Metropolitan Transportation Commission

Regional Bicycle Plan for the San Francisco Bay Area

2008 Update

Public and Planning Committee Review DRAFT

November 14, 2008

Prepared by:

Eisen|Letunic
Transportation, Environmental and Urban Planning
www.eisenletunic.com

In association with:
Fehr & Peers transportation consultants

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1 | Introduction

In this era of increasing awareness of the critical difference that wise transportation choices can make to global climate change, the bicycle is emerging as a legitimate and significant travel mode. Already, more than 300,000 bicycle trips are made every weekday by Bay Area residents (see Table 3.1), and bicycling has the potential to play a much bigger role if current trends continue.

Attention in the media, schools and popular culture has highlighted the adverse effect that driving has on the planet's climate, energy supplies, gasoline prices, air and water pollution and bicyclist and pedestrian safety. To maximize the number of people bicycling to work, school, shopping and for fun throughout the nine-county Bay Area, myriad infrastructure improvements, ongoing maintenance, and safety and promotion programs are needed.

The *Regional Bicycle Plan for the San Francisco Bay Area* is one component of the Metropolitan Transportation Commission's multipronged effort to promote bicycling and bicycle safety while reversing decades of automobile-oriented development. *Transportation 2035* – the *Regional Transportation Plan* update – boosts bicycle spending fivefold over prior *Regional Bicycle Plan* expenditures (from $20 million to $1 billion), increases funds to help spur compact transit-oriented development and a launches new Climate Action Program that will include new programs for bicycle facilities (see Chapter 5).

Why a Regional Bicycle Plan?

Transportation 2035 is a comprehensive strategy to accommodate future growth, alleviate congestion, improve safety, reduce pollution and ensure mobility for all residents regardless of income.

As a component of the *Transportation 2035* plan, the *Regional Bicycle Plan for the San*

Francisco Bay Area ("*Regional Bicycle Plan*" or "*Plan*") seeks to support individuals who choose to shift modes from automobile to bicycle by making investments in the Regional Bikeway Network (RBN) and other bicycling facilities, and focusing growth in Priority Development Areas (PDAs), which encourage growth in existing communities and promote connections between land-use and transportation. This plan presents data, provides guidance and makes recommendations to help propel these efforts forward.

Plan update

The original *Regional Bicycle Plan*, published in 2001, documented the region's bicycling environment, identified the links in a regionwide bikeway network and summarized corresponding funding sources.

> A primary purpose of the Regional Bikeway Network is to focus regional bicycle-related funding on high-priority bicycle facilities that serve regional trips.

This update to the *Regional Bicycle Plan* seeks to: encourage, increase and promote safer bicycling; provide an analysis of bicycle trip-making and collision data; summarize countywide bicycle planning efforts throughout the Bay Area; and document advances in bicycle parking and other important technologies. While the 2001 plan provided an inventory of bicycle facilities at transit facilities, this update further investigates the relationship between bicycling and public transportation in recognition of the importance of bicycle-accessible transit and transit stations. Because safe and convenient bicycle access must include a place to securely store one's bicycle at destinations, bicycle parking, at public transit and elsewhere, is another focus of this plan update.

The Regional Bikeway Network

A focus of the *Regional Bicycle Plan* is the Regional Bikeway Network (RBN), which defines the San Francisco Bay Area's continuous and connected bicycling corridors of regional significance. A primary purpose of the RBN, which includes both built and unbuilt segments, is to focus regional bicycle-related funding on high-priority bicycle facilities that serve regional trips.

> Almost 50 percent of the Network's 2,140 miles has been constructed.

The 2001 *Regional Bicycle Plan* defined the original RBN. MTC staff created a new RBN geographic information system (GIS) database for this publication, which includes updated mileage and cost information, and county-specific maps. Almost 50 percent of the Network's 2,140 miles have been constructed. The cost to construct the remainder is estimated to be $1.4 billion, including pathways on the region's three remaining bicycle-inaccessible toll bridges (see Chapter 5).

Plan development process

A subcommittee of the Regional Bicycle Working Group, an advisory committee to MTC staff, guided the development of the *Regional Bicycle Plan* (see "Credits" for membership list). The region's congestion

management agencies, transportation authorities, transit operators, bicycle advocacy groups and members of the public provided data to help update the RBN.

2 | Goals and Policies

This chapter documents the bicycle-related goals and policies of the Metropolitan Transportation Commission (MTC), which guided the development of this updated *Regional Bicycle Plan for the San Francisco Bay Area*.

The goals of MTC's transportation blueprint for the next 30 years – *Transportation 2035* – address the three "E's" of sustainability: a prosperous economy, a quality environment, and social equity. The document includes performance objectives to evaluate how the agency's projects and programs contribute to these important sectors of the region. Corresponding MTC policies address transportation investments, focused growth (which concentrates development in areas that allow residents to bicycle to transit and other destinations), pricing and affordability, technology, and individual actions, such as bicycle transportation, that result in vehicle emissions reductions, reduced delay, and improved affordability for Bay Area households. Increasing bicycle safety is another goal of *Transportation 2035*, which sets a goal of a 25% reduction of collisions and fatalities each from 2000 levels.

Supporting these goals, objectives and policies are recently adopted federal, state and regional directives that place greater emphasis on considering the accommodation of pedestrians and bicyclists when designing roadway facilities than when this plan was originally adopted in 2001.

Principal Goal

To ensure that bicycling is a safe, convenient, and practical means of transportation and healthy recreation throughout the Bay Area, including in Priority Development Areas (PDAs); to reduce traffic congestion and risk of climate change; and to increase opportunities for physical activity to improve public health.

In 2001, Caltrans issued Deputy Directive (DD) 64, which requires the California Department of Transportation to consider

the needs of bicyclists and pedestrians in the planning, design, construction, operation and maintenance of its facilities (see Appendix C).

In 2006, MTC adopted Resolution 3765, which requires agencies applying for regional discretionary transportation funds to document how the needs of bicyclists and pedestrians were considered in the planning and design of projects for which funds are requested.

REGIONAL BICYCLE PLAN
GOAL AND POLICY CATEGORIES

1. Routine accommodation
2. The Regional Bikeway Network
3. Bicycle safety
4. Bicycle education & promotion
5. Multimodal integration
6. Comprehensive support facilities & mechanisms
7. Funding
8. Planning
9. Data collection

For the region to make further strides toward improving bicycle travel, the routine accommodation of bicycles and pedestrians must be embraced by other implementing agencies as well, such as countywide transportation authorities and congestion management agencies, local jurisdictions, transit operators, and other partner agencies of MTC.

Goal 1.0: Routine accommodation

Guarantee that accommodations for bicyclists and pedestrians are routinely considered in the planning and design of all roadway, transit and other transportation facilities funded by MTC (see Appendix C).

Policies

1.1 Ensure that all transportation projects funded by MTC consider enhancement of bicycle transportation, consistent with MTC Resolution 3765, Caltrans Deputy Directive 64 and Assembly Concurrent Resolution 211 (see Appendix C).

1.2 Encourage bicycle-friendly design of all roadways, public transit systems and other transportation facilities, through new technologies, "best practices," mandatory standards, optional guidelines and innovative treatments.

Goal 2.0: The Regional Bikeway Network (RBN)

Define a comprehensive RBN that connects every Bay Area community; provides connections to regional transit, major activity centers and central business districts; and includes the San Francisco Bay Trail.

Policies

2.1 Develop a cohesive system of regional bikeways that provide access to and among major activity centers, public transportation and recreation facilities.

2.2 Ensure that the RBN serves bicyclists with diverse ability levels who are bicycling for a range of transportation and recreational purposes.

2.3 Ensure that closing gaps in the RBN — particularly those that occur over jurisdictional boundaries — are given high funding priority.

2.4 Ensure ongoing maintenance and monitoring efforts that support the implementation and operation of the RBN.

2.5 Encourage coordination of cross-jurisdictional bicycle way-finding signage.

2.6 Provide bicycle access across all Bay Area toll bridges and other regionally significant facilities, such as the Webster and Posey tubes between Oakland and Alameda, whenever possible.

Goal 3.0: Bicycle safety

Encourage local and statewide policies that improve bicycle safety.

Policies

3.1 Ensure investment choices that help achieve the *Transportation 2035* goal of reducing bicycle fatalities and injuries by 25 percent each from 2000 levels by 2035.

3.2 Support local government efforts to improve bicyclist safety by encouraging enforcement of the California Vehicle Code for motorists and cyclists alike. Examples include diversion training programs and reduced fines for errant cyclists so police officers will be more willing to cite them. (Diversion training allows motorists and cyclists who break traffic laws to avoid having citations documented in exchange for attending traffic safety classes.)

3.3 Encourage local jurisdictions and other agencies and organizations to utilize MTC's online Safety Toolbox.

Goal 4.0: Bicycle education and promotion

Develop training sessions and educational materials that emphasize bicycle safety and the positive benefits of cycling.

Policies

4.1 Encourage and support the creation or expansion of comprehensive safety awareness, driver education, cyclist education, and diversion training programs for cyclists and motorists.

4.2 Develop a comprehensive promotion and outreach effort — including, but not limited to, Bike-to-Work Day — that advocates for bicycling as part of a larger effort to provide healthy and environmentally friendly transportation choices.

4.3 Use 511.org to disseminate information to Bay Area bicyclists.

4.4 Offer training sessions on "best practices" bicycle facility design and safe cycling practices.

Goal 5.0: Multimodal integration

Work toward developing seamless transfers between bicycling and public transportation.

Policies

5.1 Encourage transit agencies to provide, maintain and promote convenient and secure bicycle parking at transit stops, stations and terminals, including racks, bike lockers, in-station bike storage and staffed and automated bicycle parking facilities.

5.2 Ensure that bicycles are accommodated on all forms of public transit whenever possible, including on local and regional systems.

5.3 Foster collaboration between local jurisdictions and regional transit agencies to improve bicycle access to transit stations in the last mile surrounding each station. Improvements to ease, speed, convenience and safety of bicycle access, including by means of signage and bikeways, should be considered.

Goal 6.0: Comprehensive support facilities & mechanisms

Encourage the development of facilities and institutions that contribute to a bicycle-friendly environment.

Policies

6.1 Encourage development of facilities at transit stations that provide long-term bicycle storage, bicycle repair and bicycle rental.

6.2 Encourage local jurisdictions to adopt ordinances requiring bicycle parking and storage and to offer incentives to employers that provide enclosed, sheltered bicycle parking for their employees and, when feasible, their customers.

6.3 Encourage local jurisdictions to provide shower and locker facilities, or to make arrangements for access to local health clubs, for all new developments and major redevelopments.

6.4 Continue to require cities and counties to form and maintain bicycle advisory committees, and to develop and update comprehensive bicycle plans, as a condition for receiving Transportation Development Act (TDA) funds.

Goal 7.0: Funding

Develop an equitable and effective regional funding and implementation process.

Policies

7.1 Continue to fund bicycle projects to complete the RBN.

7.2 Consider the benefits of bicycling in the allocation of all transportation funding and in developing performance measures, including vehicle trip and greenhouse gas reduction, public health and community livability.

7.3 Pursue additional fund sources to continue MTC's Safe Routes to Transit program once Regional Measure 2 and Climate Action Program funds are no longer available (see Chapter 5).

7.4 Identify new funding sources to support operation and maintenance of bicycle and pedestrian facilities, such as attended bicycle parking facilities and maintenance of multiuse paths.

7.5 Support additional funding for Safe Routes to Schools programs once federal, state and regional funds are no longer available (see Chapter 5).

Goal 8.0: Planning

Continue to support ongoing regional bicycle planning.

Policies

8.1 Support ongoing planning efforts to implement projects in the *Regional Bicycle Plan* with the assistance of MTC Resolution 3765.

8.2 Update and adopt the next *Regional Bicycle Plan* before the development of the next *Regional Transportation Plan* begins.

8.3 Encourage development of bicycle facilities and amenities when planning Priority Development Areas (PDAs).

8.4 Continue to staff and support the Regional Bicycle Working Group (which guided the development of this plan) to oversee implementation of the plan, among other efforts.

8.5 Create mechanisms to distribute this plan to jurisdictions and other agencies throughout the Bay Area and encourage incorporation of applicable policies into locally adopted documents.

8.6 Continue working with the Caltrans District 4 Bicycle Advisory Committee and statewide Bicycle Advisory Committee.

8.7 Encourage jurisdictions to consider adopting California Environmental Quality Act (CEQA) standards that rigorously analyze project impacts to bicyclists and pedestrians.

8.8 Support inclusion of transportation and land-use standards in Health Impact Assessments (HIAs). (An HIA is a multidisciplinary process to examine evidence about the health effects of a development proposal.)

8.9 Work to complete the Bay Trail and other intercounty trail systems. (See Chapter 4 for more information about the Bay Trail.) Work to provide connections to the California Coastal Trail[1] by coordinating with the State Coastal Conservancy, the California Coastal Commission and Caltrans to ensure a complete system of safe and efficient trails for cyclists in the Bay Area.

[1] The California Coastal Trail, once completed, will extend 1,300 miles along the California Coast, including over 300 miles in the Bay Area. The Trail is designed to foster appreciation and stewardship of the scenic and natural resources of the California coastline through bicycling and hiking. The California Coastal Conservancy's publication, "Completing the California Coastal Trail," provides a strategic blueprint for future development of the Trail. (www.scc.ca.gov)

Goal 9.0: Data collection

Routinely collect regionwide bicycle, pedestrian trip-making and collision data, including for trips using these modes to access public transit, as part of the *State of the System* report and Bay Area Travel Survey (BATS) work in order to gauge progress toward the goals in this plan.

Policies

9.1 Collect Statewide Integrated Traffic Records System (SWITRS) bicycle collision statistics and data on bicycle travel in Bay Area jurisdictions, and post data on MTC's Web site.

9.2 Encourage Caltrans to purchase additional Bay Area households for the National Personal Transportation Survey.

9.3 Continue to make travel data available to the public through the MTC Web site.

9.4 Encourage local jurisdictions to work with the National Bicycle and Pedestrian Documentation Project to standardize bicycle and pedestrian data collection throughout the region.

9.5 Maintain and continue to improve MTC's existing BikeMapper service, an interactive online service that shows possible bicycle routes between any two Bay Area points.

3 | Background

This chapter provides bicycle trip-making trends, bicycle/motor vehicle collision rates, and MTC bicycle-related programs and policies as a backdrop to the remainder of the *Regional Bicycle Plan for the San Francisco Bay Area.* Please refer to the bicycle plans of MTC's partner agencies – local governments, congestion management agencies, transit agencies and park districts – for information on bicycle facilities in each Bay Area jurisdiction (see Appendix F).

Physical setting

The nine-county Bay Area encompasses 7,200 square miles of varied topography, climate and development intensity. The region is divided into a number of subregions by the Bay and the hills that parallel the coastline. While these barriers make bicycling between subregions challenging, they frame flatlands on which bicycling can be relatively easy for cyclists of all abilities. These level areas include the Santa Clara, Diablo and Livermore valleys, the East Bay flatlands, the western edges of the Central Valley, and the eastern Peninsula. The majority of Napa and Sonoma county development is also located in broad valleys. Many of the region's homes and businesses are located in these relatively flat areas, thereby providing multiple utilitarian and recreational bicycling opportunities.

In addition to the Bay Area's generally hospitable topography and land-use patterns, is a temperate climate that is conducive to cycling. Although temperatures vary with distance from the moderating influence of the Pacific Ocean and San Francisco and San Pablo bays, the region is relatively warm in winter and rarely excessively hot in summer. Annual rainfall is limited in most areas, on average less than 21 inches, although the portions of the North Bay can see double this amount. This mild climate is conducive to cycling during most months of the year.

Development in many parts of the region also supports bicycling. Before World War II, San Francisco and Oakland were the Bay Area's only big cities, but smaller towns were scattered around the region: the railroad suburbs on the Peninsula; the

industrial towns along the Bay and San Joaquin River in Contra Costa County; the agricultural centers of San José and Santa Rosa; and the university towns of Berkeley and Palo Alto.

The relatively compact and frequent grid development patterns in these areas create a hospitable bicycling environment. Destinations are often clustered in neighborhood commercial districts and downtowns, and motor vehicle traffic is dispersed among many parallel roadways, rather than channeled onto a single expressway as is typical in postwar development.

Traveling between these older communities by the region's more athletic bicyclists is possible along many corridors. However, automobile and truck traffic, frequently inadequate bicycle facilities, and many areas of postwar sprawling development conspire to dissuade many potential cyclists from venturing beyond their neighborhoods.

> Together the Bay Area's extensive flatlands, moderate climate and compact development create a hospitable cycling environment.

Linking multiuse pathways, bicycle lanes, and other bicycle facilities with the region's extensive bus, rail and ferry network can allow cyclists to use their bicycles at either or both ends of their trip, while using public transit to travel longer distances and over steep hills and the Bay. Coordinating bicycles and public transit also allows transit systems to increase ridership without constructing additional automobile parking (see Chapter 4).

Trip-making trends

According to MTC's most recent travel survey – the Bay Area Travel Survey (BATS) – Bay Area residents took over 300,000 daily trips by bicycle each weekday and over 2 million trips each week in 2000 (see Tables 3.1-3.3). These numbers include trips to work, shopping, recreation and school and other trips (such as an errand on the way home from work) that neither originate nor terminate at home. The trip purposes with the largest share of weekday bicycle trips (versus other modes) in the region are work commute trips (1.8 percent), followed closely by school trips (1.7 percent). More Bay Area bicycle trips are to work each day than for any other purpose (81,000), but there are almost as many bike-to-shop trips across the region (75,000). The counties with the highest share of bicycle trips (compared to other modes used in that county) are Alameda and San Francisco, where 2.1 percent of all weekday trips are by bike. More weekday bicycle trips occur in Alameda County than anywhere else in the region (over 90,000 per weekday).

Beyond these weekday trips, over 500,000 additional bicycle trips take place each weekend across the Bay Area (see Table 3.2). The trip purposes with the highest bicycle share are work trips and social/recreational trips (both 1.6 percent of trips by all modes)

but, not surprisingly, there are far more weekend social/recreational trips (222,000) than any other trip purpose. San Francisco is the county with the highest share of weekend bicycle trips (2.3 percent of all weekend trips in San Francisco are by bike) and Alameda County has the highest number of weekend trips in the region (151,000).

> Regionwide, there are over 2 million weekly bicycle trips, which account for 1.4 percent of all trips taken by all modes in all nine Bay Area counties.

Table 3.3 shows the number of weekly bicycle trips (i.e., in a seven-day period). Regionwide, there are over 2 million weekly bicycle trips, which account for 1.4 percent of all trips taken by all modes in all nine Bay Area counties. The highest share of trips over the seven-day period are work trips (1.7 percent of all work trips are by bike), but more people bicycle to go shopping (550,000 weekly trips) than for any other trip purpose.

> More people shop by bicycle than for any other trip purpose: 550,000 weekly trips.

The U.S. Census Bureau, which tracks bicycle commuters rather than bicycle trips, reports 36,000 Bay Area bicycle commuters in 2000, 1.1 percent of all commuters (see Table 3.4). This ranges from 0.5 percent in Contra Costa and Solano counties to 2 percent of commuters who live in San Francisco, numbers that are comparable to the BATS work trip data reported in Table 3.1.

Table 3.1: Average Bay Area weekday bicycle trips (Monday through Friday; 2000)

	Home-based trips						
	Work	Shopping	Social/ Recreation	School	Non-home-based	Total	% of all trips
Alameda	22,000	16,000	26,000	10,000	19,000	93,000	2.1%
Contra Costa	1,800*	9,000	3,000*	3,000*	1,000*	19,000	0.7%
Marin	3,600*	5,000*	3,000*	2,000*	1,000*	14,000	1.7%
Napa	1,000*	2,000*	1,000*	1,000*	400*	5,000*	1.3%
San Francisco	20,000	14,000	8,000	1,000*	8,000	51,000	2.1%
San Mateo	13,000	7,000	3,000*	11,000	6,000	39,000	1.8%
Santa Clara	15,000	16,000	9,000	11,000	11,000	62,000	1.2%
Solano	3,000*	4,000*	1,000*	2,000*	400*	10,000	1.0%
Sonoma	3,000*	4,000*	3,000*	2,000*	1,000*	11,000	0.8%
Regionwide	**81,000**	**75,000**	**56,000**	**43,000**	**49,000**	**303,000**	**1.5%**
% of all trips**	1.8%	1.4%	1.5%	1.7%	1.0%	1.5%	

* Insufficient sample size; reported for information purposes only.

** These values show percent of this trip purpose regionwide that is by bicycle.

Percentages do not add up to 100% due to rounding

Source: Metropolitan Transportation Commission, Bay Area Travel Survey

Table 3.2: Average Bay Area weekend bicycle trips (Saturday and Sunday; 2000)

	Home-based trips						
	Work	Shopping	Social/ Recreation	School	Non-home-based	Total	% of all trips
Alameda	13,000	37,000	80,000	—	21,000	151,000	1.9%
Contra Costa	—	19,000	7,000	3,000*	1,000*	30,000	0.6%
Marin	1,600*	13,000	1,000*	—	3,000*	19,000	1.1%
Napa	1,000*	1,000*	—	—	2,000*	4,000	0.6%
San Francisco	12,000	34,000	40,000	2,000*	16,000	105,000	2.3%
San Mateo	9,000	13,000	7,000	—	6,000	36,000	0.9%
Santa Clara	5,000	34,000	65,000	1,000*	9,000	114,000	1.1%
Solano	3,000*	4,000*	10,000	—	1,000*	18,000	1.1%
Sonoma	—	18,000	12,000	3,000*	7,000	40,000	1.4%
Regionwide	**46,000**	**173,000**	**222,000**	**9,000**	**66,000**	**517,000**	**1.3%**
% of all trips**	1.6%	1.4%	1.6%	1.0%	0.7%	1.3%	

* Insufficient sample size; reported for information purposes only.

** These values show percent of this trip purpose regionwide that is by bicycle.

Percentages do not add up to 100% due to rounding

Source: Metropolitan Transportation Commission, Bay Area Travel Survey

Table 3.3: Average Bay Area total weekly bicycle trips (weekdays+weekends; 2000)

	Home-based trips						
	Work	Shopping	Social/ Recreation	School	Non-home-based	Total	% of all trips
Alameda	122,000	115,000	209,000	51,000	117,000	615,000	2.0%
Contra Costa	9,000*	64,000	25,000*	19,000*	8,000*	125,000	0.6%
Marin	19,000*	36,000*	14,000*	8,000 *	9,000*	86,000	1.5%
Napa	6,000*	10,000*	4,000*	4,000*	4,000*	28,000*	1.1%
San Francisco	112,000	106,000	78,000	9,000*	57,000	361,000	2.1%
San Mateo	72,000	46,000	23,000*	53,000	36,000	230,000	1.5%
Santa Clara	82,000	112,000	108,000	58,000	63,000	423,000	1.2%
Solano	17,000*	25,000*	15,000*	10,000*	3,000 *	69,000	1.0%
Sonoma	13,000*	36,000*	25,000*	11,000*	11,000*	96,000	1.0%
Regionwide	**452,000**	**550,000**	**501,000**	**223,000**	**307,000**	**2,033,000**	**1.4%**
% of all trips**	1.7%	1.4%	1.6%	1.6%	0.9%	1.4%	

* Insufficient sample size; reported for information purposes only.

** These values show percent of this trip purpose regionwide that is by bicycle.

Percentages do not add up to 100% due to rounding

Source: Metropolitan Transportation Commission, Bay Area Travel Survey

Table 3.4: Bay Area daily journey-to-work commuters (2000)

County	Drive alone[1]	Carpool	Transit[2]	Bicycle[3]	Walk	Other	Work at home	Total
Alameda	453,000	94,000	72,000	**8,000**	22,000	6,000	24,000	679,000
	66.7%	13.8%	10.6%	**1.2%**	3.2%	0.9%	3.5%	100.0%
Contra Costa	311,000	60,000	40,000	**2,000**	7,000	4,000	19,000	442,000
	70.4%	13.5%	9.0%	**0.5%**	1.5%	0.9%	4.3%	100.0%
Marin	83,000	14,000	13,000	**1,000**	4,000	1,000	11,000	127,000
	65.8%	10.7%	10.1%	**1.0%**	3.0%	0.6%	8.8%	100.0%
Napa	42,000	8,500	800	**500**	2,000	500	3,000	57,000
	72.9%	14.8%	1.4%	**0.8%**	4.1%	0.8%	5.1%	100.0%
San Francisco	173,000	45,000	130,000	**8,000**	39,000	3,000	19,000	419,000
	41.4%	10.8%	31.1%	**2.0%**	9.4%	0.7%	4.6%	100.0%
San Mateo	257,000	45,000	26,000	**3,000**	8,000	2,000	13,000	354,000
	72.6%	12.8%	7.4%	**0.8%**	2.1%	0.7%	3.6%	100.0%
Santa Clara	643,000	101,000	29,000	**10,000**	15,000	5,000	26,000	829,000
	77.6%	12.2%	3.5%	**1.2%**	1.8%	0.6%	3.1%	100.0%
Solano	128,000	31,000	5,000	**1,000**	3,000	2,000	5,000	175,000
	73.5%	17.7%	2.7%	**0.5%**	1.6%	0.9%	3.1%	100.0%
Sonoma	169,000	28,000	6,000	**2,000**	7,000	2,000	12,000	225,000
	75.0%	12.6%	2.4%	**0.8%**	3.1%	0.7%	5.4%	100.0%
Region	**2,260,000**	**427,000**	**321,000**	**36,000**	**106,000**	**24,000**	**133,000**	**3,306,000**
	68.4%	**12.9%**	**9.7%**	**1.1%**	**3.2%**	**0.7%**	**4.0%**	**100.0%**

[1] Includes motorcyclists
[2] Includes taxicab passengers
[3] Unlike BATS data, indicates bicycle commuters, rather than bicycle trips.
Percentages do not add up to 100% due to rounding

Source: U.S. Census 2000, Journey-to-Work

Motor vehicle/bicycle collision analysis

From 2000 to 2006, the number of reported collisions between motor vehicles and bicycles in the Bay Area ranged between 2,300 and 2,800, with a high in 2000 and a low in 2003 (Statewide Integrated Traffic Records System/SWITRS; see Table 3.5). While an average of 1.4 percent of regional trips were made by bicycle in 2000 (see Table 3.3), over 2.5 times that proportion of traffic fatalities were bicyclists (Table 3.6).

> The likelihood that a given person bicycling will be struck by a motorist varies inversely with the amount of bicycling.

Just as bicycle/motor vehicle collisions peaked in 2000 and were at their lowest level in 2003, regional traffic levels (as measured by vehicle hours of delay) and transit ridership experienced a similar pattern. In all cases, these trends are commonly attributed to the 2002 downturn in the high-tech economy. Although the number of collisions between bikes and motor vehicles — which decreased between 2000 and 2003 — did not increase with the region's journey to economic recovery, the rate of decrease flattened out after 2003.

> While an average of 1.4 percent of regional trips were by bicycle in 2000, almost 2.5 times that proportion of traffic fatalities were bicyclists.

While analyzing absolute numbers of reported collisions in each county is useful for comparing year-to-year levels, it is not as valuable for comparing the relative safety of cycling between counties because it considers neither the number of motor vehicles nor the number of cyclists on the road. Table 3.7 shows the number of collisions in each county relative to population, a common surrogate for motor vehicles. This analysis shows that, on average, between 2000 and 2006, there were 35 collisions per 100,000 population throughout the Bay Area, ranging from 23 in Solano County to 54 in Marin.

While measures of collisions per population are more informative than collisions alone, to obtain an accurate sense of the relative risk of motor vehicle/bicycle collisions, one must consider the number of cyclists on the road as well. In fact, the likelihood that a given person bicycling will be struck by a motorist varies inversely with the amount of bicycling.[2] This pattern is consistent across communities of varying size, from specific intersections to cities and countries, and across time periods.

Information from MTC's 2000 Bay Area Travel Survey, which considers all bicycle trips, provides perhaps the best measure of cyclists' actual risk of collision. The data in Table 3.7 shows that there was a regional average of 2.3 reported motor vehicle/bicycle collisions per 100,000 bicycle trips. Between 2000 and 2006, the lowest rates were in Alameda, San Francisco and San Mateo counties, all counties with above-average rates of total bicycle trips, supporting the notion that bicyclists may be safer when there are more of them on the

[2] Jacobsen, P.L., "Safety in numbers: more walkers and bicyclists, safer walking and bicycling," *Injury Prevention*, 2003.

road. Conversely, the highest collision rates occur in Contra Costa, Napa and Sonoma counties, areas with lower densities, where cars travel at higher speeds, which may increase the likelihood of serious injury.

> Addressing roadway configurations that increase the likelihood of dooring, pavement condition and multiuse trail design may reap greater safety benefits to cyclists than improvements aimed at the smaller proportion of bicycle/motor vehicle collisions that are typically reported.

In an effort to reduce the number and severity of bicycle/motor vehicle collisions, MTC provides examples of safety countermeasures on its Web site (www.mtc.ca.gov/planning/bicyclespedestrians/safety/uses.htm). See "Emerging bicycle innovations" discussion in Chapter 4 for further information.

UNDER-REPORTING

Although there is no reason to suspect inaccuracies in terms of the orders of magnitude of collision rates from year to year, by comparing SWITRS data to emergency room admissions and cyclist surveys, a number of studies have demonstrated that collisions involving bicyclists are severely under-reported, sometimes with as few as one in 10 incidents reported.* A joint study by the San Francisco Bicycle Coalition and the San Francisco Department of Public Health revealed that only 5 percent of dooring incidents were reported to the police. (Dooring refers to a motorist opening his/her car door into the path of a bicyclist.) Other types of collisions that tend to go unreported are those that do not involve a motor vehicle — such as those due to uneven pavement or between a bicyclist and a pedestrian — and those that do not result in serious injury.

* District of Columbia Department of Transportation, *Bicycle Collisions in the District of Columbia: 2000-2002*, 2004.

Conclusions

It is instructive to use countywide and regionwide collision statistics to observe year-to-year collision rates in a given geographic area, and to identify geographic areas that might benefit from programs aimed at improving these numbers, such as police stings and bicycle and driver education (see Goal 3 in Chapter 2). Perhaps more important than how many collisions are reported in a given county, however, is at what locations and for what reasons collisions occur. The SWITRS data on which the analysis in this section was based tracks the specific location and reported causes of each collision. Cities and counties can and do benefit from regularly reviewing this information as a tool for identifying problem locations and, where possible, traffic engineering solutions.

The issue of under-reporting of collisions involving bicyclists is a barrier against fully understanding the extent, location and cause of these incidents (see adjacent box). Besides severely understating the extent of bicyclist injuries, under-reporting of collisions involving cyclists may also skew public agencies' prioritization of bicycle

safety improvements. It is conceivable, for instance, that: addressing roadway configurations that increase the likelihood of dooring; pavement condition; and multiuse trail design may reap greater safety benefits to cyclists than improvements aimed at the smaller proportion of bicycle/motor vehicle collisions that are typically reported.

Table 3.5: Bay Area bicycle/motor vehicle collisions (injuries & fatalities)

County	2000	2001	2002	2003	2004	2005	2006	Annual Average
Alameda	607	539	563	514	508	512	532	539
Contra Costa	312	245	207	225	230	246	218	240
Marin	160	143	159	120	115	123	122	135
Napa	62	49	55	50	71	68	56	59
San Francisco	366	360	309	316	323	351	347	339
San Mateo	274	287	229	217	208	199	189	229
Santa Clara	714	698	588	592	657	660	627	648
Solano	122	113	87	91	90	89	72	95
Sonoma	210	152	143	143	175	145	158	161
Total	**2,827**	**2,586**	**2,340**	**2,268**	**2,377**	**2,393**	**2,321**	**2,445**

Table 3.6: Bay Area bicycle/motor vehicle injuries and fatalities

Year	Bicyclist Killed	Bicyclists Injured	Total	Total people killed in collisions	% killed who are bicyclists	Average % trips by bicycle*
2000	17	2,810	2,827	444	3.8%	1.4%
2001	20	2,566	2,586	449	4.5%	N/A
2002	19	2,321	2,340	451	4.2%	N/A
2003	14	2,254	2,268	468	3.0%	N/A
2004	20	2,357	2,377	426	4.7%	N/A
2005	17	2,376	2,393	438	3.9%	N/A
2006	23	2,298	2,321	458	5.0%	N/A
Total	**130**	**16,982**	**17,112**	**3134**	**4.1%**	**N/A**

* 2000 Bay Area Travel Survey data (from Table 3.3)

Source: Statewide Integrated Traffic Reporting System

Table 3.7: Bay Area bicycle/motor vehicle (mv) collision analysis (2000 - 2006)

County	Average annual bike/mv collisions[1]	Average % region's bike/mv collisions	Average % region's population[2] (2000-2006)	Average annual bike/mv collisions (per 100,000 pop)	Average annual bike/mv collisions per bicycle trip[3] (per 100,000 pop)
Alameda	539	22%	21%	37	1.7
Contra Costa	240	10%	14%	24	3.7
Marin	135	6%	4%	54	3.0
Napa	59	2%	2%	46	4.1
San Francisco	339	14%	11%	43	1.8
San Mateo	229	9%	10%	32	1.9
Santa Clara	648	27%	25%	38	2.9
Solano	95	4%	6%	23	2.6
Sonoma	161	7%	7%	34	3.2
Regional Total	**2,445**	**100%**	**100%**	**35**	**2.3**

Sources:

1. California Highway Patrol (Statewide Integrated Traffic Records System for collision figures)
2. Association of Bay Area Governments (Projections 2007 for population)
3. Metropolitan Transportation Commission (2000 Bay Area Travel Survey for bicycle trip figures; see Table 3.3)

MTC's bicycle-related programs and policies

MTC facilitates bicycle transportation in three distinct ways. The agency coordinates regionwide bicycle planning by adopting and implementing policies, staffing committees and producing documents, such as this plan. MTC also provides services and programs aimed at making bicycling safer and more accessible throughout the region. Thirdly, the agency's role as the region's transportation funding agency includes the development and distribution of numerous bicycle funding sources.

Planning/Policy

MTC develops and updates this *Regional Bicycle Plan*, which guides regionwide bicycle facility investment. In 2000, MTC established the Regional Bicycle Working Group to advise on development of the original *Regional Bicycle Plan*. In addition to participating in the development of this plan update, the committee meets bimonthly to discuss MTC policies that affect the bicycling community and to share information about bicycle-related issues throughout the Bay Area. The Working Group also serves as a forum to discuss new technologies, such as electronic lockers (see Chapter 4) and online bicycle route mapping programs (see following page). The committee is comprised of local and countywide bicycle planners, other transportation planners, and bicycle advocates.

At least three important resolutions adopted by MTC facilitate bicycling in the region.

- **Resolution 875:** First adopted in 1980 and most recently amended in 2005, this resolution guides the allocation of the "Transportation Development Act, Article 3," which funds $2.9 million worth of Bay Area bicycle projects annually (see Chapter 5).

- **Resolution 3765:** This resolution, adopted in 2006, requires agencies applying for regional transportation funds to document how the needs of bicyclists and pedestrians were considered in the process of planning and/or designing the project for which funds are requested (see Appendix C).

- **Resolution 3434:** Although not directly related to bicycling, this resolution lays out $13.5 billion of planned rail and bus investment and calls for the development of a regional transit-oriented development (TOD) policy to maximize the smart growth potential of these investments. The subsequent TOD policy adopted by MTC calls for maximizing transit investment by requiring prescribed numbers of nearby housing units, which will result in compact mixed-use communities that are inherently bicycle-friendly. MTC also created a companion program to fund planning around the region's present and future transit hubs (see "Funding" section later in this chapter).

Services/Programs/Tools

MTC also helps bicycling throughout the Bay Area by providing services that improve safety and encourage bicycling. See www.mtc.ca.gov/planning/bicyclespedestrians for details about the current services and programs listed in this section.

- **511.org:** This Web site is MTC's portal to Bay Area transit, traffic, rideshare and bicycling information. The bicycle page is aimed at Bay Area bicyclists. Links include information on Bike-to-Work Day, bicycle access on transit and bridges, bicycle parking, bicycle safety and bicycling organizations. The page also provides interactive bicycle maps (see following page).

- **Bike-to-Work Day:** Sponsored by MTC's 511.org and organized by the Bay Area Bicycle Coalition, this annual event is dedicated to encouraging Bay Area residents to try bicycle commuting. Support includes coordination of "bicycle buddies" for the ride to work and complimentary food, tote bags and t-shirts for participants. Bike-to-Work Day falls on the third Thursday in May, but usually involves a weeklong period, with other efforts – like the TEAM BIKE challenge and National Bicycle Month – lasting throughout the month of May. The TEAM BIKE challenge encourages novice and experienced cyclists to form teams that compete to log the most miles during the month of May.

- **511** BikeMapper℠**:** BikeMapper℠ is an interactive mapping tool that displays existing Bay Area bikeways. Rather than determining the best bicycle route between two points, BikeMapper℠ displays all possible routes so the bicyclist can choose and print the route of his/her choice.

- **MTC bicycle/pedestrian planning Web page:** In addition to 511.org, which targets bicyclists, MTC hosts a bicycle planning Web page at www.mtc.ca.gov/planning/bicyclespedestrians.

- **Bicycle and Pedestrian Safety Toolbox:** MTC created the Bicycle and Pedestrian Safety Toolbox to help local governments and others prevent collisions involving bicyclists and pedestrians through partnerships between multiple disciplines, multiple jurisdictions and the public. The Toolbox contains information for engineering, maintenance and planning staff, law enforcement officials, school districts, public health agencies and others. It also provides techniques to perform collision analysis, identify appropriate countermeasures, and develop effective bicycle and pedestrian safety programs. The toolbox can be accessed at www.mtc.ca.gov/planning/bicyclespedestrians.

- **Pedestrian and bicycle training workshops:** MTC periodically offers interactive workshops aimed at providing the latest bicycle and pedestrian design information to practicing transportation and urban planning and design professionals. These day-long classes cover trends in bicycle and pedestrian planning, design innovations and updates on related legislation, and bicycle planning tools. The workshops typically include an

hour-long walkabout in the vicinity of each class site to observe and discuss common design challenges and solutions.

Funding

MTC administers seven funding programs that can support bicycle projects. These grant programs — Transportation Enhancements; Transportation for Livable Communities; a new Regional Bikeway Network Program; Safe Routes to Transit; Transportation Development Act, Article 3; and a new Climate Action Program — are described in detail in Appendix D.

In addition to these sources, MTC's Station Area Planning Grant Program helps local governments map out plans for vibrant, mixed-use transit villages in the vicinity of transit hubs. Station area plans consider bicycle access in the context of roadway design, and call for facilities and amenities that encourage safe bicycle transportation.

4 | A Survey of Regional Bicycle Facilities

The San Francisco Bay Area contains many components of a truly bikable region. A growing network of on-street bikeway facilities and paved inter-county trails that serve local and regional destinations; access to and on public transit to allow travel over longer distances than most people are able to bicycle; safe and convenient bicycle parking options at destinations throughout the Bay Area; programs that encourage and educate cyclists and other roadway-users; and a willingness to experiment with innovative roadway treatments and other bicycle facilities in the pursuit of a bikeway system that encourages safer and more frequent cycling.

The Regional Bikeway Network

The RBN defines the San Francisco Bay Area's continuous and connected bicycling corridors of regional significance. The primary purpose of the RBN, which includes both built and unbuilt segments, is to focus regional bicycle-related funding on the highest-priority bicycle facilities that serve regional trips, including access to transit. This approach assumes that Bay Area cities and counties prioritize the expenditure of locally generated funds and local set-asides of discretionary funds for local-serving projects, leaving many intercity, intercounty and other important bikeways of regional significance to be funded with regional discretionary sources. (See Appendix F for a summary of the countywide bicycle planning occurring in each of the nine Bay Area counties.)

A summary of the network mileage by county, including a breakdown of existing versus unbuilt mileage, is shown in Table 4.1. Appendix A provides a complete listing of all unbuilt segments in the RBN, including the estimated cost to construct each segment, while Appendix B lists all completed links.

Regional Bikeway Network Maps

Area	Page
Region	33
Alameda County	34
Contra Costa County	35
Marin County	36
Napa County	37
San Francisco	38
San Mateo County	39
Santa Clara County	40
Solano County	41
Sonoma County	42

Maps of the RBN are found later in this chapter and PDF maps can be downloaded at:

http://mtc.ca.gov/planning/bicyclespedestrians/regional.htm#bikeplan

Original link selection process

The links in the RBN described in this chapter were first identified in 2001 in conjunction with the development of the original *Regional Bicycle Plan*. During that process, a set of five criteria was developed and used to select links from among those in the Bay Area's adopted countywide bicycle networks, which are themselves subsets of locally adopted networks (see box on following page). The RBN has been updated to reflect formerly unbuilt links that have since been constructed and local decisions to replace one alignment with a superior (or more feasible) parallel route.

In many locations, the RBN is defined by corridors; exact alignments (street, path, or route) may not have yet been determined by local governments or may change based on further study. Short routes that connect regional bikeways to transit stations may not show up on printed maps due to scale, but are considered to be part of the RBN.

2001 Regional Bikeway Network Link Selection Criteria

1. Provide connections to every incorporated town and city and to unincorporated areas with populations of over 5,000 people, and between the Bay Area and surrounding regions.
2. Provide connections to the regional transit system, including multimodal terminals, ferry terminals, BART stations, commuter rail stations and Amtrak.
3. Provide connections to major activity centers such as universities, hospitals, parks, athletic venues and shopping malls.
4. Provide access within or through the major central business districts of the region.
5. Comprise part of the existing, planned or proposed Bay Trail system (an interconnected system of routes ringing San Francisco and San Pablo bays being implemented by the Association of Bay Area Governments).

According to the 2000 Bay Area Travel Survey, just one-quarter of regional bicycle trips are for commute purposes (see Table 3.3). However, a lack of reliable information about other bicycle trip purposes has led the field of bicycle planning to focus on work trips, leaving routes that are considered to be primarily recreational off of the RBN. For this update, some routes that fit this description (e.g., the northern Alameda County-Contra Costa County connection) are included in the RBN. All of the Bay Area's toll bridges are also included in the RBN.

Network modifications

Although RBN link selection criteria were not changed for this update, the update did involve an extremely data-intensive process to identify and rectify network gaps, inconsistencies and other erroneous information contained in the 2001 network. All congestion management agencies were surveyed to determine needed updates to RBN links in each county. During this process, link mileage and end-point information were added to the database. With this information, MTC staff created a RBN geographic information system (GIS) mapping layer, with attributes that distinguish built links from unbuilt links. Where local bicycle route information was not available, MTC staff turned to digital high-definition aerial photographs and the BikeMapper℠ database of existing bikeways, which is based on direct feedback from the region's cities and counties. BikeMapper℠ is available at 511.org and is described in more detail in the previous chapter.

> As of January 2008, the RBN was nearly half complete.
>
> The eight Bay Area toll bridges together comprise just 1 percent of total RBN mileage while the combined cost to provide bicycle access on the three remaining bridges without access is one-half of the total RBN cost.

San Francisco Bay Trail

The Bay Trail is a planned recreational corridor that, when complete, will encircle San Francisco and San Pablo Bays with a continuous 500-mile network of bicycling and hiking trails. To date, approximately 290 miles of the alignment—over half the Bay Trail's ultimate length—have been completed.

The planning promotion and implementation coordination of the Bay Trail is managed by the San Francisco Bay Trail Project, while land ownership and trail segment construction and maintenance is handled by cities, counties, park districts and other agencies with land-management responsibilities, often in partnership with local nonprofit organizations, citizens' groups or businesses

The Bay Trail Project is administered by the Association of Bay Area Governments (ABAG).

Completing the Network

When completed, the RBN will be 2,140 miles long, including links within the nine Bay Area counties and on the region's eight toll bridges (see Table 4.1). As of January 2008, the RBN was nearly half complete. This proportion varies considerably by county: Whereas less than one-quarter of network links in Sonoma County are built, more than 50 percent are complete in Contra Costa, San Francisco, San Mateo and Santa Clara counties. This situation is likely due to the more sparsely developed roadway networks in the North Bay, which translates to fewer, and often more expensive, bikeway alignment options.

The eight Bay Area toll bridges together comprise just 1 percent of total RBN mileage; however, the combined cost to provide bicycle access on the three bridges where it does not currently exist and where it is not scheduled to be built (the Richmond/San Rafael Bridge, the West Span of the San Francisco/Oakland Bay Bridge and the San Mateo/Hayward Bridge) is one-half of the total RBN cost (see Tables 4.2 and 5.1).

When evaluating the completeness of the RBN, it is important to remember the context of this 2,140-mile chain: the RBN actually represents a small portion of all planned Bay Area bikeways. Furthermore, it does not include the myriad investments beyond regional bikeway projects necessary to create a truly bicycle-friendly region, including bicycle parking, signage, transit accommodations, facility maintenance and operations, and encouragement and education programs (see Chapter 5 for further discussion). If implemented at the same time as the RBN, these other projects, programs, and planning efforts will create a safe and inviting bicycling environment for hardy bicycle commuters, those who shop by bike, occasional and avid recreational cyclists, families with children, and anyone whose travels can conveniently occur by bike.

Table 4.1: Completion status of Regional Bikeway Network

County	Total built mileage[1]	Total unbuilt mileage[2]	Total mileage[3]	% Built
Alameda	161	187	348	46%
Contra Costa	181	138	319	57%
Marin	37	81	118	31%
Napa	39	61	99	39%
San Francisco	58	47	106	55%
San Mateo	141	104	245	57%
Santa Clara	241	182	423	57%
Solano	71	110	180	39%
Sonoma	59	214	273	22%
Toll bridges[4]	15	14	29	51%
TOTAL	**1,002**	**1,138**	**2,140**	**47%**

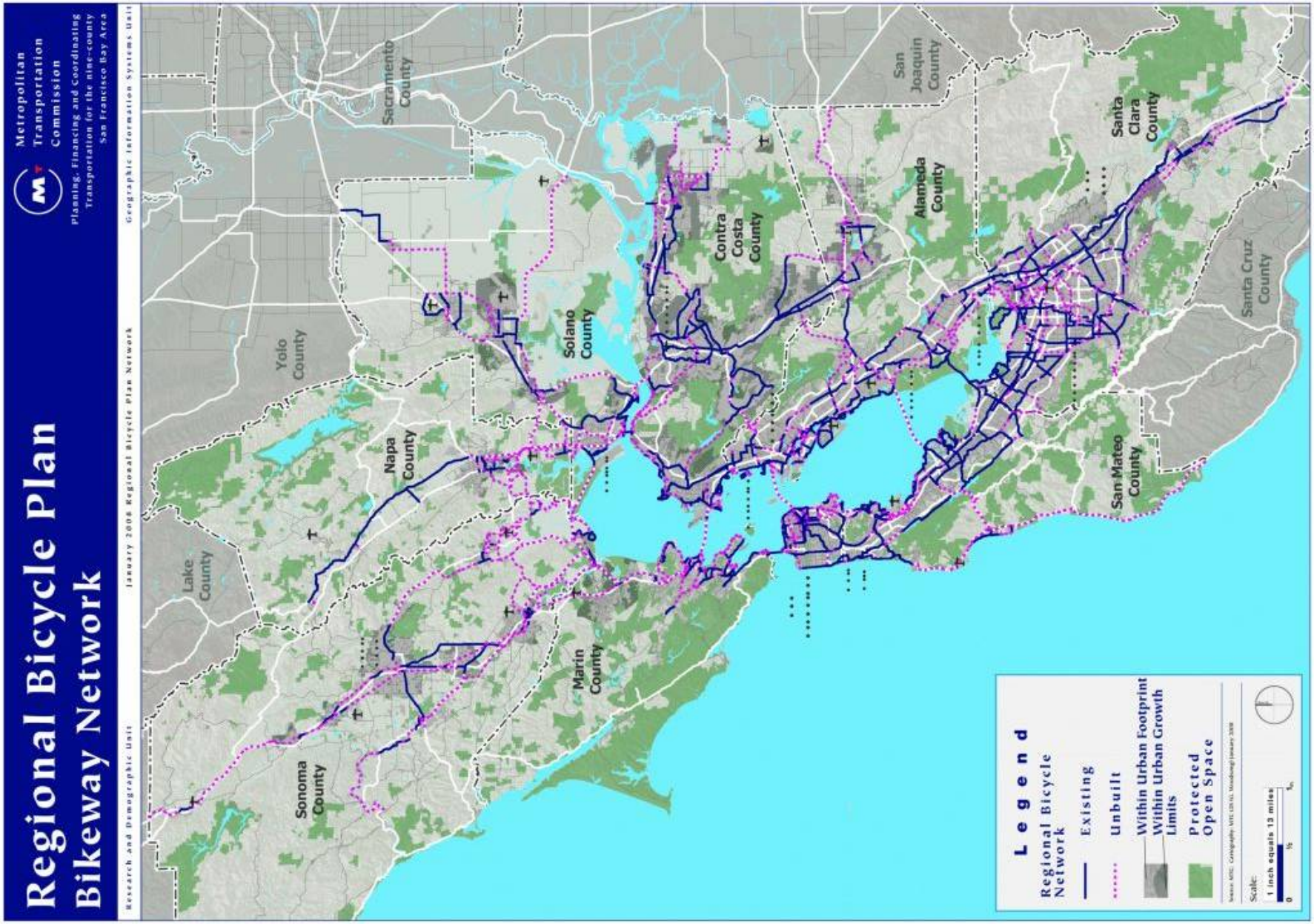
1. Total built mileage = Built links (from Appendix B) plus built and fully funded segments of "unbuilt" links (from Appendix A)
2. From Appendix A.
3. Mileage includes all Bay Trail spine segments.
4. The RBN includes pathways on all eight Bay Area toll bridges, including those that are built and unbuilt, but does not call for shuttle or ferry service on these routes.

Built mileage plus unbuilt mileage may not sum to total mileage due to rounding.

Table 4.2: Regional Bikeway Network toll bridge links (built and unbuilt miles)

Bridge	Built mileage	Unbuilt mileage	Total mileage	% Built mileage
Antioch	1.0	0.0	1.0	100%
Benicia/Martinez[1]	1.8	0.0	1.8	100%
Carquinez	1.2	0.0	1.2	100%
Dumbarton	1.6	0.0	1.6	100%
Richmond/San Rafael	0.0	3.9	3.9	0%
San Francisco/Oakland Bay[2]	7.0	1.9	8.9	79%
San Mateo/Hayward	0.0	8.2	8.2	0%
Golden Gate	1.9	0.0	1.9	100%
Totals	**14.5**	**14.0**	**28.5**	**51%**

1. At publication time, a bicycle/pedestrian pathway on the west side of the original Benicia/Martinez span was fully funded and planned for construction in 2009, and is therefore counted as built in this table.
2 At publication time, a bicycle/pedestrian pathway on the new East Span of the Bay Bridge was fully funded and under construction, and is therefore counted as built in this table.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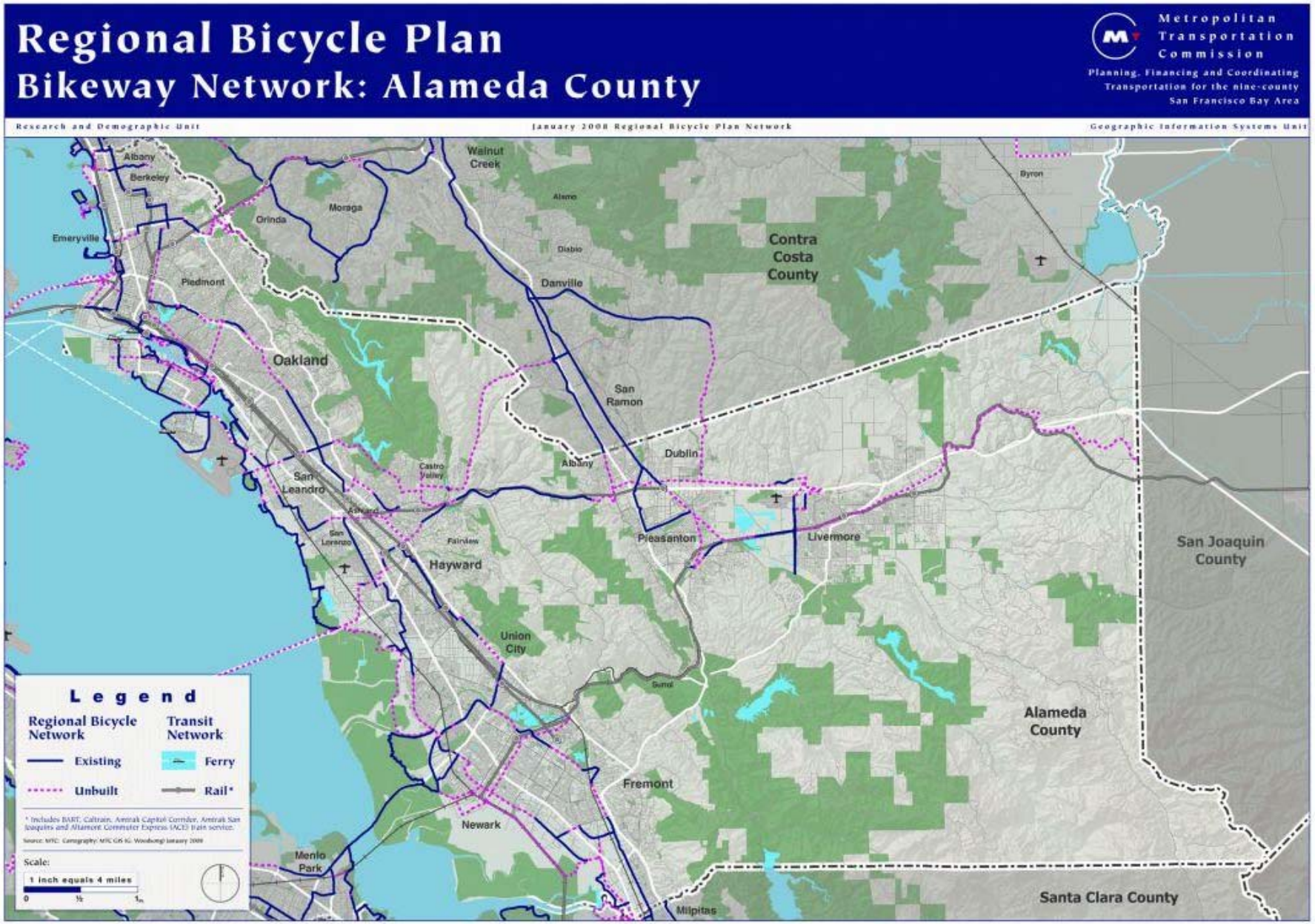
Bikeway Network
Metropolitan Transportation Commission
Planning, Financing and Coordinating Transportation for the nine-county San Francisco Bay Area
Research and Demographic Unit
January 2008 Regional Bicycle Plan Network
Geographic Information Systems Unit
Lake County
Yolo County
Sacramento County
Napa County
Sonoma County
Solano County
Marin County
Contra Costa County
San Joaquin County
Alameda County
Santa Clara County
San Mateo County
Santa Cruz County
Legend
Regional Bicycle Network
Existing
Unbuilt
Within Urban Footprint
Within Urban Growth Limits
Protected Open Space
Scale:
1 inch equals 13 miles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Planning, Financing and Coordinating Transportation for the nine-county San Francisco Bay Area
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Geographic Information Systems Unit
Albany
Berkeley
Emeryville
Piedmont
Orinda
Moraga
Walnut Creek
Alamo
Diablo
Danville
Contra Costa County
Byron
Oakland
San Ramon
Dublin
Castro Valley
San Leandro
Ashland
San Lorenzo
Fairview
Hayward
Pleasanton
Livermore
San Joaquin County
Union City
Sunol
Alameda County
Fremont
Newark
Menlo Park
Milpitas
Santa Clara County
Legend
Regional Bicycle Network
Existing
Unbuilt
Transit Network
Ferry
Rail*
* Includes BART, Caltrain, Amtrak Capitol Corridor, Amtrak San Joaquin and Altamont Commuter Express (ACE) train service.
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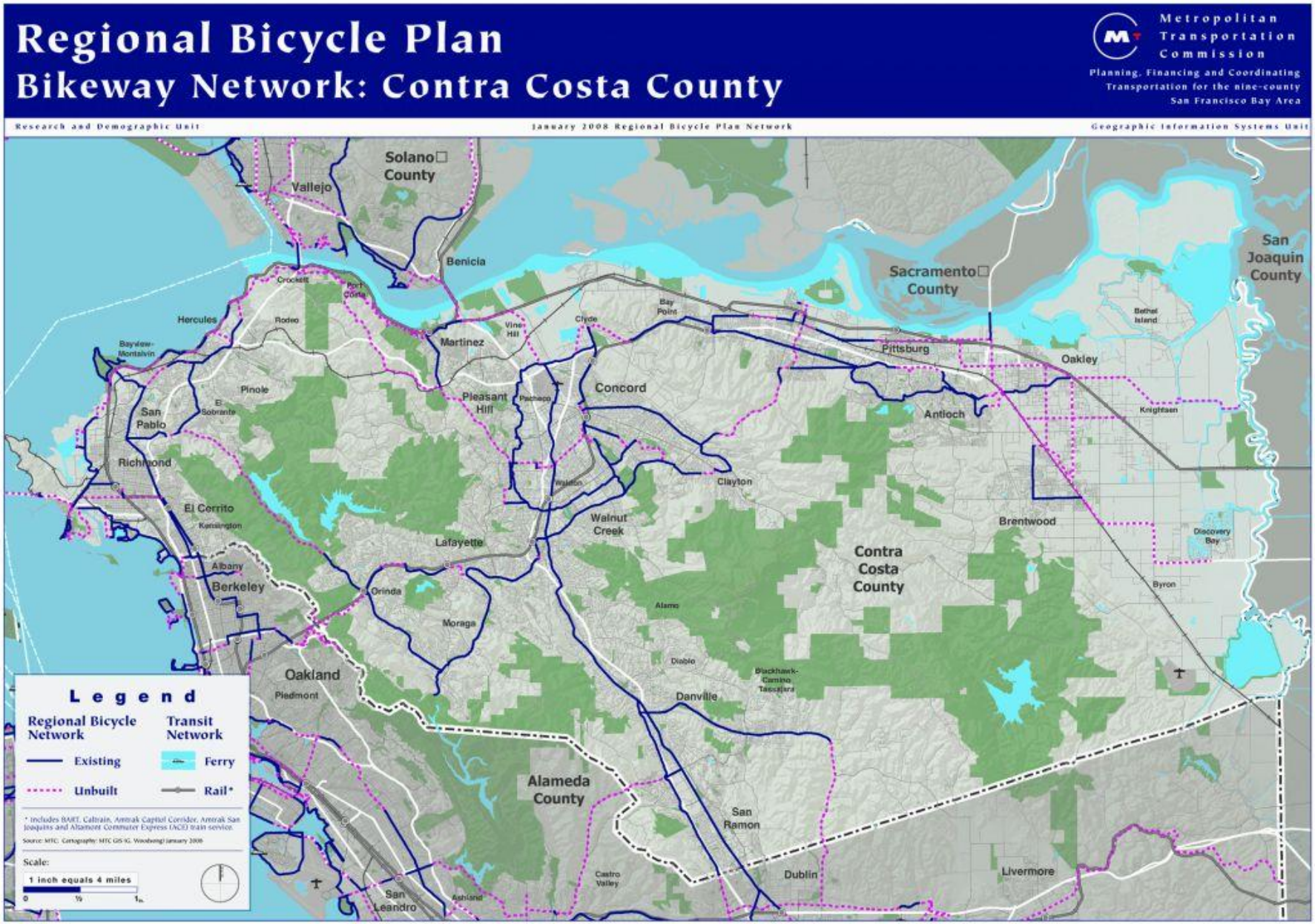
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Research and Demographic Unit
January 2008 Regional Bicycle Plan Network
Geographic Information Systems Unit
Solano County
Vallejo
Benicia
Crockett
Port Costa
Hercules
Rodeo
Bayview-Montalvin
Martinez
Vine Hill
Clyde
Bay Point
Sacramento County
San Joaquin County
Bethel Island
Pittsburg
Oakley
Pinole
El Sobrante
San Pablo
Pleasant Hill
Pacheco
Concord
Antioch
Knightsen
Richmond
Clayton
El Cerrito
Kensington
Walnut Creek
Brentwood
Discovery Bay
Lafayette
Contra Costa County
Albany
Berkeley
Orinda
Byron
Alamo
Moraga
Diablo
Oakland
Piedmont
Blackhawk-Camino Tassajara
Danville
Legend
Regional Bicycle Network
Existing
Unbuilt
Transit Network
Ferry
Rail*
* Includes BART, Caltrain, Amtrak Capitol Corridor, Amtrak San Joaquins and Altamont Commuter Express (ACE) train service.
Source: MTC. Cartography: MTC GIS (G. Woodburg) January 2008
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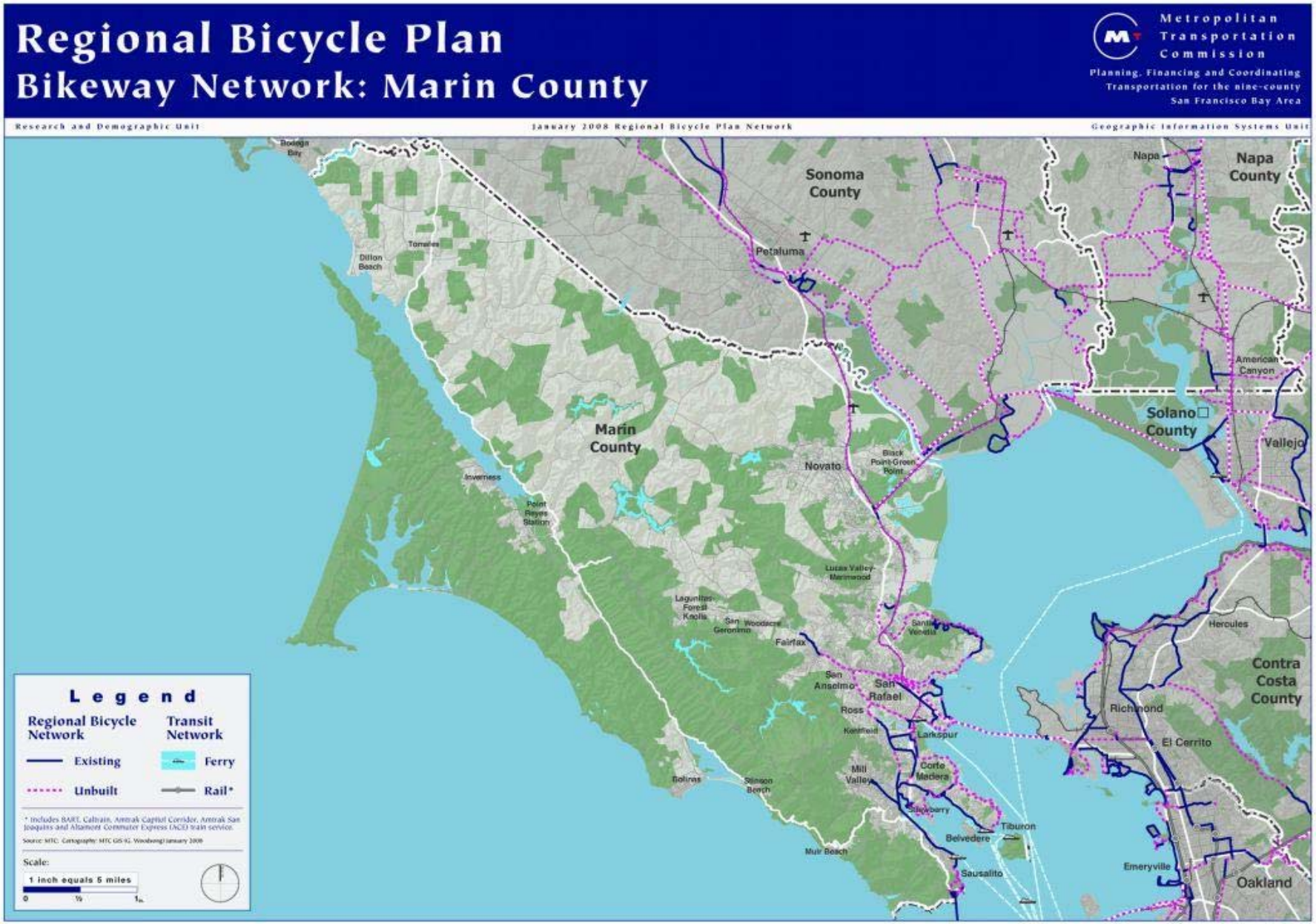
San Ramon
Castro Valley
Dublin
Livermore
San Leandro
Ashland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Geographic Information Systems Unit
Sonoma County
Napa County
Marin County
Solano County
Contra Costa County
Petaluma
Novato
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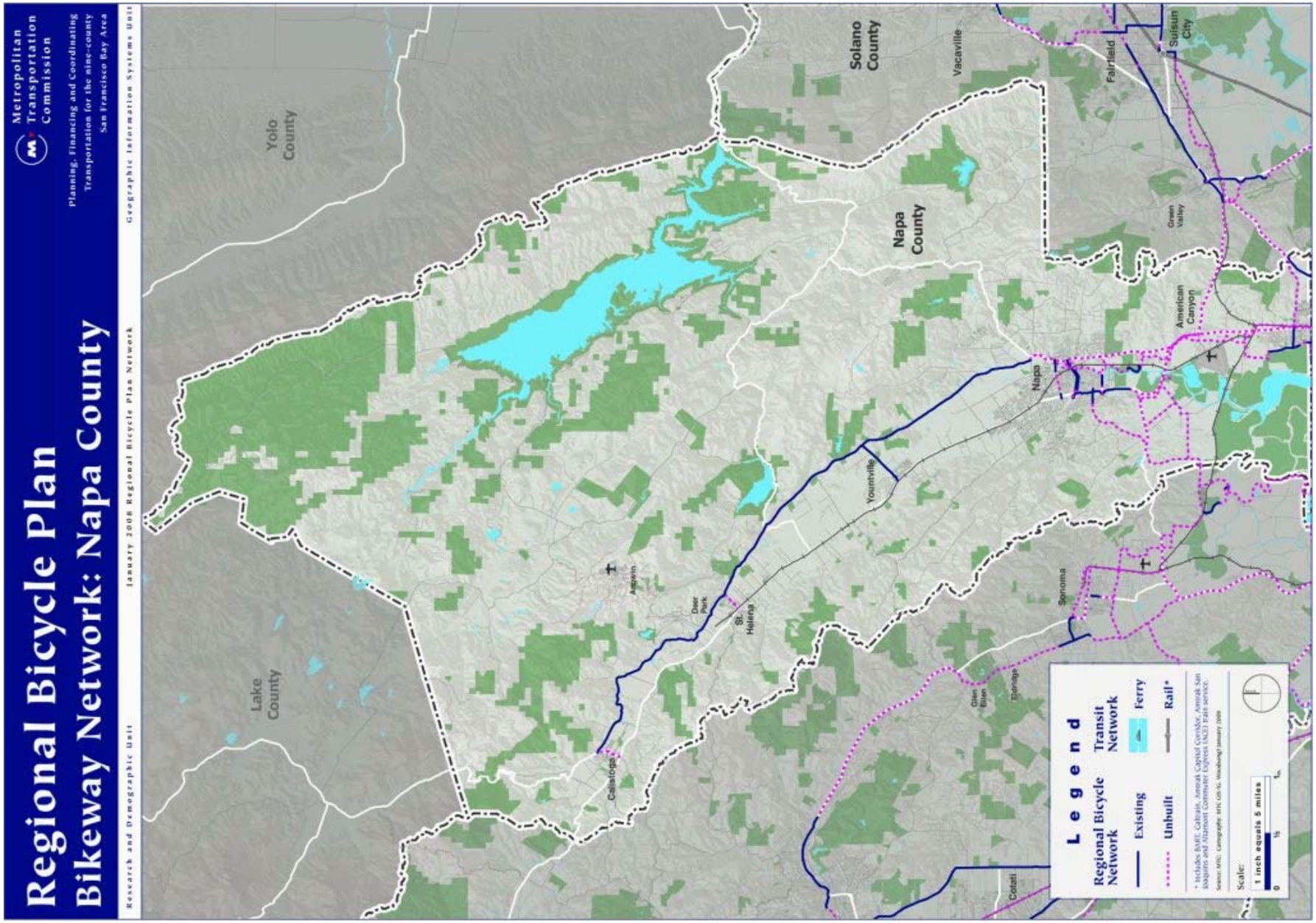
Regional Bicycle Network
Existing
Unbuilt
Transit Network
Ferry
Rail*
Scale:
1 inch equals 5 miles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Research and Demographic Unit
January 2008 Regional Bicycle Plan Network
Geographic Information Systems Unit
Yolo County
Lake County
Solano County
Napa County
Vacaville
Fairfield
Suisun City
Green Valley
American Canyon
Napa
Yountville
Sonoma
Glen Ellen
Eldridge
Cotati
Calistoga
Angwin
Deer Park
St. Helena
Legend
Regional Bicycle Network
Existing
Unbuilt
Transit Network
Ferry
Rail*
* Includes BART, Caltrain, Amtrak Capitol Corridor, Amtrak San Joaquins and Altamont Commuter Express (ACE) train service.
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Scale:
1 inch equals 5 miles
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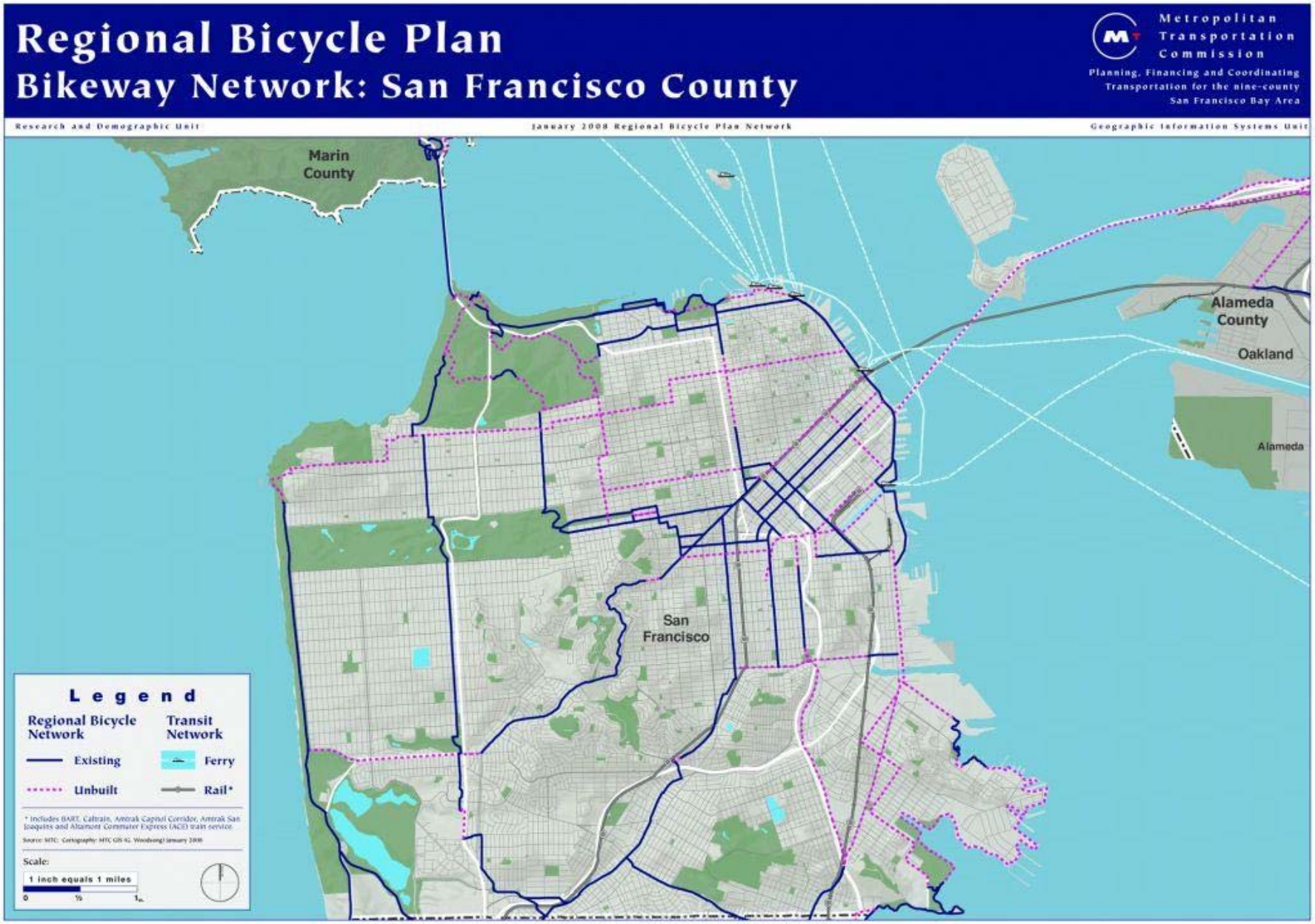
Regional Bicycle Plan
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Metropolitan Transportation Commission
Planning, Financing and Coordinating Transportation for the nine-county San Francisco Bay Area
Research and Demographic Unit
January 2008 Regional Bicycle Plan Network
Geographic Information Systems Unit
Marin County
Alameda County
Oakland
Alameda
San Francisco
Legend
Regional Bicycle Network
Existing
Unbuilt
Transit Network
Ferry
Rail*
* Includes BART, Caltrain, Amtrak Capitol Corridor, Amtrak San Joaquins and Altamont Commuter Express (ACE) train service.
Source: MTC. Cartography: MTC GIS-G. Woodbury January 2008
Scale:
1 inch equals 1 miles
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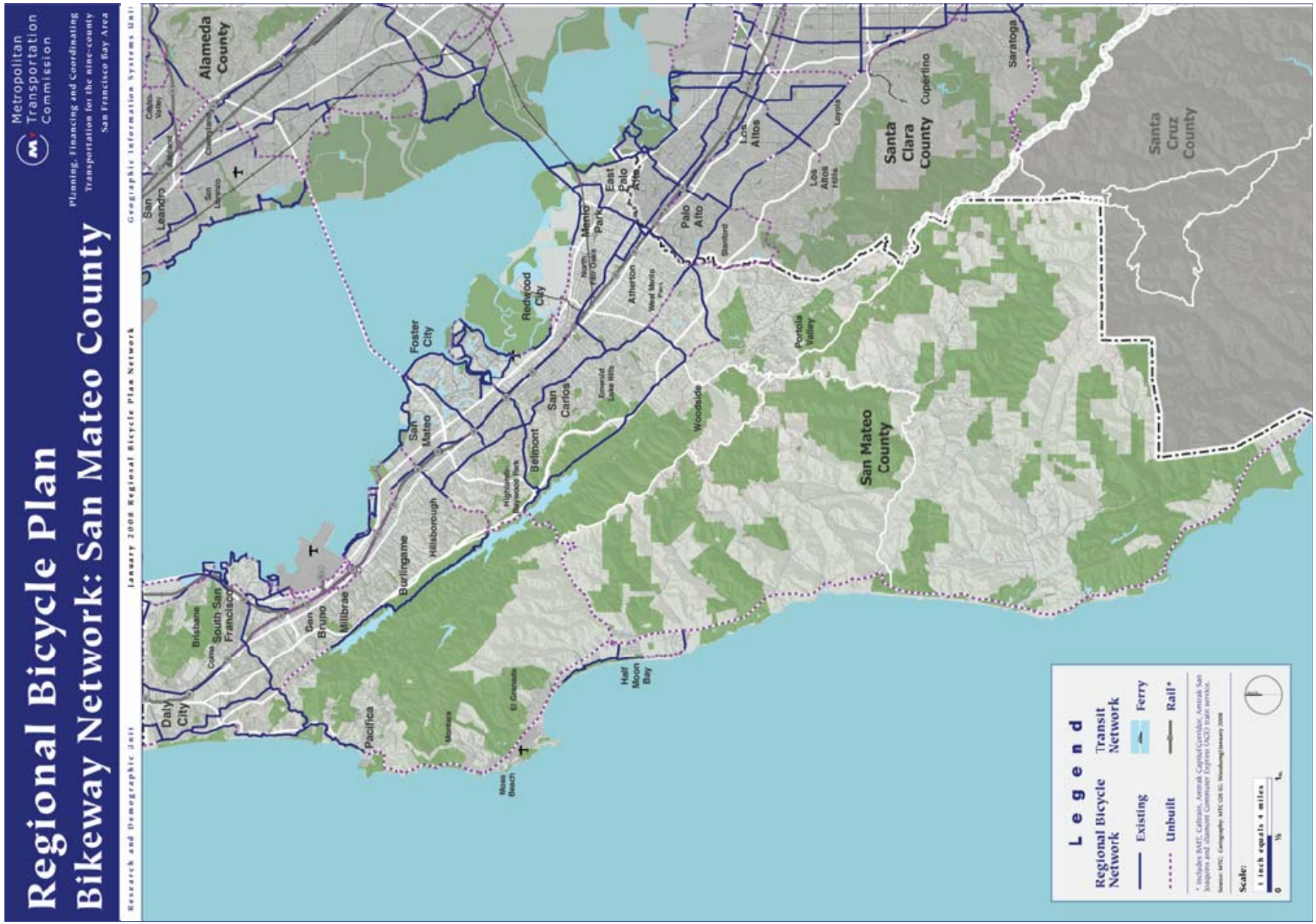
1


Regional Bicycle Plan
Bikeway Network: San Mateo County
Metropolitan Transportation Commission
Planning, Financing and Coordinating Transportation for the nine-county San Francisco Bay Area
Research and Demographic Unit
January 2008 Regional Bicycle Plan Network
Geographic Information Systems Unit
Alameda County
Santa Clara County
Santa Cruz County
San Mateo County
Daly City
Brisbane
South San Francisco
Colma
San Bruno
Millbrae
Pacifica
Burlingame
Hillsborough
San Mateo
Foster City
Redwood City
Belmont
San Carlos
Menlo Park
Atherton
East Palo Alto
Palo Alto
Los Altos
Los Altos Hills
Portola Valley
Woodside
Half Moon Bay
Moss Beach
El Granada
Montara
San Leandro
Cupertino
Saratoga
Legend
Regional Bicycle Network
Existing
Unbuilt
Transit Network
Ferry
Rail*
* Includes BART, Caltrain, Amtrak Capitol Corridor, Amtrak San Joaquins and Altamont Commuter Express (ACE) train service.
Source: MTC. Cartography: MTC GIS SC. Revised January 2008
Scale:
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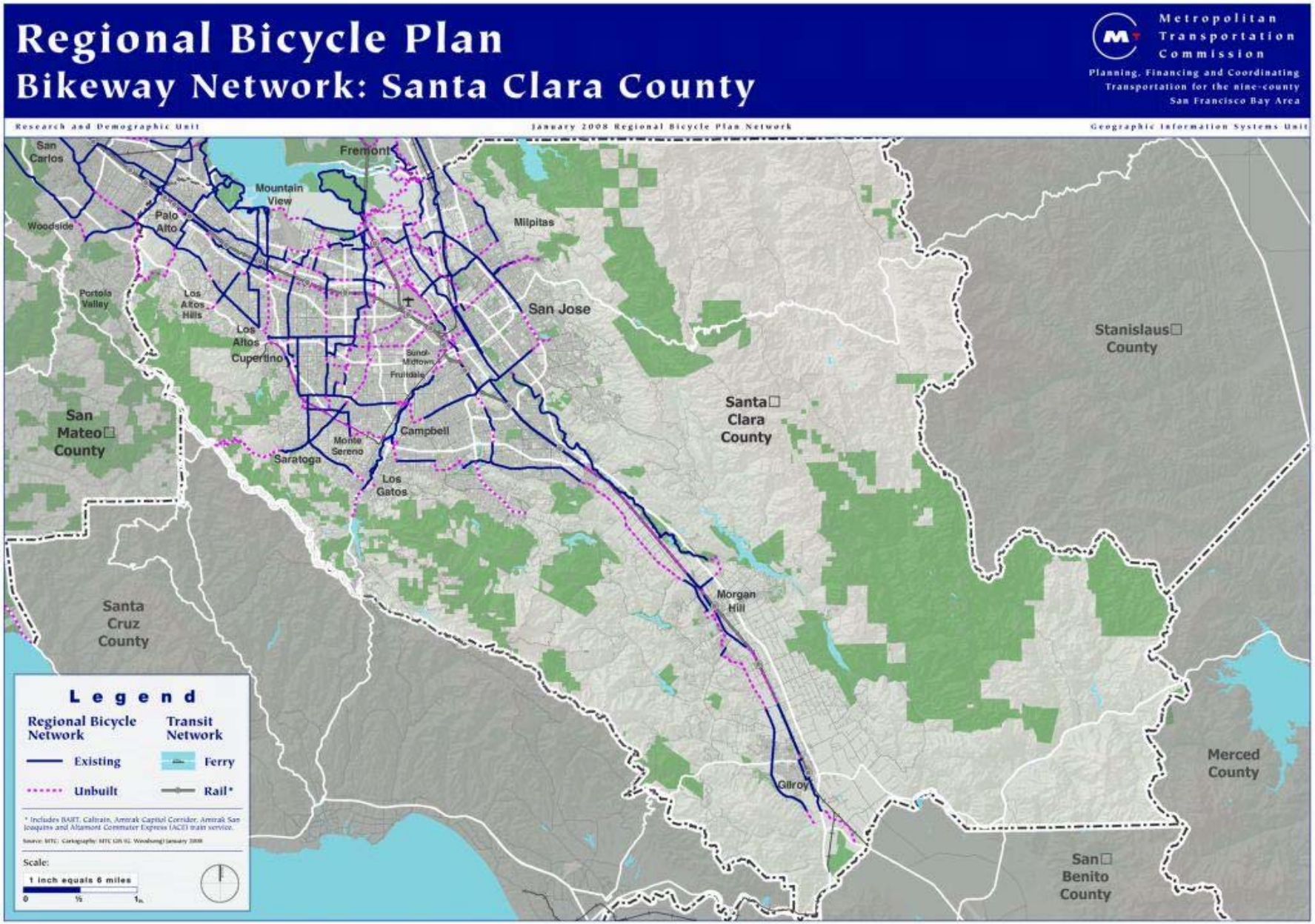
½
1 mi.


Regional Bicycle Plan
Bikeway Network: Santa Clara County
Metropolitan Transportation Commission
Planning, Financing and Coordinating Transportation for the nine-county San Francisco Bay Area
Research and Demographic Unit
January 2008 Regional Bicycle Plan Network
Geographic Information Systems Unit
San Carlos
Fremont
Mountain View
Palo Alto
Woodside
Milpitas
Portola Valley
Los Altos Hills
Los Altos
Cupertino
San Jose
Sunol-Midtown
Fruitdale
Campbell
Monte Sereno
Saratoga
Los Gatos
Morgan Hill
Gilroy
San Mateo County
Santa Clara County
Stanislaus County
Santa Cruz County
Merced County
San Benito County
Legend
Regional Bicycle Network
Existing
Unbuilt
Transit Network
Ferry
Rail*
* Includes BART, Caltrain, Amtrak Capitol Corridor, Amtrak San Joaquins and Altamont Commuter Express (ACE) train service.
Source: MTC; Cartography: MTC GIS (G. Woudsma) January 2008
Scale:
1 inch equals 6 miles
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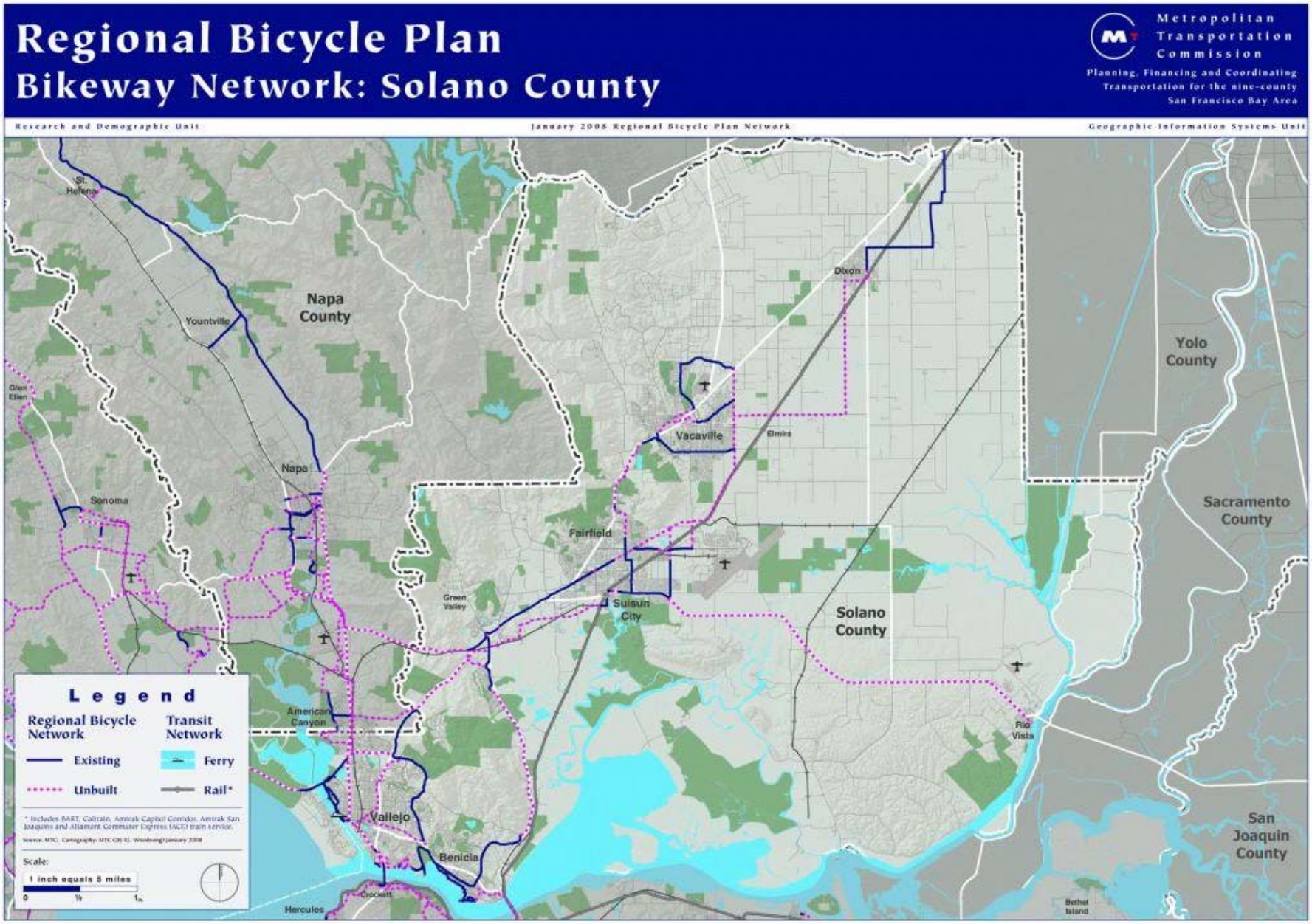
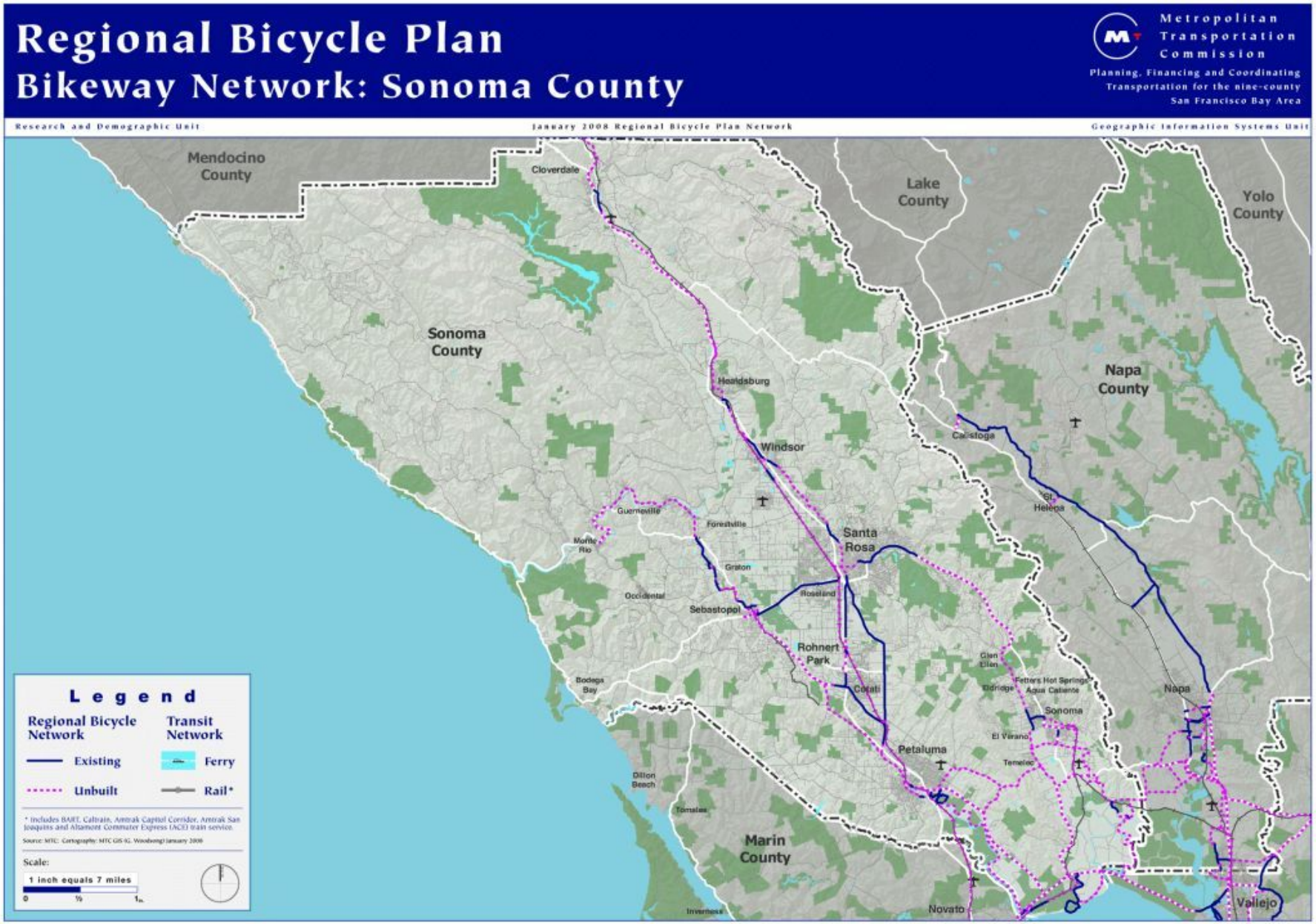
1 in.


Regional Bicycle Plan
Bikeway Network: Solano County
Metropolitan Transportation Commission
Planning, Financing and Coordinating Transportation for the nine-county San Francisco Bay Area
Research and Demographic Unit
January 2008 Regional Bicycle Plan Network
Geographic Information Systems Unit
Napa County
Yolo County
Sacramento County
Solano County
San Joaquin County
St. Helena
Yountville
Glen Ellen
Napa
Sonoma
Dixon
Vacaville
Elmira
Fairfield
Green Valley
Suisun City
American Canyon
Vallejo
Benicia
Crockett
Hercules
Rio Vista
Bethel Island
Legend
Regional Bicycle Network
Existing
Unbuilt
Transit Network
Ferry
Rail*
* Includes BART, Caltrain, Amtrak Capitol Corridor, Amtrak San Joaquins and Altamont Commuter Express (ACE) train service.
Scale:
1 inch equals 5 miles


Regional Bicycle Plan
Bikeway Network: Sonoma County
Metropolitan Transportation Commission
Planning, Financing and Coordinating Transportation for the nine-county San Francisco Bay Area
Research and Demographic Unit
January 2008 Regional Bicycle Plan Network
Geographic Information Systems Unit
Mendocino County
Lake County
Yolo County
Sonoma County
Napa County
Marin County
Cloverdale
Healdsburg
Windsor
Santa Rosa
Sebastopol
Rohnert Park
Cotati
Petaluma
Sonoma
Napa
Vallejo
Novato
Calistoga
St. Helena
Guerneville
Forestville
Monte Rio
Graton
Occidental
Roseland
Bodega Bay
Dillon Beach
Tomales
Inverness
Glen Ellen
Eldridge
Fetters Hot Springs Agua Caliente
El Verano
Temelec
Legend
Regional Bicycle Network
Existing
Unbuilt
Transit Network
Ferry
Rail*
* Includes BART, Caltrain, Amtrak Capitol Corridor, Amtrak San Joaquins and Altamont Commuter Express (ACE) train service.
Source: MTC. Cartography: MTC GIS-G. Woodbury January 2008
Scale:
1 inch equals 7 miles
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1 in.

Bicycle access to public transit

Despite the large, hilly, and water-constrained geography in the Bay Area, bicycling can truly be a transportation alternative to the single-occupant motor vehicle when conveniently linked with the region's buses, trains, and ferries via secure and plentiful bicycle parking at stations and bicycle access onboard transit vehicles. The combination of bicycling and public transit offers many Bay Area residents, workers and visitors perhaps the best alternative to the flexibility and convenience of the single-occupant vehicle as a result of lower costs, reduced parking stress and reduction of contributions to greenhouse gases. Many portions of the region are well-served by bus, rail and ferry operators that traverse long distances, climb steep hills, and provide access to and across barriers that prevent bicycle travel. With a bicycle, one can avoid the sometimes necessary, time-consuming transfers at either or both ends of a transit ride.

Bicycling can be the most convenient method of reaching a transit stop, station or terminal, and ultimate destination. The bicycle offers the independence of the automobile and costs less than auto parking and gas. On transit systems that allow bicycles onboard, the same bike can be used on the origin and destination ends of the trip, or transit riders may have two bicycles, one for each end of the trip. Workplace showers can allow longer-distance commuters to bicycle to work, and arrive at their desk fresh and clean.

> The combination of bicycling and public transit offers perhaps the best alternative to the flexibility and convenience of the single-occupant vehicle.

For cyclists whose destination is within convenient walking distance of transit, plentiful, secure and rain-protected bicycle parking — which is much less expensive for transit operators to provide than auto parking — gives bicycle/transit commuters an alternative to bringing their bikes onboard. This leaves more space for other transit passengers and may increase the attractiveness of bicycling to transit for those who, due to the cumbersome and sometimes dirty nature of carrying one's bicycle onboard, may only consider biking if they can stow their bicycle safely at public transit stations.

In addition to onboard access and bicycle parking, another aspect of bicycle-related transit planning is the route a cyclist takes to reach transit stops and stations. Unlike the transit facilities and vehicles, local roads and pathways are largely controlled by cities and counties, not by transit operators. Therefore, safer and more convenient bicycle access to public transit facilities often requires the cooperation and coordination of multiple agencies.

This section summarizes the policies and practices of the Bay Area's 10 largest transit operators with respect to planning for and accommodating bicycles at stops and stations and onboard transit vehicles.

Transit agency bicycle coordinators

Transit agencies with an in-house bicycle planner on staff — often referred to as a "bicycle coordinator" — have a much greater likelihood of operating systems that welcome bicyclists, and of working with their bicycling passengers to continually improve bicycle parking and bike access to and on their systems than systems that do not have a bicycle coordinator. Effective coordinators bridge the information gap between experienced bicycle/transit riders and transit system managers, who strive to operate systems that meet the needs of all passengers. Bicycle coordinators have the time and expertise to listen to cyclists' needs and to explain, and sometimes work to change, transit policies. Bike coordinators often staff transit bicycle advisory committees (BACs), an effective forum for regular communication between bicyclists and transit systems. One of their most important roles is to apply for grant funds and manage project implementation.

Of the transit operators surveyed, only the Bay Area Rapid Transit (BART) District and VTA have full-time in-house bicycle planning staff (see Table 4.3). Although Caltrain does not have a staff bicycle coordinator, the agency has a BAC that is staffed by their deputy director of rail planning. Caltrain also hires contract bicycle planners to perform some of the intermittent functions of a bike coordinator, such as developing a bicycle plan and inventorying bicycle parking at stations. Golden Gate Transit planning staff whose duties include bicycle coordination also have professional bicycle planning expertise. San Francisco Muni does not have a staff bicycle planner, but the City Bicycle Program advises on many Muni projects.

Transit agency bicycle planning

Regional transit agencies conduct planning for bicycles in various ways (see Table 4.3). AC Transit does not have a bicycle plan, but intends to develop a bicycle parking plan. BART and VTA both have stand-alone bicycle plans. Caltrain has hired a contract planner and consultants to develop the agency's first-ever bicycle plan. The published planning documents of Amtrak, County Connection, Golden Gate Transit, SamTrans, and the Water Emergency Transportation Authority (WETA) consider bicycle access, both to their stops/stations and on their vehicles.

> Effective bicycle coordinators bridge the information gap between experienced bicycle/transit riders and transit system managers, who strive to meet the needs of all passengers.

Bicycle parking at transit facilities

Public transit passengers who bicycle to their stop, station or terminal need to be assured of secure and weather-protected bicycle parking (see "New methods of bicycle parking" section later in this chapter). Many Bay Area transit operators offer a variety of bicycle parking appropriate for the day-long or occasional overnight stays of bicycle/transit users. These include covered bicycle racks that are highly visible to deter theft and vandalism;

individually rented, key-operated bicycle lockers; reserved or on-demand electronic lockers; and attended or automated bike stations.

It is in the interest of transit operators to provide good long-term bicycle parking because it is considerably less expensive to construct than is automobile parking. Regional and statewide funds are available for bicycle parking (see "Costs and Revenue" chapter).

Perhaps the most important element from the transit operator's perspective is that every bicycle that is parked at the station is one fewer that needs to be accommodated onboard. Fewer bikes on a given transit vehicle mean faster boarding and, therefore, faster travel times and better schedule adherence, more space for all passengers (and their luggage), fewer conflicts with passengers with disabilities (in cases where bicycles are stored in the wheelchair tie-down area), and fewer resources needed for transit maintenance and cleaning of transit vehicle interiors.

Inventorying what type of (and how much) bicycle parking is available at each transit stop, station and terminal throughout the region is needed. Absent this accounting, this section identifies which transit operators are tracking their supply, an important first step toward providing adequate bicycle parking (see Table 4.3).

County Connection, SamTrans, Muni and AC Transit do not provide bicycle parking at bus stops; and the Water Emergency Transportation Authority (WETA) has not yet built its first ferry terminal, but bicycle parking is being incorporated into its design. Bike parking at Amtrak stations is usually administered by local jurisdictions.

Of the transit agencies surveyed that operate bicycle parking at their facilities, all keep track of bicycle parking to some degree. BART and Caltrain have, perhaps, the most detailed bicycle parking inventories in the region: BART's includes capacity and average occupancy and is updated annually, while Caltrain's covers the number and occupancy of bicycle lockers and rack spaces, but is updated less regularly. VTA also has an accurate bicycle locker inventory and is updating its bicycle rack inventories at light-rail stations, transit centers and park-and-ride lots. Golden Gate Transit updates its inventory of bicycle racks at bus stops, transit centers and ferry terminals in conjunction with the *Short- Range Transit Plan* update.

Onboard policies

All transit operators surveyed accommodate the transport of bicycles, with some restrictions based on demand and time of day (see Table 4.3). While some policies are common among most transit operators, most differ by operator and, within operators, by vehicle type. All operators permit folded bicycles onboard all vehicles

at any time. Notably, many transit operators are switching to low-floor or level-boarding vehicles to improve access for disabled passengers. This practice has the added benefit of making it easier to bring bicycles onboard.

Common onboard policies and practices

All Bay Area transit operators surveyed have a policy of not charging additional fares for bicycles. Each also limits bicycle access in some way, whether by time of day, the location inside or on the vehicle where bicycles must be stowed or the number of bikes per vehicle. Although operators have a variety of policies in place to guide how, where and when bicycles may be brought onboard transit vehicles, all have policies — such as asking bicyclists not to board a vehicle that is already too crowded or to not ride on platforms — that rely on bicyclists' common sense to prevent conflicts with other passengers.

Onboard bus policies and equipment

With limited exceptions, the buses of all operators surveyed are equipped with front-mounted bicycle racks, each with a capacity of two or three bikes. Since these racks first gained popularity in the early 1990s, transit operators and other vendors have modified their design to overcome driver concern about the racks obscuring headlights and other operational issues. Although front-mounted racks allow bicyclists to travel long distances with their bicycles, their limited capacity reduces reliability for cyclists, who don't know whether or not the bus they're waiting for will be able to carry their bike until it arrives. Other drawbacks of these racks are that they can be confusing to first-time users, and that cyclists must be strong enough to mount and dismount their own bicycles, which also discourages use for some cyclists.

> Many transit operators are switching to low-floor or level-boarding vehicles to improve access for disabled passengers, which has the added benefit of making it easier to bring bicycles onboard.

Muni's newer models of diesel and trolley buses are equipped with front-mounted bicycle racks. SamTrans, VTA and County Connection buses are also equipped with racks. In addition, these operators also allow a maximum of two bicycles inside their buses, if the exterior rack is filled, the bus is not already too crowded, and there are not already wheelchairs in the tie-down areas.

Three-quarters of Golden Gate Transit's fleet is equipped with front-mounted racks. (The Richmond-San Rafael Bridge routes also allow two additional bicycles onboard, subject to the same crowding exceptions described above.) The remaining 25 percent of Golden Gate's bus fleet is comprised of 45-foot-long vehicles, which accommodate bicycles in the under-floor luggage compartments. Due to the need to slide out these under-carriage racks, bicycles can only be boarded and alighted at locations with sufficient space (locations are listed on the Golden Gate Transit District Web site). This combination of technologies means that all Golden Gate Transit buses can each accommodate a minimum of two bicycles.

In addition to front-mounted racks, AC Transit's transbay commuter coaches each

accommodate two bikes in the cargo bays when the front rack is full. Four bikes can also be stored in custom-made undercarriage racks on selected AC Transit commuter coaches crossing the San Mateo-Hayward and Dumbarton bridges.

Loading a bicycle onto the luggage bay of an AC Transit transbay bus

Onboard rail and ferry policies and equipment

BART allows bicycles in all cars except the first, and on all trains except those traveling in the peak direction during commute hours. The commute-trip restriction frees up standing room for additional non-cycling passengers, but also creates a significant impediment to bicycle/transit use, particularly for commute trips. Bicycles are not allowed on crowded trains at any time.

BART is currently testing various new seating configurations, which all remove some seats to create more space for priority bicycle storage (see photo below of first test of BART's BikeSpace program). Additional space for bicycles is also being considered by BART in the preliminary designs for new rail cars.

BART's experimental BikeSpace seat configuration

All Capitol Corridor and San Joaquin rail cars are equipped with bicycle racks that collectively hold between 12 and 22 bicycles per train, depending on the type and number of cars used on a particular train. The Capitol Corridor and San Joaquin promote the ability to bring bikes onboard and allow bicycles to be stored inside the cars without being restrained in a rack when these racks are full.

Caltrain provides dedicated bicycle cars that are located at the northern end of all trains. Each bike car can accommodate either 16 (Bombardier train sets) or 32 (Gallery train sets) bicycles. Today's fleet is 80 percent Gallery cars and 20 percent Bombardier cars. Through time, Caltrain plans to replace the Gallery cars (and expand the vehicle fleet) with new rolling stock that may have less onboard bicycle capacity. Caltrain has promoted a destination tag system to expedite bicycle stacking, boarding and alighting. There are no peak-period restrictions on bringing bicycles on board Caltrain vehicles. Despite substantial bicycle capacity, Caltrain attracts more passengers who want to bring their bicycles onboard than can be accommodated. In response, the agency is reviewing operational policies and technology

BICYCLE ACCESS ON RAIL

Rail passengers who use a bicycle on both ends of their trip consider the ability to bring a bicycle onboard to be essential. There are three primary barriers to onboard bicycle carriage:

Space constraints. Since one bicycle can occupy the same amount of space as one or more passengers, rail systems must balance the needs of all passengers, including those with bicycles and those without.

Dwell time. Regardless of how efficient a cyclist is, boarding and de-boarding a train with a bicycle takes longer than without. Depending on passenger loading, this additional time can increase how long a train must stay in the station, which translates to higher operating costs and longer travel times for all passengers.

Safety. Trains are moving vehicles that sometimes move unpredictably. Anything carried onboard, particularly something as heavy and unwieldy as a bicycle, has the potential to cause harm unless safely stowed, secured or held.

Bay Area rail operators accommodate bicycles to varying degrees and in myriad ways, including allowing passengers to hold their bicycles on trains space permitting, hanging them on specially-designed racks and otherwise securing them to the interior train walls.

regarding bike-onboard issues and is taking measures to improve bicycle parking at its stations.

Bicycles are not permitted on Muni's historic streetcars, cable cars or Muni Metro light-rail vehicles, although a *Bicycles on Light-Rail Vehicles* study is planned to begin in 2008/09. VTA light-rail vehicles are equipped with internal bicycle racks, which carry four bicycles per train. In addition, up to four more bicycles are permitted when the racks are full, in the turntable sections of the train.

Bicycles are permitted on all Bay Area ferry boats. Capacities vary from 11 to over 70 bicycles. All WETA boats are being designed and built to hold at least 35 bicycles.

Table 4.3: Bicycle access to Bay Area's 10 largest transit operators

Transit Operator	Bicycle Coordinator	Bike Planning	Bike Parking Inventory	Bikes (#) on/in vehicles[1]
AC Transit	—	*Designing w/Transit* (2002)	No	Front rack on standard buses (2) Front rack plus luggage bay on transbay buses (4-6)
Amtrak[2]	—	*State Rail Plan* (2005)	No	Yes (# not specified)
Bay Area Rapid Transit (BART)	✓	*Bicycle Access & Parking Plan* (2002)	✓	Yes (# not specified; peak hour restriction)
Caltrain	—	*Caltrain Bicycle Plan* (expected 2008)	✓	Yes (# depends on equipment & # of equipped cars; northernmost car)
(Contra Costa) County Connection	—	*Short Range Transit Plan* (2008)	No	Front rack or undercarriage (2) Inside (2)[3]
Golden Gate Transit	—	*Short Range Transit Plan* (2007)	✓	Front rack (2)[4] Luggage bays on 45' buses (2)
San Francisco Municipal Railway (Muni)	[5]	*San Francisco Bicycle Plan* (2005)	No	Front rack on buses only
SamTrans	—	*Short Range Transit Plan* (2008)	No	Front rack (2) Inside (2)[3]
Valley Transportation Authority (VTA)	✓	*Santa Clara Countywide Bicycle Plan* (2000)[6]	✓	Bus: Front rack (2); Inside (2)[3] Light-rail: Inside (8)
Water Emergency Transportation Authority (WETA)	—	Technical designs	No	Yes

No: Agency neither owns nor operates bicycle parking.
[1] Racks with a capacity of two-to-three bicycles are mounted on the front of most Bay Area transit buses.
[2] Amtrak operates the Capitol Corridor and San Joaquin rail lines.
[3] Passenger and wheelchair load permitting.
[4] Exception: GGT routes 40 and 42 accommodate bicycles onboard buses.
[5] No, although the San Francisco Bicycle Program is involved in many Muni projects.
[6] VTA wrote the *Countywide Bicycle Plan* as the Congestion management agency, rather than as the transit agency.

Emerging bicycle innovations

In the seven years since the original *Regional Bicycle Plan* was adopted, many Bay Area jurisdictions have developed, are experimenting with and are considering specially-designed roadway treatments, specially-designed traffic signal, new methods of bicycle parking and other innovations to encourage bicycling and make it safer. This section describes these innovations, including those in use locally as well as those from other parts of the country and world that could have promising Bay Area applications. Detailed guidance on when and where each is appropriate is provided in MTC's Bicycle and Pedestrian Safety Toolbox, which is described in Chapter 3, and in some of the resources that are summarized in Appendix G.

Roadway improvements

Bicycle boulevards

Bicycle boulevards are roadways that are shared by cyclists and motorists, but which prioritize bicycles through the use of diverters and other traffic controls. Bike boulevards can reduce crashes from wrong way riding, improper passing and excessive motor vehicle speeds. Bicycle boulevards are most effective when a grid system is in place so motor vehicles can use a parallel route and cyclists can follow a bike boulevard to within a block or two of their destination.

Bicycles can traverse the length of bicycle boulevards, but through car traffic is prohibited. Special bicycle stencils and signs are used on bicycle boulevards. Stop signs are often turned on these roadways to prevent cyclists from having to stop at each intersection, and budget permitting signals are installed at busy intersections to allow safe cyclist crossings. The City of Berkeley has the most extensive network in the Bay Area, but there are bicycle boulevards in the cities of Palo Alto and Emeryville.

Sharrows

Sharrows are pavement markings along Class III bike routes designed to alert motorists to the presence of bicyclists and to indicate to bicyclists where they should ride to avoid the "door zone" adjacent to parked cars.

CLASSES OF BICYCLE FACILITY

The California Streets and Highway Code and Caltrans Highway Design Manual define three classes of "bikeway," a facility that is provided primarily for bicycle travel:

Class I Bikeway (Bike Path)
Provides a completely separated right of way for the exclusive use of bicycles and pedestrians with crossflow by motorists minimized.
Cost: high

Class II Bikeway (Bike Lane)
Provides a striped lane for one-way bike travel on a street or highway.
Cost: medium

Class III Bikeway (Bike Route)
Provides for shared use with pedestrian or motor vehicle traffic.
Cost: low

Under the guidelines proposed for inclusion in the revised *Manual on Uniform Traffic Control Devices,* sharrows would be indicated for stretches of road with narrow travel lanes adjacent to parked cars where agencies are unable to incorporate a bicycle lane due to right-of-way constraints.

A sharrow in San Francisco

The *San Francisco Shared Lane Pavement Markings: Improving Bicycle Safety* study found that implementing these pavement markings improves the following behaviors: sidewalk riding; wrong-way riding; distance cyclists ride from parked cars; distance cyclists ride from cars in travel lanes; and distance between auto drivers in travel lane and parked cars (when no bicycles present). Other Bay Area cities currently using sharrows include Berkeley (Gilman Street), San José (San Fernando Street and Park Avenue) and San Rafael (14 routes throughout the city).

A contra-flow bicycle lane in London, UK

Contra-flow bicycle lanes

Contra-flow bicycle lanes allow bicyclists to travel in the opposite direction as motor vehicle traffic on one-way streets, thereby providing cyclists with a direct route and avoiding the need to traverse additional blocks to reach their destination. These lanes are clearly separated from opposing lanes with double yellow lines and, depending on conditions, sometimes have partial separation at intersections or mid-block, or complete separation. Factors to be considered during design include vehicle and bicycle turning movements, vehicle and bicycle ADT (average daily traffic), available

street width, existence of on-street parking and rate of turnover, and transit routes. There are contra-flow lanes in San Francisco and Santa Cruz.

Colored pavement

Colored pavement is used to increase the visibility of bikeways or, more commonly, zones with a high potential for motor vehicle/bicycle conflicts, by indicating cyclist right-of-way with a distinctive color. This convention is designed to remind motorists that they are crossing or adjacent to an area where they can expect to see cyclists and to take extra caution. Colored pavement can be used for very short sections of pavement (such as where a trail crosses an intersection) or for the full length of a bike lane.

On the down side, colored pavement can create a false sense of security for cyclists; confuse motorists since the technique is new and unfamiliar; and have high initial and maintenance costs. Options for creating colored pavement have varying degrees of permanence. Agencies interested in experimenting with colored pavement on a temporary basis can use regular paint or tennis court paint (for green lanes). These paints fade quickly and must be reapplied to maintain an impact. A more permanent option is to embed color in the last lift of an asphalt overlay, although reapplication requires a grind-out and re-paving.

Blue bicycle lanes in Sunnyvale

Portland, Ore. is the primary U.S. city using colored bike lanes; however, Sunnyvale is experimenting with blue bike pavement and Petaluma is trying out red bike pavement. The city of San Francisco has requested permission to experiment with colored bicycle lanes from the California Traffic Control Devices Committee, the first step toward establishing guidelines for the use of colored lanes.

Traffic signal accommodations

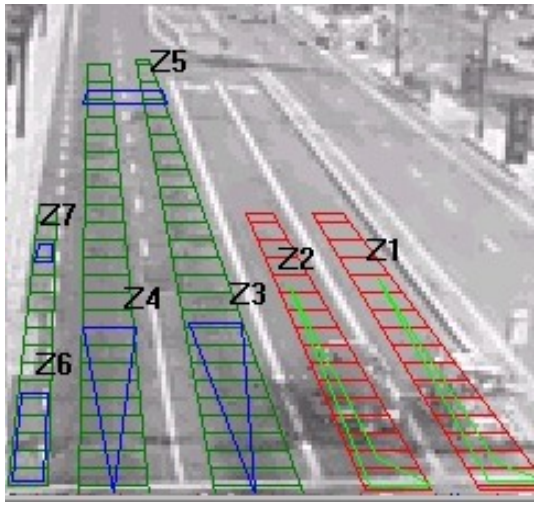
Traffic signal detection

Like in-pavement loop detectors, which have been in use throughout the Bay Area for decades, video detection allows bicyclists to trigger traffic signals at intersections. The technology uses "detection zones" for motorists and cyclists (see image) and is most often used at signalized intersections with dedicated bicycle lanes and that are already equipped with motor vehicle video detection.

Video detection is superior to loops because it can detect any bicycle, regardless of frame material, and is not disrupted by asphalt work or other maintenance. However, if a bicyclist does not stop in the detection zone, the camera can miss her, thereby leaving the signal phase on red in the cyclist's direction of travel. Furthermore, this technology is compromised by weather conditions, such as heavy fog and bright sunlight. Video detection is currently in use in Santa Rosa.

Senate Bill 1581, signed into law by Governor Schwarzenegger in January 2008, adds a section to the California Vehicle code requiring new traffic signals to detect

bicycles and motorcycles. The bill does not apply to existing signals, however. Caltrans is currently charged with developing new signal detection method guidelines for local jurisdictions.



Video detection zones (Zones Z7 and Z6 are bicycle zones.)

Bicycle signals

Bicycle signals are traffic signals equipped with signal heads that apply exclusively to cyclists. Rather than showing simple red, yellow or green lights, these specially designed signals show red, yellow or green bicycle icons, and can be used in conjunction with a pedestrian phase. Since the California Vehicle Code requires bicyclists, like autos, to obey traffic signals, local municipal codes must be changed to allow bicycles to obey bicycle signals instead.

The city of Davis has installed three of these signals at tee-intersections, such as where a bicycle path meets an intersection. The city of San Francisco is planning to install a bicycle signal at Fell Street and Masonic Avenue as part of improvements to that intersection.

Bicycle boxes

A Bicycle Box is an area designated for cyclists to wait at an intersection during a red signal phase. Cyclists are more visible in the box and this treatment reduces conflicts by designating the correct position for cars and cyclists at intersections. This waiting area – in front of motor vehicles, but behind the crosswalk – is typically painted a contrasting color and contains a bicycle stencil in the middle of the box. In order to provide maximum safety to bicycles, cars at these intersections are prohibited from making right-hand turns on red.

Bicycle boxes increase safety by preventing a common collision at intersections known as the "right hook" where a vehicle making a right turn hits a cyclist proceeding straight through the intersection. Bicycle boxes are widely used in Europe and a few American cities have started to install them, including Cambridge, Ma. and Portland, Ore.

New methods of bicycle parking

According to the Association of Pedestrian and Bicycle Professionals, the lack of secure bicycle parking keeps many people from using their bikes for basic transportation. Many people are deterred from riding to work, school, shopping and other destinations, and instead drive, because of an experience with theft or the threat of

theft. Providing a secure place to store bikes at cyclists' destinations is a key component of a robust regional bicycling network.

Many Bay Area employers, jurisdictions and other public agencies have experimented with various bicycle parking designs for decades, including electronic lockers, bicycle stations, and various types of bicycle racks. This section provides an overview of these bicycle parking innovations and a brief discussion of the situations in which each is most appropriate.

Electronic lockers

For bicyclists who need to leave their bicycles for long periods of time at transit stations or the workplace, security is a key concern. Long-term bicycle parking solutions have historically been limited to lockers, bicycle "lids," and other options that provide sheltered parking controlled with a key or padlock. The primary shortcoming of bicycle lockers is that just one user holds the key to each locker, leaving many lockers frequently empty but unavailable for rental to casual cyclists. Furthermore, while an agency may have the resources to purchase and install bicycle lockers, maintenance and administration are ongoing challenges. Lockers may be abandoned or vandalized, and frequently there are insufficient resources to maintain an accurate list of current users or respond to potential locker-renters in a timely manner.

Opening an electronic bicycle locker with a smart card

One solution to the challenges posed by traditional bicycle lockers is the electronic locker, which is rented on an hourly basis on demand, rather than being reserved for months at a time by a single user. This allows each locker to be used by many people over a given period of time, increasing the number of bicycles stored in the lockers. Electronic lockers typically charge a small fee to discourage misuse, which is paid with a specially-designed debit card. Features that are currently being considered by BART and cities such as Berkeley and Oakland include compatibility with the TransLink® universal transit card and an online reservation system.

Electronic lockers are currently available at the Belmont and Sunnyvale Caltrain stations, the 12th Street, 19th Street and El Cerrito Plaza BART stations, the Harbor Bay ferry terminal and new city parking structure in the city of Alameda, and in downtown Palo Alto. BART is planning to install hundreds of eLockers by 2008. At present, an outstanding issue is whether or not all locker payment systems will be compatible.

Bicycle stations

Bicycle stations offer attended or automated long-term bicycle parking. Other services can also be available, such as bicycle repairs, sharing, rentals and retail sales. Bicycle stations at the Downtown Berkeley and Embarcadero BART stations and the Palo

Alto Caltrain station are operated by BikeStation, an organization that serves members and nonmembers by contracting with local partners to manage bicycle parking, service and retail facilities. In addition, there are other, independently operated Bay Area bicycle stations at the Fruitvale BART and San Francisco Caltrain stations.

The annual operating cost of a bicycle station range from $25,000 for a small, unstaffed facility to $120,000-$150,000 for a fully staffed, full-service facility. Capital costs range from $25,000 for a secure room or cage to over $3 million for a more extensive facility. Bicycle stations have struggled to identify long-term revenue sources to cover their operating costs and are often subsidized by outside funding, including membership fees, grants and operating funds from transit agencies.

Retrofitted Parking Meters

Traditional parking meters each serve a single parked car. On a given block face (depending on its length), there can be up to 20 meters. This proliferation of meters is costly to administer, creates sidewalk obstructions and the meters themselves are easy to vandalize. However, these meters also serve as de facto bicycle parking, often allowing cyclists to lock their bicycles to a parking meter directly in front of their destination which increases cyclists' sense of security.

Several Bay Area cities, including Redwood City, Berkeley and Oakland, are replacing parking meters with parking kiosks, which each serve between three and five parking spaces. These kiosks allow motorists to use change, dollar bills or credit cards; are difficult to vandalize and easier to administer; and cut down on sidewalk obstructions. However, because the design of parking kiosks does not allow a bicycle to be attached, an inadvertent side effect is a loss of bicycle parking, which is particularly problematic in areas with few bicycle parking racks.

Rather than remove all of the old parking meters, the cities of Berkeley and Oakland have retrofitted some original meters for bicycle parking. After meter heads were removed in Berkeley, a metal ring was welded to the remaining post to allow two bikes to be securely attached. On blocks where the city of Oakland installs parking kiosks, they leave two meters per block face and attach a distinctive yellow bicycle parking sticker to each, but remove the internal metering mechanisms. This arrangement preserves some bike parking spaces, but has been confusing to some motorists.

Other Bicycle Storage

Bicycle stations at the Palo Alto Caltrain station and Berkeley and Embarcadero BART stations have had success with double-stacked bicycle parking. Double-decker storage racks are available in units that hold eight, 10, 12, 14 or 16 bicycles at one time. Because loading and removing a bicycle from the upper level can be difficult, these racks may be best used where there is an attendant on duty; however, the storage

units also work with U-locks and cable locks.

Other innovative parking technologies are currently employed outside the United States. In Wales, Cyclepods — sometimes called "bicycle trees" — offer room for eight bicycles parked vertically, which minimizes the rack's footprint by 30 percent, compared to traditional horizontal racks. Vertical racks made by U.S. manufacturers may also be a viable option for bicycle parking.

Other innovations

Stairway channels

Bicycle stairway channels are narrow ramps located adjacent to stairwells – often directly beneath the handrail – that allow cyclists to wheel a bicycle up or down a flight of stairs. These ramps, which are typically used at transit stations, increase the ease of using transit by reducing the effort needed to transport a bike up and down stairs, especially a bicycle with full saddlebags.

The San Mateo Caltrain station and the VTA Great Mall light-rail transit station have stair ramps. After extensive design work, bicycle stair ramps were installed at the 16th/Mission BART station in San Francisco in March 2007 for a six-month pilot program. BART is developing facility design criteria and standard specifications for the installation of stair ramps at other BART stations.

Bicycle-sharing

Bicycle-sharing is an arrangement whereby a pool of bicycles is available on demand in a particular geographic area – usually a compact downtown district. Individuals can check out a bike from one of many locations and return it to the same or to a different bike-sharing location. Customers typically use shared bikes for trips that are too far to walk, to link with public transit or just to enjoy a ride on a beautiful day.

Theft has historically been the biggest challenge to bicycle-sharing programs. The ability to identify customers without adding a time-consuming and labor-intensive check-out process is essential to these programs' success. Recent smart-card technology has allowed bike-sharing programs to blossom in more than a dozen European cities, including Paris, Vienna and Copenhagen. Civic leaders in Lyon, France attribute a 4 percent dip in auto traffic to that city's bike-sharing system. Paris's Velib system provides 15,000 bicycles throughout the city, which are used for a total of 75,000 daily trips.

Closer to home, Washington D.C. is experimenting with a 200-bicycle fleet of shared bicycles, and Portland, Ore. and New York City are considering such a move. The Los Angeles County Metropolitan Transportation Authority (MTA) is currently negotiating for a bicycle-sharing program in San Francisco.

Bicycle subsidy programs

The Santa Cruz County Regional Transportation Commission offers a $200 bicycle subsidy purchase program for electric and folding bicycles. The program is

administered through a local non-profit that provides a mandatory bicycle education and skills class prior to the bicycle purchase. A check is sent to the participant that must be used towards the purchase of a new bicycle at participating bicycle shops.

The bicycle subsidy program seeks to encourage transit passengers to bring their bikes inside local buses when front-loading racks are filled. These bikes also appeal to residents living in small housing units, who might not otherwise have room for a bicycle.

Some private employers and universities in the United States offer bicycle purchase subsidies, while in countries like the Netherlands, employees can purchase bikes pre-tax every three years.

Traffic laws

Unlike some states, the California Vehicle Code confers the same rights and responsibilities to bicycles as to motor vehicles. Bicycles are permitted anywhere on the roadway, except where explicitly prohibited.

Several states go farther and have other laws to encourage bicycling, improve safety and increase awareness of cycling. Arizona and New Hampshire have laws requiring a minimum 3-foot buffer between motor vehicles and the bicycles they are passing, although some feel that requiring half the width of the travel lane is more appropriate. Defining a minimum distance for safe passing provides an awareness that motorists need to provide cyclists with enough clearance to avoid a sideswipe. Even if there is no contact, large vehicles can churn up enough air to push cyclists a few feet from their line of travel. States such as Ohio, Vermont, Maryland, Oregon and California have considered safe passing laws to improve safety of cyclists.

Idaho has unique laws for cyclists at intersections controlled by stop signs or stoplights, unlike anything currently on the books in California. Since 1982 the Idaho motor vehicle code allows cyclists to treat stop signs as yield signs. And, while cyclists are still required to stop at stoplights during the red phase, since 2005, they have been permitted to proceed through signalized intersections if clear.

The Idaho law was passed in recognition of the infeasibility of retrofitting all signals to detect bicycles. Idaho police and Department of Transportation officials tout the safety benefit of the law in that it allows cyclists to clear intersections before turning vehicles and where parked cars on the far side of the intersection squeeze cyclists into narrow traffic lanes. Several other states, such as Minnesota, Montana, and Oregon, have considered or are considering similar laws for cyclists. MTC has conducted research on the concept.

5 | Costs and Revenue

This chapter provides an estimate of the cost to construct the Regional Bikeway Network (RBN) presented in Chapter 4, and the corresponding revenue expected to be available to complete the network through 2035, the horizon year of *Transportation 2035* and the *Regional Bicycle Plan for the San Francisco Bay Area*. All figures are in 2007 dollars, the base year of both plans.

Cost of regional network

The cost to complete the RBN is estimated to be approximately $1.4 billion (see Table 5.1). This figure includes the cost to construct all unbuilt network segments in each county ($710 million) and pathways on the three toll bridges that currently prohibit bicycle travel: the West Span of the San Francisco/Oakland Bay Bridge, the San Mateo/Hayward Bridge and the Richmond/San Rafael Bridge ($700 million). The pathway on the East Span of the Bay Bridge is fully funded and under construction, and the pathway on the Benicia/Martinez Bridge is fully funded and about to be constructed.

> The cost to complete the RBN is estimated to be approximately $1.4 billion.

To gain an understanding of the relative cost of the average project in each county and the magnitude of impact that the three toll bridge projects have on the total RBN cost, Table 5.1 shows the average cost per mile of RBN projects in each county, on the toll bridges, and regionwide. Countywide average costs range from less than $200,000 per mile in Contra Costa County to over $1.5 million per mile in Marin County, with an average cost (without the toll bridges) of about $631,500 per mile. Cost information found in Table 5.1 is detailed in Appendix A. Rather than indicate that construction costs are higher for the same project in one county than another, Appendix A shows that cost variation among counties is a function of the type of unbuilt projects that characterize a given county's network (e.g., trails and bridges are typically more expensive per mile to construct than bicycle lanes).

In contrast to this $200,000 to $1.5 million per mile range, adding bicycle facilities to

the toll bridges is estimated to cost an average of $50 million per mile, 80 times the average non-toll-bridge RBN link cost.

All cost figures were calculated by escalating to 2007 dollars (the base year for the *Regional Transportation Plan* update) the cost of still-unbuilt segments reported to MTC in 2004 by the county congestion management agencies and transportation authorities. Escalated costs were reviewed by these agencies for this Plan update. MTC staff calculated the cost of segments for which no cost information was available using the construction cost assumptions published in the 2006 Alameda County Congestion Management Agency *Countywide Bicycle Plan*.[3] All existing and unbuilt links of the San Francisco Bay Trail spine are included in the RBN and are, therefore, reflected in Table 5.1.

[3] *Alameda Countywide Bicycle Plan*, Table 5-2, Alameda County Congestion Management Agency, 2006.

Other costs

While it is instructive to know the cost of the RBN, it is equally important to get a grasp of the other expenditures needed to create a cohesive regionwide bicycle system (see "Completing the Network" section of the previous chapter). These additional costs fall into the following categories:

Local projects

There are hundreds of projects detailed in dozens of citywide and countywide bicycle plans that are needed to link cyclists safely to local origins and destinations.

Bicycle parking

To provide safe and appropriate places to park at destinations throughout the region, new and updated racks, bicycle lockers (including new electronic lockers), and staffed and electronic bicycle stations (see "Bicycle parking" section of Chapter 4) are needed.

Way-finding and other signage

Signs along recommended bicycle routes and numbered bike routes, and to destinations of regionwide significance are needed to allow visitors to navigate unfamiliar bikeways and to educate local non-cyclists on the viability of cycling.

Onboard transit accommodations

This includes maintenance and replacement of front-loading racks and accommodations for bicycles inside bus, rail and ferry vehicles.

Cost to maintain and operate facilities

Beyond capital expenditures, striping bicycle lanes, repaving trails, replacing damaged signs, and operating attended bicycle parking facilities are essential to creating a regionwide bicycle system.

Table 5.1: Regional Bikeway Network cost

County	Unbuilt mileage	% Regionwide unbuilt mileage	Total cost (2007 $'s)	Average cost per mile	% Regionwide cost
Not including Bay Area toll bridges					
Alameda	187	17%	$165,510,000	$884,000	23%
Contra Costa	138	12%	$25,943,000	$187,900	4%
Marin	81	7%	$128,859,000	$1,585,000	18%
Napa	61	5%	$18,227,000	$301,000	3%
San Francisco	47	4%	$24,335,000	$515,000	3%
San Mateo	104	9%	$34,257,000	$329,000	5%
Santa Clara	182	16%	$205,290,000	$1,128,000	29%
Solano	110	10%	$40,651,000	$371,000	6%
Sonoma	214	19%	$66,809,000	$312,000	9%
Total (not including toll bridges)[1]	**1,124**	**100%**	**$709,881,000**	**$631,567**	**100%**[2]
Toll bridges lacking bicycle access (from Table 4.2)					
Richmond/San Rafael	3.9	0.3%	$57,750,000	$14,986,000	4%
San Francisco/Oakland Bay (west span)	1.9	0.2%	$518,338,000	$272,858,000	37%
San Mateo/Hayward	8.2	0.7%	$123,363,000	$14,985,000	9%
Toll Bridge Total	**14**	**1.2%**	**$699,452,000**	**$50,013,000**	**50%**
Grand total	**1,138**		**$1,409,333,000**	**$1,238,000**	**100%**[3]

1. Costs and mileage include all Bay Trail spine segments.
2. 100% of nontoll bridge costs.
3. 100% of all Regional Bikeway Network costs, including toll bridge costs.

Table 5.2: Projected revenue for bicycle projects & programs

Funding source	Annual estimate	Total estimate (2008-2035)
Administered by Metropolitan Transportation Commission		
Transportation Enhancements (TE)[1]	$600,000	$16,800,000
Transportation for Livable Communities (TLC)[2]	$18,000,000	$504,000,000
Regional Bikeway Network (RBN)[3]	$36,000,000	$710,000,000
Safe Routes to Transit (SR2T)[4]	$2,000,000	$56,000,000
Transportation Development Act, Article 3 (TDA-3)[5]	$2,900,000	$81,200,000
Climate Action Program (CAP)[6]	$20,000,000	$100,000,000
Administered by other regional, state or countywide agencies		
Bay Trail Grants[7]	$1,250,000	$5,000,000
Transportation Fund for Clean Air (TFCA)[8]	$600,000	$16,800,000
Hazard Elimination Safety (HES)[9]	$160,000	$4,480,000
Bicycle Transportation Account (BTA)[10]	$1,840,000	$51,520,000
Safe Routes to School (SR2S)[11]	$2,600,000	$72,800,000
Countywide sales tax measures[12]	$8,973,000	$251,244,000
Total	**$94,923,000**	**$1,869,844,000**
RBN funds (created for Regional Bikeway Network construction)		$710,000,000
Funds available for other bicycle projects and programs		$1,159,844,000

All revenue in 2007 dollars.
See facing page for footnotes.

Footnotes for Table 5.2

General assumptions

- 20% of competitive statewide sources will go to the Bay Area, based on population.
- Funding sources will continue through 2035 or be replaced with other sources with similar levels of funding.

Source-specific assumptions

1. TE: $60 M per year; 25% statewide; 20% to the Bay Area; 20% for bicycle improvements
2. TLC: $60 M per year; 30% for bicycle improvements
3. RBN: $710 M until 2035 to fully fund RBN, with exception of toll bridges. Funding stream (i.e., $36 M/year) not guaranteed.
4. SR2T: $20 M for first 10 years
5. TDA-3: $290 M per year; 2% under Article 3; 50% for bicycle improvements
6. CAP: Among other programs, includes $10 M per year each for SR2S and SR2T for five years. 50% for bicycle improvements. Funding not guaranteed to be allocated in equal increments every year.
7. Bay Trail: Program is dependent on receipt of grant funds, so amount and availability of funds can vary considerably from year to year. Amounts listed in table are estimates based on funds secured as of Regional Bicycle Plan publication. See www.baytrail.org for updates on the availability of Bay Trail Grant funds.
8. TFCA: $600,000 per year
9. HES: $16 M per year; 20% to the Bay Area; 5% for bicycle improvements
10. BTA: $9.2 M per year; 20% to the Bay Area
11. SR2S: $26 M per year; 20% to the Bay Area; 50% for bicycle improvements
12. Countywide sales taxes: $10.55 M per year; 75% for bicycle improvements (with exception of SF, which is 100% bikes). This total excludes revenue from the Santa Clara county sales tax measure because it does not set aside funding for bicycle projects, although bike projects are eligible for funding.

Efforts to promote bicycling

Promotions, such as Bike-to-Work and Bike-to School days; other encouragement programs, such as the Transportation and Land Use Coalition's TravelChoice[4] program; and traffic safety education programs aimed at motorists, bicyclists and the traffic engineers who design the facilities all modes must share help cyclists and non-cyclists alike learn to use the bicycle to safely travel throughout the region. Many of these expenses are ineligible for most grant-funding sources, which focus spending on planning, design and construction of facilities. The true cost of creating a comprehensive regional bikeway system that includes these other components is unknown at this time.

Revenue

In July 2008, the Metropolitan Transportation Commission pledged to fully fund the Regional Bikeway Network described in Chapter 4, with the exception of the toll bridge links. Although a program has not yet been created to fulfill this commitment – estimated to cost on the order of $710 million in 2007 dollars – the concept is to fund construction of all unbuilt non-toll bridge-links in the Regional Bikeway Network by 2035 (see Table 5.1 and Appendix A)[5]. This program will replace the Regional Bicycle and Pedestrian Program (RBPP), which was created in conjunction with the 2001 *Regional Transportation Plan.*

Beyond MTC's commitment to fund completion of the Regional Bikeway Network, over $1 billion is expected to be available through 2035 to fund bicycle projects and programs, assuming that today's fund sources and approximate funding levels will continue through the plan horizon year of 2035 (see Table 5.2).

This funding will flow through 12 sources that routinely fund the development of bicycle facilities and, in some cases, programs. The first six are administered by MTC.

> MTC has pledged to fully fund the Regional Bikeway Network by 2035.

As the Bay Area's federally-mandated Metropolitan Planning Organization (MPO), MTC is responsible for programming many federal funds, including the Transportation Enhancements (TE) and Congestion Management and Air Quality Improvement (CMAQ) programs, as well as the State Transportation Improvement Program (STIP) and Transportation Development Act (TDA). Some of these, such as TE, are allocated directly to Bay Area claimants, while MTC uses others, such as CMAQ and STIP funds, to finance Bay Area-specific funding programs such as Transportation for Livable Communities (TLC) and the former Regional Bicycle and Pedestrian Program (RBPP).

[4] TravelChoice provides households with personalized transportation information with the goal of reducing solo driving trips and increasing transit usage, biking, and walking.

[5] *Transportation 2035* shows costs escalated to the dollars of the year of expenditure, while all costs in this plan are listed in 2007 dollars.

Regional agencies beyond MTC administer bicycle project funding as well, including the Association of Bay Area Governments through the Bay Trail Grant Program and the Bay Area Air Quality Management District through the Transportation Fund for Clean Air (TFCA). State funding sources for bicycle projects include the Hazard Elimination Safety (HES) program, the Bicycle Transportation Account (BTA) and the Safe Routes to Schools (SR2S) program, which are all administered by Caltrans. Although completely unrelated to each other, the region's seven transportation sales tax measures are treated in Table 5.2 as a single source. See Appendix D for detailed descriptions of each revenue source.

Analysis

The cost to complete the remaining 1,138 miles of the RBN is estimated to be approximately $1.4 billion, split about evenly between the toll-bridge and non-toll-bridge segments. About $1.9 billion is expected to be available for bicycle projects from non-Regional Bikeway Network program funds between 2008 and 2035. Since $710 billion of expected revenue will be dedicated to the construction of the Regional Bikeway Network, about $1.16 billion is projected to be available to fund bicycle projects and programs beyond the Regional Bikeway Network, like those discussed in the "Other Costs" section earlier in this chapter.

When comparing expected costs and revenues, it is important to consider that it is unlikely that any of the funding sources listed in Table 5.2 will fund bicycle access on the remaining bicycle-inaccessible toll bridges. Most funding is available on an annual basis, not in one 28-year chunk, the duration of the RTP, which would be necessary to fund projects of this magnitude. Furthermore, using these funds in this way would require cooperation among multiple funding agencies and agreement that they want to forego funding decades of smaller, local projects.

Therefore, if the $1.16 billion of projected revenue above the cost of the Regional Bikeway Network is assumed to be unavailable to fund bicycle access on Bay Area toll bridges because of fund source criteria, then it can be used to fund some of the non-network costs detailed in the "Other Costs" section earlier in this chapter. Transportation planners and advocates need to know the cost of local bikeway projects, planned bicycle parking, way-finding and other signage, improved onboard transit facilities, bicycle facility operation and maintenance, and programs to encourage bicycling in order to prioritize these bicycle funding investments and advocate for toll bridge access funding.

6 | Next Steps

In order to execute the policies laid out in Chapter 2, complete the Regional Bikeway Network, and implement other bicycle-related projects and programs needed to create a truly bicycle-friendly Bay Area, a number of steps are needed. These include: ensuring that bicycle facilities are routinely accommodated on all transportation projects; full funding of the Regional Bikeway Network and needed support facilities; improving bicycle safety throughout the region; acknowledging the importance of non-capital investments such as maintenance, operations, and educational and promotional programs; local and regionwide planning; and improved data collection.

1. Routine accommodation

Build on MTC's Routine Accommodation policy (see Appendix C) – which impacts only projects funded by MTC – by encouraging local jurisdictions and other agencies to adopt similar policies for all transportation projects, including those that are locally funded.

2. The Regional Bikeway Network

a) **Complete construction of the Regional Bikeway Network**, including pathways on all Bay Area toll bridges that do not currently permit bicycle access. Allowing cyclists to cross all of the region's toll bridges will provide another travel option on crowded transbay corridors, both for current and future cyclists.

b) Update the Regional Bikeway Network between Plan updates. Although the *Regional Bicycle Plan* is updated between *Regional Transportation Plan* updates, the Regional Bikeway Network (RBN) is constantly changing. To maintain the RBN's usefulness to potential project sponsors and others tracking progress and routing, it needs to be updated at least as frequently as the Regional Transportation Plan (i.e., every four years).

c) Reassess the Regional Bikeway Network. The criteria used to identify the links in the RBN originated in 2001 during the development of the original *Regional Bicycle Plan* (see Chapter 4). However, priorities have changed in the intervening years, and it may be useful to reassess the criteria used to determine which links should be included

in the RBN, and a corresponding analysis to ensure that the resulting network is sufficiently comprehensive. (The updated Regional Bikeway Network described in this plan update reflects RBN projects that have been completed since 2001, but is not the result of a reconsideration of the original criteria.)

This discussion should include the following considerations:

- Whether the Regional Bikeway Network will still be the appropriate focus of regional funding priorities if future regional bicycle investment is focused primarily in Priority Development Areas (PDAs) to achieve *Transportation 2035* performance objectives (see chapter 2 for more discussion of PDAs).
- An analysis of what sort of destinations regional bikeways should serve and the criteria for selecting the best routes for investment.
- The need for the Regional Bikeway Network to serve all types and levels of bicyclists, and the corresponding role of public transit in the RBN.

3. Bicycle safety

Help local jurisdictions improve bicycle safety. MTC could help identify resources to assist Bay Area jurisdictions and other agencies to implement the concepts presented in the Bicycle and Pedestrian Safety Toolbox (see Chapter 3).

4. Maintenance and operations

Identify and develop ongoing bicycle facility operations and maintenance funding. Without regular maintenance, the surface quality of bikeways can be degraded with gravel, glass and cracking. Some bicycle facilities, such as attended parking, require ongoing operations funding. While the previous chapter demonstrated that there may be ample funds for capital projects, particularly on the Regional Bikeway Network, there is a strong need to develop sources of ongoing operations and maintenance funding.

5. Bicycle education and promotion

Identify funding sources to fund bicycle education and promotion programs. These programs encourage people to bicycle for all sorts of trip purposes, teach cyclists how to ride more safely and show motorists how to drive more safely in the vicinity of bicyclists.

Interior of Caltrain bicycle car

6. Multimodal integration

Broaden the transit focus of the *Regional Bicycle Plan for the San Francisco Bay Area*. Future Plan updates could provide detailed transit station bicycle parking inventories; identify gaps between transit stations and the bikeway network; analyze ridership and land-use data to determine where there may be latent demand for bicycle parking at transit stations; and provide bicycle parking-related policy recommendations for transit agencies, including installation guidelines and funding strategies.

7. Comprehensive support facilities and mechanisms

a) Calculate costs beyond construction of the Regional Bicycle Network. The cost to complete the RBN reported in Chapter 5 covers only construction of (and acquiring land, where necessary, for) yet-unbuilt RBN links. Understanding the true cost of a comprehensive regional bikeway system will require calculating other costs, such as local facilities not on the RBN, operations and maintenance of bike facilities, bike parking, outreach and educational programs and way-finding signage.

This task is essential for understanding the true magnitude of regional bicycle needs. Information is by and large available from local agencies. The "Generic Cost Estimating Tool," developed for MTC's Pedestrian Districts Study (2006), could serve as a model for estimating costs that have not already been calculated.

b) Encourage agencies to adopt uniform signage and electronic locker standards.

Signage: Currently, several cities throughout the Bay Area employ the Manual of Uniform Traffic Control Devices (MUTCD), California Supplement-approved SG45 bicycle sign, which includes route number, city logo and destinations. San Francisco was the first agency to adopt the signs in the late 1990s. Since that time, Emeryville, Albany, Oakland and Berkeley have developed citywide signing programs of their own. There are slight variations among cities: For instance, the city of Berkeley has a special signage program for bicycle boulevards that includes purple street signs and extensive way-finding information.

Customized SG45 bicycle sign, City of Albany

It would be valuable to interview agencies with signs currently in place about lessons learned and whether or not there is a need for regional guidelines for bikeway signage. These discussions could evaluate the need for voluntary adoption of a uniform regional add-on to local street signs.

Bicycle lockers: Lockers have long served long-term bicycle parking needs, particularly at transit stations. Several transit providers, including BART and Caltrain, and cities such as Oakland and Palo Alto are beginning to install electronic lockers at select locations. As this technology gains popularity, MTC could convene a regional bicycle locker working group to discuss lessons learned and devise a regional fare structure and fare payment instrument in order to provide continuity for users.

8. Planning

a) Establish benchmarks for plan goals. Goals are much more useful if progress toward them can be measured. While many of the goals in this plan are strong, MTC does not currently have a way to establish progress towards most. Examples of

measurable benchmarks include construction of a certain percentage of the RBN each year; completion of a certain number of bicycle and pedestrian training courses each year; achievement of the federal government's goals to double trips made by bicycling; and achievement of the *Transportation 2035* goal of reducing bicycle fatalities and injuries each by 25 percent from 2000 levels by 2035.

b) Develop criteria for new MTC Regional Bicycle Network Program. In order to use the newly-adopted Regional Bikeway Network program to complete the Network most expeditiously and in the most logical and useful order, criteria are needed that allow funds to prioritize network gaps, high bicycle-use corridors, and locations with high rates of motor vehicle/bicycle collisions.

c) Implement plans for access on the remaining bicycle-inaccessible toll bridges. The findings of the *Project Study Report (PSR) for Bicycle and Pedestrian Access on the Richmond-San Rafael Bridge* and the *Feasibility Report: San Francisco-Oakland Bay Bridge West Span: Bicycle/Pedestrian/Maintenance Path Planning and Feasibility Study* need to be implemented to allow bicycle access on these critical gaps in the Regional Bikeway Network.

d) Develop model practices for considering bicycles in impact analyses. Impact fees exacted from new development are an underutilized resource for the construction of bicycle facilities. These fees are usually a direct outcome of mitigations uncovered through transportation impact analyses. While many agencies have criteria related to motor vehicle impacts, very few have formulated corresponding criteria for bicyclists, pedestrians or public transit.

As MTC discovered when researching the need for a Routine Accommodations policy (see Appendix C), a lack of coordinated planning at the local level can result in a lack of consideration of bicyclists in one department despite policies written to consider them by another. An agency may have an adopted bikeway network or a bicycle plan policy requiring accommodation of bicycles in new development, but the feedback loop to impact analysis requirements may be missing. As a starting point, the next update of the *Regional Bicycle Plan* could offer a simple set of criteria for considering bicycles in new development, the most basic of which would be to consult the local and regional bicycle plans when evaluating site plans and to incorporate future bicycle improvements.

9. Data collection

Improve collection and analysis of bicycle trip-making and collision data. The Bay Area bicycling community is fortunate that MTC considers bicycle trips in its models and forecasts. Nonetheless, as discussed in more detail in Appendix E, there is room for improvement in the analysis of regional bicycle trip-making and collision information currently being collected. In particular, it is important that MTC continues to conduct the Bay Area Travel Survey (BATS) with as large a sample as possible. In counties where more precise bicycle trip information is needed, Bay Area congestion management agencies could pay to add additional surveyed households. In addition, MTC could relatively easily collect data on frequency of bicycle use over a longer time period, say over the past week or month. MTC could also partner with local agencies to perform bicycle counts at

key locations and analyze the results. Bay Area transit operators should be encouraged to always include questions about mode of access on their onboard passenger surveys.

Collision data, too, could be enhanced if MTC analyzed SWITRS crash data currently being collected, and provided an enhanced section of the *State of the System* report. To be useful, such a report would identify trends by examining primary collision factors, party-at-fault, *Vehicle Code* violation codes, and time of day/time of year. In addition to providing jurisdictions with the tools they need to identify safety issues, this effort would help track progress toward MTC's *Regional Bicycle Plan* goals. As stated in Policy 9.2, MTC should encourage Caltrans to purchase additional households for the National Personal Transportation Survey.

Opportunities and constraints

Bicycle transportation has made significant strides in the Bay Area since MTC's adoption of the original *Regional Bicycle Plan* in December 2001. Bicycling has gained broader public acceptance and there are now many more facilities to serve bicyclists, including bike paths and lanes, parking lockers and racks, and bike-carrying racks on buses. The political and social environment that made such strides possible still exists and is now combined with new opportunities that could make it even easier to complete the RBN (see Chapter 4), implement the *Regional Bicycle Plan* and achieve the Plan's principal goal (see box).

On the other hand, a number of challenges and constraints persist that make it difficult to substantially expand the region's bicycle infrastructure and number of bicyclists; indeed, the most vexing constraints – including the volume of motor-vehicle traffic on our roads and the demand for scarce transportation funding and right-of-way – have only become more challenging since 2001, as the Bay Area's population and economy have expanded. Below are listed the most significant constraints to implementing the updated *Regional Bicycle Plan*, followed by a list of the most meaningful opportunities for doing so.

Regional Bicycle Plan Principal Goal

To ensure that bicycling is a safe, convenient, and practical means of transportation and healthy recreation throughout the Bay Area, including in Priority Development Areas (PDAs); to reduce traffic congestion and risk of climate change; and to increase opportunities for physical activity to improve public health.

Constraints to plan implementation

There are a number of challenges facing bicycle planners and advocates as they work to ensure that bicycling is a safe, convenient and practical means of transportation and recreation throughout the region.

Scale of region

The Bay Area is large and urban areas are separated by hills and water. Residents often must travel great distances to get to work, school, shopping and other destinations – distances that are beyond the range of most bicyclists and potential cyclists.

Dispersed land-use

The Bay Area experienced its biggest growth spurt during and after World War II when development standards and guidelines required segregating noxious industrial lands from other uses, resulting in "auto-oriented" land-use patterns. Today, in general, the increasing size and dispersal of retail development in suburban areas makes access by bicycle difficult for all but the hardiest.

Constraints to Plan Implementation

- Scale of region
- Dispersed land-use
- Dominance of the automobile
- Built-out cities
- Competition for funds
- Competition for space
- Need for staff training
- Demands on law enforcement

Dominance of the automobile

By far the largest share of trips in the Bay Area – and throughout the U.S. – is made by private automobile. For most trips to most locations, the automobile is still the cheapest and most convenient mode, especially when parking is free or inexpensive and when driving is faster than transit and bicycling. While most jurisdictions in the Bay Area have bicycle-supportive policies, most also have transportation and land-use policies and requirements that work at cross-purposes by fostering sprawl and prioritizing the movement of motor vehicles. Examples include efforts to protect intersection and segment levels of service (LOS) for automobiles by adding additional turn or through lanes.

Built-out cities

The pattern of streets is set in the vast majority of places in the Bay Area. Given that there are limited opportunities to widen urban roadways and that more Bay Area residents rely on driving than on any other mode, it is politically very difficult to reallocate the right-of-way from driving to bicycling. In certain locations, bicycles and transit also compete for roadway space. Given the Bay Area's density and largely built-out nature, creating additional right-of-way for bicycling facilities is expensive and sometimes infeasible.

Competition for funds

Despite having a relatively healthy and productive economy and well-off population, the Bay Area does not have enough funds for all of the transportation projects being pursued. Much of the funding available goes into merely maintaining existing roads and transit facilities. Expansion projects are becoming rarer and more expensive as material and right-of-way costs soar. This is as true for

bicycle facilities as for other projects. Closing many of the key remaining gaps in regional bicycle facilities will require substantial construction costs and land purchases.

Competition for space

As population and traffic have increased, roadway space has not, resulting in increased competition and inevitable conflicts. Drivers are often unaware (or don't care) that bicyclists can use any roadway unless explicitly prohibited. (And many bicyclists, unfortunately, don't always follow traffic rules as required by law.) This competition often discourages potential bicyclists by making the most convenient routes appear less safe while alternative routes can be longer and take more time.

Need for staff training

There is often limited understanding of bicycle design standards and best bicycle design practices on the part of public agency staff responsible for designing the region's transportation facilities.

Demands on law enforcement

Contributing to some motorists' and bicyclists' lack of adherence to traffic laws is the pressure on police officers to prioritize enforcement of more serious crimes.

Opportunities for plan implementation

Relationship to global climate change

More than ever before, there is an awareness of the environmental benefits of bicycle transportation (and, therefore, the disadvantages of car dependence). These benefits include less air, water and noise pollution in the short-term, and the opportunity for the bicycle to play an important role in reducing long-term global climate change.

Link to public health

The opportunity to make connections between the bicycle and public health issues is growing. Because a great deal of research attention is being paid to the negative health effects of the nation's generally low levels of physical activity, partnerships between bicycle planners and public health professionals may increase funding opportunities for needed bicycle research.

Opportunities for Plan Implementation

- Relationship to global climate change
- Link to public health
- Understanding of transportation/land-use relationship
- Supportive policies in place
- Innovative policies on the horizon
- Adopted bicycle plans
- Large and active advocacy community
- Viable transit network
- New trail opportunities
- Bikable destinations
- Political support
- Creativity and experimentation

Understanding of transportation/land-use relationship

Closely related to the previous points, there is greater awareness of the disadvantages of auto-dependent development and, conversely, of the benefits of transit-oriented, mixed-use and infill development, all of which can encourage bicycling. This awareness is resulting in more of such development, allowing more people to incorporate bicycling into their lifestyle.

Supportive policies in place

Practically all local governments in the Bay Area have policies in their general plans and in other planning documents to encourage bicycling. Most special districts with land-use or transportation-related responsibilities – such as transportation authorities, transit agencies, regional agencies and park districts – also have bicycle-supportive policies. Recently, policies that ensure that the needs of bicyclists (and pedestrians) are considered in the planning, design and construction of new transportation projects are also improving the landscape for bicyclists (see Appendix C).

Innovative policies on the horizon

Transportation professionals are becoming increasingly aware that policies that prioritize motor vehicles – such as traditional level of service requirements to minimize motor vehicle delay – can inadvertently degrade existing bicycle conditions. As more jurisdictions adopt innovative policies, such as thresholds of significance that establish LOS standards for all modes, conditions for bicyclists should improve.

Adopted bicycle plans

Seven of the nine Bay Area counties, and many cities, have by now adopted bicycle plans, either as separate documents or as combined bicycle/pedestrian plans (see Appendix F). These plans lay out strategies to construct cohesive bikeway networks and encourage bicycling in other ways.

Large and active advocacy community

The Bay Area's bicycle-advocacy community has become one of the country's largest and most effective, with organizations and groups active in every part of the region. These groups place pressure on and assist governmental agencies in making improvements to the region's bicycling environment.

Viable transit network

The Bay Area continues to be one of the most transit-rich regions in the country, allowing cyclists to travel far greater distances than by bicycle alone. The region's transit operators have become increasingly bicycle-friendly, providing greater access for bicycles at stations and aboard transit vehicles (see Chapter 4).

New trail opportunities

Much progress has been made toward securing and developing right-of-way for intercity trails. Opportunities include the Bay Trail, the Iron Horse Trail, the SMART corridor in Sonoma and Marin counties, the Union Pacific/BART right-of-way in Alameda and Santa Clara counties, and a number of canal- and creek-side trails connecting multiple jurisdictions in Santa Clara County.

Bikable destinations

The region has more compelling destinations for bicyclists than ever before,

with revitalized downtowns, new mixed-use neighborhoods, new parks and more-accessible waterfronts, hills and other open spaces. These destinations encourage bicycling and support bikeway networks that connect them.

Political support

The Bay Area's progressive and environmentally aware political and social climate results in public support for bicycle improvements and for new as well as continuing sources of bicycle funding. Increasingly, this support is the result of leadership from motivated locally elected officials.

Creativity and experimentation

The Bay Area's spirit of creativity, inventiveness and open-mindedness allows for experimentation with new types of bicycle improvements. Examples include bicycle boulevards, "sharrows" and bike-route network signage.

Appendix A | Unbuilt Regional Bikeway Network Links

This appendix contains a list of all links in the Regional Bikeway Network that contain one or more unbuilt segments, and the estimated cost to construct the unbuilt segments of each. Congestion management agencies submitted data that was then incorporated into a new, accurate GIS database that provides, for the first time, mileage and endpoints for each link, as well as updated cost estimates.

Project Identifier	Project Name	Built Miles	Unbuilt Miles	Total Miles	Endpoint A	Endpoint B	Project Cost

Note: Unlike other counties, Alameda County project numbers originated from the countywide bicycle plan. Therefore, there are gaps in project numbering, which reflect Alameda County countywide network projects that are not on the regional network

Alameda County							
ALA-1	Bay Trail - Northern Alameda County	25.6	2.8	28.4	Contra Costa County line	Breakwater Ave/Hwy 92	$4,754,507
ALA-2	Bay Trail - Southern Alameda County	0.0	8.5	8.5	Johnson Rd/Breakwater Ave (Hwy 92 overcrossing, N)	Ardenwood Blvd/Union City Blvd	$3,045,000
ALA-3	Fruitvale - Broadway	0.2	2.3	2.5	Fruitvale Ave/MacArthur Blvd	Tilden Way/Broadway	$3,194,059
ALA-4	Alameda - Doolittle - Lewelling	5.9	10.0	15.9	W Atlantic Ave/Ferry Pt	Mattox Rd/Mission Blvd (Hwy 85)	$9,273,019
ALA-5	Bay Trail -- Alameda County remainder	43.1	24.2	67.3	Contra Costa County	Santa Clara County	$38,847,645
ALA-7	Oakland I-880 Corridor	0.8	3.7	4.5	Washington St/Jack London Square Bay Trail	Fruitvale Ave/BART tracks near E 12th St	$1,563,427
ALA-9	Southern Alameda County I-880 Corridor	13.2	9.7	22.9	Hesperian Blvd/Lewelling Blvd	Warm Springs Blvd/N Milpitas Blvd (Santa Clara Co)	$6,502,948
ALA-10	Davis - Estudillo - Crow Canyon Road	1.8	13.7	15.5	Bay Trail/Davis St	Contra Costa County line	$9,170,698
ALA-11	Northern Alameda County - I-580/Foothills	8.0	2.3	10.3	Contra Costa County line	Park/MacArthur Blvds.	$4,103,157
ALA-12	MacArthur Blvd - I-580 - Foothills	0.9	2.9	3.8	Park/MacArthur Blvds	MacArthur Blvd/Seminary Ave/Camden St	$2,526,887
ALA-13	Southern Alameda County - I-580 - Foothills	19.0	11.5	30.5	Warm Springs Blvd/Santa Clara County line	MacArthur Blvd/Camden St/Seminary Ave	$7,689,135
ALA-14	Highway 92 Corridor	2.3	6.2	8.5	Bay Trail/East End San Mateo Bridge	Old Dublin Rd/E Castro Valley Blvd	$2,650,392

Project Identifier	Project Name	Built Miles	Unbuilt Miles	Total Miles	Endpoint A	Endpoint B	Project Cost
ALA-15	E Castro Valley Blvd - Dublin Canyon	4.4	6.6	11.0	Old Dublin Rd/E Castro Valley Blvd	Dublin Blvd/Tassajara Rd	$5,365,240
ALA-16	Dublin Blvd Extension	0.0	1.9	1.9	Dublin Blvd/Tassajara Rd	Collier Canyon Rd, .2 mi east of Croak Rd	$1,065,481
ALA-17	Collier Canyon - N Canyons Parkway	0.8	1.6	2.4	Collier Canyon Rd, .2 mi east of Croak Rd	Portola Ave/Isabel Ave	$46,787
ALA-22	Highway 13 Corridor	3.1	4.8	7.9	65th St/Shellmound St	Skyline Blvd/Grizzly Peak Blvd	$1,706,901
ALA-26	Skyline - Palomares	1.8	2.7	4.5	Audrey Dr/Redwood Rd	E Castro Valley Blvd/Palo Verde Rd	$1,562,689
ALA-27	Stanley - East Avenue	1.1	0.8	1.9	Bernal Ave/Pleasanton Ave	Stanley Blvd/Bernal Ave	$204,864
ALA-28	San Ramon - Foothill Rd - I-680 Corridor	3.5	15.3	18.8	San Ramon Valley Blvd/Alcosta Blvd	Grimmer Blvd/Osgood Rd	$7,210,562
ALA-34	Iron Horse Trail	4.0	22.5	26.6	San Joaquin County Line	Contra Costa County line	$18,912,348
ALA-36	Alvarado - Niles - Niles Canyon	4.8	8.4	13.2	Paseo Padre Pkwy/Union City Blvd	Niles Blvd/Pleasanton Sunol Rd	$5,018,456
ALA-37	Vallecitos Road	6.2	10.2	16.4	Vallecitos Rd/Niles Canyon Rd	Isabel Ave/Portola Ave	$6,040,483
ALA-38	Tassajara Rd	3.7	3.9	7.6	Castlewood Dr/Foothill Rd	Camino Tassajara/Contra Costa County line	$3,071,379
ALA-46	Emeryville Ped/Bike Overcrossing	0.0	0.3	0.3	Bay Trail @ Frontage Rd/Ashby Ave I-80 Ramp	65th St/Shellmound St	$8,190,983
ALA-55	Alamo Canal-580/680 Connector	0.0	0.1	0.1	North side of I-580	South side of I-580 @ I-680	$3,255,000
ALA-56	Emeryville Bike/Ped Bridge	0.0	0.2	0.2	Shellmond St	Horton St/53rd St	$8,191,050
ALA-57	Fremont Central - Peralta	0.3	5.4	5.7	Central Ave @ Bay Trail/ RR tracks	Niles Blvd/Mission Blvd	$261,450
ALA-58	Fremont - Santa Clara	0.0	3.8	3.8	Fremont Blvd/Grimmer Blvd	Dixon Landing Rd/Santa Clara County line	$892,500

Project Identifier	Project Name	Built Miles	Unbuilt Miles	Total Miles	Endpoint A	Endpoint B	Project Cost
ALA-59	Albany - Berkeley	1.5	1.0	2.5	Buchanan St/Bay Trail @ I-80/I-580	Los Angeles Ave/Spruce St	$1,192,800
Alameda County TOTAL		**156.0**	**187.1**	**343.1**			**$165,509,849**
Contra Costa County							
CC-1	Antioch Bridge to Knightsen	0.0	4.6	4.6	Bartels Rd/Delta Rd	Hwy 4/Ohara Ave	$1,342,488
CC-2	Antioch Delta DeAnza Trail	4.7	0.9	5.5	Hillcrest Ave	Hwy 4	$211,841
CC-3	Brickyard Cove Trail	0.0	3.6	3.6	W Cutting Blvd/S Garrard Blvd	Brickyard Cove	$379,770
CC-4	Camino Tassajara Road	7.7	3.9	11.6	San Ramon Valley Rd/Sycamore Valley Rd	Camino Tassajara/Alameda County Line	$16,378
CC-6	Central Richmond Greenway	0.0	3.2	3.2	Conlon Ave/Key Blvd	Garrard Ave	$353,661
CC-7	Concord Gap Closures	18.5	7.0	25.5	Concord City Limits	Concord City Limits	$6,052
CC-8	Crockett to Martinez	2.3	9.4	11.7	Wanda St/Pomona St/San Pablo Ave/Merchant St	Franklin Canyon/Alhambra Ave	$195,484
CC-9	Crow Canyon Bikeway	1.2	1.7	2.9	Alameda County Line	Iron Horse Trail	$99,690
CC-10	Fish Ranch Road	0.0	0.8	0.8	Grizzly Peak Blvd./Fish Ranch Rd	Fish Ranch Rd/Highway 24	$1,187
CC-11	Highway 4 - Highway I 60 to Discovery Bay	0.0	14.0	14.0	Hwy 160/Antioch Bridge	Hwy 4/Discovery Bay Blvd	$812,352
CC-12	Iron Horse to Baypoint Delta de Anza Trail	0.0	3.3	3.3	Arnold Industrial Way (north of Hwys 242/4)	Evora Rd/Willow Pass Rd	$2,373,565
CC-13	Iron Horse Trail: Gap Closures	21.8	4.3	26.2	Alameda County Line	Benicia/Martinez Bridge	$636,115
CC-14	Oakley to Brentwood (O'Hara, Fairview)	0.0	4.7	4.7	Sycamore Ave/Brentwood Blvd	Hwy 4/Ohara Ave	$989,634

Project Identifier	Project Name	Built Miles	Unbuilt Miles	Total Miles	Endpoint A	Endpoint B	Project Cost
CC-15	Oakley to San Joaquin County	0.0	7.3	7.3	E Cypress Rd/Hwy 4	Holland Tract Rd/San Joaquin County Line	$1,056,236
CC-17	Pittsburg to Clayton	3.5	6.4	9.9	Railroad Ave/E 3rd St	Clayton Rd/Oakhurst Dr	$296,695
CC-18	Pittsburg to Oakley	6.9	3.1	10.0	Buchanan Rd/Harbor St	Neroly Rd/Laurel Rd	$19,819
CC-19	Pittsburg to Oakley On-Street Route	2.2	8.0	10.2	W 9th St/L St	Ohara Ave/Hwy 4	$176,237
CC-20	Pleasant Hill Gap Closures	2.0	5.8	7.8	Franklin Canyon Rd/Alhambra Ave	Geary Rd/Lexington Pl	$70,732
CC-21	Refugio Creek Connector Trail	0.0	1.0	1.0	Hercules Station	San Pablo Ave/Sycamore Ave	$213,620
CC-22	Richmond-San Rafael Bridge Access	0.0	1.8	1.8	Richmond Bridge	W Cutting Blvd/S Garrard Blvd	$409,559
CC-23	San Pablo Avenue Bike Lane/Bikeway	10.9	4.9	15.8	San Pablo Ave/Wanda St/Merchant St/Pomona St	Central Ave/San Pablo Ave	$379,860
CC-24	San Pablo Dam Road	4.2	8.1	12.3	El Portal Dr/San Pablo Ave	Moraga Way/Camino Pablo	$29,670
CC-26	Brentwood Loop	3.8	0.5	4.3	Grant St/Ohara Ave (future)	Brentwood Blvd/Balfour Rd	$47,814
CC-28	Central Richmond Bikeways	2.6	0.3	2.9	Central Richmond Greenway	W Cutting Blvd/S Garrard Blvd	$26,201
CC-30	Hwy 24 Bikeway	3.0	4.4	7.4	Fish Ranch Road	School St/Lana Ln	$2,750,811
CC-31	Lafayette to Walnut Creek	8.0	0.1	8.1	Lana Ln/School St	Ygnacio Valley Rd/Contra Costa Canal Trail	$10,526
CC-35	Neroly Rd	0.0	1.9	1.9	Neroly Rd/Hwy 4	Neroly Rd/near Empire Ave	$437,512
CC-36	Oakley to Brentwood (Hwy 4)	0.0	2.4	2.4	Delta Rd/Hwy 4	Brentwood Blvd/Brentwood Hwy	$542,109
CC-37	Pittsburg: Downtown to Bay Point BART	2.5	1.8	4.3	Harbor St/E 10th St	Pittsburg/Bay Point BART Station/Bailey Rd	$173,103
CC-39	Pittsburg Approach to Antioch Bridge	0.0	1.2	1.2	Wilbur Ave/Viera Ave	Wilbur Ave/Bridgehead Rd	$112,656

Project Identifier	Project Name	Built Miles	Unbuilt Miles	Total Miles	Endpoint A	Endpoint B	Project Cost
CC-40	Bay Trail -- Contra Costa County remainder	25.1	16.8	41.9	Solano County	Alameda County	$11,771,179
Contra Costa County TOTAL		**130.9**	**137.0**	**268.0**			**$5,942,556**
Marin County							
MRN-1	Central Marin Ferry Connection Project	0.0	0.9	0.9	Larkspur Landing/Victoria Way	Redwood Hwy./Wornum Dr	$24,423,000
MRN-2	Golden Gate Bridge Access Improvements Study	0.0	1.6	1.6	Golden Gate Bridge, NW Parking Lot	2nd St/Richardson St	$157,500
MRN-3	Hwy 37	0.0	3.3	3.3	Hwy 37/Sonoma County Line	Highway 37/Highway 101	$525,000
MRN-4	Magnolia Bikeway Project (partial)	0.7	0.4	1.1	Doherty Dr/Magnolia Ave	Magnolia Ave/Murray Ln/College Ave	$84,000
MRN-5	Mill Valley–Corte Madera (North/South Bikeway)	0.0	1.2	1.2	Corte Madera Ave/Tamalpais Dr	Vasco Ct/Underhill Rd/Vasco Dr/Lois Ct	$5,512,500
MRN-6	NWP Bicycle/Pedestrian Path Share (Marin-Sonoma)	0.6	15.3	15.9	Anderson Drive/Francisco Blvd W	Sonoma County Line	$29,400,000
MRN-7	Puerto Suello Gap Closure Project	0.0	1.7	1.7	Los Ranchitos Rd/N San Pedro Rd	4th/Tamalpais	$11,760,000
MRN-8	San Rafael – Larkspur Gap Closure	0.0	1.1	1.1	Larkspur Landing/Victoria Way	Anderson Dr/W Francisco B	$26,250,000
MRN-14	College Avenue	0.0	0.5	0.5	Magnolia Ave/College Ave	Sir Francis Drake Blvd/College Ave	$49,434
MRN-15	Sir Francis Drake Blvd.	0.3	11.0	11.3	Claus Dr/Sir Francis Drake Blvd	Hwy 101/Sir Francis Drake Blvd	$1,289,470

Project Identifier	Project Name	Built Miles	Unbuilt Miles	Total Miles	Endpoint A	Endpoint B	Project Cost
MRN-16	San Rafael's Miracle Mile	0.0	2.1	2.1	4th St/Brooks St	Sir Francis Drake Blvd/Center Blvd/Greenfield Ave	$200,586
MRN-17	Marin East/West Bikeway	0.0	4.5	4.5	4th St/2nd St/West End Ave	Francisco Blvd/Main St/Richmond Bridge	$422,720
MRN-19	Sir Francis Drake (Larkspur)	0.4	1.2	1.6	Sir Francis Drake Blvd/Francisco Blvd E	Sir Francis Drake Blvd/Hwy 101	$112,035
MRN-20	Alta Hill Bypass Route	2.1	0.4	2.5	Montecito Dr/Redwood Ave/Tamalpais Dr	Tower Dr/E Blithedale Ave/Kipling Dr	$105,000
MRN-24	Bay Trail -- Marin County remainder	15.7	36.2	52.0	San Francisco County	Sonoma County	$28,567,788
Marin County TOTAL		**19.8**	**81.3**	**101.1**			**$128,859,032**
Napa County							
NAP-1	1st/2nd Street	2.1	0.6	2.8	American Canyon Rd	I-80/Napa County Line	$105,756
NAP-2	Duhig/Las Amigas/ Cuttings Wharf	0.0	4.3	4.3	California	SR 121	$1,590,288
NAP-3	Frontage Road (Golden Gate Drive/Freeway Drive)	2.6	1.0	3.6	SR 121	SR 121 and/or Ramal	$1,407,000
NAP-4	Hwy 12 (Duhig to Solano County)	0.0	12.4	12.4	Golden Gate Dr	Freeway Dr/First St.	$37,800
NAP-7	Lincoln Avenue	0.7	1.0	1.6	California	Soscol	$21,000
NAP-8	Napa River Connector Trail	0.0	4.6	4.6	Hartle Drive	Lincoln	$693,000
NAP-9	Napa Vallejo Hwy	0.0	9.4	9.4	SR 121	SR 29	$2,625,000
NAP-10	Old Sonoma Road	0.6	3.2	3.8	SR 12	Walnut	$1,050,000
NAP-11	Pope	0.0	0.9	0.9	SR 29	Silverado Trail	$210,000

Project Identifier	Project Name	Built Miles	Unbuilt Miles	Total Miles	Endpoint A	Endpoint B	Project Cost
NAP-12	Silverado Trail/Highway 121 (City of Napa)	0.0	2.8	2.8	Soscol	Trancas	$2,882,250
NAP-14	Lincoln Street, Hwy 128 to Silverado Trail	0.0	1.0	1.0	Hwy 128/Lincoln St	Lake St/Silverado Trl/Hwy 29	$228,242
NAP-16	Bay Trail -- Napa County remainder	3.7	19.3	23.0	Sonoma County	Solano County	$7,376,379
Napa County TOTAL		**9.7**	**60.5**	**70.2**			**$18,226,715**

San Francisco							
SF-1	2nd Street	0.0	0.9	0.9	Market	King	$70,455
SF-2	3rd Street	1.3	3.7	5.0	King	Bayshore	$187,845
SF-3	Battery East Road Multiuse Path	0.0	0.4	0.4	Lincoln Blvd.	Golden Gate Bridge	$273,000
SF-4	Broadway Tunnel	0.0	0.4	0.4	Hyde	Mason	$188,055
SF-5	Cesar Chavez Street	0.3	1.5	1.9	Valencia	3rd Street	$1,099,350
SF-6	Fort Mason Tunnel	0.0	0.5	0.5	Aquatic Park	Laguna St	$262,500
SF-7	Howard Street Bike Lanes	1.6	0.3	1.9	11th Street	Embarcadero	$88,856
SF-9	Market Street Multimodal Study (No route in 2004 layer)	1.6	1.5	3.1	Castro	Embarcadero	$210,000
SF-10	Market/17th/Castro Intersection	0.0	0.2	0.2	Eureka St/17th St	Castro St/Market St	$333,210
SF-11	Market/Hyde/Grove Intersection	0.0	0.1	0.1	Grove St/Hyde St	8th St/Market St	$222,140
SF-12	Mission Creek Bikeway and Greenbelt	0.0	2.8	2.8	18th Street	4th Street	$10,500,000
SF-13	Polk Street	1.3	0.8	2.1	Beach	Market	$63,000

Project Identifier	Project Name	Built Miles	Unbuilt Miles	Total Miles	Endpoint A	Endpoint B	Project Cost
SF-15	Presidio Promenade Improvements	0.0	0.8	0.8	Lombard Gate	Golden Gate Bridge Toll Plaza	$463,155
SF-16	Sloat Blvd Striping	0.0	2.0	2.0	Great Highway	Portola	$199,926
SF-18	The Embarcadero/ Market Connection	0.0	0.1	0.1	Market St/Steuart St	Embarcadero St in front of Ferry Building	$55,536
SF-19	US 101/Bayshore/3rd Intersection Improvement	0.0	0.1	0.1	Hester Ave/Bayshore Blvd/West Side of 101	3rd St/Meade Ave/East Side of 101	$522,030
SF-20	Washington Blvd Improvements	0.3	1.5	1.9	Arguello Blvd	Lincoln Blvd	$191,268
SF-21	West Pacific	0.0	0.7	0.7	Presidio Blvd	W. Pacific Ave End	$182,259
SF-22	West-Coastal Trail Multiuse Path - Lincoln Blvd	1.2	2.2	3.4	Presidio Blvd	25th Ave	$1,386,698
SF-25	The Wiggle	1.4	0.6	2.0	Baker St/Fell St/Oak St	Duboce Ave/Sanchez St/Market St	$59,848
SF-26	Folsom Street Bike Lanes	1.8	0.4	2.1	14th St/Folsom St	The Embarcadero/Folsom St	$33,471
SF-27	16th street, Kansas/Division to 3rd	0.8	0.3	1.1	Kansas St/Division St	16th St/3rd St	$24,962
SF-28	11th Street, Treat to Market	0.6	0.0	0.6	Market St/11th St	Treat Ave/Bryant St/Division St	$2,716
SF-30	Potrero Ave Bike Lanes	0.9	0.5	1.4	Cesar Chavez St/Potrero Ave	Potrero Ave/Division St/Brannan St	$47,773
SF-31	Bayshore Ave Bike Lanes	0.0	2.0	2.0	Paul Ave/Bayshore Blvd	25th St/Potrero Ave	$192,565
SF-33	Broadway Street	0.0	1.0	1.0	The Embarcadero/Broadway St	Broadway St/Polk St	$94,434
SF-34	Broadway to Ocean Beach	0.0	6.1	6.1	Broadway St/Polk St	Great Highway/Balboa St	$575,523
SF-37	Daly City BART to Sloat (Hwy 35)	2.7	0.4	3.1	Sloat Blvd/20th Ave	Sickles Ave/Alemany Blvd & Goethe St/San Jose	$35,459

Project Identifier	Project Name	Built Miles	Unbuilt Miles	Total Miles	Endpoint A	Endpoint B	Project Cost
SF-38	Alemany/San Jose, Daly City BART to Valencia St	3.6	0.1	3.7	San Jose Ave/Goethe St/San Mateo County Line	Tiffany Ave/Duncan St/Valencia St	$8,698
SF-40	14th/15th Street Bike Couplet	1.0	1.0	1.9	Harrison St	Sanchez St	$92,379
SF-41	7th Street/McAllister Street	1.7	1.6	3.3	McAllister St/Masonic Ave	7th St/Mississippi St/16th St	$146,699
SF-43	Masonic/Presidio Ave	0.0	1.6	1.6	Presidio Ave/Broadway St	Masonic Ave/Page St	$152,347
SF-50	Bay Trail -- San Francisco County remainder	5.4	11.3	16.7	San Mateo County	Marin County	$6,369,201
San Francisco TOTAL		**27.6**	**47.2**	**74.8**			**$24,335,356**
San Mateo County							
SM-2	BART/SFO Bikeway Project	3.1	6.9	10.0	Goethe St/Hwy 82/San Francisco county line	E Millbrae Ave/S Magnolia Ave	$588,735
SM-3	Ralston Avenue Bikeway Interchange Improvements (Project #3)	4.6	0.2	4.8	Canada Rd/Hwy 92	Marine Pkwy/Shoreway Rd	$293,344
SM-6	Recreational Route Bikeway Improvements	9.4	4.6	14.0	Hwy 92	I-280	$1,483,125
SM-7	North Coast Bikeway (Project #7)	9.7	5.5	15.1	John Muir Dr/Lake Merced Blvd	Hwy 1/16th St/Vallemar	$203,438
SM-8	North-South Bikeway (Old County Road Section)	4.3	1.6	5.9	Bay Meadows Race Track Entrance	Middlefield Rd/Jefferson Ave	$231,788
SM-9	Coastside Bikeway Projects (Project #9)	5.2	47.9	53.1	I-280/Hwy 92	Hwy 1	$2,100,000
SM-11	North-South Bikeway (Bayshore Selection) (Project #11)	4.8	3.5	8.4	Bayshore Blvd/Paul Ave	Herman St/Huntington Ave	$2,224,688
SM-12	U.S. 101/Broadway Bikeway Project	0.0	0.3	0.3	Carolan Ave/Broadway	Airport Blvd/Broadway	$68,931

Project Identifier	Project Name	Built Miles	Unbuilt Miles	Total Miles	Endpoint A	Endpoint B	Project Cost
SM-13	North-South Bikeway (Delaware-California) (Project #13)	3.1	4.8	7.9	E Millbrae Ave/S Magnolia Ave	S Delaware St/E 25th Ave	$3,297,000
SM-14	Crystal Springs-3rd/4th Avenue Bikeway (Project #14)	1.2	3.8	5.0	Skyline Blvd/Crystal Springs Rd	Bayview Ave/Bay Trail	$149,625
SM-15	SFIA East Side/Bay Trail Project	2.6	2.9	5.5	Gateway Blvd/S Airport Blvd/Mitchell Ave	Bayshore Hwy/Broadway/Airport Blvd	$1,615,845
SM-20	Hillsborough to Menlo Park	11.1	1.7	12.9	Crystal Springs Rd/Alameda de Las Pulgas	Santa Cruz Ave/Sand Hill Rd	$164,403
SM-23	Pacifica to Hillsborough	7.8	2.4	10.2	Sharp Park Rd/Skyline Blvd/Westborough Blvd	San Andreas Valley Rd/Crystal Springs Rd	$230,627
SM-24	Pacifica to South San Francisco	6.2	0.1	6.3	Sharp Park Rd/Francisco Blvd	Gateway Blvd/E Grand Ave	$14,098
SM-25	Redwood City to Menlo Park East/West	6.7	0.3	6.9	Whiskey Hill Rd/Sand Hill Rd	Willow Rd/Van Buren Rd	$59,950
SM-26	Skyline Blvd	0.2	0.5	0.7	San Francisco County Line	Skyline Blvd/John Daly Blvd	$118,538
SM-27	Bay Trail -- San Mateo County remainder	34.8	17.2	52.0	Santa Clara County	San Francisco County	$21,412,447
San Mateo County TOTAL		**114.9**	**104.1**	**219.0**			**$34,256,580**
Santa Clara County							
SCL-1	North 101/CalTrain Corridor	18.0	8.4	26.4	Willow Rd/Willow Pl/Bryant St	N Park Victoria Dr/San Benito Dr	$4,045,650
SCL-2	I-280 Corridor to San Jose Airport Corridor	12.6	5.9	18.5	Sand Hill Rd/Santa Cruz Ave/Alpine Rd	Airport Blvd/I-880	$8,599,500

Project Identifier	Project Name	Built Miles	Unbuilt Miles	Total Miles	Endpoint A	Endpoint B	Project Cost
SCL-3	Central North-South-Mary Ave Corridor	14.1	3.2	17.3	Lockheed Martin Way/W Moffett Park Dr	Saratoga Ave/Los Gatos Blvd	$10,439,100
SCL-4	Cupertino to East San Jose	4.5	11.0	15.5	Vallco Pkwy/N Wolfe Rd	Penitencia Creek Rd/Alum Rock Ave	$614,250
SCL-5	San Tomas/Lawrence Expressway	14.1	17.9	32.0	Great America Pkwy/Moffett Park Dr	Hwy 9/Hwy 35	$20,735,400
SCL-6	Highway 87/Guadalupe Light-Rail Corridor	6.5	14.0	20.5	E Taylor St/Gold St	Harry Rd/Almaden Expy	$31,500,000
SCL-7	Highway 880 Corridor and South 101/CalTrain	50.0	19.5	69.5	Dixon Landing Rd/N Milpitas Blvd	Bolsa Rd/Hwy 25	$29,180,550
SCL-8	Highway 237/Tasman and Capitol Rail	10.8	7.2	18.0	Tully Rd/Capitol Expy	Ellis St/E Middlefield Rd	$925,050
SCL-9	East-West Corridor Between I-280 and Highway 85	11.5	4.3	15.8	Saratoga Sunnyvale Rd/Prospect Rd	Tully Rd/S White Rd	$372,750
SCL-10	Highway 880/680/Highway 17/Vasona Rail/Los Gatos	20.1	6.6	26.7	Warm Springs Blvd/Firethorn St	Alma Bridge Rd/Mt Madonna County Park	$25,200,000
SCL-11	Bay Trail -- Santa Clara County remainder	25.0	25.8	50.8	Alameda County	San Mateo County	$19,623,844
SCL-12	Highway 85 to Gilroy	24.9	33.0	57.9	Bay Trail at Stevens Creek Trail	Santa Teresa Blvd/Castro Valley Rd	$27,594,000
SCL-13	Alma Street/El Camino Real	6.8	14.6	21.4	Alma St/Palo Alto Ave	Piedmont Rd/Landess Ave	$6,300,000
SCL-14	Wolfe Road Alignment	4.7	5.6	10.3	W Carribbean Dr/Borregas Ave	Miller Ave/Cox Ave	$12,600,000
SCL-15	Shoreline-Miramonte	9.5	1.3	10.8	Bay Trail/Shoreline Blvd	Grant Rd/Foothill Expy, El Monte Rd/Oneonta Dr	$2,520,000
SCL-16	Dumbarton to Los Altos Hills	8.2	3.7	11.9	Arastradero Rd/Alpine Rd	Service Rd/Dumbarton Bridge	$5,040,000
Santa Clara County TOTAL		**241.3**	**182.0**	**423.4**			**$205,290,094**

Project Identifier	Project Name	Built Miles	Unbuilt Miles	Total Miles	Endpoint A	Endpoint B	Project Cost
Solano County							
SOL-1	Benicia to Cordelia	6.3	7.4	13.7	SR 113	Leisure Town Road	$10,248,000
SOL-2	Benicia-Martinez Bridge Approach	0.0	1.6	1.6	Park Road	Mangels Boulevard	$262,500
SOL-4	Central County Bikeway - Suisun City to Rio Vista	3.5	0.3	3.7	2nd Street	Solano Way, Benicia Bridge	$1,197,000
SOL-5	Cordelia to Napa County	0.0	2.8	2.8	Marina Road	Rio Vista Bridge	$892,500
SOL-6	Dixon to Vacaville Bike Route	0.0	12.5	12.5	Red Top Road	Napa County Line	$1,102,500
SOL-7	Fairfield to Vallejo (Solano Bikeway) - Phase I	10.5	5.0	15.6	North Texas Street	Georgia Street	$2,467,500
SOL-8	Fairfield to Vallejo (Solano Bikeway) -- Phase II	0.0	3.7	3.7	Columbus Parkway	Sonoma Boulevard	$299,889
SOL-9	Jepson Parkway/ Vacaville to Suisun City	1.7	10.3	12.0	I-80	SR 12	$4,536,000
SOL-10	Suisun City to Rio Vista	0.0	18.7	18.7	Walters Road	Rio Vista Bridge	$945,000
SOL-11	Vallejo to Benicia	0.0	3.7	3.7	Vallejo Ferry Terminal	Rose Drive	$976,500
SOL-12	Vallejo to Carquinez Bridge	0.0	2.5	2.5	Curtola Parkway	Maritime Academy Drive	$94,500
SOL-13	Vallejo to Napa	0.0	4.3	4.3	Solano Avenue	Napa County Line	$199,500
SOL-15	Vallejo to Sonoma County (SR 37)	0.0	6.7	6.7	Redwood Boulevard	SR 37	$3,657,991
SOL-18	Solano Bikeway, Fairfield to Vallejo	0.0	2.9	2.9	North Texas St/E Tabor Ave	Walters Rd/Cement Hill Rd	$972,443
SOL-20	Browns Valley Parkway	2.2	2.3	4.5	Merchant St/Alamo Dr	Vaca Valley Pkwy/Browns Valley Rd	$425,594
SOL-21	Fairfield-Vacaville I-80 Path	2.1	5.1	7.2	Dover Ave/Nightingale Dr (Fairfield Linear Park)	Alamo Creek at Butcher Road	$840,437

Project Identifier	Project Name	Built Miles	Unbuilt Miles	Total Miles	Endpoint A	Endpoint B	Project Cost
SOL-22	Fairfield North/South: Sunset Ave	2.0	0.1	2.0	E Tabor Ave/Sunset Ave	Sunset Ave/Hwy 12	$15,030
SOL-25	Fairfield East-West Connector (Air Base Pkwy)	2.2	0.5	2.7	Air Base Pkwy btwn Dawn Way & Swan Way	Peabody Rd	$114,774
SOL-27	Ulatis Creek Trail	2.1	1.2	3.3	Mason St/Depot St	Ulatis Creek/Leisure Town Rd	$735,000
SOL-28	Peabody Rd	0.0	1.2	1.2	Air Base Pkwy	Peabody Rd just north of Cement Hill Rd	$281,078
SOL-29	Bay Trail -- Solano County remainder	9.8	16.9	26.6	Napa County	Contra Costa County	$10,386,908
Solano County TOTAL		**42.4**	**109.7**	**152.0**			**$40,650,644**
Sonoma County							
SON-1	Arnold Dr – Country Club to Madrone	1.4	3.6	4.9	Madrone Rd	SR 116	$18,900
SON-2	College/4th (Santa Rosa)	0.5	1.8	2.3	SMART Trail	Farmers Lane	$50,815
SON-3	Cotati to Rohnert Park (Old Redwood Hwy/Santa Rosa Ave)	4.0	3.0	7.0	Bellevue Ave	Eucalyptus Ave	$84,691
SON-4	Healdsburg Ave.-Lytton Springs	0.0	3.2	3.2	Alexander Valley Rd	Geyserville Ave	$148,050
SON-5	Healdsburg Route (Healdsburg/Piper/1st)	0.0	1.3	1.3	1st St./Mason St	Healdsburg Ave/March Ave	$198,982
SON-6	Hwy 37	0.0	6.3	6.3	Napa County Line	Marin County Line	$210,034
SON-7	Mendocino to Cloverdale	0.0	4.2	4.2	Mendocino County Line	Cloverdale City Limit	$135,506
SON-8	Napa County to Hwy 37 (Arnold, Fremont, Ramal)	0.0	13.9	13.9	Ramal Rd/Napa County Line	Arnold Dr/Highway 37	$267,123

Project Identifier	Project Name	Built Miles	Unbuilt Miles	Total Miles	Endpoint A	Endpoint B	Project Cost
SON-9	NWP Bicycle/Pedestrian Path	0.7	30.8	31.6	Vandenburg Rd	Marin County Line	$19,435,374
SON-10	Old Redwood Hwy: Cotati to Petaluma	3.6	0.5	4.2	Ely Rd	Eucalyptus Ave	$26,040
SON-11	Old Redwood Hwy/Mendocino Ave/Santa Rosa Ave	1.3	7.6	8.9	Pleasant Ave (Windsor)	Sonoma Ave.(Santa Rosa)	$647,231
SON-12	Petaluma Blvd: Stony Point to South City Limits	0.2	4.1	4.3	Petaluma Blvd/Stony Point	Petaluma Blvd South/US 101	$152,443
SON-13	Petaluma to Sonoma (Lakeville, Hwy 116, Arnold, Leveroni, Napa)	0.1	15.6	15.7	Lakeville St	Napa Rd/8th St East	$468,160
SON-14	Santa Rosa to Eldridge (Hwy 12, Arnold)	0.0	11.8	11.8	Highway 12/Los Alamos Rd	Arnold Dr/Madrone Rd	$340,152
SON-15	Sebastopol to Cotati	0.6	6.6	7.2	Madrone Ave	Cooper Rd	$2,289,543
SON-16	Sonoma-Schellville Trail	0.0	4.0	4.0	Lovall Valley Rd	State Highway 121	$669,375
SON-17	Street Smart Sebastopol Improvements	0.0	3.7	3.7	Hwy 116/Fircrest Ave	Hwy 116/Zimpher Dr	$1,050,000
SON-19	Stony Point Road	0.0	6.3	6.3	Hwy 116/Stony Point Rd	Old Redwood Hwy/Stony Point Rd	$1,422,096
SON-20	Verano Ave, Sonoma Hwy, Napa St	0.0	2.7	2.7	Sonoma Hwy/Lomita Ave	8th St/Napa St	$251,923
SON-21	Broadway Street	0.3	0.8	1.1	Napa Rd/Leveroni Rd/Broadway	Hwy 12/E Napa St	$75,331
SON-23	Old Redwood Hwy	2.4	0.9	3.4	Old Redwood Hwy/Eastside Rd	Old Redwood Hwy/Shadetree Dr	$89,064
SON-27	Main St: Adobe Rd to Old Redwood Hwy	0.0	0.3	0.3	Old Redwood Hwy/Main St	Adobe Rd/Main St	$31,626
SON-29	Sebastopol to Guerneville	5.3	15.9	21.3	Morris St/Hwy 12/Joe Rodota Trl	Bohemian Hwy/Hwy 116/Church St	$3,610,636

Project Identifier	Project Name	Built Miles	Unbuilt Miles	Total Miles	Endpoint A	Endpoint B	Project Cost
SON-31	Cloverdale to Healdsburg	1.5	13.3	14.8	Cloverdale South City Limits, roughly at Sandholm Ln	Hanning Rd	$3,010,680
SON-32	Bay Trail -- Sonoma County remainder	12.1	50.0	62.1	Marin County	Napa County	$31,732,774
SON-33	Old Redwood Hwy, Hwy 101 to Vandenburg Rd	0.0	1.7	1.7	Hwy 101	Vandenburg Rd	$392,937
Sonoma County TOTAL		**34.2**	**213.9**	**248.2**			**$66,809,485**
Regional TOTAL without toll bridges		**776.7**	**1,124.0**	**1,900.8**			**$709,880,311**
Toll Bridges							
REG-3	Oakland-San Francisco Bay Bridge (West Span)	0.0	1.9	1.9	Yerba Buena Island	Spear St/Harrison St	$518,338,493
REG-4	San Mateo-Hayward Bridge	0.0	8.2	8.2	Beach Park Blvd/San Mateo County	Bay Trail/Alameda County	$123,363,237
REG-5	Richmond-San Rafael Bridge	0.0	3.9	3.9	San Quentin Village/Marin County	Point Richmond/Contra Costa County	$57,750,000
Toll Bridge TOTAL		**0.0**	**14.0**	**14.0**			**$699,451,730**
TOTAL including toll bridges		**776.7**	**1,138.0**	**1,914.7**			**$1,409,332,042**

1. Any given project may include discontinuous segments within the endpoints listed for that project. "Bay Trail remainder" projects, in particular, may include discontinuous segments within the applicable county. Please see Bay Trail Gap Analysis for more details.
2. Gaps in sequence of Project Identifiers indicate either built segment or a link in a countywide network that is not part of the Regional Bikeway Network.
3. Totals may not add up due to rounding.

Appendix B | Existing Regional Bikeway Network Links

This appendix contains a list of all existing links in the Regional Bikeway Network, including mileage and endpoints for each link. This list was generated in part, using information from MTC's BikeMapper℠ GIS database of existing and bikable Bay Area roadways and pathways.

Project Identifier	Bikeway	Built Miles	Endpoint A	Endpoint B
Alameda County				
ALA-29	Iron Horse to Shadow Cliffs Trail	2.6	Iron Horse Trail, near Amador Valley Blvd	W Las Positas Blvd
ALA-41	Damon Slough Bridge	0.1	Near 66th Ave/I880: West Side of Slough	Bay Trail: East Side of Slough
ALA-52	Arroyo Mocho Trail	1.9	I-680	Iron Horse Trail
Alameda County Total		**4.6**		
Contra Costa County				
CC-5	Ohlone Greenway	2.5	Conlon Ave/Key Blvd	Alameda County Line
CC-16	Pacheco to Concord	3.3	Blum Rd/Pacheco Blvd	Arnold Industrial Way/Port Chicago Hwy
CC-25	Appian Way	3.1	Appian Way/San Pablo Dam Road	San Pablo Ave/Appian Way
CC-29	Delta DeAnza Trail	13.9	Willow Pass Rd/Evora Rd	Deer Valley Rd btwn. Burwood Way & Carpinteria Dr
CC-32	Lamorinda Off-Street Trail	6.0	Canyon Rd/Westchester St	School St/Lana Ln
CC-33	Martinez to Concord/Walnut Creek off-street trail	9.7	Pacheco Blvd/Blum Rd/Muir Rd	near Citrus Ave/Santa Paula Dr
CC-34	Moraga Way	4.3	Hwy 24	School St
CC-38	San Ramon Valley Rd	7.4	Iron Horse Trail	Alameda County Line
Contra Costa County Total		**50.3**		

Project Identifier	Bikeway	Built Miles	Endpoint A	Endpoint B
Marin County				
MRN-9	Marin Bicycle Freeway	2.1	Vasco Ct/Underhill Rd	North Bridge Blvd/Bridgeway
MRN-10	Miller Avenue	0.5	Almonte Blvd/Miller Ave	Miller Ave/Camino Alto
MRN-11	Miller Avenue in Mill Valley	1.8	Miller Ln/Miller Ave/Sunnyside Ave	Miller Ave/Camino Alto
MRN-12	Marin Bicycle Freeway	1.0	Vasco Ct/Underhill Rd	North Bridge Blvd/Bridgeway
MRN-13	Larkspur Trail	1.9	Doherty Dr/Holcomb Ave & Hwy 101	Montecito Dr/Tamalpais Dr/Redwood Ave
MRN-18	Sir Francis Drake Blvd: Western Fairfax	1.4	Olema Rd/Sir Francis Drake Blvd/Sherman Ct	Sir Francis Drake Blvd/Claus Dr
MRN-21	Tiburon Blvd	2.5	E Blithedale Ave/Lomita Dr	Greenwood Beach Rd/Tiburon Blvd/Trestle Glen Blvd
MRN-22	Tiburon Bay Trail	3.1	Greenwood Beach Rd/Tiburon Blvd/Trestle Glen Blvd	Paradise Dr/Mar West St
MRN-23	Bridgeway Bicycle Route through Sausalito	2.4	Richardson St/2nd St	North Bridge Blvd/Bridgeway
Marin County Total		**16.8**		
Napa County				
NAP-13	Yountville Crossroad	2.1	Yount St	Silverado Trail
NAP-15	Silverado Trail, Napa to Calistoga	26.9	Silverado Trl/Rosedale Rd/Hwy 29/Lake St	Silverado Trl/Trancas St/Hwy 121
Napa County Total		**29.0**		

Project Identifier	Bikeway	Built Miles	Endpoint A	Endpoint B
San Francisco				
SF-8	Marina Blvd. Path Improvement	1.1	Laguna St	Lyon St
SF-14	Portola Drive Class III	2.0	Sloat	Market
SF-17	The Embarcadero Path	2.4	North Point	King
SF-23	Arguello: Panhandle to Presidio	1.6	Kezar Dr/Stanyan St	Arguello Blvd/Pacific Ave
SF-24	Panhandle Path	0.7	Baker St/Fell St	Kezar Dr/Stanyan St
SF-29	Harrison Street Bike Lanes	1.6	Harrison St/Cesar Chavez St	14th St/Harrison St
SF-32	Valencia Street Bike Lanes	1.8	Valencia St/Market St	Duncan St/Valencia St
SF-35	Great Highway	4.8	Great Highway/Balboa St	Skyline Blvd/San Mateo County Line
SF-36	John Muir Drive	1.1	Skyline Blvd/John Muir Dr	Lake Merced Blvd/John Muir Dr/San Mateo County
SF-39	Geneva Ave	1.5	Alemany Blvd/Geneva Ave	Pasadena St/Geneva Ave/San Mateo County Line
SF-42	8th St/Grove St	1.0	Polk St/Grove St	8th St/Townsend St/Division St
SF-44	Marina to Presidio Connection	1.5	Lincoln Blvd/Cowles St/Crissy Field Ave	Mason St/Lyon St
SF-45	Corbett Ave	1.3	Corbett Ave/Portola Dr/Market St	17th St/Eureka St
SF-46	North Point St	0.9	North Point St/Polk St	North Point St/Kearny St/The Embarcadero
SF-47	Polk Street to Presidio Trans-Marina Route	1.6	Lombard St/Lyon St	Francisco St/Polk St
SF-48	Sloat to Presidio N/S Route	3.8	23rd Ave/Lake St	20th Ave/Sloat Blvd
SF-49	Page Street Bike Corridor	2.0	Page St/Kezar Dr	Page St/Market St
San Francisco Total		**30.8**		

Project Identifier	Bikeway	Built Miles	Endpoint A	Endpoint B
San Mateo County				
SM-4	North-South Bikeway (South Section) (Project #4)	4.1	Jefferson Ave/Winslow St	Middlefield Rd/Willow Rd
SM-10	US 101/Willow Road Interchange (Project #10)	0.2	East side Hwy 101/Bay Rd/Willow Rd	West Side Hwy 101/Grayson Ct/Willow Rd
SM-16	Atherton to Menlo Park	1.6	Encinal Ave/Middlefield Rd	Willow Rd/Laurel St
SM-17	Canada Rd	7.7	Hwy 92	Woodside Rd
SM-18	Daly City to South San Francisco	3.8	Westmoor Ave/Skyline Blvd	Callan Blvd/Westborough Blvd
SM-19	Dumbarton Bridge Approach	3.1	Hwy 101/Willow Rd	Dumbarton Bridge
SM-21	Hwy 92 East/West Parallel Route	3.9	Teal St/Beach Park Blvd	Alameda de las Pulgas/Hillsdale Blvd
SM-22	Jefferson Ave Bikeway	1.5	Jefferson Ave/Middlefield Rd	Jefferson Ave/Alameda de Las Pulgas
San Mateo County Total		**25.9**		
Solano County				
SOL-14	Vallejo to Sonoma County (SR 37)	2.7	Mini Drive	Sonoma County Line
SOL-16	Davis to Vallejo (Solano Bikeway)	8.9	Hwy 113/1st St/H St	Old Davis Rd/I-80/Sacramento County Line
SOL-17	Wilson Ave/Mare Island Way	2.7	Sonoma Blvd/Curtola Pkwy/Mare Island Way	Wilson Ave/Sears Point Rd/Rodgers St
SOL-19	Vaca Valley Parkway	2.6	Vaca Valley Pkwy/Browns Valley Rd	Leisure Town Rd/Vaca Valley Pkwy
SOL-23	North Vallejo to Benicia	4.9	Columbus Pkwy/Admiral Callaghan Ln	State Park Rd/Rose Dr/Columbus Pkwy

Project Identifier	Bikeway	Built Miles	Endpoint A	Endpoint B
SOL-24	Vallejo to Martinez Bridge Connection	2.9	State Park Rd/Rose Dr/Columbus Pkwy	Military East Hwy/2nd St
SOL-26	Vacaville East-West: Alamo Drive	3.6	Alamo Dr/Butcher Rd	Alamo Dr/Fry Rd/Leisure Town Rd
Solano County Total		**28.2**		
Sonoma County				
SON-18	Joe Rodota Trail - Stony Point to Downtown Santa Rosa	1.5	Stony Point Rd	W 6th St/Adams Ct
SON-22	Verano Ave, Sonoma Hwy, Napa St, 8th St	1.1	Lomita Ave/Sonoma Hwy	W Verano Ave/Arnold Dr
SON-24	Hwy 12, Bryden Lane to Melita Rd	3.9	Farmers Ln/4th St	Sonoma Hwy/Hwy 12/Melita Rd
SON-25	Santa Rosa Ave	2.4	Santa Rosa Ave/Sonoma Rd	Wilfred Ave/Santa Rosa Ave
SON-26	Petaluma Hill Rd - Santa Rosa to Rohnert Park	9.8	Petaluma Hill Rd/Santa Rosa Ave	Adobe Rd/Petaluma Hill Rd/Main St
SON-28	Joe Rodota Trail, Sebastopol to Santa Rosa	5.3	Main St/Burnett St & Hwy 12/ Morris St	Stony Point Rd/Joe Rodota Trl
SON-30	Old Redwood Hwy, 1st to Hwy 101	0.8	Hwy 101	Vandenburg Rd
Sonoma County Total		**24.9**		
Regional TOTAL without toll bridges		**210.4**		
Toll Bridges				
REG-1	Golden Gate Bridge	1.9	South approach to GG Bridge	North approach to GG Bridge
REG-2	Oakland-San Francisco Bay Bridge (East Span) (under construction)	7.0	Yerba Buena Island	Powell St/Frontage Rd, Mandela Pkwy/Grand Ave

Project Identifier	Bikeway	Built Miles	Endpoint A	Endpoint B
REG-6	Dumbarton Bridge	1.6	Alameda County/Bay Trail	San Mateo County/Bay Trail
REG-7	Antioch Bridge	1.0	Hwy 160/Wilbur Ave	Sacramento County Line
REG-8	Carquinez Bridge Bike/Ped Path	1.2	Vallejo	Crockett
REG-9	Benicia-Martinez Bridge	1.8	Park Road	West Ninth Street
Toll Bridge Total		**14.5**		
Totals:		**224.9**		

1. Note: Gaps in sequence of Project Identifiers indicate either unbuilt segment or a link in a countywide network that is not part of the Regional Bikeway Network.
2. Totals do not add up due to rounding.

Appendix C | Routine Accommodation Policies

Policies at the regional, state and federal level call for the consideration and routine accommodation of bicyclists in transportation projects. MTC's policy applies to projects funded with money programmed by the Commission; state and federal policies apply to projects funded with their funds.

This Appendix reproduces these routine accommodation policies. Please also refer to the "MTC bicycle-related policies and programs section" of Chapter 3 for summaries of other related MTC resolutions. Numerous Bay Area local governments have also adopted routine accommodation policies; however, these are not reproduced in this document.

MTC Routine Accommodation Policy: Resolution No. 3765

Date: June 28, 2006
W.I.: 1125
Referred by: POC

ABSTRACT
Resolution No. 3765

This resolution sets forth MTC's Regional Policy for the Accommodation of Non-Motorized Travelers during project planning, design, funding and construction.

Further discussion of these actions are contained in the MTC Executive Director's Memorandum to the Planning Committee dated June 9, 2006.

Date: June 28, 2006
W.I.: 1125
Referred by: PC

RE: Regional Policies for Accommodation of Non-Motorized Travelers

METROPOLITAN TRANSPORTATION COMMISSION
RESOLUTION NO. 3765

WHEREAS, the Metropolitan Transportation Commission (MTC) is the regional transportation planning agency for the San Francisco Bay Area pursuant to Government Code Section 66500 et seq.; and

WHEREAS, MTC adopted Resolution No. 3427 in 2001 which adopted the 2001 Regional Transportation Plan and the 2001 Regional Bicycle Plan for the region; and

WHEREAS, MTC adopted Resolution No. 3681 in 2005 which adopted the Transportation 2030 Plan including Calls to Action to address non-motorized transportation needs during project development; and

WHEREAS, MTC recognizes that coordinated development of pedestrian and bicycle infrastructure offers cost savings in the long term and opportunities to create safe and convenient non-motorized travel; now, therefore, be it

RESOLVED, that MTC adopts the Recommendations from the study *Routine Accommodation of Pedestrians and Bicyclists in the Bay Area,* as outlined in Attachment A, attached hereto and incorporated herein as though set forth at length

METROPOLITAN TRANSPORTATION COMMISSION

_____
John Rubin, Chair

The above resolution was entered into by the
Metropolitan Transportation Commission
at a regular meeting of the Commission held
in Oakland, California, on June 28, 2006.

Date: June 28, 2006
W.I.: 1125
Referred by: PC

Attachment A
Resolution No. 3765
Page 1 of 2

Routine Accommodation of Pedestrians and Bicyclists in the Bay Area: Study Recommendations

POLICY

1. Projects funded all or in part with regional funds (e.g. federal, STIP, bridge tolls) shall consider the accommodation of non-motorized travelers, as described in Caltrans Deputy Directive 64. These recommendations shall not replace locally adopted policies regarding transportation planning, design, and construction. These recommendations are intended to facilitate the accommodation of pedestrians, bicyclists, and disabled traveler needs into all projects where non-motorized travel is consistent with current, adopted regional and local plans. In the absence of such plans, federal, state, and local standards and guidelines should be used to determine appropriate accommodations.

PROJECT PLANNING and DESIGN

2. Caltrans and MTC will make available routine accommodations reports and publications available on their respective websites.

3. To promote local non-motorized involvement, Caltrans District 4 will maintain and share, either quarterly or semi-annually at the District 4 Bicycle Advisory Committee, a table listing ongoing Project Initiation Documents (PIDS) for Caltrans and locally-sponsored projects on state highway facilities where nonmotorized users are permitted.

FUNDING and REVIEW

4. MTC will continue to support funding for bicycle and pedestrian planning, with special focus on the development of new plans and the update of plans more than five years old.

5. MTC's-fund programming policies shall ensure project sponsors consider the accommodation of non-motorized travelers consistent with Caltrans' Deputy Directive 64. Projects funded all or in part with regional discretionary funds must consider bicycle and pedestrian facilities in the full project cost consistent with Recommendation 1 above. The Federal Highway Administration recommends including up to 20% of the project cost to address non-motorized access improvements; MTC encourages local agencies to adopt their own percentages.

6. TDA Article 3, Regional Bike/Ped, and TLC funds shall not be used to fund non-motorized facilities needed for new roadway or transit construction projects that remove or degrade non-motorized access. Funding to enhance bicycle and/or pedestrian access associated with new roadway or transit construction projects should be included in the funding for that project.

7. MTC, its regional bicycle and pedestrian working groups, the Partnership's Local Streets and Roads committee, and the county congestion management agencies (CMAs) shall develop a project checklist to be used by implementing agencies to evaluate non-motorized needs and to identify non-motorized accommodations associated with regionally-funded roadway and transit projects consistent with applicable plans and/or standards. The form is intended for use on projects at their earliest conception or design phase and will be developed by the end of 2006.

8. CMAs will review completed project checklists and will make them available through their websites, and to their countywide Bicycle/Pedestrian Advisory Committees (BPACs) for review and input to ensure that routine accommodation is considered at the earliest stages of project development. The checklist outlined in Recommendation 7 should be the basis of this discussion prior to projects entering the TIP.

9. Each countywide BPAC shall include members that understand the range of transportation needs of bicyclists and pedestrians consistent with MTC Resolution 875 and shall include representation from both incorporated and unincorporated areas of the county.

10. MTC and its partner agencies will monitor how the needs of non-motorized users of the transportation system are being addressed in the design and construction of transportation projects by auditing candidate TIP projects to track the success of these recommendations. Caltrans shall monitor select projects based on the proposed checklist.

TRAINING

11. Caltrans and MTC will continue to promote and host project manager and designer training sessions to staff and local agencies to promote routine accommodation consistent with Deputy Directive 64.

Department of Transportation Deputy Directive DD-64

California Department of Transportation

DEPUTY DIRECTIVE

Number:	DD-64
Refer to Director's Policy	05 - Multimodal Alternatives Analysis 06 - Caltrans' Partnerships
Effective Date:	3-26-01
Supersedes:	New

Title: Accommodating Non-Motorized Travel

POLICY

The Department fully considers the needs of non-motorized travelers (including pedestrians, bicyclists and persons with disabilities) in all programming, planning, maintenance, construction, operations and project development activities and products. This includes incorporation of the best available standards in all of the Department's practices. The Department adopts the best practice concepts in the US DOT Policy Statement on Integrating Bicycling and Walking into Transportation Infrastructure.

DEFINITION/ BACKGROUND

The planning and project development process seeks to provide the people of California with a degree of mobility that is in balance with other values. They must ensure that economic, social and environmental effects are fully considered along with technical issues, so that the best interest of the public is served. This includes all users of California's facilities and roadways.

Attention must be given to many issues including, but not limited to, the following:

- Safe and efficient transportation for all users of the transportation system
- Provision of alternatives for non-motorized travel
- Support of the Americans with Disabilities Act (ADA)
- Attainment of community goals and objectives
- Transportation needs of low-mobility, disadvantaged groups
- Support of the State's economic development
- Elimination or minimization of adverse effects on the environment, natural resources, public services, aesthetic features and the community
- Realistic financial estimates
- Cost effectiveness

Individual projects are selected for construction on the basis of overall multimodal system benefits as well as community goals, plans and values. Decisions place emphasis on making different transportation modes work together safely and effectively. Implicit in these objectives is the need to accommodate non-motorized travelers as an important consideration in improving the transportation system.

RESPONSIBILITIES

Deputy Director, Planning and Modal Programs:

- Ensures that the needs of non-motorized travelers are incorporated into the program element of Transportation Planning and the modal elements of the statewide strategy for mobility.
- Ensures that liaison exists with non-motorized advocates to incorporate non-motorized needs into all program areas including project and system planning.
- Ensures that the needs of the non-motorized travelers are incorporated in Personal Movement Strategies.

Deputy Director, Project Delivery:

- Ensures that projects incorporate best practices for non-motorized travel in the design and construction of Capital projects.

Deputy Director, Maintenance and Operations:

- Ensures that the transportation system is maintained and operated in a safe and efficient manner with the recognition that non-motorized travel is a vital element of the transportation system.
- Ensures that the needs of non-motorized travelers are met in maintenance work zones.

District Directors:

- Ensure that best practices for non-motorized travel are included in all district projects and project planning.
- Ensure that best practices for non-motorized travel are implemented in maintenance and travel operations practices.

Chief, Division of Design:

- Ensures that project delivery procedures and design guidance include the needs of non-motorized travelers as a regular part of doing business.
- Ensures that all Project Delivery staff is trained and consider the needs of the non-motorized traveler while developing and designing transportation projects.

Chief, Division of Planning:

- Ensures incorporation of non-motorized travel elements in transportation plans, programs and studies prepared by Transportation Planning.
- Ensures planning staff understand and are trained in the principles and design guidelines, non-motorized funding sources and the planning elements of non-motorized transportation.
- Coordinates Caltrans projects with non-motorized interest groups.
- Ensures incorporation of non-motorized travel elements in Corridor Studies prepared by Transportation Planning.

Chief, Division of Environmental Analysis:

- Ensures that non-motorized travel groups potentially affected by Caltrans projects are identified and have the opportunity to be involved in the project development process.
- Advocates effectively for all reasonable project-specific best practices that support or promote non-motorized travel.

Chief, Division of Maintenance:

- Ensures State-owned facilities are maintained consistent with the needs of motorized and non-motorized travelers.
- Provides guidance and training to those maintaining roadways to be aware of and sensitive to the needs of non-motorized travel.

Chief, Division of Traffic Operations:

- Ensures that the transportation system is operated in accordance with the needs of all travelers including non-motorized travel.
- Provides training and guidance on the operation of the transportation facility consistent with providing mobility for all users.

- Recommends safety measures in consideration of non-motorized travel on California's transportation system.

Chief, Division of Local Assistance:

- Ensures that Local Assistance staff, local agencies and interest groups are familiar with funding programs that are available for non-motorized travelers.
- Ensures that program coordinators responsible for non-motorized travel modes are familiar with non-motorized issues and advocate on behalf of non-motorized travelers.

APPLICABILITY

All Caltrans employees who are involved in the planning, design, construction, maintenance and operations of the transportation system.

TONY V. HARRIS
Chief Deputy Director

Other State of California routine accommodation policies[6]

Assembly Concurrent Resolution No. 211 (2002)

"That in order to improve the ability of all Californians who choose to walk or bicycle to do so safely and efficiently, the Legislature of the State of California hereby encourages all cities and counties to implement the policies of the California Department of Transportation Deputy Directive 64 and the United States Department of Transportation's design guidance document on integrating bicycling and walking when building their transportation infrastructure."

Assembly Bill 1358, Complete Streets Act (2008)

Amends Government Code sections 65040.2 and 65302 to require the circulation elements of city and county general plans to identify how the jurisdiction will provide for the routine accommodation of bicyclists, pedestrians and other roadway and public transit users.

Congestion Management Programs, Government Code 65089(b)(1)(B)(5)

"It is the intent of the Legislature that, when roadway projects are identified in the program, consideration be given for maintaining bicycle access and safety at a level comparable to that which existed prior to the improvement or alteration."

Federal routine accommodation policy

SAFETEA-LU, passed in 2005, integrates bicycle and pedestrian travel into the mainstream transportation system. This builds on previous federal transportation bills, beginning with ISTEA (passed in 1991), and TEA-21 (passed in 1998). The legislation asserts that bicycle and pedestrian facilities should offer a viable transportation choice while prioritizing the safety of all road users. SAFETEA-LU requires that bikeways and pedestrian walkways be considered as the rule rather than the exception in all federally funded transportation projects. SAFETEA-LU also includes a Safe Routes to School program, which provides funding for safety and access projects that improve conditions for children walking or bicycling to school.

[6] As documented in the City of Oakland's *Bicycle Master Plan*, October 2007 Revised Draft.

Appendix D | Revenue Sources

The 12 funding sources presented in Table 5.2 that routinely fund the development of bicycle facilities and, in some cases, programs are detailed in this appendix. For each source, the fund origin, average annual funding levels, and eligible projects and applicants are provided.

The first six funding sources are administered by MTC, including federal funds (Transportation Enhancements (TE) and Congestion Management and Air Quality Improvement (CMAQ) programs) and state funds (State Transportation Improvement Program (STIP) and Transportation Development Act (TDA)). Some of these, such as TE, are allocated directly to Bay Area claimants, while MTC uses others, such as CMAQ and STIP funds, to finance Bay Area-specific funding programs such as Transportation for Livable Communities (TLC). With reauthorization of the federal surface transportation act, Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), expected in 2010, CMAQ- funded programs may need to change significantly.

Regional agencies beyond MTC administer bicycle project funding, including the Association of Bay Area Governments through the Bay Trail Grant Program and the Bay Area Air Quality Management District through the Transportation Fund for Clean Air (TFCA). State funding sources for bicycle projects described in this appendix include the Hazard Elimination Safety (HES) program, the Bicycle Transportation Account (BTA) and the Safe Routes to School (SR2S) program, which are all administered by Caltrans. Although completely unrelated to each other, the region's seven transportation sales tax measures are treated as a single source in this write-up.

Bay Area funding sources for bicycle projects and programs

Transportation Enhancements (TE)

Under the Transportation Enhancements program, California receives approximately $60 million per year from the federal government to fund projects and activities that enhance and have a direct relationship to the surface transportation system. The

program funds projects under 12 eligible categories, including the provision of bike lanes, trails, bicycle parking and other bicycling facilities; safety-education activities for pedestrians and bicyclists; landscaping, streetscaping and other scenic beautification projects; and the preservation of abandoned railway corridors and their conversion to trails for nonmotorized transportation. Under California's TE program, administered by Caltrans, 75 percent of funding is distributed by the regional transportation planning agencies. In the Bay Area, MTC allocates money through its Transportation for Livable Communities program (see below). The remaining 25 percent is allocated by Caltrans at the district level.

www.fhwa.dot.gov
www.dot.ca.gov

Transportation for Livable Communities (TLC)

MTC created TLC in 1998 to provide technical assistance and funding to cities, counties, transit agencies and nonprofit organizations for capital projects and community-based planning that encourage multimodal travel and the revitalization of town centers and other mixed-use neighborhoods. The program funds projects that improve bicycling and walking to transit stations, neighborhood commercial districts and other major activity centers.

www.mtc.ca.gov/planning/smart_growth/tlc_grants.htm

Regional Bikeway Network program

Just prior to press time, MTC pledged to fully fund the Regional Bikeway Network described in Chapter 4, with the exception of the toll bridge links. Although a program has not yet been created to fulfill this commitment, the concept is to create a program that by 2035 will complete construction of the Regional Bikeway Network. This program will replace the Regional Bicycle and Pedestrian Program (RBPP), which was created in conjunction with the 2001 *Regional Transportation Plan.*

Safe Routes to Transit (SR2T)

Safe Routes to Transit is a grant-funding program that is part of the Bay Area's Regional Measure 2 (RM2), which instituted a $1 toll increase on the Bay Area's seven state-owned toll bridges. Through the SR2T program, $20 million is to be allocated through the year 2013 on a competitive basis to programs, planning efforts and capital projects designed to reduce congestion on toll bridges by improving bicycling and walking access to regional transit services that serve toll-bridge corridors. Funds can be used for secure bike storage at transit; safety enhancements and barrier removal for pedestrian or bike access to transit; and systemwide transit enhancements to accommodate bicyclists or pedestrians. Projects that improve access to car-sharing pods are also eligible. The SR2T program is administered by two nonprofit organizations, the East Bay Bicycle Coalition and the Transportation and Land Use Coalition, with MTC serving as the fiscal agent. The program awarded approximately $3.9 million during each of its first two cycles, in 2005 and 2007. Future funding cycles are scheduled to occur in 2009, 2011 and 2013.

www.transcoalition.org

Transportation Development Act, Article 3 (TDA-3)

Article 3 of California's Transportation Development Act is perhaps the most

readily available source of local funding for bicycle and pedestrian transportation projects. TDA funds are derived from a statewide ¼-cent retail sales tax. This tax is returned to the county of origin and distributed to the cities and county on a population basis. Under TDA Article 3, 2 percent of each entity's TDA allocation is set aside for bicycle and pedestrian projects, which generates approximately $2.9 million in the Bay Area annually. Eligible projects include the design and construction of bike paths and bike lanes, bicycle-safety education programs, and the preparation of comprehensive bicycle or pedestrian plans. According to MTC Resolution 875, these projects must be included in an adopted general plan or bicycle plan and must have been reviewed by the relevant city or county bicycle advisory committee. (These requirements are unique to MTC's program.) Eligible applicants include cities, counties and joint-powers agencies. In the Bay Area, project requests are compiled annually by each county's congestion management agency (CMA). Each CMA then submits a single countywide request for review and approval by MTC.

www.mtc.ca.gov/funding/STA-TDA/RES-0875.doc

Climate Action Program

In partnership with the Bay Area Air Quality Management District, Bay Conservation Development Commission and the Association of Bay Area Governments, MTC is sponsoring a five-year transportation Climate Action Program designed to reduce mobile emissions through an education campaign, grant program, transit traffic signal priority program, regional telecommuting pilot project, consumer incentive program to reduce trips and drive smart, a "plug-in hybrid electric vehicle" incentive program and new safe routes to school and safe routes to transit funding. The program will include funding for bicycle projects through new regional Safe Routes to School and Safe Routes to Transit programs with funding expected to be an average of about $20 million per year, for a total of about $100 million over the planned five-year lifespan of the program. This funding is in addition to the state and federal Safe Routes to School programs and MTC's existing Safe Routes to Transit program.

Bay Trail grants

The San Francisco Bay Trail Project – a non-profit organization administered by the Association of Bay Area Governments – provides grants to plan, design and construct segments of the Bay Trail, a 500-mile multiuse path encircling San Francisco and San Pablo bays that is now halfway built. In summer 2007, the Bay Trail Project announced a new, $2.5 million round of grant funding, with funds made available from Proposition 84, the 2006 Clean Water, Parks and Coastal Protection Bond Act. Permitting costs and trail projects required as part of a permit approval or as mitigation for another project are not eligible. Eligible applicants include cities, counties, special districts, federal and state government agencies, land trusts and nonprofit organizations. There are no minimum or maximum grant amounts and the grant application period will remain open until all funds have been allocated.

www.baytrail.org/grants.html

Transportation Fund for Clean Air (TFCA)

The Transportation Fund for Clean Air is a grant program funded by a $4 surcharge on

motor vehicles registered in the Bay Area. The purpose of the program, which is administered by the Bay Area Air Quality Management District (BAAQMD), is to fund projects and programs that will reduce air pollution from motor vehicles. A sub-program of the TFCA is the Bicycle Facility Program (BFP), which provides funding for bicycle paths, lanes and signed routes, bicycle parking, bus racks and the like. In fiscal year 2007-08, $600,000 was available under the BFP, for grants ranging from $10,000 $210,000. Grant awards are generally made on a first-come, first-served basis to qualified projects. All public agencies with the authority to implement bicycle-related projects within the BAAQMD's jurisdiction are considered eligible applicants. Funding for bicycling projects is also available through the TFCA's County Program Manager Fund. Under that subprogram, 40 percent of TFCA revenues collected in each Bay Area county is returned to that county's congestion management agency (CMA) for allocation. Applications are made directly to the CMAs, but must also be approved by BAAQMD.

www.baaqmd.gov

Hazard Elimination Safety (HES)

Administered in California by Caltrans, the federal Hazard Elimination Safety program provides funds to eliminate or reduce the number and severity of traffic collisions on public roads and highways. Cities and counties compete for HES funds by submitting candidate projects to Caltrans for review and analysis. Caltrans prioritizes these projects statewide and approves priority projects for funding through its annual HES program plan. Historically, only about 20 percent of applications are approved for funding. In the 2005-2006 program cycle, Caltrans awarded approximately $16 million under the HES program.

www.dot.ca.gov

Bicycle Transportation Account (BTA)

The Bicycle Transportation Account is a Caltrans-administered program that provides funding to cities and counties for projects that improve the safety and convenience of bicycle commuting. Eligible projects include secure bike parking; bike-carrying facilities on transit vehicles; installation of traffic-control devices that facilitate bicycling; planning, design, construction and maintenance of bikeways that serve major transportation corridors; and elimination of hazards to bike commuters. In fiscal year 2006/07, the BTA provided almost $9.2 million for projects throughout the state. To be eligible for BTA funds, a city or county must prepare and adopt a bicycle transportation plan that meets the requirements outlined in Section 891.2 of the *California Streets and Highways Code*.

www.dot.ca.gov/hq/LocalPrograms

Safe Routes to Schools (SR2S)

California's Safe Routes to Schools is a Caltrans-administered grant-funding program established in 1999 (and extended in 2007 to the year 2013). Eligible projects include bikeways, sidewalks, crosswalks, traffic signals, traffic-calming applications, and other infrastructure projects that improve the safety of walking and biking routes to elementary, middle and high schools, as well as "incidental" education, enforcement and encouragement activities. Planning projects, on the other hand, are not eligible. In fiscal years 2006/07 and 2007/08, approximately $26.8 million and $25.5

million respectively were available in grant funding.

www.dot.ca.gov/hq/LocalPrograms

Countywide sales taxes

With the exception of Napa and Solano counties, the voters in every Bay Area county have passed local ballot measures that levy a sales tax to fund local transportation projects. The expenditure plans for all seven measures allow funds to be used for bicycle projects and all but Santa Clara County set aside a fixed amount for a bicycle/pedestrian funding program (see Table F-2).

Appendix E | Data

Accurate information about who is bicycling today, where they are traveling and for what purposes can help MTC and other public and advocacy organizations develop appropriate bicycle facilities and target marketing to potential new cyclists. This appendix describes the data sources used in this plan and concludes with recommendations for improving each.

Bay Area Travel Survey

Every 10 to 15 years, MTC asks thousands of randomly selected Bay Area households to track their travel patterns for a few days in an "activity diary." All members of participating households document each time they move from one place to another, recording the origin, destination, time and mode in these diaries. Children's activities are recorded by adults in the same household. The data collected from these trip diaries are then "expanded" – a statistical term meaning that the travel patterns of each household are multiplied by the number of Bay Area households with a similar demographic make-up – to represent the travel characteristics of all households in the region. The expanded data is then published as the Bay Area Travel Survey (BATS), the region's only source of data on trip purposes[7]. Each trip recorded (e.g., a commuter's bike ride to work) is assumed to represent between 250 and 1,000 actual trips, depending on the demographics of the trip-maker. Therefore, data is more statistically precise in the more populous counties.

In addition to trips that occur by one mode only, BATS collects data on multi-modal trips, including those that use a bicycle to access public transit. In the past, MTC has analyzed this data and found that the number of bike-to-transit trips is too small regionwide to provide meaningful information. Transit operators' onboard surveys are a much better vehicle with which to collect this information. A more complete picture of bicycle usage could be obtained by adding bicycle trips reported by

[7] BATS data is now expanded using demographic data from the U.S. Census American Community Survey (ACS). See page 120 for more information on ACS.

BATS to bike-access-to-transit trips reported by Bay Area transit operators.

U.S. Census Journey-to-Work

Historically, the U.S. Census Bureau's detailed decennial survey of one in eight U.S. households has provided bicycle commuter levels through the Journey-to-Work (JTW) dataset. Transportation planners have relied on the JTW because of its extremely large sample size – 300,000 Bay Area households were surveyed in 2000 – and because it provides information about one of the most common bicycle trip purposes. In contrast to BATS, which provides information about *bicycle trips*, the focus of the JTW is on the number and characteristics of *bicyclists* (who bicycle to work).

Because of how the JTW question is worded ("How did this person usually get to work last week?") and the limitation of being able to report just one mode ("If this person usually used more than one method of transportation during the trip, mark the box of the mode used for the most distance"), the survey may miss reporting occasional bicycle commuters and those who bicycle to public transit.

After the 2000 Census, the Census Bureau discontinued the one-in-eight household "long form," the source of the JTW dataset. However, JTW data is now available through the American Community Survey (see following section).

U.S. Census American Community Survey

The American Community Survey (ACS) is an ongoing survey administered by the U.S. Census Bureau that provides annual data for large geographic areas (65,000+ total population), data every three years for smaller (20,000+ total population) and larger areas, and five-year data for all geographic areas down to the census tract and block group. ACS now contains the journey-to-work question that was previously asked in the "long form." Having access to data more frequently than once in ten years will allow planners and analysts to better understand trends in the demographics of bicycle commuters over time.

Although ACS is administered much more frequently than the decennial Census, many fewer households are being surveyed than completed the Census "long form." This means that, although updated ACS data is available to all areas more frequently than the decennial Census, the data has larger standard errors. Also, because data is collected between US censuses when population numbers are not known, and state and federal demographers do not agree on population in intermediate years, additional errors may occur in the expanding and weighting process common to all sample surveys (see BATS section on page 119).

Future work

Until the number of Bay Area bicycle trips grows significantly relative to those made by automobile, the Bay Area Travel Survey will be an imperfect tool to measure cycling in the region. In 2000, MTC spent $1.5 million surveying 15,000 BATS households. These numbers would need to double in order to increase the precision of the resulting bicycle trip data.

The Bay Area Travel Survey should continue to collect information on bicycle ownership and usage and detailed multi-modal journeys that use bicycles as an access or egress mode. MTC should also consider having future BATS travel diaries record bicycle use over a longer period of time, say over the past week or month. The survey could utilize global positioning systems (GPS) devices to track routes for pedestrians, cyclists and vehicles over the course of the survey period to accurately monitor speed and distance traveled.

Changes to the American Community Survey are not likely unless required by Congress. However, the Census Bureau could consider pretesting an "all modes used in the journey to work" question to replace the current question, which asks about the "mode used for greatest distance." In addition, MTC staff should carefully review any upcoming Census products for bicycle commuting information and/or analysis generated from ACS data. Finally, MTC staff should use and encourage the use of ACS county-level data[8] to investigate characteristics of bicycle commuters over time.

[8] ACS Public Use Microdata Sample (PUMS) reports Bay Area data in 54 PUMAs (public use microdata sample areas).

Appendix F | Countywide Bicycle Planning

This appendix summarizes countywide planning efforts in the nine Bay Area counties, where every county has either a countywide bicycle (or bicycle and pedestrian) plan, a countywide transportation sales tax that funds bicycle projects, or both (see Tables F-1 and F-2). Most plans summarized in this appendix describe: existing bicycling conditions; goals and policies (or objectives); route selection and prioritization criteria; a countywide bikeway network; other bicycle facilities; funding and implementation; and, in counties with a transportation sales tax, information on this local source of bicycle project revenue.

Three counties have full-time bicycle or bicycle/pedestrian coordinators, as described below. These staff members coordinate countywide funding applications and allocations, staff countywide bicycle advisory committees and, given a conducive institutional arrangement, review projects to ensure consistency with applicable bicycle plans and consideration of cyclists.

As discussed in more detail in Chapter 4, combining bicycling with public transit can provide perhaps the best alternative to the flexibility and convenience of the single-occupant vehicle. Therefore, this appendix describes how each county's countywide bicycle planning efforts address bicycle access to public transit.

Alameda County

The *Alameda Countywide Bicycle Plan* – prepared by the Alameda County Congestion Management Agency in 2006 – focuses on the identification and implementation of planned countywide bicycle corridors and other facilities and programs.

A key portion of the Plan's implementation plan is Alameda County's transportation sales tax, Measure B. Five percent of Measure B funds is dedicated to bicycle and

pedestrian improvements, and this source is estimated to generate $80 million over the 20-year life of the measure (until 2022). Seventy-five percent of Measure B bicycle and pedestrian funds are local "pass-through" funds, which are distributed to Alameda County cities and the county based on population. The remaining 25 percent are allocated to high-priority countywide bicycle and pedestrian projects, programs and planning efforts, with special recognition of East Bay Regional Park District projects that are included in the *Countywide Bicycle Plan*. The Alameda County Transportation Improvement Authority administers Measure B, which, through the 25 percent countywide funds, pays for a full-time countywide bicycle and pedestrian coordinator.

For further information:

- *Alameda Countywide Bicycle Plan*
  www.accma.ca.gov
- Measure B Bicycle and Pedestrian program
  www.actia2022.com

Contra Costa County

Approved in 2004, Contra Costa County's Measure J will replace the original transportation sales tax (Measure C) in 2009. Measure C is summarized in the *Contra Costa Countywide Bicycle and Pedestrian Plan*, which was adopted the year before the current measure, Measure J, was approved by county voters. The plan is currently being updated and will include a discussion of Measure J and its "Pedestrian, Bicycle and Trail Facilities" program, which sets aside 1.5 percent of Measure J funding, estimated to generate $30 million over 25 years. Two-thirds of this funding is set aside to complete projects in the *Countywide Bicycle and Pedestrian Plan*, while the remaining third is earmarked for the East Bay Regional Park District. In addition to this program, Measure J has four other programs that can fund bicycle, pedestrian and trail facilities:

- Major Streets: Traffic Flow
- Safety and Capacity Improvements
- Safe Transportation for Children
- Local Streets and Road Maintenance and
- Transportation for Livable Communities.

The *Contra Costa Countywide Bicycle and Pedestrian Plan* has chapters on the relationship between bicycling and public transit, safety projects and programs, bikeway planning and design, and a unique appendix on bicycle demand forecasting.

For further information:

- *Contra Costa Countywide Bicycle and Pedestrian Plan*
  www.ccta.net

Marin County

Marin County and every city in the county have prepared a bicycle plan for their jurisdiction, with the exception of Belvedere and Ross. Although there is no countywide bicycle plan, the county congestion management agency (the Transportation Authority of Marin) is currently overseeing a contract for updating the local agencies' bicycle plans and developing a new plan for Ross. Each plan will discuss Marin County's transportation sales tax measure, Measure A, as well as other bicycle and pedestrian needs.

Table F-1: Countywide bicycle planning

County	Plan (Year adopted)	Staff bicycle planner	Public transit addressed in bicycle plan?
Alameda	*Countywide Bicycle Plan* (2006)	Yes (ACTIA[1])	Existing conditions sections on bicycle access and bus, rail and ferry transit. Identification of "Transit Priority Zones," where bicycle connections to transit stations need improvement.
Contra Costa	*Contra Costa Countywide Bicycle and Pedestrian Plan* (2003)[2]	No	Transit rider needs, safe routes to and from transit, station and stop amenities, pedestrian- and bicycle-friendly transit vehicles, current state of transit links, bicycle parking and storage, recommended improvements.
Marin	None	No	All city plans address multimodal linkages and there is a public transit section in each plan.
Napa	*Napa Countywide Bicycle Plan* (2003)	No	In goals, bicycle parking and trail/trailhead locations sections.
San Francisco	*San Francisco Bicycle Plan* (2005)[3]	Yes	Policies for streets with shared bus and bicycle use; goals and policies to improve bicycle access on transit vehicles whenever feasible and to provide bicycle access to and parking at transit stations.
San Mateo	*San Mateo County Comprehensive Bicycle Route Plan (2000)*	No	Existing conditions section on bicycle access to bus and rail.
Santa Clara	*Santa Clara Countywide Bicycle Plan* (2000)	Yes	Bicycle parking at transit stations and onboard policies of local transit operators.
Solano	*Solano Countywide Bicycle Plan* (2004)	No	Bicycle parking at multimodal connections, transit centers, park-and-ride lots, ferries, rail stations, bicycle shuttles and bus transfer stops, and onboard policies of local operators.
Sonoma	*Sonoma County Transportation Authority Countywide Bicycle Plan* (2003)[1]	No	No, but update will address public transit.

[1] Alameda County Transportation Improvement Authority

[2] Currently being updated

[3] Formal plan adoption pending environmental review.

Table F-2: Countywide sales tax bicycle funding

County	Sales tax-funded bicycle program?	Eligible projects, programs, plans	% Set-aside	Measure lifetime (expiration)	Est. rev. (millions)
Alameda	• "Local Bicycle and Pedestrian Funds" (75% of set-aside) • "Countywide Discretionary Fund" (25% of set-aside)	Projects in the *Countywide Bicycle Plan*, including bicycle facilities, signage, transit and plans and education, enforcement and promotion programs.	5%	20 years (2022)	$80
Contra Costa	• Pedestrian/bike/trail facilities and completion of plan projects (2/3) • East Bay Regional Park District projects (1/3)	• Projects in the *Countywide Bicycle and Pedestrian Plan*. • East Bay Regional Park District projects.	1.50%	25 years (2034)	$30
Marin	• "Safe Pathways" • Strategies 2, 3 and 4 (see page 19))	• Projects that reduce school-related congestion. • On-street and off-street bikeways and pathways.	3.5% [1]	20 years (2025)	$12
Napa	No	N/A	N/A	N/A	N/A
San Francisco	"Pedestrian and Bicycle Facility Maintenance" and "Bicycle Circulation/Safety"	Bike lanes and paths, bike parking, and outreach and education programs.	2.66% [2]	30 years (2040)	$75
San Mateo	Bicycle and pedestrian program	Bicycle and pedestrian facilities.	3%	25 years (2033)	$45
Santa Clara	Transit programs/facilities	Bicycle and pedestrian access to transit.	N/A	N/A	N/A
Solano	No	N/A	N/A	N/A	N/A
Sonoma	Safe bicycle routes	Bicycle facilities.	4%	20 years (2025)	$21
Total sales tax funding for bicycle and pedestrian projects:					**$263**

[1] Figures represent Safe Pathways funding only; funding for Strategies 2, 3 and 4 impossible to estimate.

[2] Only bicycle facilities and programs eligible.

The Measure A *Expenditure Plan* sets aside 3.5 percent (estimated to generate approximately $12 million over 20 years) for Safe Pathways funding, which is aimed at projects that reduce school-related congestion. In addition, three of the Measure's four strategies also fund bikeways to some degree, although the exact amounts are impossible to predict. Strategy 2 will fund the Puerto Suello Hill bikeway project. Strategy 3 is aimed at maintaining, improving and managing local transportation infrastructure, including bikeways and pathways, with consideration for the needs of bicyclists and pedestrians in all roadway projects. Strategy 4 is dedicated to reducing school-related congestion through Marin County's Safe Routes to School program, school crossing guards and Safe Pathways to School capital projects.

In addition to Measure A, Marin County was one of four U.S. communities selected in 2002 to receive $25 million in the federal Nonmotorized Transportation Pilot Program (NTPP). The purpose of the NTPP is to demonstrate the extent to which bicycling and walking can carry a significant part of the transportation load and can represent a major portion of the transportation solution. The county of Marin has undertaken an extensive public involvement process to determine the list of projects that will be funded with NTPP funds and will implement these projects in concert with participating cities, towns and other agencies.

For further information:

- Current city and county plans (updates expected 2007/08)
  www.walkbikemarin.org
- Measure A *Expenditure Plan*
  www.tam.ca.gov
- Non-Motorized Transportation Pilot Program project list
  www.tam.ca.gov

Napa County

The *Napa Countywide Bicycle Plan* was adopted in 2003 and includes sections on specific bikeway projects, design guidelines and resources related to the impact of off-road bicycling facilities on private property. Napa County has neither a transportation sales tax nor any other local source of dedicated bicycle funding.

For further information:

- *Napa Countywide Bicycle Plan*
  www.nctpa.net

San Francisco County

The *San Francisco Bicycle Plan* was adopted in 2005. The following year, the California Supreme Court ruled that the plan was subject to a CEQA environmental analysis, which city staff is currently performing. Because this plan replaces one adopted in 1997 and because adoption of the 2005 plan is expected eventually, this brief summary refers to the more recent edition.

The *San Francisco Bicycle Plan* is different than other countywide bicycle plans, and more like a city bicycle plan, in a number of ways. Because San Francisco County is also a city, the same agency that wrote the Plan—the Municipal Transportation Agency—will implement the projects called for in the plan. As a result, the plan goes into far greater detail than other countywide plans. Examples include much longer sections on bicycle parking; transit access; education; enforcement and promotion programs; and, in a companion document, a description of gaps in the "Bicycle Route Network."

The *San Francisco Bicycle Plan* also describes San Francisco's transportation sales tax, Proposition K, which provides approximately $19 million for Pedestrian and Bicycle Facility Maintenance and $56 million for Bicycle Circulation/Safety over 30 years. The city of San Francisco has a bicycle program that is staffed with a program manager and five full-time staff, consisting of traffic engineers, planners and an outreach coordinator.

For further information:

- *San Francisco Bicycle Plan*
  www.sfmta.com
- San Francisco Bicycle Program
  www.sfmta.com

San Mateo County

The *San Mateo County Comprehensive Bicycle Route Plan*, prepared in 2000 and currently being updated, attempts to identify connections between bicycle facilities identified in San Mateo cities' bicycle plans and provides suggested bikeway design and maintenance standards.

San Mateo County's transportation sales tax, Measure A, dedicates 3 percent of revenue to a pedestrian and bicycle program, which will generate approximately $45 million over 25 years. Bicycle facilities such as paths, trails and bridges are eligible for funding under this program.

For further information:

- *San Mateo County Comprehensive Bicycle Plan*
  www.smcta.com

Santa Clara County

The Santa Clara Valley Transportation Authority's 2000 *Countywide Bicycle Plan* is being updated and is expected to be adopted in 2008.

Although Santa Clara County's original transportation sales tax, Measure B, set aside $12 million for bicycle projects, that measure expired in 2006 and most Measure B funding has been allocated. The only bicycle projects that are eligible for Measure A, the current transportation sales tax, are improvements to bicycle access to transit. There is neither a set-aside nor a project list for bicycle/pedestrian projects in the current measure. The first set of transit projects funded under Measure A includes $6.5 million for a bicycle/pedestrian tunnel at the Santa Clara Caltrain station. VTA (Valley Transportation Authority), the county's congestion management agency, has a full-time staff bicycle planner.

For more information:

- *Santa Clara Countywide Bicycle Plan*
  www.vta.org

Solano County

The *Solano Countywide Bicycle Plan* was adopted in 2004. In addition to the typical chapters outlined at the beginning of this appendix, the Solano County plan addresses demand for bicycle facilities and marketing to increase awareness and use of the existing bikeway system. Solano County does not have a transportation sales tax.

For further information:

- *Solano Countywide Bicycle Plan*
  www.sta.dst.ca.us

Sonoma County

The *Sonoma Countywide Bicycle and Pedestrian Master Plan*, published in 2008, discusses Measure M, the local transportation sales tax measure and the importance of convenient access and connectivity to public transit. Bicycle and pedestrian projects are allocated 4 percent of the total Measure M program revenues over 20 years, which is expected to generate a total of $21 million.

For further information:

- Sonoma County Transportation Authority *Countywide Bicycle Plan*
  www.sctainfo.org

Appendix G | Resources

There are perhaps hundreds of resources designed to help transportation professionals develop safe, functional and attractive bicycling facilities. The following resources are considered to be essential starting points for work in this area. Links to additional resources can be found at www.mtc.ca.gov/planning/bicycles/pedestrians. Following this list are descriptions of and links to tools that can help bicycle planners and traffic engineers develop better bicycle facilities.

Manual on Uniform Traffic Control Devices

"The Manual on Uniform Traffic Control Devices, *or MUTCD, defines the standards used by road managers nationwide to install and maintain traffic control devices on all streets and highways. The MUTCD is published by the Federal Highway Administration (FHWA) under 23 Code of Federal Regulations (CFR), Part 655, Subpart F."* – Federal Highway Administration

The first volume of the MUTCD was published in 1932 in response to the proliferation of transportation infrastructure following the introduction of the "horseless carriage" in the late 19th century. Today, state and local transportation practitioners who design roadways and other facilities use the MUTCD as the foremost authority on signing and marking. In the 75 years since its first publication, there have been nine editions of the MUTCD, with the next edition scheduled for release in 2009. Local agencies can request permission to experiment with new markings or traffic controls that are not currently in the MUTCD. FHWA outlines a process for experimentation and for amending the document.

The National Committee on Uniform Traffic Control Devices (NCUTCD) is a private organization with no official affiliation with the Federal government. Committee members meet semiannually to discuss the MUTCD and to develop consensus comments and recommendations, which are then submitted to the FHWA for consideration. Currently, NCUTCD membership includes more than 200 traffic control device experts, representing a wide variety of organizations with an interest in

and experience with traffic control device issues.

Standards for bicycle facilities are covered in Part 9 of the MUTCD. For more information, frequently asked questions, an electronic version of the MUTCD, and a list of upcoming changes, visit:

http://mutcd.fhwa.dot.gov

California's Manual on Uniform Traffic Control Devices

"As of September 26, 2006, the California Department of Transportation adopted the California Manual on Uniform Traffic Control Devices *(FHWA's MUTCD 2003 Revision 1, as amended for use in California), also called the California MUTCD, to prescribe uniform standards and specifications for all official traffic control devices in California."*
-- Caltrans

California's MUTCD consists of the federal MUTCD plus a California Supplement, which makes the document consistent with Chapter 1000 of the Caltrans *Highway Design Manual* (see below) and provides additional standards with respect to signage.

Highway Design Manual

"The needs of nonmotorized transportation are an essential part of all highway projects...Chapter 1000 of the Highway Design Manual discusses bicycle travel. All city, county, regional and other local agencies responsible for bikeways or roads where bicycle travel is permitted must follow the minimum bicycle planning and design criteria contained in this and other chapters of this manual (see Streets and Highways Code Section 891)."
—Caltrans

The California Department of Transportation, or Caltrans, publishes the Highway Design Manual (HDM), which governs the design of transportation facilities throughout the State. Chapter 1000 provides detailed information about signing and marking for on-street and off-street bicycle facilities. The HDM is not intended to provide best practices; rather, it provides minimum design standards for commonly used bicycle facilities such as bicycle lanes.

www.dot.ca.gov/hq

A Policy on Geometric Design of Highways and Streets, 5th Edition (aka the "Green Book")

"The American Association of State Highway and Transportation Officials (AASHTO) advocates transportation-related policies and provides technical services to support states in their efforts to efficiently and safely move people and goods." – AASHTO

AASHTO publishes a series of documents related to planning, operations, and design of transportation facilities. The most prominent publication, *A Policy on Geometric Design of Highways and Streets, 5th Edition*, is also known as the "Green Book" because of its signature color. The "Green Book" contains the latest design practices in universal use as the standard for highway geometric design.

https://bookstore.transportation.org

Guide for the Development of Bicycle Facilities

"Bicycle travel has played an historic role in transportation. Even before the invention of the automobile, the League of American Wheelmen promoted improved traveled ways"—American

Association of State Highway and Transportation Officials

This guide provides information on the development of new facilities to enhance and encourage safe bicycle travel, including planning considerations, design and construction guidelines, and operation and maintenance recommendations. The document culls relevant design guidelines from AASHTO's "Green Book," and includes more robust explanations of special considerations when planning for cyclists. The guide is currently under revision; the new version is expected to become available in early 2009.

http://downloads.transportation.org/aashto_catalog.pdf

Pedestrian and Bicycle Information Center (PBIC)

"Since its inception in 1999, PBIC's mission has been to improve the quality of life in communities through the increase of safe walking and bicycling as a viable means of transportation and physical activity. The PBIC is managed and operated by staff at the University of North Carolina Highway Safety Research Center, including engineers, urban planners, public health specialists, Web site specialists, researchers, computer programmers, communication specialists, and others." – PBIC

The Pedestrian and Bicycle Information Center is the clearinghouse for accurate and current bicycling and pedestrian information. The bicycle pages of the PBIC Web site provide information on the latest research, new tools (such as the Cost/Benefit Analysis Tool for new bicycle facilities discussed later in this appendix), and examples of exemplary bicycle plans. The site is useful to a variety of audiences, including practitioners at every level, advocates, interested community members, and academics.

www.bicyclinginfo.org

Innovative Bicycle Treatments

"The intent of this report is to identify bicycle and pedestrian facility innovations and to share information on their applications, advantages and disadvantages; this report does not necessarily encourage or discourage their use" — Institute of Transportation Engineers (ITE)

This report, developed by the ITE Pedestrian and Bicycle Council, provides information on approximately 50 bicycle treatments, including on-street innovations such as contra-flow bike lanes, bicycle boulevards, and colored bike lanes, as well as trail facilities. The report includes sections on bicycles at intersections, bicycle detection, unique bicycle signs, traffic calming accommodations and bicycle parking. The description of each innovation is accompanied by graphics, applications, advantages/disadvantages, evaluation studies, sample sites and contact information for locations where the device is in use.

www.ite.org/bookstore

Local design guidelines

While the federal and State Manuals on Uniform Traffic Control Devices, the Caltrans Highway Design Manual and the AASHTO publications cited above provide information about planning and designing bicycle facilities, local agencies have also created excellent examples of design guidelines that identify best practices, rather than minimum standards. One of the most commonly cited guides is the Santa Clara

Valley Transportation Authority's extensive *Bicycle Technical Guidelines*. Another example of design guidelines that covers innovative tools is the *San Francisco Bicycle Plan Update: Supplemental Design Guidelines*, published in 2003.

- VTA Bicycle Technical Guidelines
  www.sccrtc.org
- San Francisco Supplemental Design Guidelines
  www.bicycle.sfgov.org

Tools

Shared-use path level of service (LOS) calculator

The 1999 American Association of State Highway and Transportation Officials (AASHTO) *Guide for the Development of Bicycle Facilities* (aka the "Green Book") states, "Under most conditions, a recommended paved width for a two-directional shared-use path is 3.0 m (10.0 feet). . . Under certain conditions it may be necessary or desirable to increase the width of a shared-use path to 3.6 m (12.0 feet) or even 4.2 m (14.0 feet), due to substantial use by bicycles, joggers, skaters and pedestrians." While the Green Book acknowledges that sometimes a wider path is desirable, it does not provide direction on when and how to determine the appropriate width.

The shared-use path level of service calculator is a spreadsheet tool developed by the Federal Highway Administration (FHWA). It allows agencies to estimate demand for bicycle/pedestrian multiuse pathways, size new facilities and plan improvements to existing ones. The tool can also be used to determine the maximum number of users that existing trails can comfortably accommodate and to understand bicycle LOS at "pinch points."

The trail LOS model uses six levels of service categories represented by the letters A to F, from best to worst. This system is similar to motor vehicle LOS in the following ways:

- A key criterion is maintaining an optimum speed (for the bicyclist).
- Service measures are primarily related to freedom to maneuver. These include meetings, active passes, delayed passes, and the perceived ability to pass.
- Safety is not included in the set of measures that establish service levels.

The key difference between trail LOS and motor vehicle LOS is that trail LOS does not factor in travel time or traffic interruptions such as signals or stop signs at grade crossings.

Information necessary to run the calculator is trail width, one-way user volume, and mode split among five user types: bicyclists; pedestrians; in-line skaters; runners; and child bicyclists. (The tool is not meant for trails with users beyond these five user types, such as equestrians.) To use the LOS calculator, test segments must be a minimum of 0.25 miles long. There is no

maximum as long as width, striping, volume and mode split characteristics are consistent within the segment. The tool is meant only to apply to paved, hard surface, two-way shared-use paths with at-grade crossings no more than once every 0.25 miles. Although improvements to LOS are likely to benefit all users, the purpose of the tool is mainly to evaluate bicycle mobility.

To download the calculator:
www.tfhrc.gov/safety/pedbike/pubs/05138

Bicycle safety index

The intent of the *Pedestrian and Bicyclist Intersection Safety Indices*, published by the Federal Highway Administration (FHWA), is to establish a methodology that agencies can use to prioritize improvements to intersection crossings (for pedestrians) and approaches (for cyclists). The report does not establish a desirable (or undesirable) safety index value; rather, agencies can use the index to compare a group of locations to each other in order to determine which location performs the best according to the indices.

FHWA collected quantitative data in the form of conflicts and avoidance maneuvers and qualitative data in the form of expert safety ratings in order to formulate the index. The bicycle portion analyzed 67 intersection approaches from Gainesville, Fld.; Philadelphia, Penn.; and Portland and Eugene, Ore.

In the field, agencies using the tool collect data about variables such as presence of bicycle lanes, main and cross street traffic volumes, number of through and turn lanes, presence of on-street parking, main street speed limit, and presence of traffic signal. The *Pedestrian and Bicyclist Intersection Safety Indices* are most appropriate for use in the following situations:

- three-leg and four-leg intersections;
- signalized, two-way and four-way stops;
- on streets with traffic volumes from 600 to 50,000 vehicles per day;
- on one-way and two-way roads;
- on streets with one to four through lanes; and
- on streets with speed limits from 15 to 45 miles per hour.

To download the document:
www.tfhrc.gov/safety/pedbike/pubs/06125/06125.pdf

Cost/benefit tool

This new online sketch-planning tool helps bicycle facility planners and designers project the relative costs and benefits of new facilities on a cost-per-user basis. Developed by the Transportation Research Board (TRB), this tool is appropriate only for citywide sketch planning.

Tool users enter two types of information:

1. Factors that influence demand, including land-use density around the project, household size and income for the city in

which the facility will be built, and the length of the facility.

2. Facility cost. With this information, the tool projects: the range of potential cyclists that might use the facility; the "mobility savings" per trip made by bicycle on the facility; and the health benefits of the facility, in terms of dollars.

The TRB cost/benefit tool has been subject to very limited testing and, given the rough nature of the data required, is useful only at a big-picture level. For instance, while it takes land-use density and household size into consideration, the tool does not account for a mix of uses or proximity of destinations. Therefore, this tool may be useful to compare one project to another, but it has not yet proven sufficiently accurate to anticipate the actual cost/benefit ratio of a particular project.

Bicycle counters

Collecting data on the number of cyclists in a corridor can be time-consuming and expensive, as most counts are still taken manually. However, there are several techniques for counting cyclists that do not require a human in the field, including the following:

- Infrared and laser counts require no on-site staff and compile data automatically; however, they only produce raw numbers, not user information such as age, experience, etc. These techniques work by registering each time a cyclist "breaks" the laser or passes through a given plane. Because they can't distinguish between cyclists and pedestrians or motorists, these techniques are only recommended for trails where the only users are cyclists.

- Time-lapse video photographs a given location every few seconds, and allows counting to take place without a human present, but still relies on humans for analysis.

- In-pavement loop detectors, which were originally designed to allow traffic signals to detect motor vehicles, have recently been used to count bicyclists. These detectors can only detect bikes with some amount of metal in the frame and must be near a traffic signal box that can collect data, which then requires extensive staff time for tabulation and analysis. Bay Area locations currently experimenting with in-pavement counters include San Francisco and Alameda County.

- Pyroelectric sensors detect body heat in both pedestrians and cyclists and are currently in use at U.C. Berkeley. These sensors are very new and have yet to be evaluated for accuracy or usefulness.

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