,000.00	$220,000
2	Clearing and Grubbing	1	LS	$20,000.00	$20,000
3	Water Pollution Control	1	LS	$20,000.00	$20,000
4	Traffic Control System	1	LS	$20,000.00	$20,000
5	Construction Area Signs	1	LS	$10,000.00	$10,000
6	Roadway Excavation (F)	1,582	CY	$50.00	$79,100
7	Remove Metal Beam Railing	750	LF	$8.00	$6,000
8	Remove AC Berm	3,050	LF	$3.00	$9,150
9	Remove Thermoplastic Stripe	4,300	LF	$7.00	$30,100
10	Hot Mix Asphalt (Type A)	225	TON	$150.00	$33,750
11	Class 2 Aggregate Base	637	CY	$55.00	$35,035
12	12' Pedestrian Path, PCC	51,600	SF	$10.00	$516,000
13	Thermoplastic Traffic Stripe, Detail 27B	4,300	LF	$0.80	$3,440
14	Relocate Sign Panel	9	EA	$200.00	$1,800
15	Relocate Pavement markers	5	EA	$50.00	$250
16	Retaining Wall	2509	SF	$80.00	$200,720
17	Retaining Wall, Subdrain (Perforated), and PCC Ditch	4161	SF	$100.00	$416,100
18	Retaining Wall Railing	486	LF	$60.00	$29,160
19	Metal Beam Railing	4,300	LF	$30.00	$129,000
20	Catch Basin (Drop Inlet)	2	EA	$4,000.00	$8,000
21	HDPE Storm Drain	140	LF	$45.00	$6,300
22	Reconstruct 30" RCP Headwall (Type A)	1	LS	$7,000.00	$7,000
23	Reconstruct Bus Stop	1	LS	$4,000.00	$4,000
24	Cantilever Path Over Existing Retaining Wall (100LF)	1	LS	$30,000.00	$30,000
				Subtotal Construction Cost	**$1,834,905**
				25% Contingency	**$458,726**
				Total Construction Cost	**$2,293,631**
				15% Engineering Cost	**$344,045**
				10% Construction Management Cost	**$229,363**
				4% Administration Cost	**$91,745**
				Total Cost	**$2,958,784**

Table E-17: Segment 8 Option A2

ITEM	DESCRIPTION OF ITEMS	QUANTITY	UNIT	UNIT PRICE	TOTAL
Construction Items					
1	Mobilization	1	LS	$240,000.00	$240,000
2	Clearing and Grubbing	1	LS	$20,000.00	$20,000
3	Water Pollution Control	1	LS	$20,000.00	$20,000
4	Traffic Control System	1	LS	$20,000.00	$20,000
5	Construction Area Signs	1	LS	$10,000.00	$10,000
6	Roadway Excavation (F)	1,997	CY	$50.00	$99,850
7	Remove Metal Beam Railing	750	LF	$8.00	$6,000
8	Remove AC Berm	3,050	LF	$3.00	$9,150
9	Remove Thermoplastic Stripe	4,300	LF	$0.70	$3,010
10	Hot Mix Asphalt (Type A)	225	TON	$150.00	$33,750
11	Class 2 Aggregate Base	637	CY	$55.00	$35,035
12	12' Pedestrian Path, PCC	51,600	SF	$10.00	$516,000
13	Thermoplastic Traffic Stripe, Detail 27B	4,300	LF	$0.80	$3,440
14	Relocate Sign Panel	9	EA	$200.00	$1,800
15	Relocate Pavement markers	5	EA	$50.00	$250
16	Retaining Wall	3997	SF	$80.00	$319,760
17	Retaining Wall, Subdrain (Perforated), and PCC Ditch	3561	SF	$100.00	$356,100
18	Retaining Wall Railing	450	LF	$60.00	$27,000
19	Metal Beam Railing	4,300	LF	$30.00	$129,000
20	Catch Basin (Drop Inlet)	2	EA	$4,000.00	$8,000
21	HDPE Storm Drain	140	LF	$45.00	$6,300
22	Reconstruct 30" RCP Headwall (Type A)	1	LS	$7,000.00	$7,000
23	Reconstruct Bus Stop	2	LS	$4,000.00	$8,000
24	Cantilever Path Over Existing Retaining Wall (100LF)	1	LS	$30,000.00	$30,000
				Subtotal Construction Cost	**$1,909,445**
				25% Contingency	**$477,361**
				Total Construction Cost	**$2,386,806**
				15% Engineering Cost	**$358,021**
				10% Construction Management Cost	**$238,681**
				4% Administration Cost	**$95,472**
				Total Cost	**$3,078,980**

Table E-18: Segment 8 Option B1

ITEM	DESCRIPTION OF ITEMS	QUANTITY	UNIT	UNIT PRICE	TOTAL
Construction Items					
1	Mobilization	1	LS	$220,000.00	$220,000
2	Clearing and Grubbing	1	LS	$20,000.00	$20,000
3	Water Pollution Control	1	LS	$20,000.00	$20,000
4	Traffic Control System	1	LS	$20,000.00	$20,000
5	Construction Area Signs	1	LS	$10,000.00	$10,000
6	Roadway Excavation (F)	1,450	CY	$50.00	$72,500
7	Remove Metal Beam Railing	750	LF	$8.00	$6,000
8	Remove AC Berm	3,050	LF	$3.00	$9,150
9	Remove Drainage Inlets	2	EA	$500.00	$1,000
10	Remove Curb and Gutter	1,376	LF	$6.00	$8,256
11	Remove Thermoplastic Traffic Stripe	3,960	LF	$0.70	$2,772
12	Hot Mix Asphalt (Type A)	307	TON	$125.00	$38,375
13	12' Pedestrian Path, PCC	46,820	SF	$10.00	$468,200
14	Class 2 Aggregate Base	623	CY	$55.00	$34,265
15	Retaining Wall	2,420	SF	$80.00	$193,600
16	Retaining Wall, Subdrain (Perforated) and PCC Ditch	4,415	SF	$100.00	$441,500
17	Thermoplastic Traffic Stripe (Detail 21)	1,800	LF	$1.50	$2,700
18	Thermoplastic Traffic Stripe, Detail 27B	2,584	LF	$0.80	$2,067
19	Thermoplastic Sharrows	18	EA	$100.00	$1,800
20	Relocate Sign Panel	9	EA	$200.00	$1,800
21	Relocate Pavement markers	5	EA	$50.00	$250
22	Catch Basin (Type A)	2	EA	$4,000.00	$8,000
23	HDPE Storm Drain, Reconnect	80	LF	$100.00	$8,000
24	Retaining Wall Railing	486	LF	$60.00	$29,160
25	Metal Beam Guardrail	2,584	LF	$30.00	$77,520
26	Cantilever Path Over Existing Retaining Wall (100LF)	1	LS	$30,000.00	$30,000
				Subtotal Construction Cost	**$1,726,915**
				25% Contingency	**$431,729**
				Total Construction Cost	**$2,158,644**
				15% Engineering Cost	**$323,797**
				10% Construction Management Cost	**$215,864**
				4% Administration Cost	**$86,346**
				Total Cost	**$2,784,651**

Table E-19: Segment 8 Option B2

ITEM	DESCRIPTION OF ITEMS	QUANTITY	UNIT	UNIT PRICE	TOTAL
Construction Items					
1	Mobilization	1	LS	$220,000.00	$220,000
2	Clearing and Grubbing	1	LS	$20,000.00	$20,000
3	Water Pollution Control	1	LS	$20,000.00	$20,000
4	Traffic Control System	1	LS	$20,000.00	$20,000
5	Construction Area Signs	1	LS	$10,000.00	$10,000
6	Roadway Excavation (F)	1,884	CY	$50.00	$94,200
7	Remove Metal Beam Railing	750	LF	$8.00	$6,000
8	Remove AC Berm	3,050	LF	$3.00	$9,150
9	Remove Drainage Inlets	2	EA	$500.00	$1,000
10	Remove Curb and Gutter	1,376	LF	$6.00	$8,256
11	Remove Thermoplastic Traffic Stripe	3,960	LF	$0.70	$2,772
12	Hot Mix Asphalt (Type A)	307	TON	$125.00	$38,375
13	12' Pedestrian Path, PCC	46,820	SF	$10.00	$468,200
14	Class 2 Aggregate Base	623	CY	$55.00	$34,265
15	Retaining Wall	3,908	SF	$80.00	$312,640
16	Retaining Wall, Subdrain (Perforated) and PCC Ditch	3,815	SF	$100.00	$381,500
17	Thermoplastic Traffic Stripe (Detail 21)	1,800	LF	$1.50	$2,700
18	Thermoplastic Traffic Stripe, Detail 27B	2,584	LF	$0.80	$2,067
19	Thermoplastic Sharrows	18	EA	$100.00	$1,800
20	Relocate Sign Panel	9	EA	$200.00	$1,800
21	Relocate Pavement markers	5	EA	$50.00	$250
22	Catch Basin (Type A)	2	EA	$4,000.00	$8,000
23	HDPE Storm Drain, Reconnect	80	LF	$100.00	$8,000
24	Retaining Wall Railing	425	LF	$60.00	$25,500
25	Metal Beam Guardrail	2,584	LF	$30.00	$77,520
26	Cantilever Path Over Existing Retaining Wall (100LF)	1	LS	$30,000.00	$30,000
				Subtotal Construction Cost	**$1,803,995**
				25% Contingency	**$450,999**
				Total Construction Cost	**$2,254,994**
				15% Engineering Cost	**$338,249**
				10% Construction Management Cost	**$225,499**
				4% Administration Cost	**$90,200**
				Total Cost	**$2,908,942**