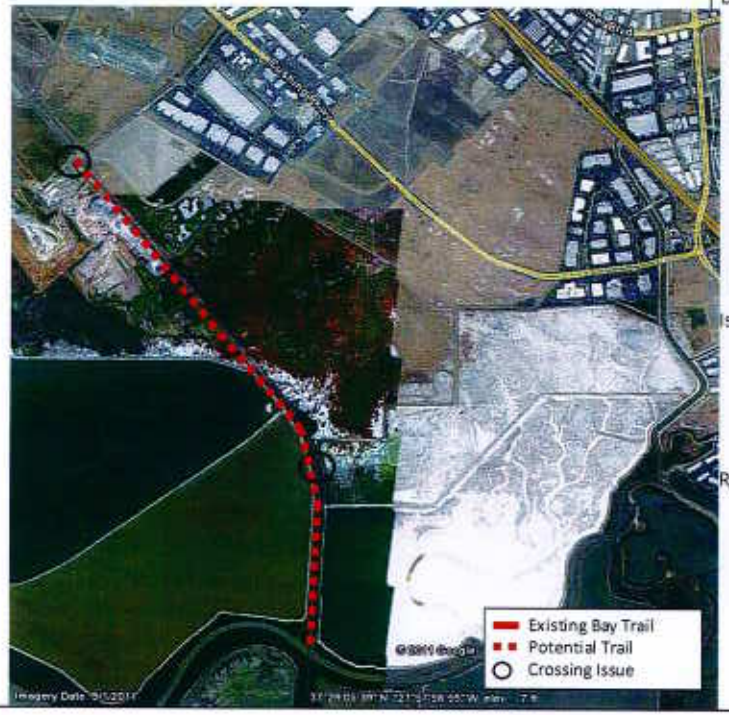
6 RAILROAD SEGMENT

6C: UPRR LINE SOUTH OF AUTO MALL PARKWAY

10,875 LF



Existing Conditions

Segment 6C includes north-south rail lines owned by UP that serve passengers on Amtrak's Capitol Corridor as well as freight services.

The Capitol Corridor Joint Powers Authority (CCJPA) is a partnership among the six local transit agencies in the eight county service area, which shares the administration and management of the Capitol Corridor. The San Francisco Bay Area Rapid Transit District (BART) provides day-to-day management support to the CCJPA. Capitol Corridor services are developed with input from our riders, private and public sector stakeholders, along with the partners who help deliver the Capitol Corridor service - Amtrak, the Union Pacific Railroad, Caltrans and the various agencies and communities that make up the Capitol Corridor.

This segment of the UP Coast Subdivision has been identified for expansion to accommodate increased passenger rail and freight operations.

The reconstruction of the rail corridor will include track improvements, a new moveable rail bridge, four stations and a centralized traffic control system. Six round-trip trains will travel from Union City during peak commute hours. Three of these trains will travel to San Francisco and three to San Jose. Environmental review of the project is currently underway.

Issues

- This rail corridor does not meet Bay Trail goals for a shoreline experience.
- There is insufficient ROW outside rail ROW for a continuous trail.
- Since the Bay Trail is shown along the rail corridor on the Bay Trail Plan, and the Alameda County Bike and Pedestrian Plans, some accommodation or mitigation may be required for rail corridor expansion.

Recommendations

- Locating trail within existing railroad ROW is not feasible for this segment, given ROW and cost considerations.
- Locate trails away from rail corridor as far as possible to avoid noise, use and safety conflicts; provide security fencing.
- Local agencies should actively monitor rail planning activities and seek partnerships for incorporation of bicycle/pedestrian improvements with regional rail planning projects.

7 SHORELINE SEGMENT

7A: EXISTING BAY TRAIL, BAYSIDE BUSINESS PARK, PHASE I

12,175 LF

Existing Conditions

This is an existing dedicated Bay Trail along a levee owned and operated by the USFWS associated with restoration of former salt ponds in the area. The trail is about 14 to 16 feet wide and surfaced with gravel. Restored wetlands are located immediately to the west, and Bayside Business Park Phase II is located on the other side of a small wetland area. The trail can be accessed via an ACFCWCD levee at the southern terminus of Fremont Blvd. A small parking/trail staging area is located there.

Issues

- It is not clear if the existing gravel trail fully meets the ADA requirements for a firm and stable surface.
- A gravel surface is used due to long-term settlement of the levee, making an asphalt paved trail difficult and expensive to maintain.

Recommendations

- As noted for Segment 6A, construction of the recommended trail improvements to the immediate north (6A) and south (8A.2, 8B), combined with the existing Bay Trail of Segment 7A, will provide just over a two mile continuous trail, as well as a connector to the Coyote Creek Trail system beginning at MacArthur Blvd. near Dixon Landing Rd. in Milpitas. This should be considered a high priority for advanced planning, ROW acquisition, design, and construction.
- Coordinate wayfinding signage with USFWS/Don Edwards Wildlife Refuge.
- Coordinate with ACFCWCD on use of and improvements to the Scott Creek flood control levee.

7 ON STREET TRAIL SEGMENT

7B: FREMONT BLVD
WARREN AVENUE TO ACFCWCD LINE B

8,225 LF

Existing Conditions

Fremont Blvd. is a principal arterial that has a painted left turn median as well as Class II bicycle facilities and 10-foot-wide meandering sidewalks on both sides of the street. The speed limit on Fremont Blvd. is 35mph. They typical cyclist would likely feel somewhat uncomfortable riding on the street even within the Class II bicycle facility. The street and sidewalks are lined by mature trees along most of both sides of Fremont Blvd.

Issues

- Pedestrian facility improvement options are limited to 8 ft in some sections unless tree removal is considered.
- This street does not meet Bay Trail goals for a shoreline experience, but could be considered as a connector trail to link accessible shoreline areas, especially as a connection via the planned extension of Fremont Blvd. to McCarthy Rd. and the Coyote Creek Trail in Santa Clara County.
- Bay Trail goal is to have off-street trail facilities that accommodate bicyclists and pedestrians.

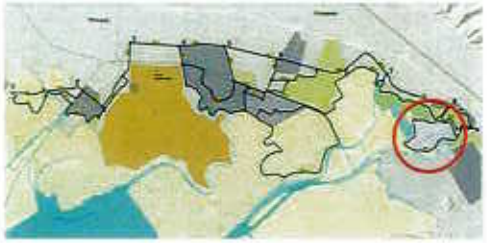
Recommendations

- Consider and plan improvements along Fremont Blvd., as noted in the City of Fremont and Alameda County Bicycle and Pedestrian Plans as Bay Trail connectors.
- Incorporate wayfinding signage noting the preserve of a staging area at the end of Fremont Blvd., and an existing access point to the Bay Trail, Segment 7A.

8 SHORELINE SEGMENT

8A.1: NEWBY ISLAND PERIMETER TRAIL AND LEVEE

19,225 LF



Existing Conditions

Segment 8A.1 would be located on the existing dirt service road (loop road) that runs around the toe of the Newby Island landfill. Technically, this area is located in unincorporated Santa Clara County, outside of the jurisdictions of the cities of Fremont and Newark, and Alameda County, but is being discussed here in the interests of describing trail connections to the south, especially the Coyote Creek Trail. It also is a potential alternative to the Coyote Creek levee trail described under Segment 8B, should construction of that segment prove difficult or in the future for Right of Way availability, environmental and permitting reasons. The landfill loop road is currently shown on the Santa Clara County Bike Plan as well as on the SF Bay Trail Plan as a future trail.

Newby Island is an active, Class III Municipal or Sanitary landfill, although portions of the landfill, including the landfill slope areas, have been closed to accepting new wastes and have been capped. The service road is in use, mainly for well monitoring access and landfill slope maintenance activities. The service road is 14 to 18 or more feet wide.

Issues

- Discussions with the Newby Island landfill management staff indicate they are amenable to having a public access trail in the future, provided public safety and site security is assured.
- They also indicated that they needed to do additional work on many of the landfill slopes for seismic safety reasons, to ensure that the landfill slopes do not fail during a large earthquake event, discharging the buried solid waste into adjacent wetlands. Therefore the service road will not become available for use as a trail for several more years.
- The service road will need to be managed as a jointly used road, as it will need to continue to be used by landfill staff to reach portions of the landfill for maintenance and monitoring purposes, and may need to be closed for periods of time during this work, to ensure safety of trail users. In addition, a sunrise to sunset schedule or other some other trail use time considerations coincident with landfill operations hours will need to be planned for.
- Typically there is a 30 year period of monitoring following formal closure of the landfill to acceptance of new solid wastes, and the completion of landfill capping and stabilization work. There is precedence for use of landfill service roads for public access, including the West Contra Costa Landfill in Richmond, and the American Canyon Landfill in southern Napa County, both of which have Bay trail spur loops currently in use.
- In addition to potential safety, security and use conflicts on the service loop road, a safe way needs to be located and designed to get trail users from the Dixon Landing- McCarthy Blvd. gate, past the landfill entry area and onto the service road.

Recommendation

- This loop trail, along with a connection through the landfill property to McCarthy Blvd., will require careful planning to find a safe alignment through the landfill property.
- Coordinate with Newby Island Landfill management, the City of Milpitas, King and Lyons, and City of San Jose to plan connections through the landfill and between the Bay Trail and the Coyote Creek Trail.

8 SHORELINE SEGMENT

8A.2: CREEKSIDE LANDING/COYOTE CREEK TRAIL

6,300 LF

Existing Conditions

Segment 8A.2 would be located on an existing levee bordering Coyote Creek., as well as along a levee bordering the south side of Line B. The trail segment would terminate either at Dixon Landing Rd., or through Newby Island Landfill property near the landfill entry gate before connecting to McCarthy Blvd. This area is being studied in greater detail in a separate Bay Trail Feasibility Study. The exact ownership of the levee is unclear, with portions of it owned by King and Lyons, associated with their ownership of the adjacent vacant parcel that has been approved for construction of the Creekside Landing Business Park., and portions of it owned by the State Lands Commission, under a settlement agreement related to the realignment of the historic course of Coyote Creek. The Creekside Landing development agreement between the City of Fremont and King and Lyons requires that they make the levee along Coyote Creek available for construction of a trail, but not that they construct or operate and maintain the trail. The agreement does not cover use of the levee along the south side of Line B. The immediate adjacent lands to the east of Coyote creek consists of a muted tidal wetlands area, with the Line B levee on the north, and the approved business park located further to the east of this. Tidal wetlands occur along Coyote Creek, including several small wetlands connected to Coyote Creek via regulated tide gates that were constructed as mitigation projects. The Newby Island Landfill lies further to the east, on the other side of Coyote Creek. The existing levee top service roadway is fairly narrow, 12 to 14 feet wide, and in places the levee bank slopes are eroding and steeply sloping. In addition, the levee has a fairly low surface elevation, below the height of the 100-year flood.

Issues

- Levee ownership is un-certain in places, and ROW agreements with State Lands, King and Lyons, and possibly ACFCWCD and Newby Island Landfill operators, will be needed to secure permission to construct and operate this trail segment.
- Improving the levee by raising its elevation and repairing and stabilizing eroding side slope areas is challenging because of the occurrence of wetlands adjacent to the levee, requiring fill placement in the wetlands to accomplish. The adjacent wetlands contain known occurrences of the fully protected and endangered Salt Marsh Harvest Mouse. However, some improvements can be made to the levee including stabilizing side slopes using biotechnical methods, and locally widening the surface to construct turn outs. This segment can be considered as a part of an interim trail, before the Bay Trail along the planned extension of Fremont Blvd. is constructed as described in segment 8B.
- A pedestrian bridge crossing of Line B will be required, either from USFWS Refuge lands on the west end of the north levee of Line B, or from ACFCWCD lands on the north levee of line B, to the east and near Fremont Blvd.
- Permits from bridge construction and for construction of the levee improvements will be required from the US Army Corps of Engineers, the SF Bay Regional Water Quality Control Board, and the California Department of Fish and Game, as well as consultation with the USFWS on endangered species issues.

Recommendations

- This is a high priority section for trail implementation within the overall project Study Areas.
- Construction of the Coyote Creek levee trail will eliminate a key gap in the Bay Trail, providing a connection to the existing Bay Trail near upper Mud Slough (Segment 7A) and other opportunities to the north, and Coyote Creek Trail to the south.
- Interim levee improvements, signage, and wayfinding will be important components of the project in this area.

8 ON STREET TRAIL SEGMENT

8B: FREMONT BOULEVARD EXTENSION AFCWD LINE B TO DIXON LANDING ROAD

4,000 LF

Existing Conditions

Fremont Blvd. to the north is a principal arterial in southern Fremont. This segment passes through the vacant commercial parcel of approved Creekside Landing Business Park and adjacent to a small restored muted or partially tidal wetland. As a condition of approval, the developer will be required to extend Fremont Blvd. to McCarthy Blvd., including providing a paved and landscaped Bay Trail paralleling the extension and improvements at the new Fremont Blvd.-Dixon Landing intersection. The Coyote Creek Trail system originates near McCarthy Blvd., and a trail system around and near City of San Jose wastewater treatment ponds also occurs in this area.

Issues

- This street extension and associated trail improvements will close a significant Bay Trail gap, and provision of off-street facilities adjacent to restored wetlands will enhance user experience.
- Construction of the trail will require grading, a new trailway surface through elevated fill pads, and bridge crossings of Line B and Scott Creek.
- Timeframe for implementation is unknown, as the improvements are associated with the construction of Bayside Business Park Phase II.
- Bay Trail goal is to have off-street trail facilities that accommodate bicyclists and pedestrians.

Recommendation

- Provide trail connection through property to close Bay Trail gap. This alignment could be located at proposed future trail location or along existing levee road owned by ACFCWCD, State Lands Commission, and King and Lyons (see Segment 8A.2).

5. OPPORTUNITIES AND CONSTRAINTS

Selecting the appropriate alignment(s) and best fit for a trail system, as well as providing appropriate trail design elements requires the evaluation of trail conditions, including opportunities and constraints to minimize potential physical, biological, and land use conflicts, and ensure that the trail is safe and enjoyable for users, geotechnically stable, and does not require constant, costly maintenance. In addition, the trail should meet the goals and objectives established in the applicable General Plan(s), local bicycle and pedestrian plans, and other guiding documents. Trail constraints consist of physical, biological and land use and land ownership conditions, or obstacles that need to be carefully evaluated and considered in alignment selection and trail design. Trail opportunities are improvements or elements that enhance, simplify or mitigate trail issues.

Each of the study segments was ranked based on an analysis of their existing conditions, constraints and opportunities. A decision matrix was utilized to rank the potential trail segments based on project goals, trail design issues (discussed in Section 7) and are identified below. Each criterion had a weighting factor reflecting its relative importance:

- Consistency with Bay Trail Policies
- Wildlife and Wetlands Resource Sensitivity
- Geotechnical/Hydrology/Flooding Issues
- Land Use and Safety
- Land Ownership/Available Right of Way
- Relative Cost/Infrastructure Needs
- User Experience and Community Survey Preference

5.1 EVALUATION CRITERIA

1. Consistency with Bay Trail Policies

Bay Trail alignment goals, objectives and policies were developed as part of the Bay Trail Plan, and are used to evaluate and guide the adoption of trail segments as part of a continuous Bay Trail System.

Ranking:

1 Consistent with many/most of Bay Trail policies
2 Consistent with some Bay Trail policies
3 Not consistent with Bay Trail policies

2. Wildlife and Wetlands Resource Sensitivity

Noise, intrusion, pets and other factors associated with public access can affect sensitive wildlife resources and wildlife populations. Portions of the Study Area contain existing sensitive wildlife habitat, including areas of threatened and endangered species habitat, areas of restored habitat, or areas set aside as protected habitat for endangered species in dedicated mitigation areas, some of which may limit or preclude public access.

Wetlands, including waters of the United States and the State of California that are subject to regular flooding, ponding, and tidal inundation significantly limit suitability for public access, especially if they require placement of fill or a structure, such as a bridge or boardwalk across or through them. Many of the seasonal wetlands that occur within the Study Area are degraded or of poor quality, but also represent a constraint in that they require regulatory permit approval, and may require compensatory mitigation.

Ranking:

1 High benefit or low effect on resource; adjacent areas not subject to regular tidal flooding or seasonal ponding, minimal wetlands impacts
2 Moderate benefit or some potential effect; adjacent areas subject to periodic riverine or tidal flooding or seasonal ponding, within or adjacent to poor quality wetlands suitable for enhancement
3 Low benefit or potentially significant negative effect; adjacent areas may be subject to regular tidal flooding or seasonal ponding, within or adjacent to high quality wetlands and sensitive species habitat.

3. Geotechnical/Hydrology/Flooding Issues

The most significant geotechnical constraint within the Study Area is the presence of Bay Mud, which consists of historic tidal marsh sediments. Much of the area of historic tidal marsh has been converted to salt ponds. The Bay Mud sediments are soft and highly compressible, and provide poor foundations for roads, pathways and structures.

Historic levees located on Bay Mud, including the salt pond levees were often constructed using dredged Bay Mud material. Other developed areas consist of imported artificial fill placed on Bay Mud, or areas of alluvial sediments adjacent to and at elevations just above the historic tide lands. Historic levees may not be well engineered, and as a result may subside, settle, erode, or be overtopped by extreme tides and high slough flood flows.

Not all of the levees which occur within the Study Area are underlain by Bay Mud, and some that have been better engineered, while other levees constructed using Bay Mud are inspected and maintained with a high degree of professional attention. The issue is complex and requires a detailed analysis of specific levee segments to determine their construction and maintenance history, elevation, and existing condition.

Many trail facilities, especially bridge crossings, are located with the 100-year floodplains of rivers and streams, or the 100-year high tide, and require additional consideration in trail and structure design, or necessitate more frequent maintenance to periodically clear flood debris, repave or rebuild washed out sections and repair damage. Typically bridges are located at least 3 feet above expected flood levels. Most often trail occurrence in an area of shallow and/or low velocity flooding is not seen as a major constraint. However crossing poorly drained areas, or installing trail drainage structures such as causeways and culverts can be expensive to construct and maintain.

Most of the trail segments being evaluated within the Study Area are located within areas designated on FEMA Flood Insurance Rate Maps (FIRM) as subject to shallow flooding during extreme bay tide events, although the upper or eastern areas along the major slough channels (near the UP Railroad tracks) may be subject to traditional riverine flooding during a large flood event, or if a levee break occurs.

Areas outside of FEMA designated 100-year floodplains were given a better ranking than those within the FEMA 100 year floodplain. Levee segments that were mostly on Bay Mud were given the most significantly constrained ranking, levees that were mostly not underlain by Bay Mud, but by alluvial deposits were given an intermediate ranking, while segments not on levees and not underlain by Bay Mud were given the least constrained ranking.

Ranking:

1 Not a levee trail segment; an/or not underlain by Bay Mud deposits; outside FEMA 100 year floodplain
2 Levee trail segment, but not underlain by Bay Mud deposits, or on well engineered fill; within 100 year floodplain
3 Levee trail segment underlain by Bay Mud deposits; levee constructed using Bay mud; area within 100 year floodplain

3. Land Use and Safety

This is a key component for any public access facility located adjacent to private properties that may have concerns about privacy and security and conflicts with their day to day operations. Alternatives that have potential impacts on the security, privacy, or day to day operation of business of adjacent land uses would score lower than other project alternatives. Trail segments along rail corridors were given the lowest score (highest points) because of noise and safety concerns.

Ranking:

1. Trail in open area, not adjacent to residential or industrial use
2 Trail adjacent to residential or industrial use, may require periods of trail closure or installation of security measures such as fencing and CCTV cameras; potential user safety conflicts along street
3 Significant operational conflict with adjacent use; user safety issue along arterial street
4 Railroad safety issue along rail corridor

5. Land Ownership/ Available Right of Way

The availability of public right-of-way for a trail is a very important criterion. Alternatives that require the purchase of easements or property may involve timely and complex negotiations, and add significant land costs. Since trail projects are typically not completed using eminent domain, a willing property owner is most often needed for project implementation. However, combining public access with planned infrastructure improvements, even future infrastructure improvements, such as flood control levees, and making trails conditions of approval for future development projects provide realistic opportunities for trail implementation.

Projects on private lands or where an existing long term agreement makes public lands un-available in the near future would score much lower than projects where right-of-way ownership is already in place, or where there is a cooperating public partner agency. Likewise, an unwilling private property owner represents a significant constraint. Cargill has indicated an unwillingness to locate trails on lands they own, operate or manage. UP is unlikely to allow trails within their right of way due to expansion and upgrade plans within regional framework planning.

Ranking:

1 Publicly owned right of way
2 Privately owned land planned for future development, and/or where ROW is needed for minor bicycle/pedestrian improvements along street
3 Privately owned land or public lands under private management where no development project is anticipated, and/or where ROW is needed for extensive bicycle/pedestrian improvements along street

6. Relative Cost and Infrastructure Needs

In addition to right of way or land acquisition costs, relative cost issues include need for infrastructure, utility relocation, or special construction techniques for trail installation, such as bridges, boardwalks, retaining walls, drainage facilities, special construction techniques, street reconfiguration, etc. Additional information regarding infrastructure costs and ranking is contained in the ABAG Gap analysis. This ranking does not directly factor in railroad grade separation, but is noted as a potential additional cost.

Ranking:

1 Easy to construct (trail located on existing levees, roads, crossings, etc.)
2 Moderate construction cost (retrofit existing crossings, bridge spans less than 200 ft., boardwalks less than 500 feet, minor grading, infrastructure)
3 Significant infrastructure challenges (street reconfiguration, signals, ramps, walls, long bridges and boardwalks, utility relocation, etc)

7. User Experience/ Community Survey Preferences

The project should appeal to the widest variety of users possible, including bicyclists, walkers, joggers, disabled users and others. At the public workshops held in Fremont and Newark, members of the public were invited to prioritize key issues such as visual impacts, trail connectivity, proximity to neighborhoods, safety concerns, privacy, etc. Virtually all public participants favored a Bay Trail system that was near the Bay and not on city streets, even if implementation were in the distant future and were associated with creation of a new levee system for flood protection and sea level rise mitigation. Connections to local trails and bike lanes were also voiced as being very important. Participants generally expressed concerns regarding safety and quality of experience if the trail is placed on busy streets or along the rail corridor. The results of the public workshops are reflected in the matrix. Worksheets from the public workshop are contained in Appendix A.

Ranking:

1 Consistent with community survey preferences
2 Somewhat consistent with community survey preferences
3 Not consistent with community survey preferences

5.2 RANKING MATRIX

Table 5-1 identifies the ranking for the criteria in each study segment, with the lowest scores indicating the most viable segments. Based on this evaluation, the preliminary preferred alignment is identified in Section 6.

Table 5-1: Ranking Matrix

SEGMENT	CRITERIA								TOTAL	NOTES
	1. Bay Trail Policies	2. Wildlife & Wetlands Sensitivity	3. Geotechnical Hydrology Flooding	4. Land Use & Safety	5. Right of Way	6. Cost & Infrastructure	7. Public Workshop Criteria			
1A	1	2	3	2	1	1/2	1		11-12 *	
1B	2	2	2	2	2	2	2		16	
2A.1	1	2	2	2	2	1	1		11 *	
2A.2	2	2	2	2	1	1	2		12	
2B	3	1	1	3	2	2	3		15	
3A	1	3	3	2	3	2	1		15 **	
3B.1	3	1	1	3	2	2	3		15 **	
3B.2	3	1	1	3	2	3	3		16	
3C	3	1	2	4	3	3	3		20	
4A.1	1	3	3	1	1	1/2	1		11-12	
4A.2	2	2	2	2	2	1	1		12	
4B.1	3	1	1	2	1	2	3		13	
4B.2	3	1	1	3	2	3	3		16	
4C	3	1	2	4	3	3	3		19	

SEGMENT	CRITERIA								TOTAL	NOTES
	1. Bay Trail Policies	2. Wildlife & Wetlands Sensitivity	3. Geotechnical Hydrology Flooding	4. Land Use & Safety	5. Right of Way	6. Cost & Infrastructure	7. Public Workshop Criteria			
5A	1	3	3	2	2	1/2	1		13-14	
5B.1	3	1	1	2	1	2	3		13	
5B.2	3	1	1	3	2	3	3		16	
5C	3	2	2	4	3	3	3		20	
6A.1	1	3	3	2	2/3	1/2	1		13-15	
6A.2	1	3	3	1	1	1/2	1		11-12*	
6B.1	3	1	1	2	2	1	3		13	
6B.2	2	1	1	3	2	1	1/3		11-13	
6C	1	3	3	4	3	3	1		18	
7B	3	1	1	3	1	1	3		13	
8A.1	1	2	2	2	2	2	1		12**	
8A.2	1	2	3	1	2	2	1		12**	
8B	2	2	2	1	2	1	2		12**	

** Apparent Lowest Score for Each Segment*
*** Apparent Tie*

A Group – Shoreline Segments
B Group – On-Street Segments
C Group – Rail Corridor Segments

5.3 RESULTS OF RANKING ANALYSIS AND PREFERRED ALIGNMENT DESIGNATION ADD TO TOC

The ranking matrix provides preliminary guidance regarding a trail segment's suitability and apparent preference for Bay Trail designation, consistent with established policies and environmental characteristics. The bay shoreline alignments (A designations) generally scored slightly lower in points (higher preference) than the on-street, urban alignments (B designations). Trail alignments along the rail corridor (C designations) consistently scored the highest points (lowest preference), and would likely not be permitted unless located some distance away from the rail ROW.

The shoreline segments are generally adjacent to wetlands and sensitive habitat, occur on levees on Bay Mud, and may have Right of Way issues, (all of which are constraints that score relatively higher points) while counterbalancing this, the on-street options generally do not meet fully Bay Trail goals, do not provide a highly positive trail user experience, and potentially have significant infrastructure improvement costs in street realignment and utility relocation. All of these result in higher scores.

In addition, the clear community preference was for a shoreline trail alignment for the Bay Trail, even if it would take many years to fully implement.

6. PRELIMINARY POTENTIAL ALIGNMENT

6.2 PREFERRED ROUTE

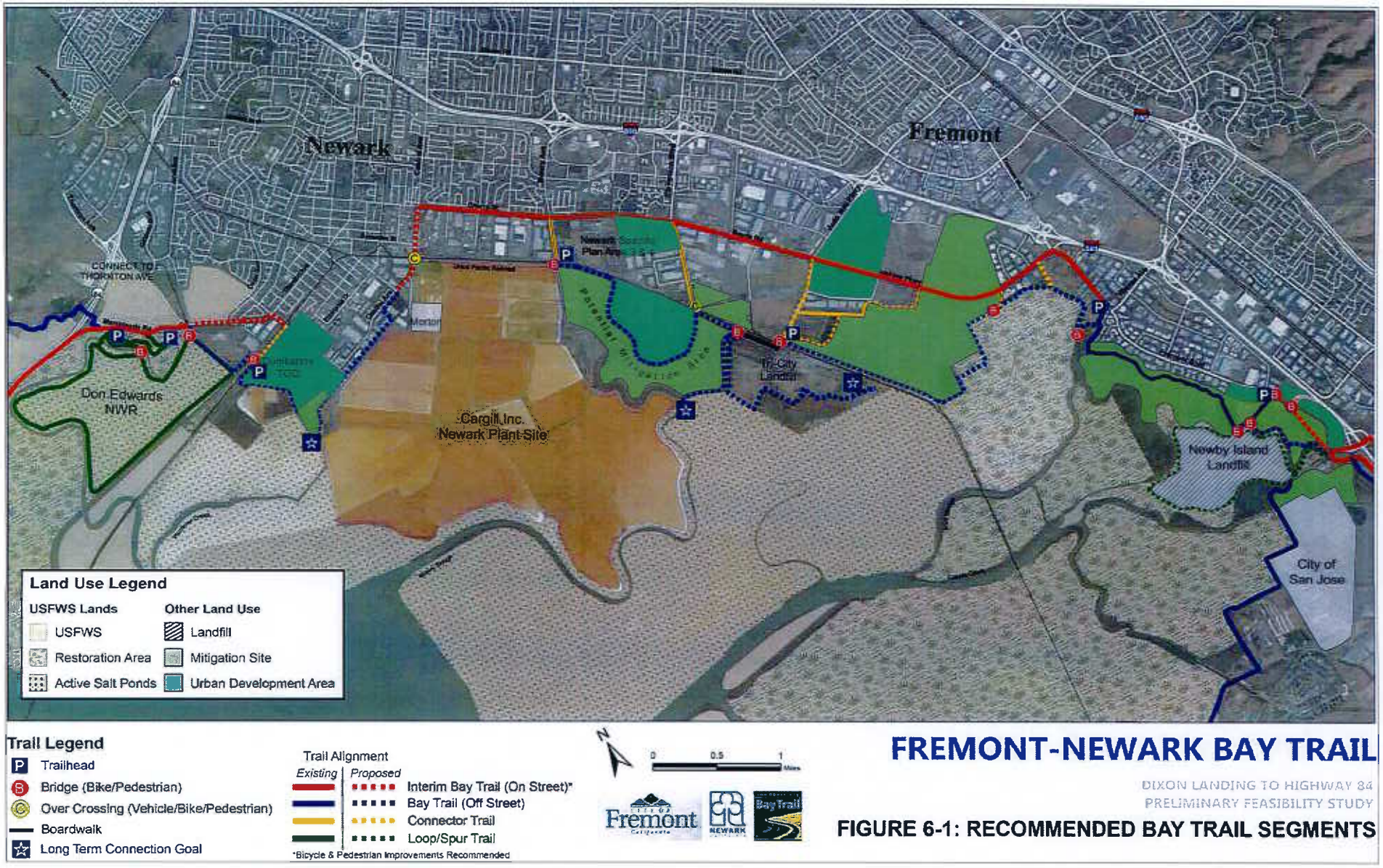
Construction of a continuous shoreline-oriented Bay Trail through the Study Area is a challenging, long term commitment. The trail will likely be completed in individual segments: when opportunities occur for trail construction in conjunction with other development projects, when right of way and/or funding becomes available. The most challenging segment will be to connect the Bay Trail around Cargill's Newark Plant Site. Cargill has expressed reservations about any trails in the areas on or around their operations. An alternative, interim alignment to connect this potential gap between the Dumbarton TOD trails and Areas 3 and 4 Specific Plan trails is to utilize Cherry Street, which the Bay Trail Plan designates as the Bay Trail, but is mostly unimproved. Cherry Street in this area, does not have continuous sidewalks, bicycle lanes or pedestrian accommodations that would provide a safe and enjoyable route for Bay Trail users. In addition, there are challenges along Cherry Street due to existing infrastructure along each industrial parcel such as driveways, utilities, parking areas, mounded landscaping, etc.) that might necessitate significant construction to create a suitable trail connection.

Some use of on-street options should be included, to provide connector trails to neighborhoods, including improvements on Central Ave., Mowry Ave., Stevenson Blvd., Auto Mall Parkway, Thornton Ave. and Fremont Blvd. However, since these trails provide connections and links to neighborhoods and other trails, rather than functioning as a primary shoreline route (it will be costly to make the needed infrastructure improvements), on-street options that improve the existing sidewalk and bike lanes should be considered when they are associated with other development projects, capital improvement projects, such as Green Streets/Complete Streets projects, or Bicycle Plan implementation.

Plan and policy level language should be included in the General Plan and applicable agency documents to affirm each community's commitment to a long term shoreline-oriented trail system within the Study Area.

The preferred Bay Trail alignment is shown in Figure 6-1. The map also shows connections, interim alignments and other trails that will provide connections to the Bay Trail as part of a comprehensive trails network. The section in the vicinity of Cargill's Newark Plant Site (Segment 3) is shown using a broad swath, since coordination needs to occur with the interested stakeholders, who do not currently believe the proposed route is feasible because of operational conflicts and sensitive species issues. Clearly the Bay Trail through this area will be a long- term goal, and may possibly be completed associated with planning for future regional flood control systems to address climate change issues. However, considering the relatively small amount of urban land presently within the 100-year floodplain in the Newark-Fremont area, there may not be an immediate need for providing such a levee system. Figure 6-2 shows how the Bay Trail through the Newark-Fremont area would look in the future, with a connected, shoreline oriented trail and local and regional connector trails that form a comprehensive trails network. The recommended Bay Trial alignment changes are proposed and subject to approval by the cities of Newark and Fremont, as well as the Bay Trail Project Board of Directors.

As indicated above, implementation of the ultimate Bay Trail as close to the bay shoreline and adjacent tidal marsh areas and seasonal wetlands as possible is a long term goal that will be implemented in segments over time as conditions change in the planning area and as specific opportunities arise and are taken advantage of by local governments. The recommended alignment, which is designated as the Preliminary Potential Alignment and shown on Figure 6-1, includes the following distinctions:



FREMONT-NEWARK BAY TRAIL

DIXON LANDING TO HIGHWAY 84
PRELIMINARY FEASIBILITY STUDY

FIGURE 6-1: RECOMMENDED BAY TRAIL SEGMENTS

Legend

- Bay Trail (off street)
- Bay Trail (on street)
- Other Trail
- Long Term Connection Goal
- Boating/Marina
- Parking
- Bridge
- Crossing

0 0.5 1 Miles

FREMONT-NEWARK BAY TRAIL

DIXON LANDING TO HIGHWAY 84
PRELIMINARY FEASIBILITY STUDY

FIGURE 6-2: FUTURE BAY TRAIL

1. Preferred Alignment - this includes the trail areas on public lands or on private lands associated with a proposed development project or other action requiring local government approval where construction and dedication of a the Bay Trail, or the granting of an easement or licensing agreement appears relatively straightforward.

   Bay Trail construction will occur in a variety of ways, as opportunities arise. This could be through private development or governmentally funded projects. For instance, construction of the Bay Trail west of Cherry Street, between Mowry Ave. and Stevenson Blvd. might be coordinated with implementation of Specific Plan Areas 3 and 4, when the Stevenson Blvd. overpass is constructed.

2. Interim Alignment - It will not be possible to construct the Bay Trail close to the Bay westward around the Cargill Salt Ponds unless consensus is reached with the property owner, and/or the land use changes, which is not anticipated in the near future. The current Bay Trail Plan alignment as shown along the Union Pacific Railroad tracks is not desirable from a safety or aesthetic perspective, and it does not appear to be feasible due to lack of available Right of Way (especially considering proposed track expansion plans in this area). An *interim* on-street alignment along Cherry Street is shown for this area. This will require some safety related improvements be made, associated with implementation of the City of Newark's Bicycle and Pedestrian Plan.

   Similarly, construction of a connection to the Bay Trail south of Stevenson Blvd. cannot be made on the east side of the UP railroad tracks and through the Pacific Commons mitigation parcel, and the trail route must occur on Tri Cities Landfill land west of the UP Railroad tracks. This may also require the eventual construction of a pedestrian overcrossing of the UP Railroad Tracks at the west end of Auto Mall Parkway connecting the Tri Cities Landfill at some time in the future, possibly associated with construction of a park on city lands east of the landfill. An *interim* on-street alignment along Boyce Road, as with Cherry Street, is shown for this area. This will require some improvements that can be made, associated with implementation of the City of Fremont's Bicycle and Pedestrian Plan.

3. An alignment is also shown along the levee on the east side of Coyote Creek and on the south side of Zone 6 Line B at the south end of Fremont Blvd. near Newby Island Landfill and Dixon Landing Road. This alignment on the levee top will require some levee improvements and side slope stabilization. There is an opportunity for a loop trail when Fremont Blvd is extended to connect to Dixon Landing Road at some time in the future, associated with the development of Creekside Landing, and a trail segment is built adjacent to the new street.

4. Trail Connections are also designated on the *Preliminary Alignment* Plan. These are mostly on-street facilities that connect a Bay Trail segment either to an Interim alignment, or to a local trail or bikeway system. In some cases the connections could also be considered for use as interim facilities, that would become part of a network of pedestrian and bicycle facilities once the spine of the Bay Trail is completed. As with the interim alignments, some improvements might be needed to the trail connections to make them safer and more bicycle/pedestrian friendly.

4. Loop/Spur Trails. These are recreational trails that are either loops around an area such as wetlands or spurs to a specific destination point, such as Mowry Slough. Loop trails are shown within the Newark Area 3 & 4 Specific Plan, around Tri-Cities Landfill, and around Newby Island

Landfill. The landfill loops cannot be presently constructed as the landfill managers use the existing roads for maintenance and monitoring activities.

5. Preferred Alignment-Existing. In some cases a pathway or widened sidewalk exists, and is suitable with minor modifications, such as signage, for designation as a part of the Bay Trail. This includes the pathway through the Pacific Commons area and along Cushing Parkway.

6. Existing Bay Trail. There are two existing and constructed segments of the Bay Trail within the Study Area, at the north end, the loop around the Don Edwards Wildlife Refuge, and near the south end, the existing segment east of Mud Slough and south of Fremont Blvd., behind Bayside Business Park. When plans are being prepared to construct adjacent sections of the Bay Trail, these existing trail segments should be re-visited to determine if additional improvements are warranted, such as wayfinding signage, benches, and trail surfacing improvements.

7. Long Term Connection Goal. This designation symbol has been placed in two areas on the Plan, around the west side of Cargill's Newark Plant Site, and along the east side of the Tri Cities Landfill. These are areas where it is not presently considered feasible to construct a trail because of operational conflicts with adjacent land uses. The adjacent land use and operations will need to change before a trail can be constructed in these areas, and the land owner will need to be a willing seller. The timeline for such a change is not known, but may be some distance into the future.

In addition to the trail alignment designations, a number of other public access features are shown on the *Preliminary Potential Alignment*, including:

- Trailhead Parking Areas, some of which are existing and need minor improvements such as bay trail designations and wayfinding signage, and some will be new staging areas
- Bridges- New bridge crossings of sloughs are needed at:
  - Zone 5 Line L; Upper Newark Slough near Don Edwards Headquarters, Marshlands Road
  - Zone 6, Line N,; tributary to Mowry Slough, adjacent to Tri Cities Landfill
  - Zone 6, Line E; near Pacific Commons Mitigation Site II
  - Zone 6 Line E; upper Mud Slough near Bayside Business Park Mitigation Site I
  - Zone 6 Line B; near Creekside Landing Phase II and Fremont Blvd. extension
  - Zone 6 Line A, Scott Creek at Creekside Landing Business Park Phase II and Fremont Blvd. extension
  - Zone 6 Line B; tributary to Coyote Creek near Newby Island Landfill

  In addition to these bridges, pedestrian bridges over Plummer Creek and middle Mowry Slough may be needed in the future to accommodate an envisioned trail around the western side of Cargill's Newark Plant Site.

- Railroad Over-Crossings- Four potential Railroad Overcrossings are shown on the Plan, including crossings at the proposed Dumbarton TOD, at Mowry Ave., at Stevenson Blvd. and at Auto Mall Parkway. Because of their costs, these facilities will likely be constructed associated with a

development project, and not uniquely for Bay Trail use. In most cases these will be automobile over-crossings that have bicycle/pedestrian facilities incorporated into them.

6.3 PROJECT PRIORITIZATION AND PHASING

Projects can be selected and ordered in terms of priority and phasing by considering such factors as the following:

- Connectivity to other local and regional trails
- Fill-in of a short trail gap to make a larger, continuous trail segment
- Ease of implementation and low cost, to build momentum
- Availability of Right of Way
- Proximity of trail to trail user population groups

Certain other factors influencing prioritization and phasing, including:

- High segment construction costs
- Lack of available Right of Way
- Opposition by stakeholders or neighbors
- Environmental and permitting issues

In addition, the implementation of certain segments will be tied to other specific projects, such as the commercial development of a parcel through which the trail has been aligned, or construction of a transportation project. These projects, and the Bay Trail component of them, will proceed independently within each construction implementation schedule.

Based on a consideration of the above factors, the following is the recommended prioritization of projects. Conditions change over time and the Bay trail has traditionally been built by opportunistically taking advantage of situations where a trail can be constructed.

Top Priorities

1. Segment 8A.2: Coyote Creek Gap. This is one of the top priorities as construction of this segment will allow a connection to the Coyote Creek Trail in San Jose and Santa Clara County as well as connecting to the existing Bay Trail segment 7A, west of Fremont Blvd.

2. Segment 6A2 Mud Slough to Pacific Commons Area This would include construction of the shoreline segments on city-owned right of way, public access implemented as part of the South Bay Salt Ponds Restoration project, and around the Warm Springs and Pacific Commons Mitigations sites connecting the Tri Cities landfill area near Auto Mall Parkway with existing Bay Trail segment 7).

Medium Priorities

3. Segment 1A: Connection from Existing Bay Trail Don Edwards Refuge to Plummer Creek. Segment 2A1 Dumbarton TOD area, 2A.2: Connector Trail along ACFCWCD levee road and Central Ave. interim on-street improvements would be made associated with construction of the Dumbarton TOD.

4. Segment 5 Tri Cities Connection: from Specific Plan Area 3&4 to Tri Cities Landfill; to be implemented same timeline as Specific Plan; portions can be implemented with improvements proposed to be made at landfill.

5. Segments 3B1 - 3B2 (Central and Cherry Streets) and 5B1, 6B1, 6B2 (Stevenson Blvd., Boyce Rd., Auto Mall Parkway) These are on-street interim alignments and connectors that would be implemented associated with Bike/Ped Plan improvements or other Capital projects, most likely following the development of Specific Plan Areas 3&4.

Long Term Goal

6. Segment 8: Newby Island Loop- timeline unknown

7. Segment 3: West side of Cargill Newark Plant Site- timeline unknown

7. DESIGN GUIDELINES

This Section discusses the physical and environmental issues related to trail design, so that the proposed public access improvements maximize the trail user experience, yet minimize impacts to the environment. In general, the trail system should be designed to accommodate a wide range of users of varied abilities, including bicyclists (both road and mountain bikes), pedestrians/hikers, people in wheelchairs and with other mobility limitations, and considerations for maintenance, shared utility use, and emergency access. The trail design will also comply with applicable trail standards of the managing agency, such as USFWS, cities of Fremont or Newark, ACFCWCD, etc.

7.1 TRAIL WIDTH, SURFACE, TYPE AND USE

The trail surface must be designed to accommodate pedestrians, bicycles, and others with two-way traffic, and on occasion, patrol, maintenance, and emergency vehicles. Because of the need to meet these requirements, a minimum 14-foot wide trail (10-foot surfaced, 2-foot gravel shoulders) is recommended, with turnouts located in key areas. In constrained areas, the trail can be as narrow as 8 feet. Each phase of trail implementation should be evaluated for compliance with current ADA requirements, and comply with applicable provisions of the following standards, if applicable:

- Bay Trail design guidelines and standards
- BCDC Shoreline Access Guidelines
- USFWS Design guidelines for trails within Refuge lands
- Caltrans Highway Design Manual on Bikeway facilities (Chapter 1000)
- Manual on Uniform Traffic Control Devices (MUTCD), part 9 and California Supplement
- Americans with Disabilities Act
- AASHTO Guide for the Development of Bicycle Facilities (1999)
- National Highway Institute Pedestrian Facility Design
- Newark and Fremont trail design standards and specifications
- ACFCWCD maintenance access requirements

Bay Trail Plan Design Guidelines

Consistency with the Bay Trail Plan design guidelines is important in order to create a regional trail system that provides similar accommodations for trail users and maintenance access. Almost all of the segments would be considered multi-use paths, with some areas to be paved, and others with a hardened or stabilized gravel trail surface. The Bay Trail Plan Design Guidelines for implementation of new trails is presented in Table 7-1.

Table 7-1: Bay Trail Design Guidelines

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

** Standards meet Caltrans Class I bikeway standards*

[a] Minimum widths that are less than 5' will be required to have 5'x5' turnouts at intervals to meet accessibility standards.

[b] High-use pedestrian path could be hardened surface other than asphalt, such as stabilized fine aggregate.

[c] Natural surfaces may require surface hardening to provide accessibility.

[d] Area specified is area on both sides of the trail.

[e] Percentage grade for short distances with flat rest areas at turn outs, except where site conditions require a greater slope for short distance.

The trail surface should be a durable material that complies with universal access needs. Paving designs should be selected that provide permeability, where appropriate, and fit with the rural setting. In some locations, it may be appropriate to remain as "natural" as feasible, and the trail could be constructed as a permeable path with stabilized or cemented aggregate base. Special design considerations, including use of geosynthetic stabilizers (geocells) for areas of soft or organic soils, and surface treatment to withstand ponding may be needed in some areas. In addition, the surface will need to be designed to accommodate ongoing levee settlement, so trail areas on levees probably cannot be asphalt paved. Trail sections along ramps, bridges, rail crossings and boardwalk approaches, and any trails that will be routinely utilized by motorized vehicles for access and maintenance should be paved.

In areas where new asphalt paving is needed, the trail should consist of a minimum 10-foot wide asphalt pathway using 3 inches of asphalt concrete, with 2-foot wide (minimum) shoulders of 4 to 8 inches of Class 2 aggregate base (AB).

The trail should generally be elevated slightly above existing grade, with a cross slope of 2% to provide drainage and trail compaction. Where the trail is located near or over an existing road, the trail should be separated by a vegetated strip or shoulder that is a minimum five feet wide to separate trail users from vehicular travel.

Levee integrity, slope stability, erosion potential, and pathway drainage issues will need to be carefully evaluated during the design of each trail segment. In general, the trail should be outsloped to minimize

slope disturbance. Special precautions may also be needed in placement of fencing and retention structures to avoid or minimize fill placement where existing roads, grades or crossings need to be elevated adjacent to wetlands.

Weed management may be needed along the trail if stabilized aggregate is used, because weed seeds can invade some of the fine cracks that develop in these materials, and non-native invasive species often colonize disturbed areas. Annual spring upper levee mowing, and/or spraying with an herbicide approved for use near wetlands and water bodies, or other form of weed control may be needed in the spring to discourage colonization by invasive plant species. Weed management would need to be consistent with Refuge management guidelines as well as Bay-Friendly landscape requirements applicable to Fremont, Newark, and Alameda County.

7.2 DESIGN ISSUES NEAR RAILROADS

Use of the Rail Corridor Alignment for a Trail

This section of rail line has been identified in numerous plans for expansion of trackage and increased train use to serve San Jose to Sacramento and beyond. It is UP's policy not to support any trails on or near their right of way, and they intend to preserve all right of way for future operating growth. Federal rail guidelines require a minimum setback of 25 feet from the centerline of a rail to adjacent facilities. It may be likely that rail expansion necessitates acquisition of additional right of way for track expansion; if this infrastructure is developed, then opportunities for shared use of service roads or other facilities that parallel the rail line should be explored at that time.

Placing a trail immediately adjacent to a high volume rail corridor may also require infrastructure elements such as security fencing, CCTV surveillance elements, lighting, noise attenuation walls and/or other infrastructure that may affect the trail user experience. Shared use of utility roads may also require special surface treatment, thicker pavement sections, monitoring equipment or other elements to facilitate utility services.

Trail/Rail Crossing Issues

In addition to considerations for a trail along the rail corridor, providing access to the shoreline from the neighborhoods and business parks of Newark and Fremont may necessitate crossing the rail line. Within the Coast Subdivision between Santa Clara and Newark there are 21 at-grade rail/highway crossings, 12 of which have active warning devices consisting of bells, flasher signal lights and gates. Nine of these crossings, classified as private crossings, have only stop signs or crossbuck signs. Within the Study Area, these include public at-grade crossings at Central Avenue, Mowry, Stevenson, and the private Auto Mall Parkway crossing.

Railroad crossings are regulated by the California Public Utilities Commission (CPUC), including setbacks, grade separation, and use issues. General Order 26-D dictates setbacks, and General Order 75-D contains regulations for at-grade private rail crossings. In general, the CPUC strongly prefers that new rail crossing projects be grade separated, and often requires a nearby at-grade crossing to be removed if a new one is approved.

The California Public Utilities Code Section 7537 regulates private railroad crossings in conjunction with General Order 75-D:

> *The owner of any lands along or through which any railroad is constructed or maintained, may have such farm or private crossings over the railroad and railroad right of way as are reasonably necessary or convenient for ingress to or egress from such lands, or in order to connect such lands with other adjacent lands of the owner. The owner or operator of the railroad shall construct and at all times maintain such farm or private crossing in a good, safe, and passable condition. The commission shall have the authority to determine the necessity for any crossing and the place, manner, and conditions under which the crossing shall be constructed and maintained, and shall fix and assess the cost and expense thereof.*

Conversion of a private crossing to a public crossing would be subject to agreement from the property owner, the regulatory authority of the CPUC. Recent discussions with the CPUC regarding use of the Tri-Cities landfill for a recycling facility and potential public access trail included the CPUC opinion that the existing private crossing at Auto Mall Parkway could not include public access without the provision of grade separation.

Grade separation of trail facilities is a probable CPUC recommendation for any new designated public access trail crossing, such as at the end of Auto Mall Parkway, at Tri-Cities Landfill.

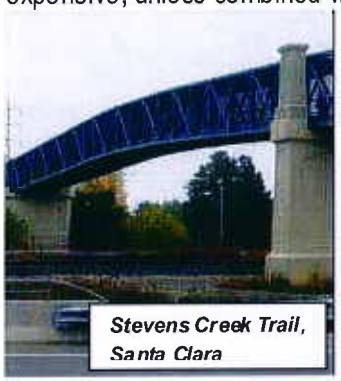
Grade Separation Guidelines

In urbanized areas, the decision to create grade-separated crossings where an at-grade crossing already exists is often a factor of volume of use. The Manual on Uniform Traffic Control Devices (MUTCD) Guidelines recommend evaluation of all at-grade crossings as part of projects, due to the potential for accidents and congestion. A review of literature regarding pedestrian grade separation projects generally utilizes pedestrian traffic volumes of at least 100 users per hour, or higher peak averages when considering grade separation. Table 7-2 provides some general guidelines to determine the appropriate use of underpasses vs. overpasses for grade separation.

Table 7-2: Railroad Grade Separation/Crossing Guidelines

Design Issue	Underpass	Overpass
Vertical Clearance	8.5 to 10 ft. + 3 ft. cover	26 ft. +
Access Ramp	100 ft.+	208 ft. +
Utility Conflicts	Possible	No
Drainage	Pump may be needed	No
Security/Visibility	May be needed depending on location	May be needed depending on location
Cost	$500K +	$1M+
Vandalism	Yes	Yes (need enclosed crossing)

Guidelines for Overpasses. In general, overpasses are utilized to separate high-volume/high-speed pedestrian and motorized traffic. A typical overcrossing of a railroad is elevated more than 26 feet above the tracks, with approach ramps for ADA access at a maximum grade of 5% slope (limited segments may be slightly steeper if a level landing area is provided). Within the Study Area, the flat topography and low elevations would necessitate a long approach ramp, with potential geotechnical issues associated with footing placement and landings. It is likely that the structure would be visually imposing, and relatively expensive, unless combined with traffic grade separation projects.



Stevens Creek Trail, Santa Clara

AMTRAK, Emeryville, CA

AMTRAK, San Luis Obispo, CA

Federal research also indicates that an overpass structure might not be utilized by intended trail users if a more direct or convenient route is available. Vandalism, security and user safety issues increase where the volume of pedestrian use is low, and trail users might create "social trails" with informal trespass of the existing rail line. Ramps and stairs may also discourage use of the structure, although placing a ramp that connects directly from a trailhead or parking area may be utilized to increase accessibility.

Caltrans Highway Manual (1985) recommends overpasses (not underpasses) where grade separation is to be provided, due to potential for vandalism and crime. Costs associated with overpass construction include length and height of the structure, design features, need for vertical clearance, ADA ramp, enclosure to protect the rail line from falling objects, and fencing adjacent to the tracks to prevent trespass.

Guidelines for Underpasses. Underpasses are less popular in urban areas, due to concerns regarding crime, vandalism, drainage, high water tables, and relocation of utilities. Most of the potential grade separation locations would be difficult due to elevation, groundwater and access to levees. However, if track reconstruction occurs as part of rail upgrade projects, the rail track or roadway might be raised slightly to facilitate undercrossing structures.

Davis CA

Santa Clara, CalTrain

Fremont, CA

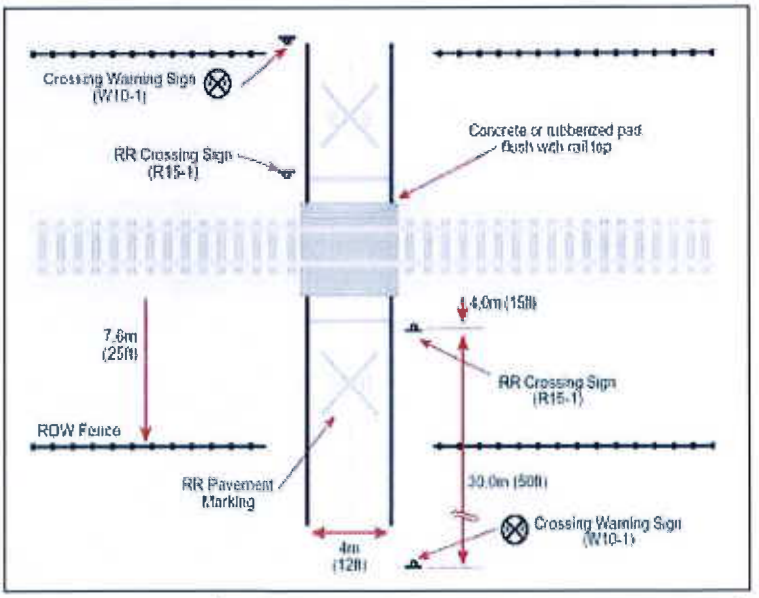
Since UP's right of way is approximately 100 feet wide tunneling for this distance, if required by UP, would be costly and could be technically challenging. Other issues related to an underpass in this area include geotechnical challenges related to shallow groundwater and poorly drained and weak soils, and potential conflicts with future rail use of the corridor. In addition, depending on the proximity of any underpass to existing at-grade crossings, trail users may attempt unsafe crossing shortcuts at-grade, even if they are signed as private crossings.

Design. According to Chapter 1000 of the Caltrans Highway Design Manual, the minimum acceptable vertical clearance for an underpass is 8.5 feet, with a width of 12 to 14 feet. An underpass would likely include concrete headwalls, retaining walls and long ramps, and fitted with lighting and a pump system if located near any creek systems, or in an area subject to seepage.

Warrants. Specific warrants (justification) were developed by the US Department of Transportation in 1984 for grade-separated pedestrian crossings, and warrants were also included in the Caltrans Highway Design Manual (1995, for street grade separation). Generally, use of the Bay Trail does not generate consistent usage to meet these warrants:

- Pedestrian volumes over 100 persons per hour;
- Average Daily Traffic (ADT) vehicular volume greater than 25,000;
- The site is at least 600 feet from the nearest alternative safe crossing;
- There should be a physical barrier to prevent at-grade crossing;
- Artificial lighting of underpasses is recommended;
- Topography should be considered to minimize construction costs;
- Adjacent land uses should be considered;
- Funding must be available for the crossing;
- Study of present and future conditions regarding pedestrian usage and traffic volumes;
- School crossings.

Guidelines for At-Grade Crossings. If an at-grade crossing is allowed, it will be required to have safety signage, crossing improvements and warning devices. Fencing and barriers would be installed to funnel trail users to the crossing location, to avoid unregulated crossings. All signs, safety markings and other improvements will conform to the Manual of Uniform Traffic Control Devices. Signage will be installed to warn trail users, as well as signs warning the public not to trespass on railroad property.



Typical At-Grade Rail Crossing Improvements

Options for Use of the Rail Corridor for Trail Purposes

MTC's Regional Rail Plan identified the rail lines' capacity limits within the Study Area as a constraint, with frequent delays in service due to conflicts with freight and passenger rail operations. According to the plan, there are operational issues, infrastructure needs, and right of way issues that limit optimal rail operations to existing and projected users. It is unlikely that rail corridor reconstruction in this area would be considered to accommodate the Bay Trail.

7.3 BRIDGES AND BOARDWALKS

Bridges and boardwalks to accommodate the Bay Trail consist of three types:

- Grade Separation structures to separate roadways from the railroad tracks
- Clearspan bridges to cross existing flood control channels, sloughs or other water bodies
- Boardwalks to connect levees or upland areas, crossing over seasonal wetlands or other marshlands.

Grade Separation. As discussed previously, grade separation of the rail tracks would likely be required for any new public crossings. Stevenson Blvd. is proposed as part of the Areas 3 and 4 Specific Plan, and bicycle and pedestrian facilities will be accommodated as part of that project. Central Avenue at UPRR is also proposed for grade separation. Grade separation of Willow Ave. along the Dumbarton line is not currently planned, but may occur as part of rail reactivation and implementation of the Dumbarton TOD.

Sites where potential grade separation might be required as part of a regulatory process to provide access to trails would occur at Mowry (currently a public at-grade crossing, but street will not be extended as part of Area 3 and 4 Specific Plan) and Auto Mall Parkway (CPUC has indicated this is a private crossing and public use for access is not allowed). Additionally, trail segments in Segment 6 on USFWS lands south of the Tri Cities Landfill could potentially be connected for the convenience of trail users.

Grade separation at each of these areas would either entail construction of an underpass (potentially associated with creek crossings under the tracks) or an overpass. Underpass construction would be problematic due to elevation and groundwater issues as well as the length of an undercrossing structure and associated ramp requirements (approximately 120 ft. ramp on each side to street elevation). An overcrossing would be even more challenging, with approach ramps over 300 feet long required on each side of the overpass/bridge, for a structure length of at least 700 feet.

A trail connection between the existing USFWS Bay Trail segment within Don Edwards to connect with planned trails within Dumbarton TOD would enhance connectivity and trail efficiency. This connection should be explored as part of the Dumbarton TOD in association with design of a Transit Station.

Clearspan Bridges. Prefabricated clearspan bridges are an appropriate choice to facilitate crossings of flood control channels, sloughs, and minor waterways within the Study Area. Typically, pre-engineered bridges are available for spans of about 140 or 150 feet. Depending on location, some of the slough crossings are wider than this and may require custom bridge engineering.

It is estimated that at least six bridges would be needed to cross sloughs and waterways.

Issues associated with bridges at these locations include:

- Geotechnical design of footings within soft Bay muds
- Landings and approach ramps on levees
- Design elevation of bridge to account for potential sea level rise
- Vehicle design loads for bridges, if they will be used by agencies for maintenance and service access (similar bridges installed in the Union City area were designed to accommodate 45,000 lb. design loads)

All potential bridges should be a minimum of 10 to 12 feet wide pre-fabricated steel clear-span bridges, to provide pedestrian and bicycle access, while also supporting an appropriate level of emergency access. Bridge abutments would typically be constructed on 18-inch (minimum) diameter concrete piles or 24-inch (minimum) diameter piers driven or drilled to a minimum depth of 20 feet, and deeper in areas of soft bay mud.

Boardwalks. A boardwalk or causeway would be used in locations where access is needed to connect upland areas and separate users from adjacent wetlands areas. Boardwalks would be needed to cross the Tri-Cities Landfill stormwater detention area in the northeast corner of their parcel, and boardwalks may be needed in other areas where trail parallel the sloughs.

Depending on proximity to other service access areas, the boardwalk or causeway might not carry emergency vehicle loads, but would need to be located out of the floodplain, or extreme tide level. An additional 1.5 feet would be needed to accommodate sea level change issues. Since the boardwalk would cross seasonal wetlands and tidal sloughs, the footings would be within soft soil areas. The boardwalk design could utilize helical anchors and/or drilled piers to minimize construction effects, or could utilize a series of prefabricated clearspan structures, installed by crane to minimize disturbance to adjacent areas. Wood, fiberglass, or prestressed concrete structures can all be considered. All bridges and boardwalks would be subject to regulatory permit approval, and pre-design consultation with the agencies is recommended to determine appropriate design and alignment components.

If a boardwalk is used, it would be constructed using strong and durable materials requiring a minimum of maintenance and capable of supporting lightweight vehicle loads. Because the boardwalk would likely be constructed over wetlands, construction materials and methods that minimize disturbance are critically important. Non-corrosive helical earth anchors (piers) could be considered for the boardwalk foundation system because they will provide sufficient resistance in soft underlying soils, and can be installed without the use of heavy construction equipment. It is anticipated that 1 ¾-inch post helical piers would be spaced at a maximum of 8-feet, and extend 8- to 10-feet into the soft underlying soils. Treated wood or fiberglass driven piles could also be considered. The boardwalks would connect to the adjacent grade with approach ramps constructed of engineered fill at a maximum 5% slope. Preliminary foundation and structural recommendations must be followed up with a comprehensive geotechnical investigation and structural analysis as part of the development of final construction plans.

7.4 ACCESSIBILITY

The Study site is generally flat, and compliance with accessibility regulations is expected, to be achieved without great difficulty, other than achieving a "firm and stable surface" in areas of soft levee top soils. Trail alignment, site furnishings and design of observation and interpretive areas should all be designed to comply with current ADA regulations. The goal of trail implementation will be for an all-weather shared-use trail, that is capable of accommodating pedestrians, bicycles, and universally accessible modes, as well as provide for emergency vehicle access where feasible. The trail will be designed in accordance with ADA accessibility guidelines wherever feasible, which require a firm, stable surface for trails, and contain guidelines for grade, cross-slope, width, etc. There are many design standards that provide guidance regarding trail design, and the trail segments will need to comply with one or more standards, depending upon funding, trail classification (hiking only, shared use, bikeway, etc.) and feasibility for compliance with applicable standards. Trail and bikeway advisory and regulatory guidelines include:

- Architectural Barriers Act Accessibility Guidelines for Outdoor Developed Areas (ABAAGODA, 2007)
- Caltrans Highway Design Manual (HDM) (Chapter 1000: Bikeway Planning and Design)
- Americans with Disabilities Act (ADA) www.access-board.gov
- American Association of State Highway and Transportation Officials (AASHTO)
- Manual of Uniform Traffic Control Devices (MUTCD)
- Institute of Traffic Engineering (ITE)
- Federal Highway Administration/National Highway Institute (FWHA, NHI)

Architectural Barriers Act Accessibility Guidelines for Outdoor Developed Areas (ABAAGODA)

Design of shared use trails such as this falls under the guidelines of the *Architectural Barriers Act Accessibility Guidelines for Outdoor Developed Areas* (ABAAGODA). Published June 20, 2007, these guidelines are applicable for trails and paths where one of the groups of intended users is pedestrians, as opposed to a facility designed exclusively for bicyclists. These guidelines are under review and expected to be federally adopted in 2012. These guidelines set forth recommended trail width, gradient, cross slope and other factors that affect trail accessibility. Depending upon the type of use, federal guidelines call for a trail gradient of 5%, or 1 ft. rise in 20 feet of distance, with a maximum 2% cross slope. Under some circumstances, depending on the type of anticipated use and connections to accessible facilities, short distances of trail at up to 10-12% grade may be allowed if a landing is provided:

- 1:20 (5%) any length
- 1:12 (8.33%) for up to 200 feet
- 1:10 (10%) for up to 30 feet
- 1:8 (12.5%) for up to 10 feet
- No more than 30% of the total trail length shall exceed 1:12

Americans with Disabilities Act

Design and implementation of portions of the trail that connect to parking areas, restrooms, trailheads or other physical facilities might also need to comply with federal regulations contained in the *ADA Accessibility Guidelines for Buildings and Facilities* (ADAAG) http://www.access-board.gov/adaag/html/adaag.htm#4.3. These guidelines require a 36 inches minimum clear trail width, with passing space at minimum 200-foot intervals if the trail is less than 60 inches wide, depending upon the anticipated trail use.

AASHTO Guidelines

The primary design guide for bicycle and shared use facilities is the "Guide for the Development of Bicycle Facilities" from the American Association of State Highway and Transportation Officials (AASHTO), 1999. The AASHTO Guide defines a "shared use path" as a facility on exclusive right-of-way and minimal cross flow by motor vehicles. Users generally include bicyclists, skaters, and pedestrians. In most cases, the AASHTO Guide requires a greater level of accessibility when designing trails for pedestrians, including bicyclists and skaters than the ABAAGODA guidelines, but trails should ideally be designed to comply with both standards.

Caltrans Highway Design Manual (HDM) (Chapter 1000: Bikeway Planning and Design)

Shared-use trails, such as this, also fall under the regulatory requirements of AASHTO and Caltrans Highway Design Manual. Where possible, the trail will be designed to comply with both federal guidelines as well as Caltrans/AASHTO standards for shared use.

If portions of the trail are funded from transportation sources, it may need to conform to Caltrans standards for a Class I Bicycle Path. Caltrans has developed specific design guidelines in the Highway Design Manual for Class I multi-use paths. Design standards should meet or exceed the Caltrans standards to the maximum extent possible.

Accessibility Exceptions

Although the final trail design should be in compliance with all applicable guidelines and regulations for accessibility, the ABAAGODA Guidelines also contain conditions for exceptions to meeting trail accessibility goals, where there are constrained areas, steep slopes and environmentally sensitive areas that must be avoided. This might apply along the Shell Pond spur trail or observation deck where access is limited or constrained by adjacent habitat. The ABAAGODA exception process provides conditions for exceptions that should be documented as each trail segment is implemented. The conditions include:

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

In addition to regulations regarding trail grade, cross-slope, surface and width, regulations regarding accessibility of site furnishings such as benches and drinking fountains, as well as regulations that apply to accessible routes such as trailheads, parking areas and restrooms should be designed in compliance with applicable accessibility regulations.

Future design of water trail elements within the Study Area should integrate access with the Bay Trail and provide amenities such as accessible boat launch, and other features to serve this key access point.

7.5 DESIGN AND IMPLEMENTATION PROTOCOLS FOR SENSITIVE AREAS

An important component of providing public access near sensitive areas is to limit the potential impact of human intrusion and trespass into sensitive areas. The proposed alignment avoids sensitive resources to the extent feasible by locating the trail on or adjacent to existing roads, levees or other developed upland areas. Where there are sensitive habitat areas (wetlands and creeks or sloughs within the Study Area, as well as cultural resources sites), fencing or vegetation buffers may be needed in limited locations where the trail is in close proximity to sensitive habitat areas.

Trail design will need to comply with BCDC Public Access Design Guidelines (2005), which contains protocols for the provision of public access that fits within the site's context. Regarding wildlife impacts, the guidelines state:

- *Use design elements such as varying trail widths, paving materials and site amenities to encourage or discourage specific types of human activities.*
- *Use durable materials to reduce erosion impacts on adjacent habitats and to keep users from creating alternate access routes.*
- *Provide spur trails to reduce informal access into and through more sensitive areas.*
- *Locate parking and staging areas away from sensitive habitat areas.*
- *Locate night lighting away from sensitive habitat areas.*
- *Use physical design features to buffer wildlife from human use.*
- *Manage type and location of public use to reduce adverse effects on wildlife.*
- *Incorporate educational and interpretive elements*

To minimize intrusion, additional design elements that may be considered include:

- When crossing creeks, utilize clear-span pre-fabricated bridges to minimize site disturbance.
- Vegetation buffers should be included, consisting of native plant species to provide a natural barrier to human intrusion into wetlands, as well as provide refugia cover to wildlife. In some places, low (4-foot) fencing may be needed.

- Interpretive components will be included in the project implementation, such as including interpretive displays to inform trail users about the needs of sensitive species, programs and signs to teach trail users how to behave in a habitat, user outreach, docents, adopt-a-trail, stewardship programs, etc.
- Leashed pet policies may be appropriate for certain trail segments. In some especially sensitive areas, even pets on leach may not be allowed.
- If needed to protect habitat conditions, seasonal closure of certain trail segments may be implemented to protect wildlife (during nesting periods).
- The trail should be managed and monitored to provide opportunities to improve or adjust access, such as providing screening, adjusting access points, or incorporating needed buffers, additional signs and fencing, or use restrictions to support habitat needs.

During construction, protocols should be followed to minimize wildlife disturbance, and will likely be required as part of a regulatory permit. Avoidance and minimization measures to be included in the construction process include:

1. Preconstruction Surveys, Relocation, and Avoidance. *Provision will include, but is not limited, to the following:*

    - As close to the beginning of construction as possible, but not more than 14 days prior to construction, a qualified biologist shall conduct a final pre-activity survey of the construction zone to ensure that no special-status wildlife and/or plant species have recently occupied the site, including at a minimum those species described in this report as potentially occurring

    - If any special-status species are found, exclusion zones shall be established and maintained until all construction activities are completed. In some cases it may be preferable to remove and/or relocate the individual plant or animal (to be determined by qualified regulatory agency-approved biologist).

    - If special-status species are found during the pre-construction survey, the biologist will be present immediately prior to construction activities that have the potential to impact special-status species to identify and protect potentially sensitive resources.

    - A cultural and historical resources record search will be completed prior to project implementation. Since portions of the proposed trail are along the bay margins and adjacent to freshwater sources, there is some potential for identifying unrecorded archaeological resources. Avoidance measures will be determined by an archaeologist and incorporated into project construction plans.

2. Worker Education. A construction worker education program shall be implemented that includes an explanation of all special-status animal species, identification, avoidance measures, and federal and state laws that protect the species. This shall include at a minimum those species described herein as potentially occurring in this report.

3. Temporary Exclusion. Exclusion fencing shall be erected around the perimeter of the work area prior to construction initiation. Fencing shall remain until work in sensitive areas is complete.

4. Presence of Biological Monitor. A qualified, regulatory agency approved Biological Monitor shall be present to oversee all work conducted in or adjacent to sensitive habitats.

5. Nesting Bird Avoidance. If project work would begin between March 1st and September 1st, prior to site grading and construction, a qualified bird biologist will conduct nesting surveys. Follow-up surveys would be performed 30 days prior to project construction if more than 30 days elapse between the initial nesting surveys and start of work. If nesting birds are identified, then prior to grading and/or construction the area around the nest will be fenced to provide a buffer generally with a 100- to 300-foot radius. No construction or earth-moving activity would occur within the non-disturbance buffer until the biologist confirms that the young have fledged (left the nest) and have attained sufficient flight skills to avoid project construction zones, typically by July 1, or as otherwise determined by the biologist.

6. Formal Wetland Delineation. A formal wetland delineation will be confirmed to identify all areas within the vicinity of the trail alignment that meet jurisdictional wetland or waters criteria. This delineation shall be used to determine the final alignment, with boardwalks and/or bridges implemented as necessary to avoid wetland fill.

7. Adherence to Best Management Practices. Best Management Practices should be implemented to limit disturbance outside of the trail footprint, and to prohibit intrusion into surrounding wetlands.

8. Avoidance of Cultural Resources. The construction site shall be monitored by a qualified archeologist during excavation, removal of pavement, fill, vegetation, or structures. Following exposure of the original soils, a field inspection shall be conducted by a qualified archaeologist who meets the Secretary of Interior's Standards. Other measures include:

    - If archeological or paleontological resources are encountered, the contractor shall immediately halt work in the immediate vicinity of the resource and workers should avoid altering the materials and their context until a qualified professional archeologist has evaluated the potential resource and has provided appropriate recommendations. Project personnel should not collect cultural resources. Native American Resources include chert or obsidian flakes, projectile points, mortars, and pestles, and dark friable soil containing shell and bone dietary debris, heat-affected rock, or human burials.

    - If human remains are encountered, all work within 100 feet shall immediately stop and the Contra Costa County coroner contacted to evaluate the remains. If required, the State Native American Heritage Commission shall also be contacted, and all State requirements shall be met concerning the preservation and disposition of Native American remains.

    - Any identified cultural resources shall be recorded on DPR 523 Historic resource recordation forms, available from the California Office of Historic Preservation.

7.6 GEOTECHNICAL CONSIDERATIONS

Vehicular Load Rating for Emergency Access. Some trail segments should be designed for access by emergency vehicles, with a minimum weight capacity of 10,000 pounds (H10 load). Heavier load ratings (H-

20) may be required by local fire and emergency response units, depending on availability of access and location. Trails connecting levees in the Union City area were designed for 45,000 pound loads. Where there is a nearby service road, lighter load design may be appropriate.

Flood Prone Areas. As previously discussed, design at a trail elevation to avoid all potential flooding may be difficult, since much of the Study Area is lower than the 100-year flood or extreme elevation. Trails located adjacent to areas that may be subject to periodic inundation may need to be reinforced with structural geosynthetics such as geocells to provide a stable trail surface and improve year-round accessibility. Maintenance and repair of levee side slopes will need to be coordinated with the levee owner. Special surface treatments may also be necessary. The need for structural support, levee bank slope stabilization and repair, and special surface treatments will need to be determined through additional engineering analysis as part of the trail design. Where trails are proposed to cross over such areas, they will require special structures and treatment, such as over-excavation and placement of engineering geotextile such as Geocell, and import of thick section of granular aggregate base. The wettest of these areas may require the use of a boardwalk structure supported on short piles or another anchor system.

Slope Instability. Placement of a fill wedge to support an elevated trail (levee embankment) should typically be designed with a maximum slope of 2:1 or flatter for slope stability. In addition, if the levee is intended as a flood control structure, then it may need reinforcement. Toe retention structures may be needed to keep the fill out of the wetlands.

Pavement Design. A detailed geotechnical investigation should be completed for all areas that are to be improved with a hard, non-flexible trail surface (such as asphalt concrete or concrete paving). Depending on soil conditions, persistence of ponding, and pavement design needs, the use of geotextiles, and a more flexible trail surface, such as stabilized decomposed granite (DG) or stabilized aggregate should be considered for such poor soil areas.

7.7 SIGNAGE

Trail signs should incorporate Bay Trail, USFWS and local systems. Trail signs and markings will also be consistent with the guidelines developed by Caltrans and the Manual on Uniform Traffic Control Devices. This includes advisory, warning, directional, wayfinding, and informational signs for bicyclists, pedestrians, and other users. Striping, marking, and signing plans will be subject to approval by partner agencies. Sign elements should be grouped and designed to minimize visual intrusion. Sign elements may include more than one agency.

Trail Signs

It is recommended that trail signs provide information about the trails' length, condition, accessibility, distance, and/or other characteristics to enable people to make informed decisions about using the trail. Signs should indicate distance to landmarks and observation points.

Interpretive/educational signage should be posted at trail access points and at the turnouts, in addition to location maps and directional signs. Signs should include GPS coordinates to facilitate emergency access. Trail use regulations such as keeping dogs on leash, intrusion into sensitive areas, and other programs to protect sensitive habitat would also be placed at trailhead access locations.

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

The Bay Trail is also considered an alternative transportation corridor for non-motorized users and commuters such as bicyclists. As such, lighting should be incorporated for 24 hour access unless There are conflicts with adjacent use, such as wildlife impacts.

7.8 TRAILHEADS AND ACCESS POINTS

Trail access, parking, restrooms, waste disposal, interpretive elements, drinking fountains and benches are appropriate to guide trail users. Existing trailheads are located at Refuge headquarters, and at the north and south ends of the existing segment west of Fremont Blvd. Facilities include parking, picnic tables, grass area and access ramps. The Refuge Headquarters contains restrooms. Other existing trailheads include the Silliman Recreation Center, which has service facilities and restrooms.

Additional trailhead parking and access facilities should be considered at the following locations:

- Jarvis Landing Water Trail connection
- Plummer Creek Mitigation/Dumbarton TOD
- Silliman Center/Mowry Avenue

- Future Fremont Public Park, Auto Mall Parkway
- Cushing Parkway/USFWS access
- Dixon Landing Road

Trailhead Elements and Interpretive Displays

7.9 FENCES, GATES AND BOLLARDS

Fencing may be needed adjacent to sensitive habitat areas (wetlands) to preclude trail users and domestic animals from entering the area. This can be simple as 3 or 4 strand wire fencing, or welded wire mesh with wood posts. Top rails should be avoided where possible to minimize perching by raptors. More substantial fencing or rails for user safety may be needed in some areas. Fencing adjacent to industrial facilities would be subject to agreement with the property owner.

Posts/barriers or accessible gates may be needed at trail intersections and entrances to keep vehicles from entering. Posts should be designed to be easily moveable by emergency vehicles, such as bollards or a pipe gate and bollard, but consistent with the rural setting. Pipe Gates are appropriate at locations where vehicular access will be needed.

7.10 MANAGEMENT, SAFETY AND SECURITY ISSUES

Operation and maintenance of the trail system is an important component of overall trail implementation. Since it is likely that implementation will occur in phases and possibly by various entities, such as the City of Newark, City of Fremont, USFWS, EBRPD, etc., a commitment to a uniform patrol, maintenance, and emergency response strategy is desirable. Because the trail will span multiple jurisdictions, it will be beneficial to develop policy and cooperative management agreements to facilitate management of the trail. For many trail segments, the USFWS could be the lead management entity, and would provide policing, management and coordination for trail related issues. It is also possible that another entity, such as East Bay Regional Park District, may be interested in managing the trail system, although no discussions have taken place with them regarding this potential.

Some areas of the trail are adjacent to industrial uses, and security cameras, fencing and other devices to monitor and preclude public access may be appropriate. Public safety and liability are common issues related to trail implementation. Strategies for addressing these issues include:

- Implement an emergency response protocol, integrating law enforcement, emergency services and trail maps
- Develop interagency agreements to operate, maintain and provide emergency response for trail system
- Commit funding for operations and maintenance
- Integrate with existing crime reporting database to monitor crime, and address safety and security issues
- Develop education program for trail users regarding safe trail behavior
- Provide outreach to property owners, residents and businesses for trail management
- Post and enforce trail rules
- Perform trail maintenance and vegetation management for fire safety and sight distance.

It is also expected that ongoing management of the trail route would utilize Integrated Pest Management (IPM) practices to manage pest populations and for vegetation management. This includes ecologically compatible practices and treatment strategies for the control of plant and animal pests, as well as fire management activities to reduce or maintain wildland fuels at acceptable levels. These practices comply with local Bay Friendly practices to minimize resource use, an ongoing strategy to select and integrate the most appropriate combinations of acceptable control methods for a given site in ways that will minimize risk to public safety, health and the environment.

8. IMPLEMENTATION STRATEGY

8.1 PRELIMINARY PROJECT COSTS

Table 8-1 summarizes the preliminary project design and construction costs for the recommended alignment. The costs are based on the Summary of Trail Improvements presented on the following pages. The total cost of the Newark to Fremont Bay Trail, including design, environmental review and permitting, and construction administration are expected to total about $11.6 million dollars, and would be completed over a number of years, as funding is secured, and associated with build-out of nearby development projects. Bridges over creeks and slough channels and boardwalk crossings of wetland areas account for about $1.6 million of the total costs. Not included in the costs are pedestrian and bicycle overcrossings, such as the overcrossing of the Union Pacific Railroad tracks near Mowry Avenue, which would cost about $2.6 million, and a crossing of the railroad tracks at the Dumbarton TOD, which may cost well over $3 million. About $1 million is needed to close the gap in the Bay trail between the end of Fremont Blvd and Dixon Landing Road (Segment 8), crossing Coyote Creek. This is a high priority project, and the subject of a separate Feasibility Study.

Table 8-1: Cost Summary

SEGMENT NAME	Construction	15% Contingency	Design/Env./Admin.	TOTAL*
1. Don Edwards Wildlife Refuge	$ 489,800	$ 73,500	$ 197,200	$ 761,000
2. Dumbarton TOD Project, ACVCWCD Levee Trail	$ 974,400	$ 146,200	$ 392,300	$ 1,513,000
3. Trail on Central and Cherry Streets	$ 162,800	$ 24,500	$ 50,600	$ 238,000
4. Area 3 and 4 Specific Plan Improvements	$ 1,108,100	$ 166,300	$ 446,200	$ 1,721,000
5. Mowry Slough Spur Trail	$ 688,800	$ 103,400	$ 277,400	$ 1,070,000
6. Tri-Cities/Fremont/USFWS/ACFCWCD Levee Trails	$ 3,038,800	$ 455,900	$ 1,223,600	$ 4,718,000
7. Mud Slough Levee Trail	$ 315,200	$ 47,300	$ 126,900	$ 489,000
8. Fremont Boulevard to Dixon Landing Road Bay Trail	$ 669,650	$ 100,500	$ 308,400	$ 1,079,000
TOTAL	$ 7,447,550	$ 1,117,600	$ 3,022,600	$ 11,589,000

**Rounded to nearest $1,000*

These estimates are based on the concept-level plans contained in this report and are subject to adjustment when more site specific and detailed designs are completed for each segment. Cost estimate spreadsheets, which provide the basis for the estimates for each segment and construction component are included in Appendix C. Note that some of the trail improvements would be funded and paid for as a part of separate projects, such as the Dumbarton TOD, or the development of the Specific Plan 3 & 4 area in Newark. These "funded by others" projects are noted with an asterisk (*) in the cost tables in Appendix C to distinguish them from other publically funded projects.

The total cost estimate does not include any costs for easement acquisition or fees for land purchase, as it is assumed that all of the projects will be located either on public lands, or that if on private lands, the responsible local agency will either be granted an easement for trail construction as a part of a development agreement, or that the land development project will construct the trail and then dedicate that land and improvements to the City or agency as a part of the development approval process.

Summary of Trail Improvements included in Cost Estimate

Segment 1: Don Edwards Wildlife Refuge

- Raise and improve existing Don Edwards Refuge levee trail (2,600 feet)
- Improvements to existing access road (900 feet)
- Bridge/boardwalk at water trail access point to existing parking area (175 feet)
- Parking area improvements at water trail

Segment 2: Dumbarton TOD Project, ACVCWCD Levee Trail

- Overpass over Dumbarton Rail/Hetch Hetchy water line at TOD Station, (1,200 foot long ramp, 100 foot bridge (not included in costs) *
- Parking/trailhead, Dumbarton TOD *
- Dumbarton TOD Class 1 path at site perimeter (7000 feet)*
- Spur trail south of mitigation site (2400 feet)
- Trail improvements to existing ACFCWCD levee behind industrial park (4700 feet)
- Overlook at end of spur trail

Segment 3 Interim: Trail on Central and Cherry Streets

- Class 2 Trail improvements on Central to Cherry St (cost does not include planned Central Avenue grade separation, 4000 feet)
- Class 2 trail improvements, Cherry St. from Central Ave. to Mowry Avenue (5,600 feet, 3 crosswalks)

Segment 4: Area 3 and 4 Specific Plan Improvements (Silliman Center Improvements)

- Parking trailhead, Mowry Ave.
- Mowry UPRR Bike/Pedestrian Crossing, (1200 foot long ramp, 120 ft bridge)*
- Trail at edge of Area 3/4 Specific Plan (does not include planned grade separation at Stevenson, 10,000 feet)
- Parking/trailhead at Stevenson
- Trail on west side of UP tracks, Stevenson to Tri-Cities detention pond (2500 feet)

Segment 5: Mowry Slough Spur Trail

- Bridge over Mowry Slough (120 feet)
- Spur trail on Mowry Slough ACFCWCD levee (5500 feet)
- Overlook at end of spur trail

Segment 6: Tri-Cities Landfill/City of Fremont/USFWS/ACFCWCD Levee Trails

- Tri Cities Boardwalk over Detention Pond (1500 feet, 10' boardwalk)
- Tri Cities Landfill road/trail on perimeter levee (8,200 LF of 10' QF stabilized)*
- Parking/trailhead, Auto Mall Parkway
- Auto Mall Parkway Bike/pedestrian crossing, (1200 ft ramp, 120 foot bridge (costs not included as part of this project)
- USFWS Trail on e/s UP tracks, and existing levee north of Refuge pond A22 (on USFWS lands, 10,600 feet)
- City of Fremont Improvements to existing levee/road (Old Cushing Road, 4,200 feet)
- Levee improvements, Cushing Road to Warren (USFWS levees on west side or ACFCWCD levees on east side, to be verified, 6,400 feet)
- Bridge to USFWS levee (depending on location of trail, may not be needed if on N/S), 120 feet

Segment 7: Mud Slough Levee Trail

- Bridge/boardwalk, Mud Slough, 300 feet
- Levee improvements, Mud Slough to street or existing trail, 1000 feet

Segment 8: Fremont Boulevard to Dixon Landing Road (Santa Clara County) Bay Trail

- Newby Landfill perimeter trail, 19,500 LF *
- Newby pedestrian. bridge, 300 LF
- Creekside Landing trail improvements, bridge and crossing improvements at Dixon Landing Road * (detailed estimate prepared for Segment 8 is included in the Appendix).

The planning level cost estimate is based on the following assumptions:

- Cost estimates do not include costs for major levee improvements for flood control or sea level rise adaptive management, but include work for minor improvements to level, scarify and re-compact the surface materials necessary for trail construction.
- Costs include an allowance for erosion control and side slope stabilization where needed associated with levee top improvements and trail natural surfacing
- Costs for 4 inches of polymer stabilized 3/8 inch aggregate paving, including compaction and geosynthetic blanket were estimated to be $3.50 per square foot.
- Costs for 6 inches of aggregate sub base and 3 inches of asphalt concrete paving were estimated at $5.50 per square foot.
- Costs for a 10 foot wide pickup truck rated pedestrian bridge were estimated at $1,800 per lineal foot, for a span from 40 to 100 feet long.
- Costs for a 10 foot wide boardwalk structure were estimated at $900 per lineal foot,

- Costs for a 10 car trailhead parking area were estimates at $25,00, or $2,500 per car.
- Costs for interpretive overlooks, including display signage were estimated at $12,000 each
- Costs for site furnishings, including signage, benches, etc. were estimated to be $2,000 per 1,000 lineal feet of trail
- Costs for striping, signage and stenciling bikeways were estimated to be $20.00 per lineal foot.

8.2 RIGHT OF WAY ISSUES

Although many of the potential trail alignments are located on public lands, primarily owned by the ACFCWCD and USFWS, with some portions on California Department of Fish and Game or State Lands Commission lands, key segments are located on private lands or within a planned development.

Use of USFWS lands for public access would likely require a lease agreement, license or memorandum of use, with a designated management entity. A major ROW issue to resolve is the potential use of USFWS-owned/Cargill-managed levees located adjacent to salt ponds. Although both do not consider an adjacent levee trail to be presently feasible, this is a long-term goal and could be many years out before trail implementation becomes feasible, perhaps associated with some future multi-purpose flood control levee project. USFWS probably will not construct nor maintain trails on their lands. However, they are open to further discussions regarding a trail use agreement with another public agency across their lands.

The preliminary project plans for this area call for the installation of wildlife fencing, a minimum 200-foot buffer or setback from the edge of the American Canyon Creek riparian corridor, and the planting of native trees and shrubs to provide additional buffer screening.

8.3 FUNDING OPTIONS

Funding for trail implementation will likely come from multiple sources, and local matching funds are often required to complete a funding package. Bicycle and pedestrian projects are typically funded from State and Federal-aid highway, transit, safety, recreation, and other programs. Bicycle projects must be primarily for transportation (not recreation) purposes and must be consistent with adopted transportation plans.

Obtaining project funding is often very competitive and success varies according to the number of applicants and the relative merits of each competing project. However, receiving grant funding for trail construction is generally more successful when the following components are in place:

1. The project is a component or element of a larger regional trail system, with connections, and has been addressed in a feasibility study or master plan, prepared among cooperating agencies and with stakeholder input.
2. The project has demonstrated local community support and elected government official's support.
3. Partners are included in the project and the partner nonprofit or community organizations have a demonstrated history working with the agency to implement a project, and are involved in implementing the grant request (such as Bay Area Ridge Trail and Land Trusts).
4. Environmental review (CEQA and NEPA for Federal funds) has been completed, including a Notice of Determination from the Lead Agency.

5. A Resolution from the Lead Agency(s) accepting the Master Plan or Feasibility Study and authorizing application for grant funding has been passed.
6. The project has made a commitment of local resources for patrol, monitoring, maintenance, and repair.

Allocation of project funding and procurement of funds from grants or other sources must follow the appropriate guidelines of the granting entity. Caltrans Local Assistance coordination may be required as a project component, including a local agency match and NEPA environmental review, if funding is sought from federal sources.

Most grant funding is for construction only, and does not typically include operations and maintenance costs. Considering the fact that large portions of the trail system could be located on levees that require maintenance, some mechanism to set aside or reserve funds for maintenance and repair will be essential to the long term success of any trail project within this area.

8.4 FUNDING SOURCES

For regional trail systems such as this, funding would likely come from a variety of sources, including federal, state and regional programs. Since any corridor-wide trail project will be a part of the San Francisco Bay Trail, funding by the Bay Trail and the State Coastal Conservancy can also be considered.

The Metropolitan Transportation Commission, the Regional Transportation Planning Agency for the San Francisco Bay Area, oversees additional state and federal sources of funding that can be considered for a regional trail project. These include the federal government's Transportation Enhancement (TE) program, the Congestion Management Air Quality Improvement (CMAQ) programs, California's Transportation Development Act (TDA) and the State Transportation Improvement Program (STIP).

Local and Regional Funding Sources

Measure B is Alameda County's half-cent transportation sales tax, which includes allocations for bicycle and pedestrian improvements. Administered by Alameda County Transportation Authority (ACTA) it administers funds for capital projects, local transportation, transit operations, and special transportation (paratransit), as well as to ensure timely project and program delivery. The Alameda County Transportation Commission evolved from ACTA and administers and provides pass through funding to local jurisdictions, including the Countywide Discretionary Fund Bicycle and Pedestrian Grant Program.

Capital Improvement Programs. Local funding for trail projects may include a commitment of funds from local capital improvement programs (CIP). These are typically allocations from City or County General Funds designated for important projects, and given to Public Works Departments to oversee construction plan preparation, bidding, and construction/construction management. These are funds set aside by a local city or county to support specific earmarked projects. CIPs are sometimes used to meet the local share or match requirement of larger competitive grants, and can be combined in partnerships with local nonprofits, and sometimes with developer impact fees and other funding. Due to budgetary constraints, capital improvement funding is often committed to major infrastructure and deferred maintenance needs.

Transportation Development Act (SB 821). Transportation Development Act (TDA) Article III funds are state block grants that are awarded annually to local jurisdictions for the engineering design and construction of bicycle and pedestrian projects throughout California. Two percent (2%) of the local transportation fund in each county are allocated to fund facilities for the exclusive use of bicyclists and pedestrians, including preliminary engineering, ROW acquisition, construction and construction management, and project reconstruction or retrofitting. TDA funds are generated from state sales tax revenues and are distributed through the local transportation agency.

Mello-Roos Community Facilities Act. Bike paths and bike lanes (rarely) can be funded as part of a local assessment or benefit district, approved by the property owners of the special assessment district. This mode of funding is probably applicable to Specific Plan areas or local spur or loop trails constructed off the main spine of any future trail.

Landscaping and Lighting District Act of 1972. The Landscaping and Lighting District is a flexible tool used by local government agencies to pay for landscaping, lighting and other improvements and services in public areas, including annual maintenance. It is based on the concept of assessing only those properties that benefit from the improvements. The construction and maintenance of trails have been successfully included in a number of LLDs. LLDs could be used for area-wide streetscape improvements within the Study Area.

ABAG Bay Trail. The Association of Bay Area Governments (ABAG) administers the Bay Trail project. There is not a secure source of funding for the Bay Trail grants, and the availability of the Bay Trail Grant Program will be dependent on whether or not funding sources are available for the grant program.

Agency Allocation. Funding for trail implementation could conceivably be combined with planned Capital Improvement Projects, such as for Park improvements, for circulation and transportation projects, for flood control/infrastructure and other improvement projects.

Miscellaneous Sources. Local sales taxes, partnerships with other agencies such as EBRPD, non-profit land dedications, private donations, fund-raising events and volunteer actions are other local options to generate funding for trail projects. Creation of these potential sources usually requires substantial local support.

State Funding Programs

California Dept. of Parks and Recreation-Recreational Trails Program. The Non-motorized Trails Grant Program of the National Recreational Trails Program is administered by the California Department of Parks and Recreation, which receives federal funding to develop and maintain recreational trails and trail related facilities, such as hiking, equestrians, and bicycling, skating and other uses. Funds may be used for maintenance of existing trails, trail restoration, links, trail maintenance equipment, environmental education programs, and easement acquisition. RTP projects must be ADA compliant and may be used for:

- *Maintenance and restoration of existing trails;*
- *Purchase and lease of trail construction and maintenance equipment;*
- *Construction of new trails; including unpaved trails;*

- *Acquisition of easements or property for trails;*
- *State administrative costs related to this program (limited to seven percent of a State's funds);*
- *Operation of educational programs to promote safety and environmental protection related to trails (limited to five percent of a State's funds).*

California Department of Parks and Recreation - Habitat Conservation Fund. Also administered by the CA Department of Parks and Recreation, this grant funds habitat acquisition projects, enhancement projects, and programs that provide for the interpretation of the State's park and wildlife resources or programs which bring urban residents into park and wildlife areas or provide opportunities for urban residents to use park and wildlife areas, or programs that include nature interpretation programs designed to increase the peoples' awareness and appreciation for park and wildlife resources.

State Coastal Conservancy. The San Francisco Bay Area Conservancy Program (Bay Program), administered by the Coastal Conservancy, was established to address the natural resource and recreational goals of the Bay Area. The Conservancy may award grants to help achieve the following Bay Program goals:

- *Protect, restore, and enhance natural habitats and other open-space resources of regional significance throughout the nine-county area;*
- *Improve public access and related facilities to and around the Bay, its surrounding hills, and the coast, through completion of bay, coast, and ridge trails that are part of a regional trail system; and*
- *Promote projects that provide open space that is accessible to urban populations for recreational and educational purposes.*

Trail projects that also combine habitat restoration and protection and environmental education would be ideal for grant funding by the Conservancy. Funding can cover project planning and engineering design, environmental review, construction and construction management, and in certain cases, maintenance and land management. Funding availability is subject to legislative appropriations of bond funds, and by the periodic passage of voter approved bonds for outdoor recreation, land acquisition, and habitat restoration and enhancement.

Caltrans Programs. Caltrans Office of Local Programs administers federal programs that can be used for trails-related projects. This includes:

Bicycle Transportation Account, providing grant funding to local jurisdictions for bicycle related projects, with an emphasis on bicycling for commuting. The local match must be a minimum of 10% of the total project cost.

State Transportation Improvement Fund. The STIP is a multi-year capital improvement program of transportation projects funded with revenues from the State Highway Account and other sources. STIP programming generally occurs every two years. Caltrans and the regional planning agencies prepare transportation improvement plans for fund allocations.