Investments

CHANGE IN MOTION

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“You must be the change you wish to see in the world.”

MOHANDAS GANDHI

Investments

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Investments

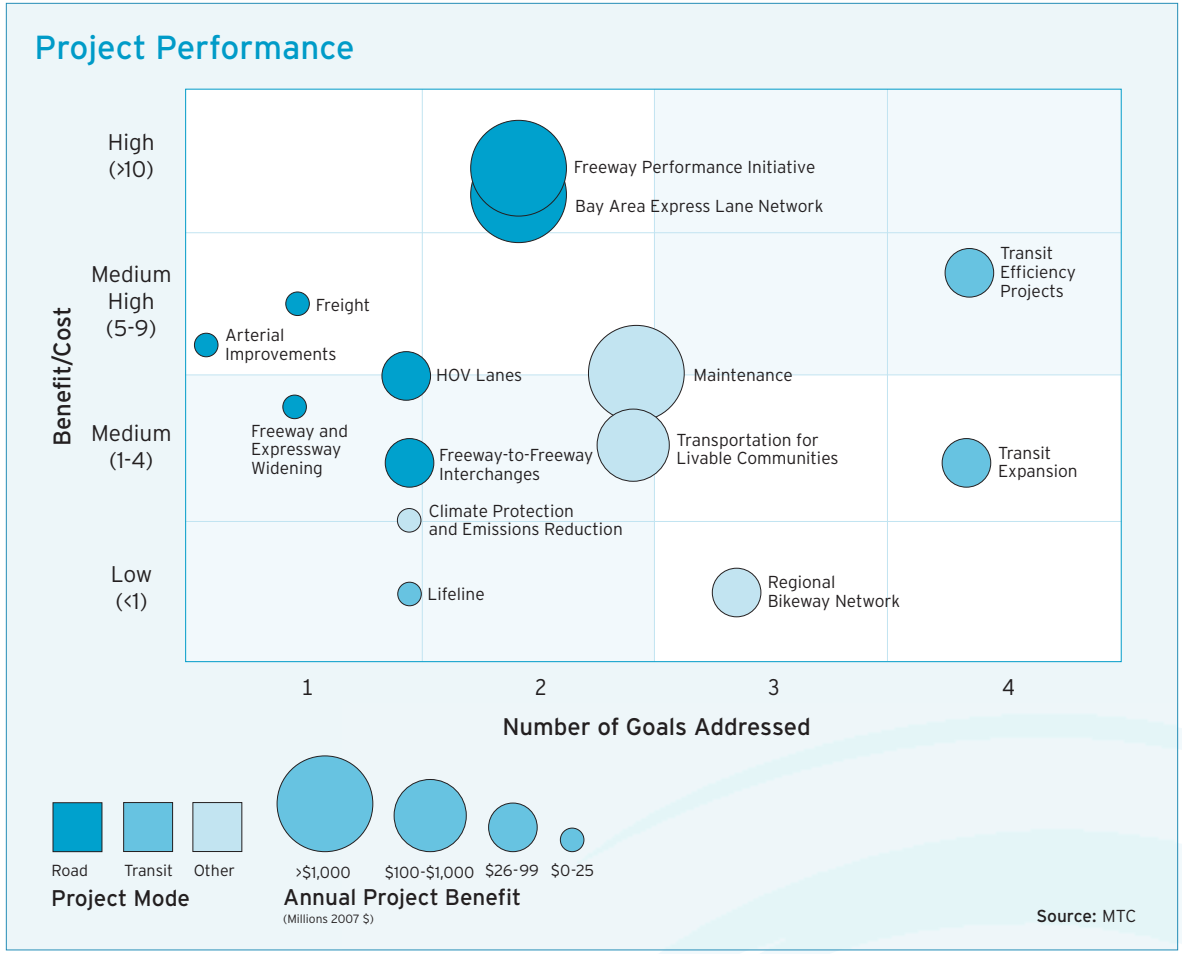
In crafting an investment program for the Transportation 2035 Plan, the Commission had to grapple with a number of important, but often competing, questions. How much do we invest in the maintenance, system efficiency and expansion of our regional transportation system when needs exceed available revenue? What are the consequences of investing in one transportation priority but not another? How should we weigh specific project performance characteristics in assembling a package of investments to address the plan's various goals?

The Commission proceeded to identify the investment plan in a systematic way, starting with a performance assessment of individual projects, followed by investment tradeoff discussions among transportation partners and stakeholders. The financially constrained investment strategy ultimately adopted by the Commission should help the region make progress on several key fronts, but further progress will be needed.

Assessing Project Performance

MTC performed a detailed assessment of some 700 projects proposed for consideration in the financially constrained Transportation 2035 Plan. The two-part project assessments included a quantitative appraisal to measure benefit/cost with respect to the performance objectives, and a qualitative policy assessment to reflect the somewhat broader considerations embodied in the Three Es and plan goals.

The purpose of this project-by-project assessment was to identify matches and outliers — projects that most strongly support the Transportation 2035 Plan's performance objectives and goals, and those that most obviously do not. The Commission's intent was to include the highest-performing projects (those that both yield a high financial return for each dollar invested and address multiple goals), and to exclude the lowest-performing projects (those that cost more than the benefits produced and address only a few goals). As shown in the graph to the right, high performers included investments such as the Freeway Performance Initiative, Bay Area Express Lane Network, and transit efficiency projects; while lower performers were found among some freeway and expressway widenings, freeway-to-freeway interchanges, and even regional projects like lifeline transportation and climate protection programs.



The results of the performance assessment guided the Commission in making tradeoffs among competing priorities vying for funding and inclusion in the financially constrained plan. But performance results were not the only factor.

The Commission also considered input from our transportation partners and stakeholders, and took into account local priorities and the regional need for specialized programs focused on lifeline transportation, bicycle use, climate

Summary of Discretionary Funding (With Remaining Shortfalls)

In billions of year-of-expenditure dollars

	Total Need	Committed Funds	Discretionary Funds	Remaining Shortfall
Maintenance				
Local Streets and Roads Maintenance	$ 34.5	$ 16.3	$ 7.0	$ 11.2
Transit Capital Replacement	$ 40.3	$ 16.7	$ 6.4	$ 17.2
Transit Operations	$ 98.0	$ 90.0	$ -	$ 8.0
State Highway Maintenance	$ 17.0	$ 4.0	$ -	$ 13.0
Efficiency				
Lifeline Transportation Program	$ 0.7	$ 0.3	$ 0.4	$ -
Regional Bicycle Program	$ 1.0	$ -	$ 1.0	$ -
Transportation Climate Action Campaign	$ 0.4	$ -	$ 0.4	$ -
Planning Funds	$ 0.3	$ -	$ 0.3	$ -
Transportation for Livable Communities	$ 2.2	$ -	$ 2.2	$ -
Freeway Performance Initiative	$ 1.6	$ -	$ 1.6	$ -
Expansion				
Transit and Roadway Expansion*	$ -	$ -	$ 12.1	$ -
Risk Contingency	$ 0.2	$ -	$ 0.2	$ -
Total	$ 196.2	$ 127.3	$ 31.6	$ 49.4

*Includes $6.1 billion in net Bay Area Express Lane Network revenue

Source: MTC

protection and other policy considerations. In some cases, these policy considerations outweighed poor performance results. Ultimately, the Commission found that using a performance-based approach to defining the investment priorities not only made good analytic and policy sense but also framed the policy discussion and decision-making process. See the *Performance Assessment Report* (as described in Appendix 2) for more details.

Investing in Change

Over the 25-year time span of this long-range plan, MTC estimates that $218 billion will be spent on transportation in the Bay Area. In addition to the $186 billion committed primarily to maintaining and operating our existing regional transportation system, Transportation 2035 sets change in motion with $32 billion of new, discretionary investments — fresh ideas, clever innovations and bold initiatives — that will improve travel in the region and overall quality of life. These Transportation 2035 investments are displayed in the table to the left.

The multimillion dollar investments made in the Transportation 2035 Plan are set forth in this chapter, presented in broad, thematic groupings. Our intent is to highlight key investments that maintain and expand our transit systems, keep our roadways in a state of good repair, respond to environmental and land-use changes, and maximize mobility and accessibility for all transportation users. Individual projects (listed by county) can be found in Appendix 1.

Change in Motion

To sustain vital Bay Area transportation infrastructure, the Transportation 2035 Plan:

- Commits $7 billion in discretionary funds to prevent further deterioration of local streets and roads. This is a break-even move that will help cities and counties keep pavement in the same "fair" condition as it is now, but will not make it easier to reduce maintenance backlogs or meet their improvement targets.
- Dedicates $6.4 billion in discretionary funds for transit capital expenses around the Bay Area, covering the entire shortfall for bus, railcar and ferry replacement, but just one-quarter of the shortfall for other high-priority investments. To handle $8 billion in anticipated operating shortfalls, transit agencies will have to increase revenues and improve the efficiency of their systems. A prime focus of regional advocacy efforts will be to generate additional revenues for transit operations.
- Leaves a $13 billion shortfall for state highway maintenance. For financing highway upkeep, the Commission believes that responsibility rests with Caltrans, which owns and operates the state highway system.

Keep Our System in a State of Good Repair

Local Streets and Roads

The strength of the Bay Area's transportation network lies in its local streets and roads — and the bridges, sidewalks, curbs and gutters, wheelchair ramps, bike paths, traffic signals and storm drains that go with them. But this intricate network of arterials, collectors and local roads is crumbling under the weight of decades of underinvestment. The 25-year pavement and nonpavement maintenance needs for the Bay Area total $34.5 billion. Committed revenues over the same period of time are expected to cover $16.3 billion, or less than 50 percent of the need, leaving more than $18 billion in shortfalls. The Transportation 2035 Plan directs $7 billion in discretionary funds to address, but not close, this funding gap.

Funding for local road maintenance typically comes from a range of sources, including state gasoline taxes, county sales taxes, and local sources such as city and county general funds, bonds and traffic-impact fees. But as the need for maintenance grows, the available funding is shrinking. The state gas tax loses an average 3 percent of its purchasing power each year due to inflation. General fund contributions are declining due to increased competition from other pressing needs such as public safety and health care. County transportation sales taxes typically dedicate less than 25 percent of revenues to local street and road maintenance.

To help cities and counties wisely use scarce roadway maintenance dollars, MTC advocates preventive maintenance as the most cost-effective way to extend the serviceability of local streets. Experience shows that delayed maintenance leads to even costlier rehabilitation.

Indeed, a municipality that spends $1 on timely maintenance to keep a section of roadway in good condition would have to spend $5 to restore the same roadway if the pavement is allowed to deteriorate to the point where major rehabilitation is necessary (see graph at bottom right).

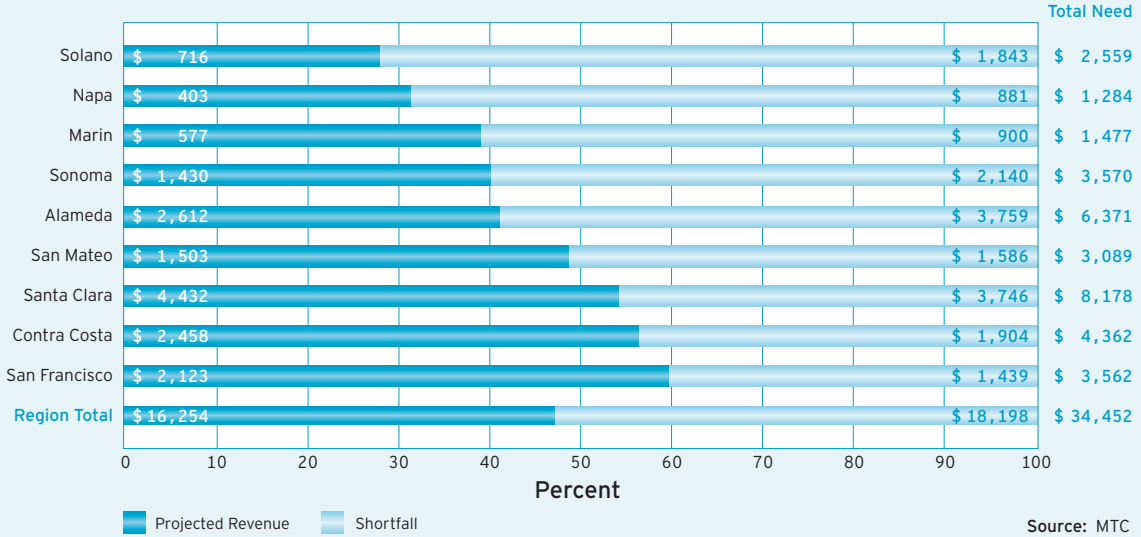
Despite MTC's emphasis on preventive maintenance, the region's backlog of needed repairs likely will more than triple over the next 25 years as roadways deteriorate faster than cities and counties are able to keep pace. Spending on street and road maintenance would have to increase by nearly 70 percent during this time just to maintain current conditions. The magnitude of the combined regional funding shortfall indicates many cities and counties will have to defer needed maintenance on some roadways, thus increasing overall costs.

Transit

Buses, trains, ferries, light-rail vehicles, cable cars and streetcars not only provide mobility for people without cars — including those who are low-income, elderly, disabled or too young to drive — they also provide a viable alternative to driving for hundreds of thousands of area residents who do own cars. By reducing the number of vehicles on the roads, public transit helps to fight congestion and curb greenhouse gas emissions.

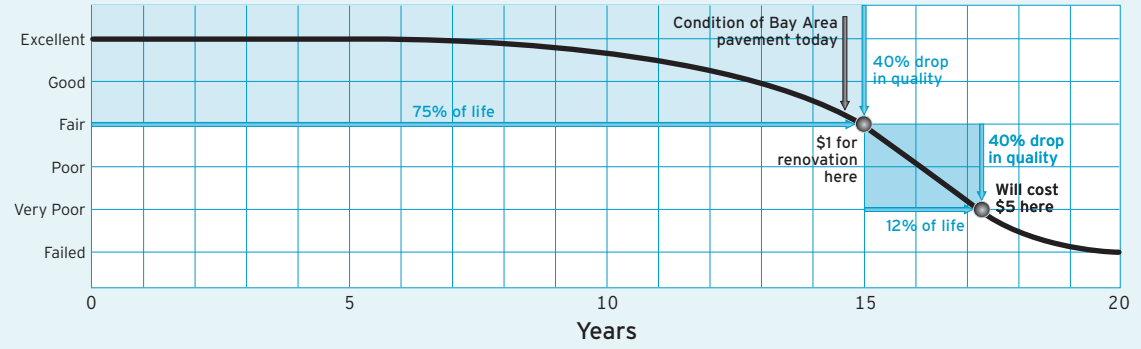
Road Maintenance Expenditures by Bay Area County, 2009 – 2033 Ranked by Relative Size of Shortfall

Dollar amounts in millions; Projected Revenue does not include Transportation 2035 discretionary funds.



Source: MTC

Pavement Condition Over Time*



*Pavement wear varies depending on traffic, climate, pavement design, etc.

Source: MTC

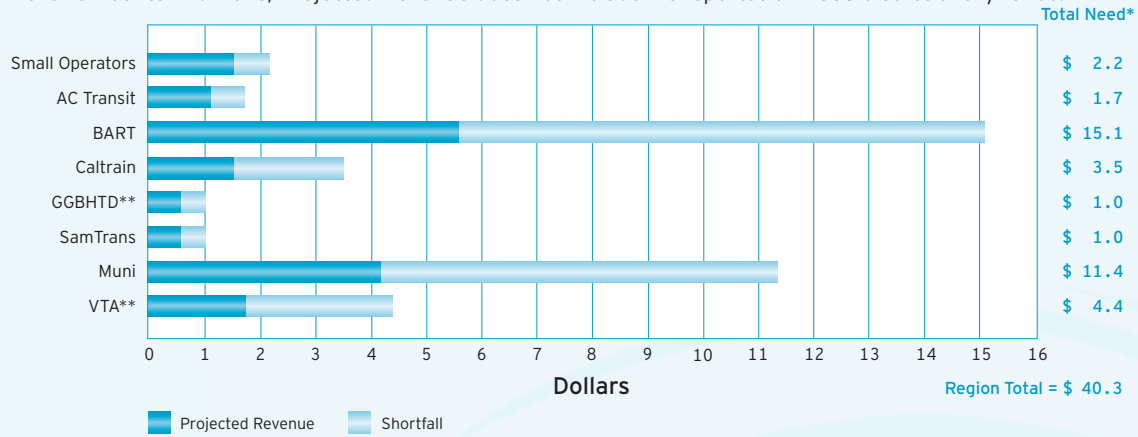
Yet despite the transit network's importance, maintaining and sustaining the network is an unending struggle. The cost of buying the fuel and paying the drivers, mechanics, dispatchers and others necessary to operate a transit system — and paying for the replacement of buses, train cars, tracks, fare machines and other capital equipment — far outpaces available funds. And just as with local streets and roads, delayed maintenance of the transit system leads to even costlier rehabilitation down the road. So the Commission has made funding for transit vehicles and fixed guideway replacement and rehabilitation a higher investment priority than proposed service expansion.

Over the next 25 years, operating and capital replacement costs for Bay Area transit providers are projected to total $138 billion. This includes $98 billion in operating costs plus $40 billion for capital replacement. But dedicated revenues over the same period, which do not include discretionary funding directed by the Transportation 2035 Plan, are expected to total only $107 billion ($90 billion for operations and $17 billion for capital). The result is $31 billion in initial unfunded needs.

The Transportation 2035 Plan helps to address transit capital needs with an investment of $6.4 billion in discretionary funds, leaving a remaining shortfall of $25 billion ($8 billion for operations, and $17 billion for capital).

Transit Capital Replacement Costs by Operator, 2009 – 2033

Dollar amounts in billions; Projected Revenue does not include Transportation 2035 discretionary funds.



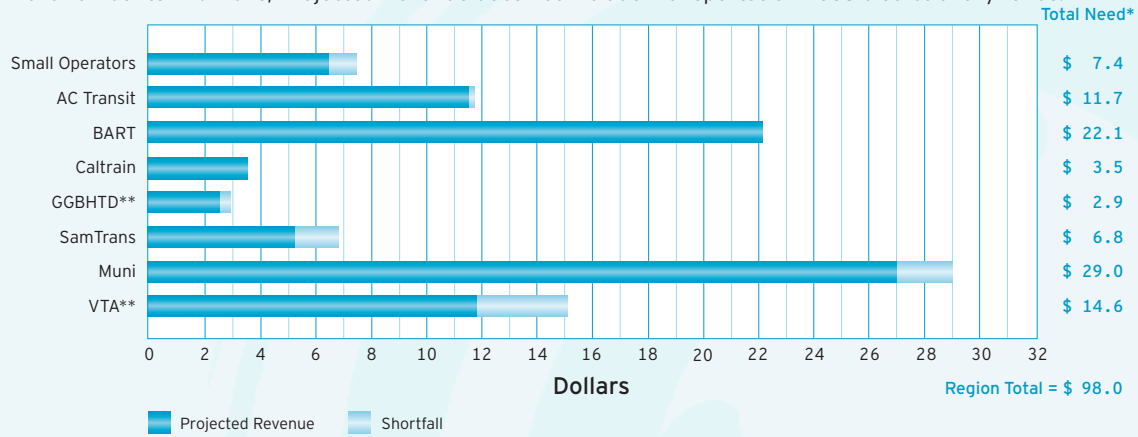
* Total transit capital replacement needs are estimated based on data available from each operator at the time of the analysis. Commission policy that directs regional discretionary funding to cover the shortfall may take into account differences in 25-year projected shortfalls and needs identified in the near term.

** VTA = Santa Clara Valley Transportation Authority; GGBHTD = Golden Gate Bridge, Highway and Transportation District

Source: MTC

Transit Operating Costs by Operator, 2009 – 2033

Dollar amounts in billions; Projected Revenue does not include Transportation 2035 discretionary funds.



* Total transit operating needs are estimated based on data available from each operator at the time of the analysis.

** VTA = Santa Clara Valley Transportation Authority; GGBHTD = Golden Gate Bridge, Highway and Transportation District

Source: MTC

Maintaining the System — Transportation 2035 Funding Levels

In billions of year-of-expenditure dollars

	Total Need	Committed Funds	Discretionary Funds	Shortfall
Local Streets and Roads	$ 34.5	$ 16.3	$ 7.0	$ 11.2
Transit Capital	$ 40.3	$ 16.7	$ 6.4	$ 17.2
Transit Operations	$ 98.0	$ 90.0	$ -	$ 8.0
State Highways	$ 17.0	$ 4.0	$ -	$ 13.0

The rising cost of transit operations is driven in large part by soaring fuel and health care expenses. On the capital side, two key points stand out:

- Muni and BART carry the largest number of Bay Area transit riders, and have by far the largest capital replacement needs. Together, these operators account for some $27 billion, or nearly two-thirds of the region's 25-year transit capital needs. And the agencies' combined $17 billion capital shortfall makes up almost 75 percent of the regional total (before taking into account Transportation 2035 discretionary funds).
- Many of the Bay Area's transit capital needs — and shortfalls — are for assets that receive high marks from the region's Transit Capital Priorities policy scoring system, which is used to rank transit projects that compete for federal transit money. These high-priority investments include revenue vehicles (buses, rail cars and ferries), track, bridges, tunnels, train control and power systems, and communications systems. Total need for such investments comes to $29 billion over the next 25 years. Yet even if all dedicated transit capital revenues were spent on these projects, the region would still face a $13 billion shortfall for these high-priority projects.

State Highways

California's 50,000 lane-mile state highway system is the foundation on which the vitality of California's economy is built, linking people and goods with intermodal transportation facilities, growing metropolitan centers, and major international airports and ports. Our state highway system is a transportation resource valued in excess of $300 billion.

Much of this system was built in the 1950s, 1960s and early 1970s to serve the growing California population and economy. Today, some of these infrastructure assets are aging beyond their useful life and in need of rehabilitation and reconstruction. Nearly 15,000 lane miles of the state highway system are distressed such that the pavement is of poor structural condition and poor ride quality. Increases in vehicle travel and goods movement have contributed to a faster rate of pavement deterioration, concentration of accidents and more hours of traffic congestion. Compounding the problem is the lack of maintenance funding and the rise of construction costs, which have led to project delays, deferred maintenance, accelerated deterioration, and ultimately higher project costs.

State law requires Caltrans to prepare a 10-year plan for the State Highway Operation and Protection Program (SHOPP). The SHOPP identifies the various needs for all state-owned highways and bridges. As illustrated in the table above, Bay Area highway maintenance needs over the 25-year life of this Transportation 2035 Plan total about $17 billion. Projected revenues over the same period are expected to cover only $4 billion, resulting in $13 billion in unfunded needs. The Commission has not yet identified any new funding sources for the $13 billion in unfunded SHOPP needs. The magnitude of the Bay Area's highway rehabilitation needs and lack of funding suggests that maintenance will have to be delayed or deferred on some highways, unless a new source of state funding can be identified.

Change in Motion

To combat global warming and help clean Bay Area air, the Transportation 2035 Plan:

- Commits $400 million to fund a multi-agency Transportation Climate Action Campaign to reduce our carbon footprint, complementing MTC's Transportation for Livable Communities Program, Regional Bicycle Program, Regional Rideshare Program, and other Transportation 2035 bicycle and pedestrian investments.
- Directs $45 million to the Bay Area Air Quality Management District's Goods Movement Emission Reduction Program to curb diesel particulate matter emissions that pose serious health threats to Bay Area residents — particularly children and adults with respiratory ailments, and those residing near the Port of Oakland and along major goods movement corridors.

Lead the Charge on Climate Protection

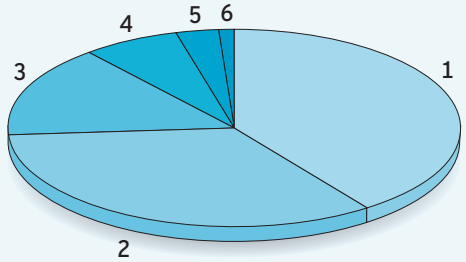
All but a few skeptics now acknowledge that climate change is real, that it is largely caused by human activity (particularly the burning of fossil fuels), and that it can have profound consequences for our planet. There is growing consensus, too, that climate change will have a dramatic local impact on California and the Bay Area.

The Bay Area emits greenhouse gases (GHGs), principally carbon dioxide, at three times the world average; and 40 percent of these emissions come from the transportation sector, mostly from cars, trucks, buses, trains and ferries (see graph to the right). GHGs linger for years, trapping heat in the earth's atmosphere and causing the global climate to change. Because the consequences of climate change are serious, the Bay Area needs to take aggressive action to reduce its transportation-related emissions, setting the example for the rest of California and for the national and international community. We will have to consider these consequences throughout our transportation and land-use planning; and we will need to ensure climate resilience in our infrastructure and development choices (see map on page 49).

Regional Response to Climate Change

Time is of the essence for the Bay Area's response to climate change. The urgency of the situation requires immediate action. Some actions by their very nature will take longer to implement, due in part to the high amount of financial investment, political capital and time required. As a first step, the four regional

CO_2-Equivalent Emissions in the Bay Area, by Major Categories



	Pollution Source	CO_2-Equivalent	Percent
1	Transportation	42	40%
2	Industrial/Commercial	35	34%
3	Electricity/Co-Generation	15	15%
4	Residential Fuel Usage	7	7%
5	Off-Road Equipment	3	3%
6	Agriculture	1	1%
Total		103	100%

Source: BAAQMD, 2007 Source Inventory of Greenhouse Gas Emissions
Emissions in million metric tons/year; data is for 2007

agencies — MTC, the Bay Area Air Quality Management District (BAAQMD), the Bay Conservation and Development Commission and the Association of Bay Area Governments — are sponsoring a Transportation Climate Action Campaign.

The Commission has earmarked $400 million toward the Transportation Climate Action Campaign, which aims to enable individuals to develop climate-friendly behaviors, reduce the Bay Area's carbon footprint, and lay the groundwork for ongoing future climate change initiatives. The Transportation Climate Action Campaign focuses on public outreach and education efforts to alter driving and travel behaviors and to offer a suite of complementary grants, incentives and action-oriented programs. In addition to the public outreach, education and advocacy efforts, specific programs to be pursued include, but are not limited to, the following:

Climate Grants Program

The Climate Grants Program will fund major demonstration projects to test the most innovative strategies to promote changes in driving and travel behaviors. Given that this is the first time that the region has focused its energies on a climate protection initiative, this program provides a great opportunity to learn what kinds of strategies can most effectively reduce GHG emissions. Potential projects may seek to increase the use of low-GHG alternative fuels, expand car-sharing programs, or implement low-GHG tire incentive programs or pricing demonstration projects.

Safe Routes to Schools

The Safe Routes to Schools Program aims to increase the number of children who walk or bicycle to school by funding projects that remove barriers to such activities. Barriers often include lack of infrastructure, unsafe facilities that result in uninviting walking and bicycling conditions, and lack of education and enforcement programs aimed at children, parents and the community at large. Through the Safe Routes to School program, local champions work with parents, schools, and transportation, health and law enforcement providers to implement community solutions. This program would provide additional funding to expand existing Safe Routes to Schools programs that are being implemented successfully in Marin, Alameda and Contra Costa counties, and offer new funding to implement similar programs in other counties.

California Out in Front

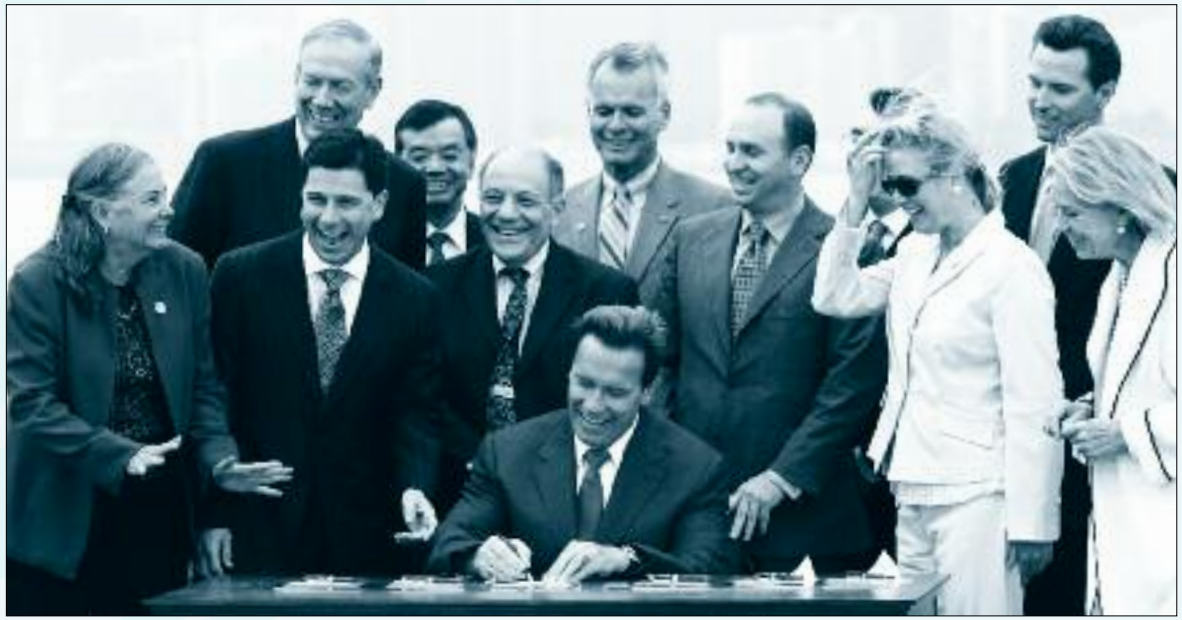
Whereas the federal government has yet to act on reducing GHG emissions, California legislators have responded to climate change with some of the strongest environmental laws ever passed. Three prominent laws that will shape our efforts to regulate GHGs include:

Assembly Bill 1493 (Pavley)

Assembly Bill 1493, enacted in 2002, requires the California Air Resources Board (ARB) to develop and adopt regulations that achieve maximum feasible and cost-effective reduction of GHG emissions from passenger cars and light- and medium-duty trucks sold in California for 2009 and subsequent model years. Under ARB regulations adopted in 2004, automakers must meet increasingly stringent GHG emission standards that phase in between 2009 and 2016. And, California has committed to implement revised, more-stringent GHG emission limits by 2020 (the Pavley Phase 2 rules). While EPA had earlier refused to grant a waiver that would allow California to implement its tighter standards, President Obama recently ordered the EPA to reconsider its denial of California's request for a waiver.

Assembly Bill 32: California Global Warming Solutions Act

The California Global Warming Solutions Act (Assembly Bill 32), a groundbreaking law signed by Governor Schwarzenegger in September

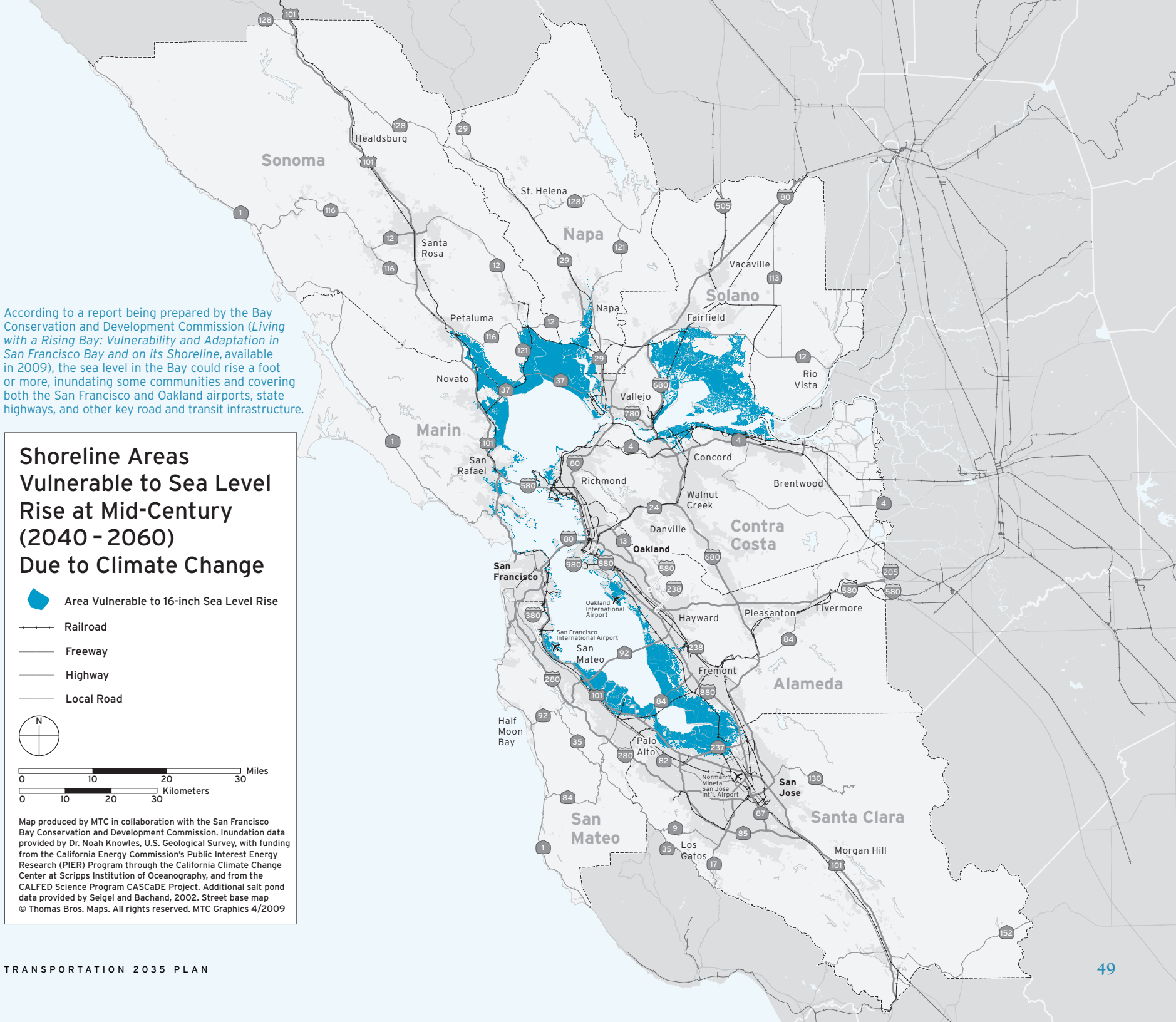


2006 (see photo above), requires reduction of statewide GHG emissions to 1990 levels by the year 2020. Reducing greenhouse gas emissions to 1990 levels means cutting approximately 30 percent from business-as-usual emission levels projected for 2020, or about 15 percent from today's levels. In December 2008, the ARB approved the scoping plan that outlines strategies the state will use to reduce GHGs.

Senate Bill 375 (Steinberg)

Senate Bill 375, signed into law in September 2008, establishes a process for ARB to implement AB 32 by requiring ARB to adopt by September 30, 2010, regional GHG targets for emissions associated with the automobile and light truck sector. Metropolitan planning organizations such as MTC are required to develop a Sustainable Communities Strategy (SCS) element in their long-range plans to strive to reach the GHG reduction targets. The SCS adds three new elements to the plan: 1) a land-use component; 2) a resource and farmland protection component; and 3) a demonstration of how the development pattern and the transportation network can work together to reduce GHG emissions. In the Bay Area, the provisions of Senate Bill 375 will apply to the successor plan to Transportation 2035, scheduled for adoption in 2013.

According to a report being prepared by the Bay Conservation and Development Commission (*Living with a Rising Bay: Vulnerability and Adaptation in San Francisco Bay and on its Shoreline*, available in 2009), the sea level in the Bay could rise a foot or more, inundating some communities and covering both the San Francisco and Oakland airports, state highways, and other key road and transit infrastructure.



Safe Routes to Transit

The Safe Routes to Transit Program encourages walking and biking to transit, and offers funding for infrastructure to remove barriers that impede access to transit. Because the current Regional Measure 2-funded Safe Routes to Transit program is inundated with demand that outstrips available funding and is due to sunset in 2013, this program would seek to provide additional funding for ongoing efforts.

Transit Priority Program

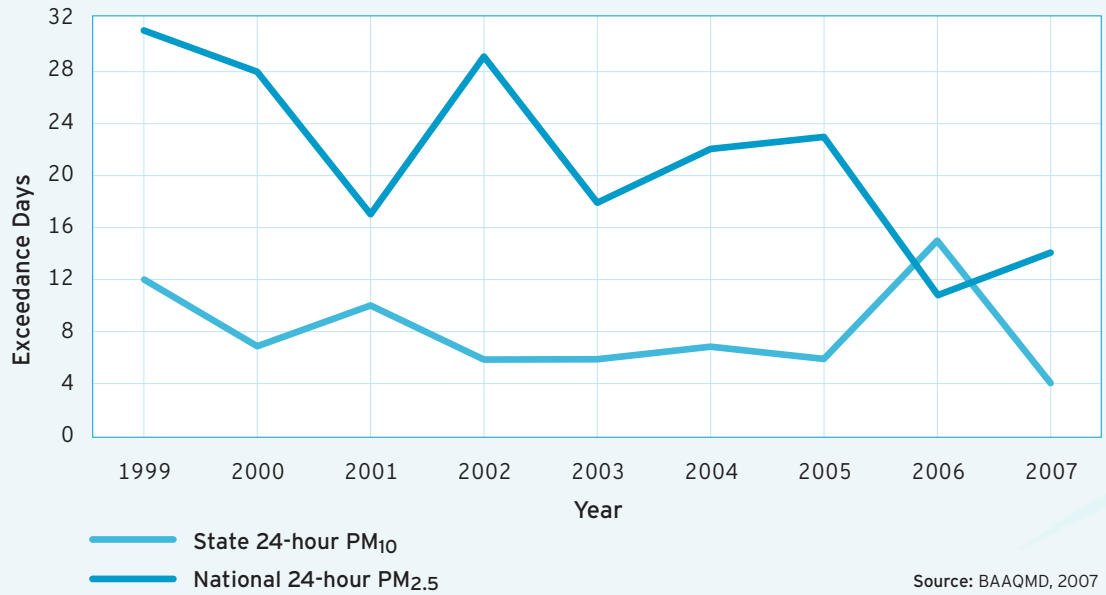
The Transit Priority Program increases the attractiveness of bus transit by improving speed and on-time reliability through improvements such as dedicated bus lanes, bus bulbs, accessible transit shelters, wheelchair landing pads and bus signal priority. This transit priority program will be coordinated with MTC's regional signal timing program to ensure that air quality and travel time benefits are optimized.

Curbing Diesel Pollution

Diesel pollution from current goods movement operations worsens the health of community residents near ports, rail yards, distribution centers and roads with high truck traffic. In 2006, the U.S. EPA released new standards for particulate matter (PM). A key change in the new standards is a stricter 24-hour $PM_{2.5}$ standard of 35 micrograms per cubic meter. In response, the Air Resources Board recommended in late 2007 that the San Francisco Bay Area be designated as a nonattainment area for the $PM_{2.5}$ standard. EPA announced the new designation in December 2008. The Bay Area must demonstrate attainment of the $PM_{2.5}$ standard by 2014.

As part of the Transportation 2035 Plan, the Commission has committed $45 million toward the BAAQMD's Goods Movement Emission Reduction Program. This program aims to quickly reduce particulate matter emissions and health risks by replacing and/or retrofitting up to 800 port and general goods movement trucks currently operating along the Bay Area's priority trade corridors. Trucks would be either retrofitted with particulate matter and nitrogen oxide filters or engines that comply with the ARB's on-road emission standards, replaced with state-of-the-art vehicles, or scrapped. Programs like this Goods Movement Emission Reduction Program target diesel particulate matter and nitrogen oxides, but also produce co-benefits by reducing greenhouse gas emissions and black carbon emissions that contribute to climate change.

Bay Area Annual Exceedances of the National and State 24-hour Standards for PM_{10} and $PM_{2.5}$, 1999 – 2007



Source: BAAQMD, 2007

HAMBURG

Change in Motion

To drive operational improvements and increase the efficiency of the region's transportation system, the Transportation 2035 Plan:

- Commits $1.6 billion to a new, comprehensive Freeway Performance Initiative to better manage freeway congestion throughout the Bay Area. To be aggressively deployed in a five- to seven-year time frame, this program also will establish a technological foundation for future intelligent transportation system innovations.
- Invests $1.1 billion to fund a separate suite of regional operations programs, many of them technology-based, to improve travel in the region. Examples include the 511 traveler information service, the TransLink® universal transit-fare smart card, and the Freeway Service Patrol's roving tow trucks equipped with Automatic Vehicle Location (AVL) devices.

Maximize System Performance Through Technology

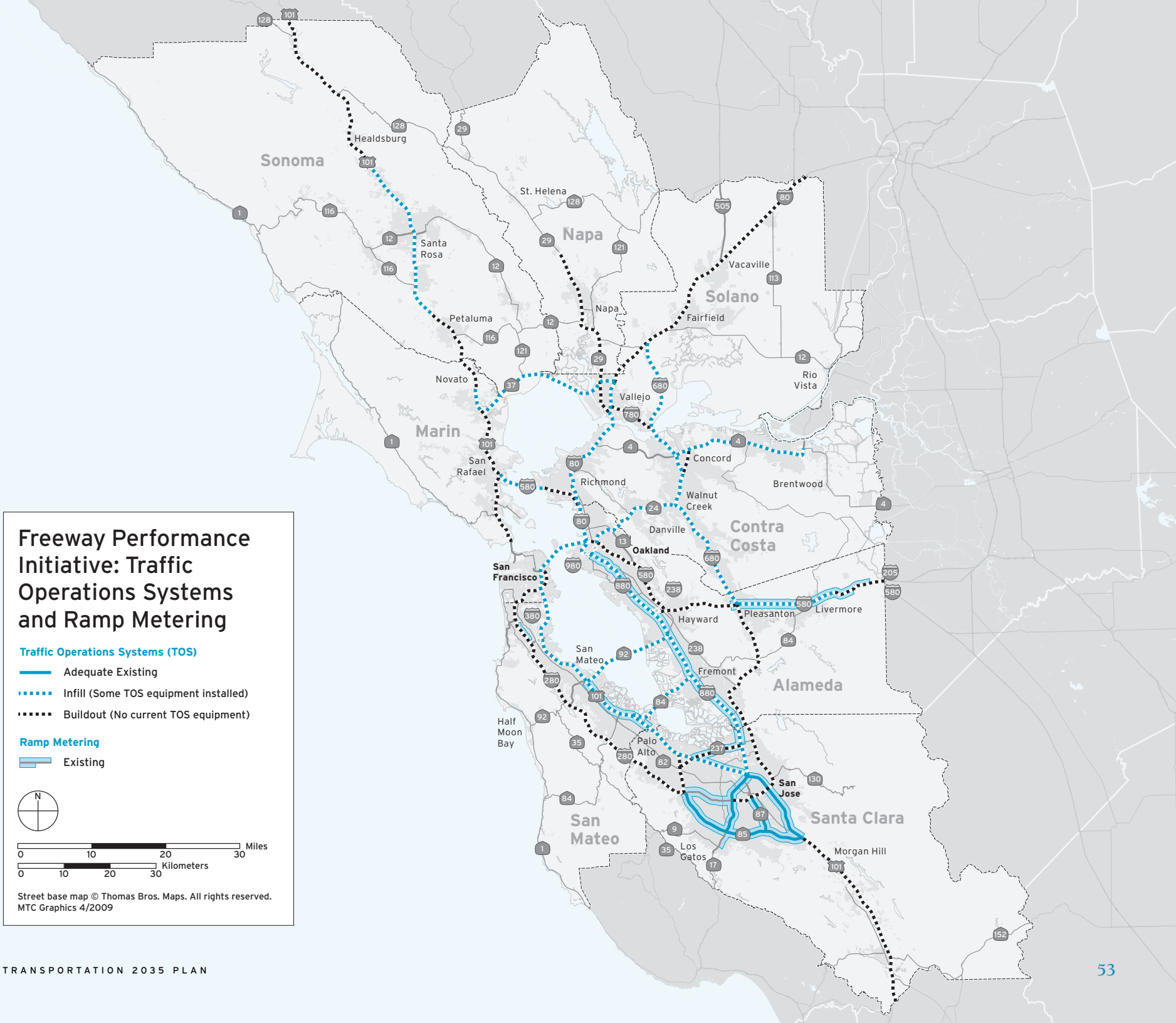
The Bay Area is the second-most congested region in the nation, according to data compiled by the Texas Transportation Institute. The effects of this congestion on our daily lives — and on the overall regional economy — are significant and costly. Individuals pay with the time that is lost while stuck in traffic, and businesses lose productivity and revenues as their employees take longer and longer to travel to work.

Opportunities to relieve congestion to any meaningful degree are limited, owing to a number of key factors. Bay Area freeways are basically a mature system, with capacity increases possible at only a limited number of locations. Finances in today's economy are constrained, and adequate funding for large transportation projects is often not available due to competing needs and rising construction costs. The challenge before us is to maximize system performance through innovative, cost-effective strategies, and thereby reduce the need for new, large-scale capital investments.

Freeway Performance Initiative

The Freeway Performance Initiative (FPI), which began in 2007, is an effort to improve the operations, safety and management of the Bay Area's freeway system. The FPI differs from traditional approaches because it addresses both recurrent daily traffic that comes from the onslaught of commuters using the freeways during rush hours and nonrecurrent congestion that results from unanticipated incidents and blockages of highway lanes. In fact, half of the total congestion experienced in the Bay Area is caused by vehicle breakdowns, vehicular accidents, material spills and other incidents.

The FPI aims to deploy current technology to better manage the congestion on our freeway system, and to establish a technological foundation from which new and innovative transportation management strategies may be implemented in the future. Through a series of corridor studies and a detailed inventory of intelligent transportation system (ITS) installations in all freeway corridors, MTC has developed a comprehensive picture of the region's current capability to manage the highway system, and has also identified the gaps that need to be filled (see map on next page).


Freeway Performance Initiative: Traffic Operations Systems and Ramp Metering
Traffic Operations Systems (TOS)
Adequate Existing
Infill (Some TOS equipment installed)
Buildout (No current TOS equipment)
Ramp Metering
Existing
N
Miles
0 10 20 30
Kilometers
0 10 20 30
Street base map © Thomas Bros. Maps. All rights reserved.
MTC Graphics 4/2009
Sonoma
Napa
Solano
Marin
Contra Costa
Alameda
San Mateo
Santa Clara
Healdsburg
Santa Rosa
St. Helena
Napa
Vacaville
Fairfield
Petaluma
Novato
Vallejo
Rio Vista
San Rafael
Concord
Richmond
Brentwood
Walnut Creek
Danville
Oakland
San Francisco
Pleasanton
Livermore
Hayward
San Mateo
Fremont
Half Moon Bay
Palo Alto
San Jose
Los Gatos
Morgan Hill

The most heavily traveled freeways in the Bay Area, such as Interstate 80, Interstate 680 and U.S. 101, have some elements of FPI infrastructure installed today. But roughly three-quarters of the 620 freeway centerline miles in the Bay Area are not FPI-equipped. And for those segments that do have some FPI elements, in virtually all cases existing deployments do not meet the level needed to properly manage the system. MTC has set an ambitious goal to fully deploy the Freeway Performance Initiative over the next five to seven years.

In this Transportation 2035 Plan, the Commission has made a first-time, $1.6 billion investment over the next 25 years to implement the Freeway Performance Initiative. Following are key elements and operating principles of the FPI.

- **Traffic Operations System (TOS):** TOS infrastructure, such as closed-circuit television cameras and traffic monitoring stations, would be installed to help detect incidents. The information gathered would be fed to the Transportation Management Center (TMC) in downtown Oakland, which would then respond and clear those incidents to reduce delays and avoid the occurrence of secondary incidents. Further, the TMC would communicate these incidents to motorists through TOS elements, such as highway advisory radios, changeable message signs and the Bay Area's 511 system. The information provided to motorists would help them make informed decisions on the best alternative routes to their destinations.

- **Ramp Metering:** [See page 55.]

- **Routine Maintenance:** The benefits of the FPI are predicated on a fully functioning system, which will require routine maintenance and periodic replacement of infrastructure. FPI includes funding for TOS maintenance and replacement. However, the cost of maintaining the TOS technology is steep, and thus will require additional funding from Caltrans and local agencies.

- **Arterial Management:** Maximizing efficiency of the freeway system requires coordination with and optimization of major parallel arterials. FPI provides funding support for ongoing regional operation programs such as those that focus on signal timing coordination, and provides traffic engineering assistance to support efforts that improve safety and mobility along arterials.

- **Performance Monitoring:** FPI also invests in performance monitoring activities to maintain and grow data sets to monitor progress in freeway performance.

Looking beyond the Freeway Performance Initiative, the completion of the technology infrastructure on the freeway system prepares the Bay Area to implement new and innovative operational strategies in the future. And advancements will be needed to provide a truly seamless set of travel options for commuters by integrating the operation of freeways, local streets and transit. As well, innovations being developed by the private sector can more easily be enabled and made available to the public if the infrastructure enhancements proposed in the FPI are completed.

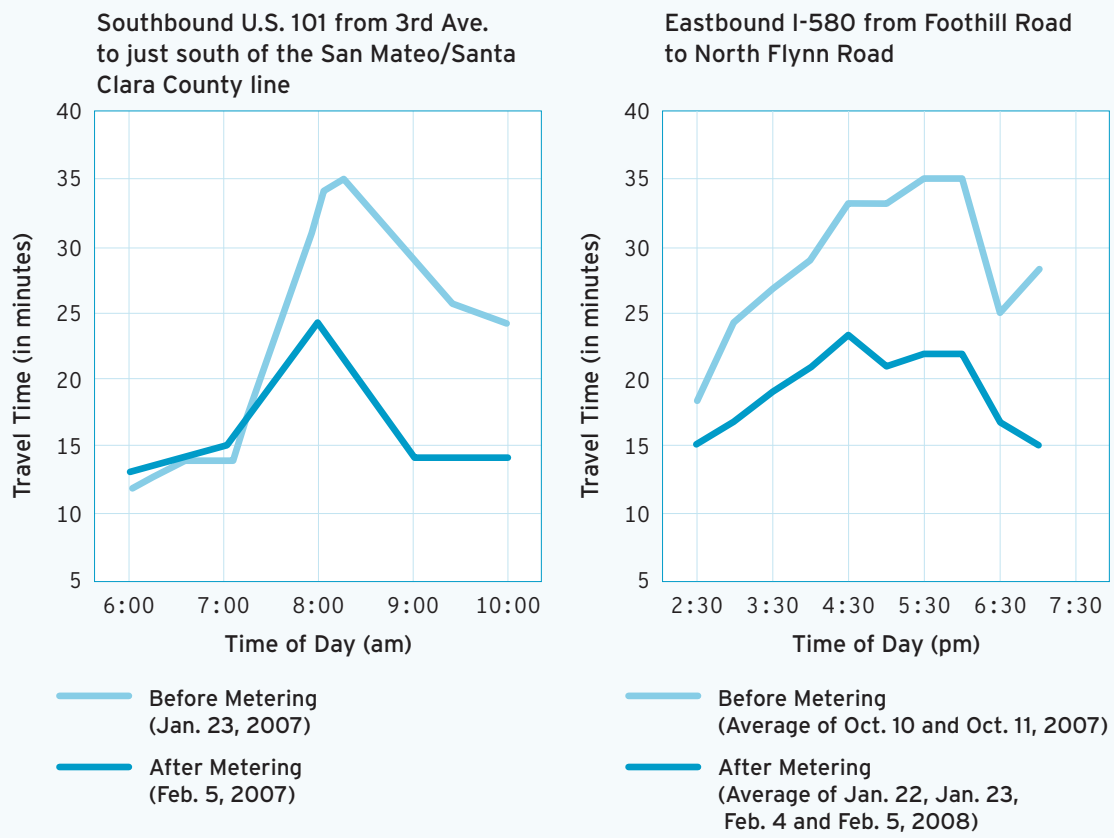
Ramp Meters Work

The metering of freeway on-ramps is not only highly effective in reducing congestion, but these types of projects can be deployed at a fraction of the cost of traditional freeway widening projects and in a fraction of the time. Currently fewer than a quarter of the Bay Area freeways are metered. Implementing this strategy will involve the installation of ramp meters at nearly 800 entrance ramps, essentially completing the ramp metering on Bay Area freeways. The capital cost is estimated at $250 million in today's currency.

In early 2007, ramp meters were activated on U.S. 101 in San Mateo County, south of State Route 92. As shown in the graph to the right, peak-hour travel time has decreased by almost one-third, to 25 minutes from 35 minutes.

Deployment of ramp metering in early 2008 on sections of eastbound Interstate 580 in the cities of Dublin, Pleasanton and Livermore — where the afternoon commute has been ranked either the second- or third-most congested freeway segment in the entire Bay Area since 2002 — has significantly reduced travel delay in this East Bay location. Before the meters were turned on, a typical commute across the 15-mile corridor from Foothill Road to North Flynn Road took 35 minutes. After ramp metering, this time has been reduced by 37 percent during peak commute hours, with the same trip now averaging 22 minutes.

Sample Travel Time Comparisons Before and After Metering



Source: Caltrans

Technology a Key Factor in Other Operational Improvements

In addition to the FPI, the Commission has earmarked $1.1 billion to fund a suite of regional operations programs that use technology to improve travel in the region. Examples include the 511 traveler information service, TransLink®, MTC's Transit Connectivity Plan, and the incident management capabilities of the Freeway Service Patrol and call box network. Featured below are the 511 traveler information and TransLink® programs, which exemplify how technology can be applied to make travel easier and more convenient for users every day.

511 Traveler Information

The Bay Area's telephone- and Web-based 511 traveler information service provides up-to-the-minute, on-demand information for transit riders, drivers, carpoolers, vanpoolers and bicyclists. Part of a national rollout of 511 service, the Bay Area's system was launched in December 2002 through a partnership between MTC, the California Department of Transportation, the California Highway Patrol, and dozens of the region's transit and paratransit operators. Six years after its debut, the Bay Area system has received nearly 25 million calls, with a high of 145,000 calls logged during its busiest week. The widely used 511 Web site at www.511.org has supported more than 85 million user sessions and continues to grow in popularity, especially as new features are added.

Key features of the 511 traveler information service include:

- real-time traffic conditions and incident reports, including point-to-point driving times on routes throughout the Bay Area
- a Web-based, state-of-the-art transit trip planner, with fare and schedule information for dozens of rail, bus and ferry services in the Bay Area and adjacent counties
- real-time transit information by phone for San Francisco Muni and BART
- a MY 511℠ personalized phone and Web service (www.my511.org), where users can build their own 511.org home page and bypass phone menu options to go directly to their trip details — and even receive a text or e-mail alert at a designated time or when conditions change
- an online ridematching tool for carpools and vanpools
- bicycling information, including an online bicycle map tool
- special phone menus and Web pages to provide quick access to critical information in emergencies, including alternate routes, closure details, park-and-ride locations, and modified or expanded transit schedules

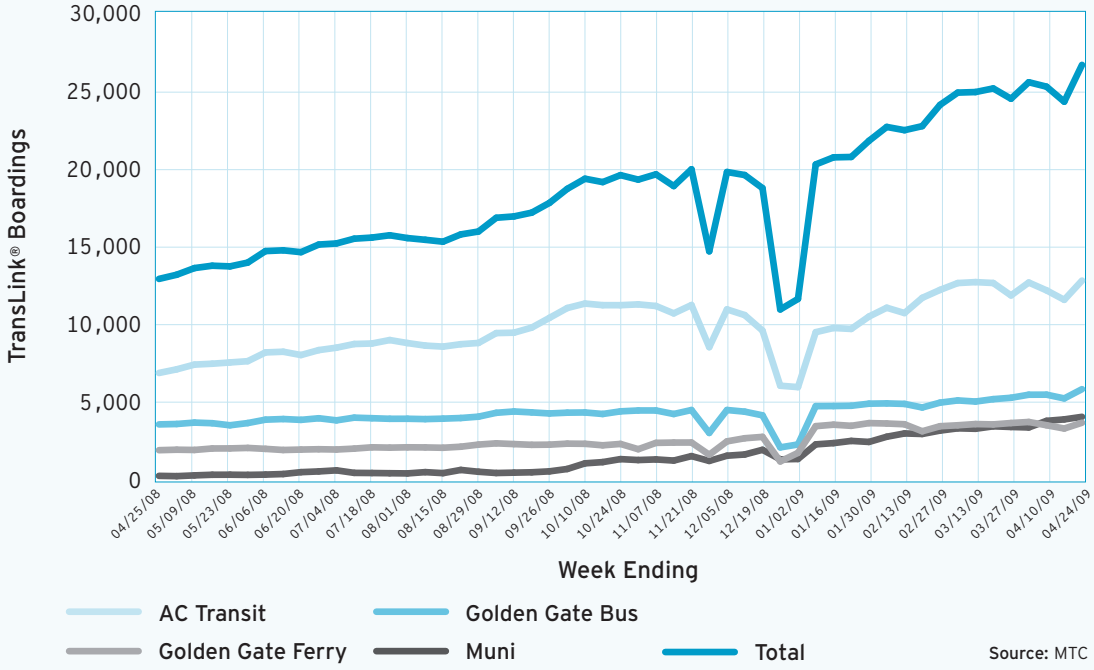
MTC is actively exploring other ways to disseminate to 511 users the information that is most current and appropriate to them.

TransLink® — Transit Smart Card

TransLink® offers transit riders a convenient and secure way to pay their fares. The TransLink® system reduces the hassle associated with paying transit fares using exact change, multiple tickets and paper transfers. The reloadable TransLink® card stores value in the form of electronic cash (e-cash) and transit passes.

Average Weekday TransLink® Ridership

April 2008 – April 2009



Source: MTC

E-cash works just like cash on transit — it does not expire and is accepted by all participating transit agencies. Customers also can set up their cards for Autoload, a feature that reloads e-cash and transit passes on TransLink® cards automatically.

TransLink® has been available on all AC Transit and Dumbarton Express buses and on all Golden Gate Transit and Ferry routes since November 2006. It is now fully installed and in the early deployment phase on San Francisco Muni and Caltrain. TransLink® will be available for use on BART in the summer of 2009, and on Santa Clara Valley Transportation Authority and SamTrans in 2010.

When fully implemented, TransLink® will serve more than 500,000 transit riders every day and process 420 million transactions every year.

Eventually, TransLink® cards could be used for parking and retail purchases and may someday be integrated with other applications like credit cards or cell phones.

TransLink® Supports TODs

In June 2007, MTC partnered with AC Transit for a pilot program that offers residents of 20 transit-oriented development (TOD) complexes around the East Bay unlimited free travel on AC Transit's local and transbay buses for a certain period of time. AC Transit also chose to use TransLink® cards as part of an agreement with the Peralta Community College District to provide year-long passes beginning in August 2008 to approximately 2,000 full-time students who attend the college district's four campuses.

Emerging Transportation Technologies

Innovation in the transportation realm is always on the horizon, and many emerging technologies have the potential to meet our mobility needs and improve the environment. Some promising new approaches are being researched, developed, field-tested and even implemented right here in the Bay Area.

Express Lanes Enforcement

Vehicle-occupancy requirements for the existing Bay Area carpool lane system are currently enforced through visual observation by the California Highway Patrol. However, as the region implements its Express Lane Network, the use of emerging technologies will be necessary to strengthen express lane enforcement. Violators not only reduce the travel time benefits for qualified carpoolers and toll-paying travelers, but they also erode public support and impact toll revenues. MTC and CHP are working to implement existing and new technologies that will automate enforcement of both toll violations and vehicle occupancy. License plate recognition, advanced electronic toll readers and transponders, and vehicle occupancy detection are systems already in place or being tested in other cities. These technologies have the potential to improve the operations, reliability and cost-effectiveness of the Bay Area Express Lane Network.

IntelliDrive℠

MTC has been involved with the IntelliDrive℠ program (and its precursor program, Vehicle Infrastructure Integration) at the national and state levels since 2005. The purpose of this effort is to achieve strategic goals for enhancing safety, mobility and convenience. At the core of the IntelliDrive℠ program is the development of a networked environment supporting high-speed communications among vehicles, between vehicles and infrastructure components, and between vehicles and hand-held devices.

Caltrans and MTC currently operate the California IntelliDrive℠ testbed on the U.S. 101/Route 82 corridor in San Mateo and Santa Clara counties. This testbed, which is an official part of the U.S. Department of Transportation's (USDOT) National IntelliDrive℠ testing program, has been used by several car manufacturers, MTC and Caltrans to test IntelliDrive℠ technology and applications such as:

- **Traveler Information**, which processes traffic data collected from IntelliDrive℠-equipped vehicles and sends 511 information directly into the vehicles
- **In-vehicle Signage**, which is used to send messages and warnings to motorists
- **Intersection Signal Violation Warning**, which warns motorists if they are driving too fast as they approach a traffic signal that is red or about to turn red
- **Curve Overspeed Warning**, which warns motorists if they are driving too fast as they approach a sharp curve
- **Open Road Tolling** using IntelliDrive℠ at the Dumbarton Bridge toll plaza

MTC also is currently managing an IntelliDrive℠ research project for USDOT's Urban Partnership Program. This project is testing the potential of IntelliDrive℠ technology for toll lane operations. In fact, IntelliDrive℠ may serve as enabling technology to support the implementation of the Bay Area Express Lane Network (see page 60).

Personal Rapid Transit

Though still somewhat futuristic in the popular mind, personal rapid transit (PRT) could one day provide speedy, on-demand access to select destinations along specially built guideways. In brief, PRT systems usually comprise a small network of stations connected by a track, over which travel small, automated electric vehicles that can carry as few as two or as many as six passengers. The concept will gain visibility later this year when the first large-scale PRT system will open at Heathrow International Airport in London. Locally, a pilot demonstration system is also being tested at the NASA Ames research facility in Mountain View.

Alternative and Renewable Fuels and Vehicle Technologies

In 2000, the California Air Resources Board adopted the Zero Emission Bus Regulation — a groundbreaking emission control rule that lays out both regulatory and investment paths to encourage the operation and use of zero emission buses in urban fleets. As part of the initial

demonstration, AC Transit operated three hybrid fuel cell buses and Santa Clara VTA deployed three fuel-cell-only buses. After 40,000 hours of operations, the AC Transit demonstration found that hybrid fuel cell buses have twice the efficiency of diesel buses and improved reliability. Starting in 2009, five Bay Area transit operators will participate in the advanced demonstration to further test the reliability and durability of the zero emission bus technology.

The California Alternative and Renewable Fuel, Vehicle Technology, Clean Air and Carbon Reduction Act of 2007 was signed into law by Governor Schwarzenegger in October 2007. This measure provides $200 million annually through 2015 for three new air quality improvement programs via increases to the smog abatement, vehicle registration and vessel registration fees. The three programs are: (1) the **Air Quality Improvement Program** to fund clean vehicle and equipment projects, and air quality research; (2) the **Alternative and Renewable Fuel and Vehicle Technology Program** to reduce petroleum use, increase the use of alternative fuels and pioneer the development of in-state bioenergy sources; and (3) the **Enhanced Fleet Modernization Program** to augment the state's existing voluntary accelerated vehicle retirement program.

These programs could spur innovative technologies that transform California's fuel and vehicle types to help attain the state's climate change goals.

Change in Motion

To speed travel and reduce congestion on Bay Area highways, the Transportation 2035 Plan:

- Creates an 800-mile Bay Area Express Lane Network. The estimated $7.6 billion construction cost to build, finance and operate the network would be paid for with toll revenues. MTC estimates that over the 25-year plan period, the Bay Area Express Lane Network will generate net revenues in excess of costs of approximately $6 billion. These funds will be used to pay for additional mobility improvements in the express lane corridors. Net revenues would be reinvested in the corridors in which they are generated; pending legislation gives funding priority to cost-effective public transit improvements and projects that reduce emissions.

Price Highway Travel Demand

Express lanes, also called high-occupancy toll (HOT) lanes, are carpool lanes with a twist: buses and carpools use the lanes free of charge, but non-carpoolers are allowed to use available capacity in the lanes, too — for a price. In this way, express lanes provide "congestion insurance," by giving travelers the option of a delay-free trip when they most need it.

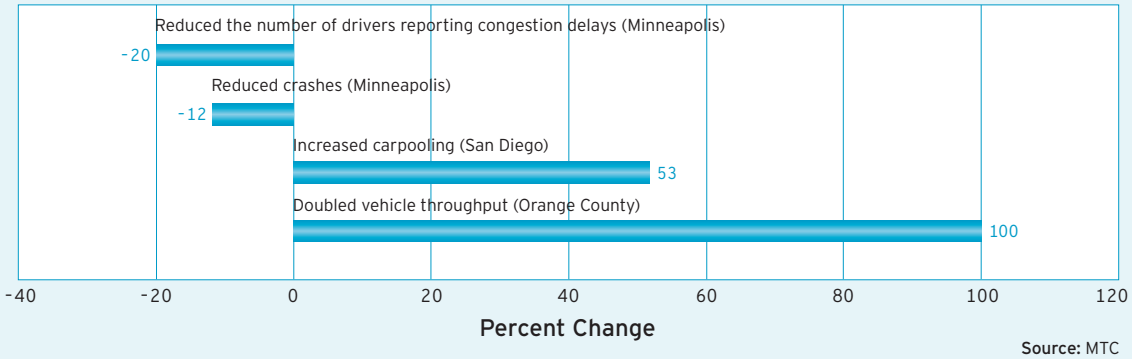
Cities throughout the country already are implementing express lanes to better manage their freeway systems, expand the choices available to travelers, and improve express bus service. Express lanes have been in operation for more than a decade in Southern California and in Houston, and in the past five years have opened in Seattle, Denver, Miami, Minneapolis and Salt Lake City. Surveys show most express lane travelers use the lanes just a few times a week, or even less. They use express lanes to bypass congestion when they are late to pick up a child at daycare, to squeeze more working hours out of a day, or to catch a plane. For this reason, and because revenue from express lanes often supports public transit service enhancements, express lanes are widely supported by travelers at all income levels.

An MTC poll taken in spring 2008 showed that 62 percent of Bay Area voters support the concept of an express lane network for the region.

The Transportation 2035 Plan creates a Bay Area Express Lane Network. As demonstrated by the "what if" analysis performed as part of the development of this plan (and described in Chapter 2), the pricing of freeway capacity can be an effective means of making progress toward performance objectives to reduce emissions, driving and delay. (For more information, see the supplemental *Performance Assessment Report*, listed in Appendix 2.) The Bay Area Express Lane Network, which is founded on the principle of choice, will demonstrate the benefits of congestion pricing, and could act as a stepping stone toward more comprehensive pricing strategies in the future.

The initial segments of the Bay Area Express Lane Network are scheduled to open in 2010 on a 14-mile stretch of Interstate 680 over the Sunol Grade, between Pleasanton and Fremont; on Interstate 580 through the Tri-Valley; and on the Interstate 880/Route 237 direct connectors. Plans also are under way to open express lanes on Route 85 and U.S. 101 in Santa Clara County. The Transportation 2035 Plan would extend the express lane concept to a connected

Express Lanes — Demonstrated Success



Source: MTC

network of express lanes spanning 800 miles, greatly improving travel options and freeway efficiency throughout the Bay Area.

Bay Area Express Lane Network Completes the Priority System for Carpools and Buses

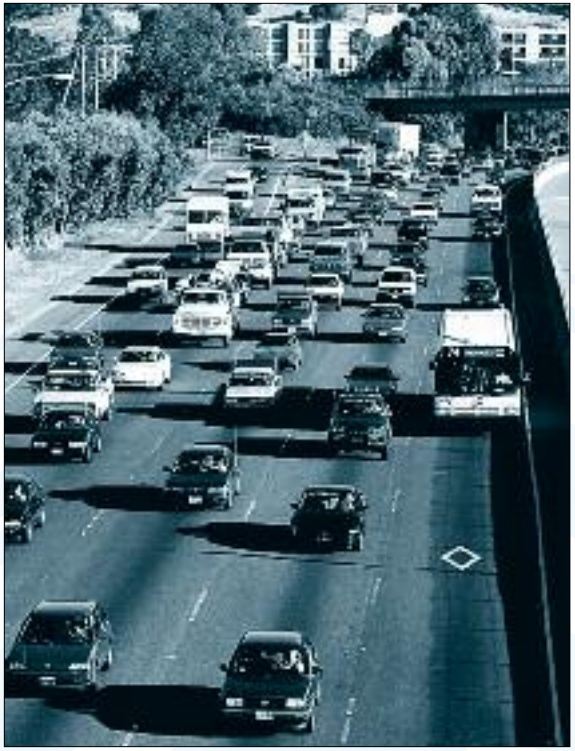
The Bay Area Express Lane Network is a strategy to accelerate completion of the region's carpool and public transit system — a key emission reduction strategy 30 years in the making (see the *2002 HOV Lane Master Plan Update*, listed in Appendix 3) but not yet complete due to a lack of funding. Finishing the system would mean the closing of gaps that inhibit seamless travel for carpools and buses, and the breaking of bottlenecks where existing carpool lanes end. MTC will convert to express lanes some 400 miles of carpool lanes that already exist or are under construction, plus 100 new miles of fully funded lanes will be built in the next four years. The revenue generated will also be used to construct some 300 new miles of express lanes that close gaps and extend the system. In total, the 300 new miles amount to less than a 6 percent increase in total Bay Area freeway mileage, and more than half the added mileage is for gap closures that connect two existing carpool lanes.

Efficiency Improvements Benefit All Travelers and Protect Carpool Time Savings

To keep express lane traffic flowing freely, toll rates will adjust dynamically to balance supply and demand based on data from roadway sensors used to monitor traffic conditions. Tolls during the most congested periods, when carpool and bus traffic is heavy, will be comparatively high so only a small number of non-carpoolers — those who most need congestion insurance that day — will buy in. Tolls will be much lower during periods of lighter traffic. Non-carpoolers using the express lanes will pay their tolls through the FasTrak® system already in place on the region's eight toll bridges. With FasTrak® readers installed on overhead structures, tolls can be collected without forcing drivers to slow down or stop.

By balancing supply and demand in this way, express lanes make more efficient use of freeway capacity and thereby reduce congestion and emissions, while offering a new travel option. The express lanes on State Route 91 in Orange County carry twice as many vehicles per lane during the peak period as the regular mixed-flow lanes. Average travel speeds for travelers in all lanes along the Interstate 394 express lane corridor in Minneapolis have increased by 2 to 15 percent since the express lanes were introduced, and Seattle-area drivers save up to 10 minutes a trip by using the 9-mile express lane along State Route 167.

There is evidence that express lanes may actually increase carpooling by creating a monetary incentive to share the ride. Carpooling in San Diego County's Interstate 15 corridor has jumped 53 percent since the express lane opened (see chart above left), leaving travelers



Benefits of Express Lane Network Compared to Carpool System, 2009 – 2050[1]

	Carpool Network	Express Lane Network	Cumulative Savings
Person hours of travel time (billions)	20.2	16.8	3.4
Carbon dioxide emissions (millions of metric tons)	335.3	325.0	10.3

[1] Figures are cumulative for the period between 2009 and 2050 and reflect differences in emissions for the Bay Area Express Lane Network and carpool system that could be built out based on funding available over this period. The travel and emissions forecasting methodology used in this preliminary analysis is documented in the *Bay Area HOT Network Study* (December 2008). Numbers are subject to revision based on future project-level environmental analysis to be performed for portions of the Express Lane Network.

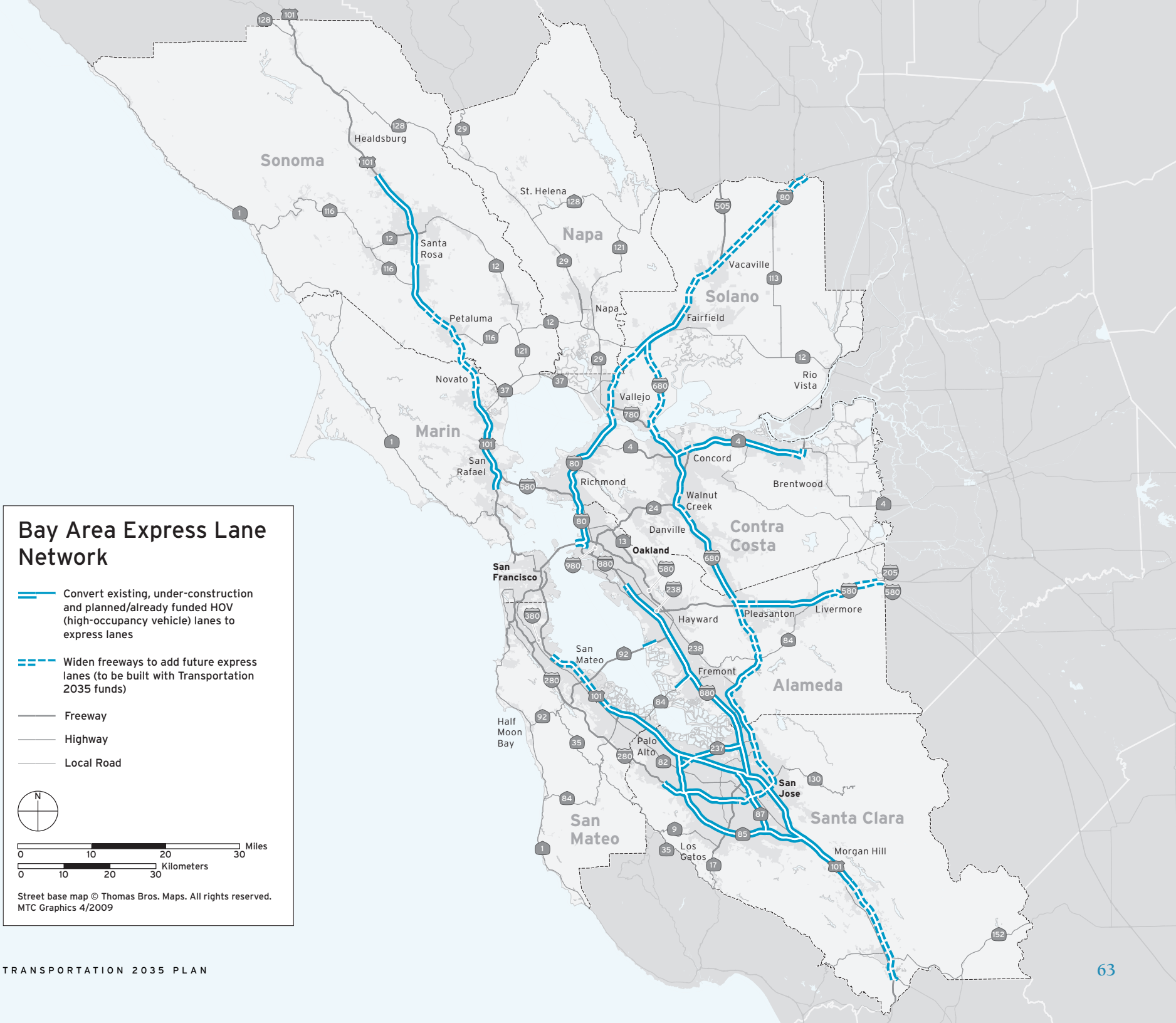
to choose between paying a $4 toll to drive alone or ridesharing for free. On Denver's Interstate 25, the number of carpools using the express lanes grew more in 2007 than the number of paying drivers.

Importantly, the Bay Area Express Lane Network will protect time savings for carpools and buses. State law requires that express lanes remain free-flowing. As space in an express lane becomes scarce, tolls rise. The higher tolls tend to reduce the number of paying vehicles, leaving more space for carpools and buses. Further, tolls collected on the express lanes will fund a beefed-up enforcement effort, meaning additional California Highway Patrol officers will be available to cite drivers who attempt to use the lanes illegally.

The Express Lane Network also will ensure that the region has a priority system that functions well as the number of carpools and buses grow in the future. Even if we do not build express lanes, many Bay Area carpool lanes will eventually become too crowded during peak commute periods, and travel time advantages for buses and carpools will diminish. The fact is we will need to take action when this time comes. The most likely solutions include: increasing the number of passengers required for a carpool during the most congested time periods (today, two people qualify as a carpool on most freeways while three persons are required on Interstate 80 and most toll bridges); or requiring carpools to register to use the carpool lane. In a limited number of locations, where space is available, it may be possible to add an additional lane dedicated to carpooling. (However, the Bay Area Express Lane Network does not presently envision two-lane facilities.) While the Express Lane Network may not delay and will not avoid the need to increase carpool occupancy requirements, it does ensure that the lanes will not be underutilized when necessary changes are made.

Revenue Stream Speeds Buildout, Reducing Congestion and Greenhouse Gas Emissions

One of the biggest benefits of express lanes is their capacity to generate revenues, which can be used to underwrite bonds and facilitate innovative project delivery strategies. With this revenue boost, the Bay Area could complete the planned carpool lane network 20 to 40 years


Bay Area Express Lane Network
Convert existing, under-construction and planned/already funded HOV (high-occupancy vehicle) lanes to express lanes
Widen freeways to add future express lanes (to be built with Transportation 2035 funds)
Freeway
Highway
Local Road
N
Miles
0 10 20 30
Kilometers
0 10 20 30
Street base map © Thomas Bros. Maps. All rights reserved.
MTC Graphics 4/2009
Sonoma
Napa
Solano
Marin
Contra Costa
Alameda
San Mateo
Santa Clara
Healdsburg
Santa Rosa
St. Helena
Napa
Vacaville
Fairfield
Petaluma
Novato
Vallejo
Rio Vista
San Rafael
Richmond
Concord
Brentwood
Walnut Creek
Danville
Oakland
San Francisco
Hayward
Pleasanton
Livermore
San Mateo
Fremont
Half Moon Bay
Palo Alto
San Jose
Los Gatos
Morgan Hill

faster than if we were to rely on traditional state and local funding sources. Preliminary analysis suggests that the faster buildout would deliver enormous reductions in travel delays and tailpipe emissions, including carbon dioxide.

By relieving congestion and increasing average travel speeds sooner than would be possible by building carpool lanes with traditional funding sources, the Express Lane Network is projected to reduce CO_2 emissions by more than 10 million metric tons over the next 40 years, and to save some 3.4 billion person hours of travel over that period (see table on page 62). This travel time savings has an estimated value of $18 billion.

MTC estimates a $7.6 billion cost to build, finance and operate the Bay Area Express Lane Network over the next 25 years. With gross express lane toll revenues reaching $13.7 billion over the same period, the remaining $6.1 billion in net revenue would be available to finance additional improvements in the express lane corridors. Expenditure plans for use of net revenue will be developed through a bottom-up process in each individual travel corridor, led by county congestion management agencies. The timing of these improvements will depend on how fast the Express Lane Network is built out and when net toll revenues begin to be generated; these topics are the subject of ongoing technical studies and discussions among partner agencies.

Next Steps

As described above, work is already under way on three express lane corridors. In collaboration with its regional partners, the Commission adopted a legislative framework to guide implementation of the Bay Area Express Lane Network. These principles (see page 65) form the basis for pending legislation — Assembly Bill 744 (Torrico). Under AB 744, the Bay Area Toll Authority — MTC's affiliate agency that currently administers toll revenue from the region's seven state-owned toll bridges — is authorized to finance, construct and operate a complete, regionally managed Express Lane Network.

Other key steps to implement the network include project-level design and environmental review consistent with federal and state laws. This analysis will consider a full range of environmental impacts including water and air quality, greenhouse gas emissions, vehicle miles traveled, traffic congestion and social equity.

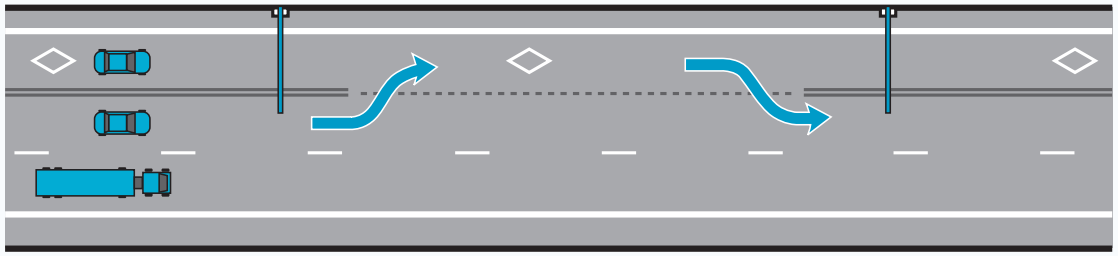
Bay Area Express Lane Network Principles

In April 2009, MTC adopted principles to guide development and implementation of a Bay Area Express Lane Network. The five primary objectives are listed below.

- More effectively manage the region's freeways in order to provide higher vehicle and passenger throughput and reduce delays for travelers in all corridors, especially those traveling by carpool, vanpool or bus
- Provide an efficient, effective, consistent and seamless system for customers of the network
- Provide benefits to travelers within each corridor commensurate with the revenues collected in that corridor, including expanded travel options and funding to support non-highway options that enhance effectiveness and throughput
- Expedite the implementation of the network using a rapid delivery approach that, to the greatest extent possible, and recognizing safety, operational and environmental constraints, relies upon existing highway right of way and minimizes the environmental impact
- Use express lane toll revenue to finance construction of the network and other corridor improvements, to operate and maintain the network, and to provide transit services and improvements in the network corridors

How It Works

- Non-carpool drivers with a prepaid FasTrak® toll tag can choose to pay a toll and use the express lane.
- Transit vehicles, carpools, vanpools and motorcycles can use the express lane at no charge.



1. The express lane is separated by double yellow lines.
2. Electronic signs will display the current toll for solo drivers with FasTrak®. The toll will vary based on the level of congestion in the express lane and will be adjusted to maintain a minimum speed.
3. Signs and lane striping at access points will provide drivers safe entry and exit.
4. For non-carpool drivers who choose to use the express lane, an overhead antenna will read their FasTrak® toll tag and the correct toll will be automatically deducted from their prepaid FasTrak® account — no toll booths, no slowing. Express lane rules and use will be enforced by the California Highway Patrol using visual and electronic means.

Change in Motion

Continuing MTC's commitment to provide mobility options for residents in low-income communities, the Transportation 2035 Plan:

- Boosts funding for the Lifeline Transportation Program by $400 million in discretionary funds — more than doubling the size of the $300 million program previously established by the Commission.

Provide Equitable Access to Mobility

MTC's Lifeline Transportation Program supports projects that address mobility and accessibility needs in low-income communities throughout the region. In 2005, MTC reaffirmed its commitment to the program in the regional transportation plan by: (a) adopting an Access to Mobility goal, which calls on MTC to further advance the region's understanding and efforts to improve mobility for older adults, the disabled, low-income persons and schoolchildren; and (b) dedicating $216 million of new funds to be available beginning in fiscal year 2009 for transportation projects that address the mobility needs of low-income communities.

To jump-start the program before funds become available in 2009, MTC approved an additional $18 million interim Lifeline funding program in 2005. Guidelines were established with the goal of funding community-based transportation projects developed through a collaborative and inclusive process. Projects needed to address transportation gaps or barriers identified in locally based needs assessments, and they had to expand transportation choices with new or expanded services. In 2006, 39 projects were funded through the first interim funding cycle. A second funding cycle in 2009 funded an additional 60 projects. (See table above right.)

Lifeline Projects Funded, by Project Type

First and Second Funding Cycles, 2006 and 2009

Project Type	Number of Projects
Transit Operations	31
Senior/Children's Transportation	7
Transit Capital	27
Community Shuttles	14
Pedestrian Infrastructure	6
Access to Autos	5
Information and Outreach	4
Fare Assistance	3
Bike Access	2
Total	99

Since the Commission's initial commitment in the previous long-range plan, the Lifeline Program received an influx of federal and state funding, bringing the program total to nearly $300 million. As part of this plan, the Commission reaffirms its commitment to this program by adding $400 million in discretionary funds, raising the amount dedicated to the Lifeline Transportation Program to nearly $700 million over the 25-year term of the Transportation 2035 Plan. Possible new emphasis areas could include mobility management services (see next page) and means-based fare assistance programs.

Coordinated Plan/ Mobility Management

In December 2007, MTC adopted the Coordinated Public Transit Human Services Transportation Plan, which assessed the transportation needs of the elderly, disabled and low-income populations in the region. The plan focuses on ways to better coordinate service and programs among the three populations.

One strategy outlined in the plan is to develop and implement **mobility management** — a centralized system that provides information about transportation options, and coordinates responses to requests for transportation services. By serving as a clearinghouse for information about transportation options, mobility managers can facilitate the most cost-effective solution or service for the traveler. The main objectives of mobility management are to:

- **Improve transportation options** for the public, particularly low-income, elderly and disabled populations
- **Reduce confusion** about what transportation options are available by consolidating transportation information in one centralized location
- **Improve coordination** among all transportation service providers, enhancing commitments to delivering service that meets the needs of low-income, elderly and disabled populations
- Through coordination, **provide cost-effective delivery of service**, benefiting both customers and transportation providers

Mobility managers could be transit operators, congestion management agencies, human services agencies, or others that have the capacity to implement the activities listed below.

Planning

- Creating and maintaining an inventory of transportation services
- Identifying opportunities for coordination of service delivery
- Monitoring and influencing land-use decisions so that social service and health facilities locate near transit

Coordinating

- Facilitating relationships among service providers to reduce service duplication
- Serving as a clearinghouse for service and trip requests
- Serving as a resource for policy bodies that encourage coordination among transit and human services transportation providers
- Providing coordination services for employers and human services agencies such as travel training, trip planning or ride sharing
- Promoting access through marketing and outreach

Operating

- Developing and operating call centers to coordinate information for all travel modes, which may include managing eligibility requirements for various services
- Assisting with technological tools to improve service delivery, such as GIS mapping programs, GPS technology for vehicles, dispatching and monitoring technologies, and those that track costs and billing
- Contracting with public, nonprofit or private transportation providers to deliver efficient service

The planning and establishment of mobility management services are eligible for funding under the Lifeline Transportation Program.

Change in Motion

To promote walking and bicycling as viable, safe transportation choices for Bay Area residents, the Transportation 2035 Plan:

- Commits $1 billion in discretionary funds to finance the Regional Bikeway Network. The top priority is to complete the on-street portion of the 2,100-mile network.

Keep Walking and Rolling

Each day in the Bay Area, residents use their bikes and feet to take over 3 million trips that do not rely upon a car. Yet despite the already high number of cyclists and pedestrians going to work, school, shopping and elsewhere, much more can be done to encourage these trips — and to make them safer and more convenient.

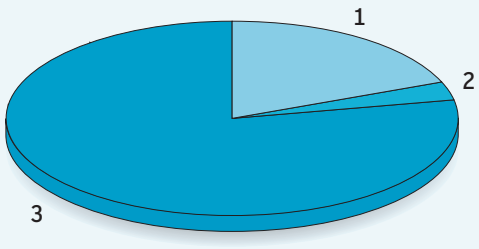
Bicycles

MTC in 2001 identified a 2,100-mile network of regionally significant bicycle routes that will cost an estimated $1 billion to complete. (This estimate excludes the cost of providing bicycle access across the three toll bridges that do not already have bicycle paths in place or planned: the Richmond-San Rafael and San Mateo-Hayward bridges, and the west span of the San Francisco-Oakland Bay Bridge.) Selected from the nine Bay Area counties' own bicycle plans, routes included in the Regional Bikeway Network link neighborhoods to work, transit and major activity centers. Routes within Priority Development Areas (PDAs, see page 72) account for approximately 84 percent of the Regional Bikeway Network.

In the Transportation 2035 Plan, MTC has committed $1 billion to finance this Regional Bikeway Network. The top priority is to complete the on-street portion of the 2,100-mile network. While most of the Regional Bikeway Network consists of on-street bike lanes and bike routes, the network also includes the Bay Trail and other dedicated bicycle/pedestrian paths that connect on-street bicycle routes. A recent study by the city of San Jose found that 38 percent of the bicyclists on a city trail that is part of the Bay Trail network were using the path as a commute route to and from work.

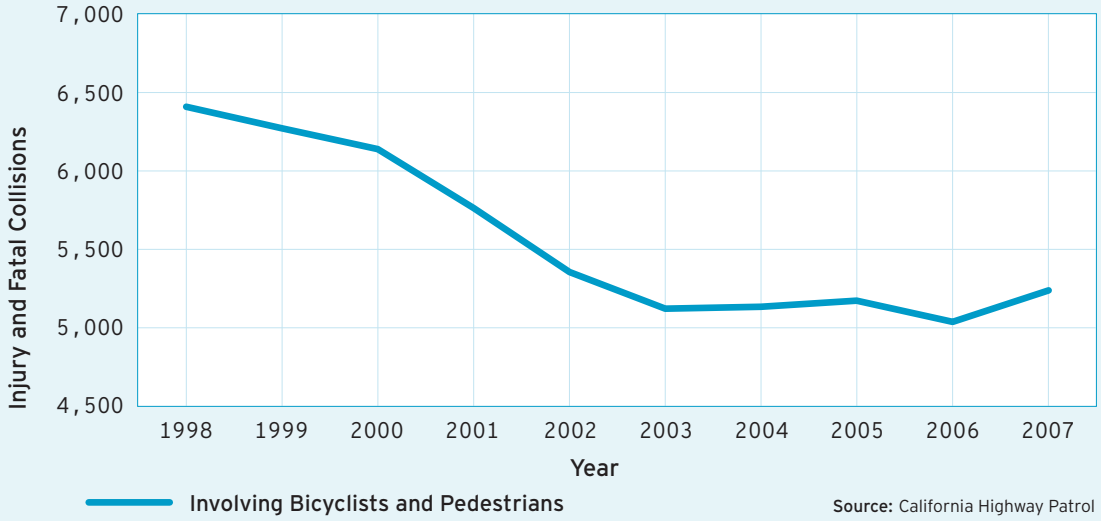
Average Annual Fatal Vehicle Collisions

Bay Area Roadways, 1998 – 2007



	Number of Collisions	Percent of Total
1 Involving Pedestrians	110	19%
2 Involving Bicyclists	18	3%
3 All Other Fatal Collisions	442	78%
Annual Average	570	100%

Injury and Fatal Vehicle Collisions Involving Bicyclists and Pedestrians on Bay Area Roadways, 1998 – 2007



Source: California Highway Patrol

Pedestrians

Due to the varying costs and scopes for street improvements such as sidewalks, crosswalks and countdown signals, it is hard to accurately gauge the regional investment needed for pedestrian upgrades and safety countermeasures. As a result, the Transportation 2035 Plan contains no analog to the Regional Bikeway Network for pedestrians.

However, the Transportation 2035 Plan does double funding for MTC's Transportation for Livable Communities (TLC) program to $2.2 billion over the next 25 years. The TLC commitment will likely be used to finance projects that improve pedestrian access to housing and transit. In addition, the new multiagency Transportation Climate Action Campaign will be a funding source for much-needed pedestrian improvements. Safe Routes to Schools and Safe Routes to Transit projects will be eligible for funding under this innovative climate initiative (See page 47 for more information).

Safety

Around the Bay Area, the number of crashes that result in injuries or fatalities has been gradually declining for the past 10 years. This includes both vehicle-to-vehicle collisions and motor vehicle collisions involving bicyclists or pedestrians (see chart above). But walkers and bicyclists are disproportionately involved in fatal collisions. Pedestrians are especially vulnerable, as 19 percent of all fatal collisions regionwide over the past decade have involved pedestrians (see pie chart above). Combined,

bicyclists and pedestrians were involved in 22 percent of fatal collisions in the Bay Area during that period.

Recognizing the need to make walking and biking safer in the Bay Area, the Transportation 2035 Plan establishes a performance objective to reduce the number of injury and fatality collisions involving bicycles and pedestrians by 25 percent (each) regionwide by 2035.

Interestingly, the likelihood that a given cyclist or pedestrian will be struck by a vehicle is inversely correlated with the amount of bicycling and walking in an area. With greater levels of cycling and walking, there is greater awareness among cyclists, pedestrians and drivers alike. So a continued increase in the number of people using their bicycles and feet to get around is likely to make conditions safer for cyclists and pedestrians in the years ahead.

Change in Motion

To encourage a regional shift toward higher-density growth patterns, protect the environment, dampen the growth in vehicle miles traveled and make our investments in transportation — especially transit — more cost-effective, the Transportation 2035 Plan:

- Doubles funding for MTC's Transportation for Livable Communities (TLC) program to $2.2 billion over the next 25 years.
- Leverages TLC investments to support compact, transit-oriented development in established urban districts identified as Priority Development Areas (PDAs) through the multiagency FOCUS initiative.
- Seeks to protect industrial land in the region's urban core that serves critical goods movement facilities such as the Port of Oakland and the Bay Area's major commercial airports.

Take Bold Steps Toward Focused Growth

Capitalizing on the regionwide momentum generated through a decade of support for livable communities and tighter integration of transportation and land-use planning, the Transportation 2035 Plan intensifies the Commission's efforts to focus growth in established communities around the Bay Area. MTC has joined forces with the Association of Bay Area Governments, the Bay Area Air Quality Management District and the Bay Conservation and Development Commission to establish a joint regional planning initiative known as FOCUS, which is the regional blueprint plan for the San Francisco Bay Area.

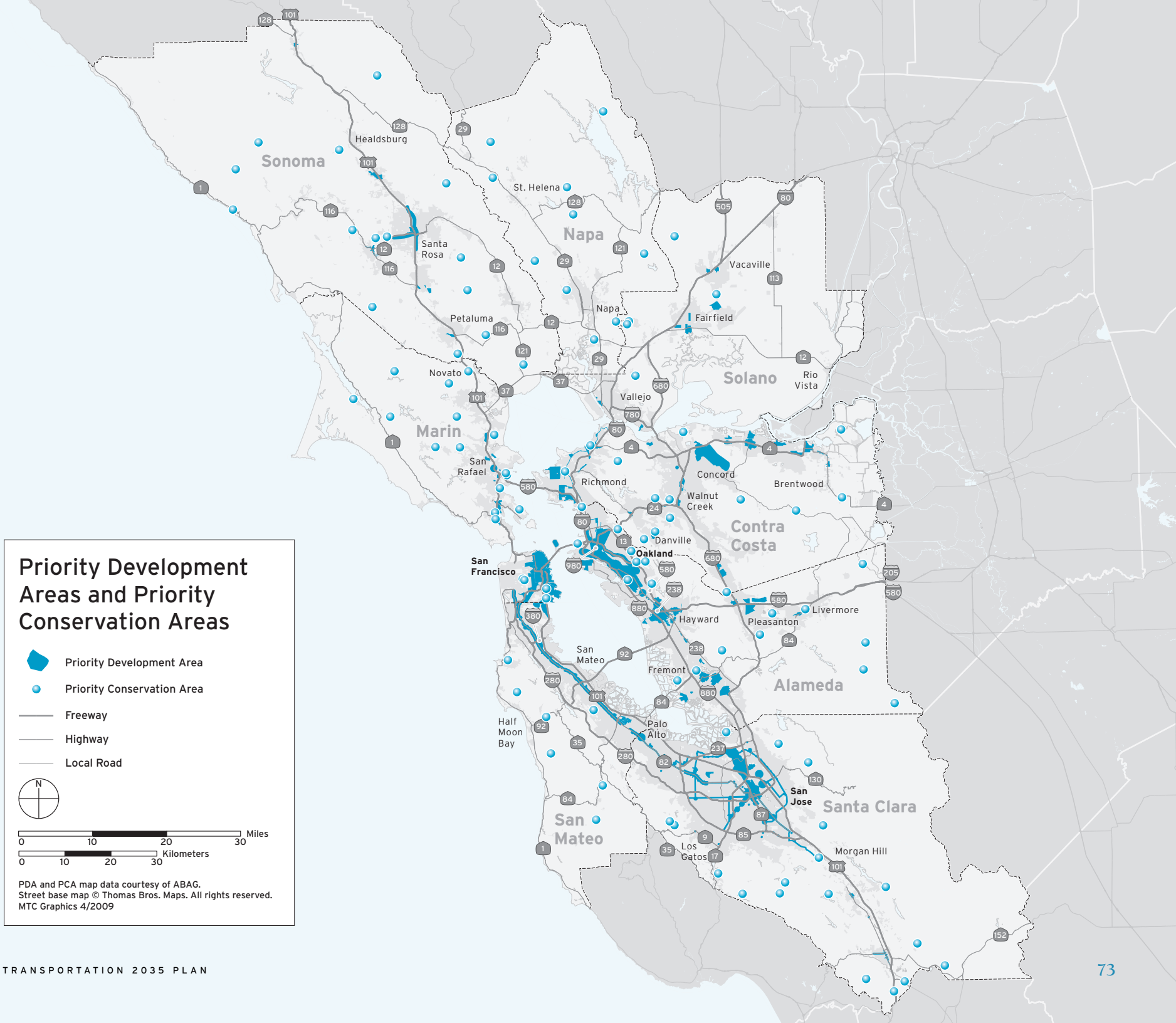
The centerpiece of the FOCUS strategy is the creation of Priority Development Areas (PDAs) in which incentives for compact, transit-oriented development will be used to help bridge the gap between regional objectives and local land-use authority. FOCUS also calls for Priority Conservation Areas, or PCAs, in which cities and counties will have incentives to resist suburbanization and preserve open spaces.

Station Area Planning Grants and technical assistance are available through FOCUS to assist local jurisdictions with the transformation of Priority Development Areas from potential areas that are served by transit to well-planned complete communities. An incentive-based approach to regional planning has already been embraced by more than 60 city and county governments that have volunteered to designate some 120 separate areas as PDAs. Local governments have estimated that these PDAs, which together account for only about 3 percent of the region's land area, will be able to accommodate as much as 56 percent of the Bay Area's population and employment growth through 2035 — all in locations accessible to transit. Many jurisdictions have indicated that with additional financial assistance their respective PDAs could accommodate more of the region's growth.

To help nurture PDAs, the Transportation 2035 Plan doubles funding to $2.2 billion for MTC's Transportation for Livable Communities (TLC) program, which supports multimodal travel, more livable neighborhoods, and the development of jobs and housing in existing town centers and near transit.

Focused Growth Pays Mobility, Livability Dividends

Channeling much of the Bay Area's growth into PDAs will increase transit ridership, promote more bicycle and walking trips, and shorten the length of automobile trips, thus helping to reduce both vehicle miles traveled and emissions


Priority Development Areas and Priority Conservation Areas
Priority Development Area
Priority Conservation Area
Freeway
Highway
Local Road
N
Miles
0 10 20 30
Kilometers
0 10 20 30
PDA and PCA map data courtesy of ABAG.
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Concord
Brentwood
Walnut Creek
Danville
Oakland
San Francisco
Hayward
Pleasanton
Livermore
San Mateo
Fremont
Half Moon Bay
Palo Alto
San Jose
Los Gatos
Morgan Hill

of carbon dioxide and other pollutants. People living in focused, compact neighborhoods of the type envisioned for PDAs travel 20 to 40 percent fewer vehicle miles each day than those who live in the sprawling suburban tracts that typify the Bay Area's post-World War II development pattern. This translates into a directly proportionate reduction in carbon dioxide emissions from personal travel. The form and location of homes in PDAs also makes them easier to heat and cool, and they require less water. This, in turn, will reduce CO_2 emissions associated with power generation for those utilities.

Challenges Ahead

FOCUS seeks to work with local governments and others in the Bay Area to collaboratively find ways to support focused growth and to overcome the challenges that can hinder its implementation. Chief among these challenges are the following:

Fiscal Imbalances

While offering significant regional benefits, PDAs can be costly for local governments. Infill projects generally are more difficult and expensive than "greenfield" development (built on land that was previously agricultural or open space), and service deficiencies for existing residents frequently have to be remedied before new growth can even be contemplated. And the structure of local government finance may make it difficult or impossible to recover many of the public costs associated with community transformation. Capital budgets submitted with the first round of PDA applications total tens of billions of dollars. Cities and counties will require direct financial assistance to make focused growth a reality.

Urgency

In recent decades, high housing costs have led to a "drive till you qualify" development pattern, with much of the region's growth being pushed outside of the region into the Central Valley and other adjacent regions. The redistribution of growth is a long-term solution to the Bay Area's transportation and climate issues. But we must start making substantial progress now if the FOCUS initiative is to be successful over the long haul. Absent a concerted response to the present intersection of local and regional priorities, local governments' interest in the FOCUS effort may wane and growth could once again follow the path of least resistance — with expensive and potentially dire consequences for the entire region. Bay Area cities and counties have identified and nominated PDAs because they are acutely aware of local and regional needs for transportation services, housing choice and climate protection.

Moving Goods in Northern California

The goods movement transportation system is a complex network including airports and seaports, rail facilities and rail lines, and highway and roadway infrastructure. It is closely tied to state, national and international transportation systems, with California serving as the nation's primary gateway for goods manufactured in Asia.

Land-Use Changes Impact Goods Movement

MTC's 2004 *Regional Goods Movement Study* found that goods movement industries and industrial businesses that rely on our transportation systems play an important role in the region's economy. However, while development and regional growth trends indicate increased demand for goods movement services, research indicates that affordable, close-in location options for goods movement businesses are becoming more difficult to find.

Under current land-use policies, the demand for well-located land for goods movement businesses will greatly exceed the industrial land supply in the future. If current trends continue, by 2035 only 60 percent of the goods movement industry demand for industrial land in the inner East Bay and north Peninsula will be accommodated. This will result in less industrial activity in the future compared to today, and over time, large numbers of Bay Area goods movement businesses and jobs serving the central Bay Area will have to locate outside the region. About 65 percent of the industrial activities are anticipated to disperse outward to the inland San Joaquin Valley. Due to the region's geography and transportation system, the demand shifting outward will be heavily focused on industrial locations with access to the central Bay Area markets they service via Interstate 580.

Impacts to the Bay Area include increased truck trips, longer truck trips and a net increase in emissions as more goods movement businesses are pushed out of the inner Bay Area. Some specific impacts include:

- 87,000 good-paying, blue/green collar goods-movement-related jobs displaced
- 300,000 more truck miles traveled on regional routes

- 8,400 daily truck trips shifted to new, mostly longer routings, including 6,100 on Interstate 580
- 2 percent increase in particulate matter emissions
- $400 million-per-day increase in transportation costs to businesses

MTC, in concert with the Joint Policy Committee, will consider specific strategies to address goods movement business displacement. Possible strategies include: coordinated planning to ensure that FOCUS PDAs do not adversely affect the economic potential of goods movement industries; educating cities and counties about the impacts of their local land-use decisions; and exploring best practices for making goods movement businesses a better "neighbor."

New Investments Planned for Trade Corridors

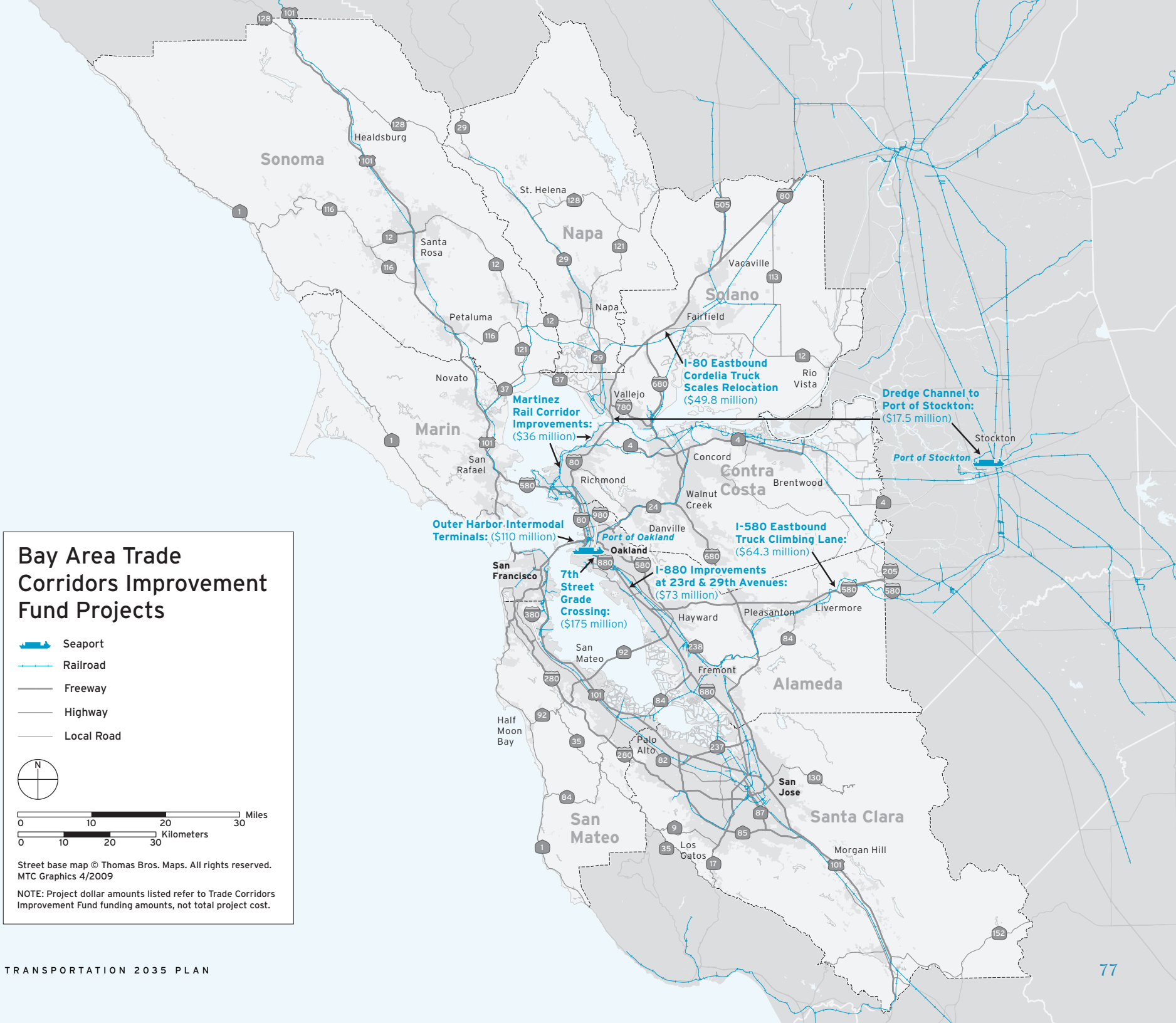
In Northern California, trade primarily occurs along two major trade corridors connecting the Bay Area, Sacramento and Central Valley regions: 1) the Central Corridor, which runs from the Port of Oakland roughly along Interstate 80 to Sacramento and across the Sierra Nevada mountains on to Chicago; and 2) the Altamont Corridor, which runs from the Port of Oakland, along Interstates 880, 238 and 580 to the Central Valley, connects with Interstate 5 and State Route 99 at the north end of San Joaquin Valley and eventually with the southern transcontinental rail route at the south end of the Central Valley. Together these corridors connect the major regions with one another and with critical national and international trade routes. The focus of this trade activity is the Port of Oakland, the nation's fourth-busiest container seaport and a critical export port for the state.

In November 2006, California voters approved Proposition 1B, a $19.9 billion transportation infrastructure bond. Proposition 1B included a $2 billion Trade Corridors Improvement Fund (TCIF) to improve goods movement infrastructure statewide. In 2008 the state augmented the program to nearly $2.5 billion (and programmed just over $3 billion, in anticipation of additional federal funding) for high-priority goods movement projects.

A coalition of regional agencies in Northern California, representing 23 counties and the three major ports, was able to secure $825 million for 14 Northern California transportation projects that are to be in construction by 2013. Nearly $550 million of this total will fund seven key Bay Area projects, shown on the map on the facing page.

The investments are concentrated in the Central and Altamont corridors, focusing on the dual goods movement concerns of: 1) supporting the economic interconnections of the Sacramento, Central Valley and Bay Area regions through interregional goods distribution corridors; and 2) ensuring the future viability and growth of the Port of Oakland as a trade gateway for both imports and exports.

(See also MTC's *Goods Movement Initiatives, 2009 Update* listed in Appendix 3, for more information.)


Bay Area Trade Corridors Improvement Fund Projects
Seaport
Railroad
Freeway
Highway
Local Road
N
Miles
0 10 20 30
Kilometers
0 10 20 30
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NOTE: Project dollar amounts listed refer to Trade Corridors Improvement Fund funding amounts, not total project cost.
Sonoma
Napa
Solano
Marin
Contra Costa
Alameda
San Mateo
Santa Clara
Healdsburg
Santa Rosa
St. Helena
Napa
Vacaville
Fairfield
Rio Vista
Petaluma
Novato
Vallejo
Concord
Brentwood
Walnut Creek
Danville
Richmond
San Rafael
Stockton
Port of Stockton
Port of Oakland
Oakland
San Francisco
Hayward
Pleasanton
Livermore
San Mateo
Fremont
Half Moon Bay
Palo Alto
San Jose
Los Gatos
Morgan Hill
I-80 Eastbound Cordelia Truck Scales Relocation ($49.8 million)
Dredge Channel to Port of Stockton: ($17.5 million)
Martinez Rail Corridor Improvements: ($36 million)
Outer Harbor Intermodal Terminals: ($110 million)
I-580 Eastbound Truck Climbing Lane: ($64.3 million)
I-880 Improvements at 23rd & 29th Avenues: ($73 million)
7th Street Grade Crossing: ($175 million)

Change in Motion

To expand the reach and utility of public transportation in the region, the Transportation 2035 Plan:

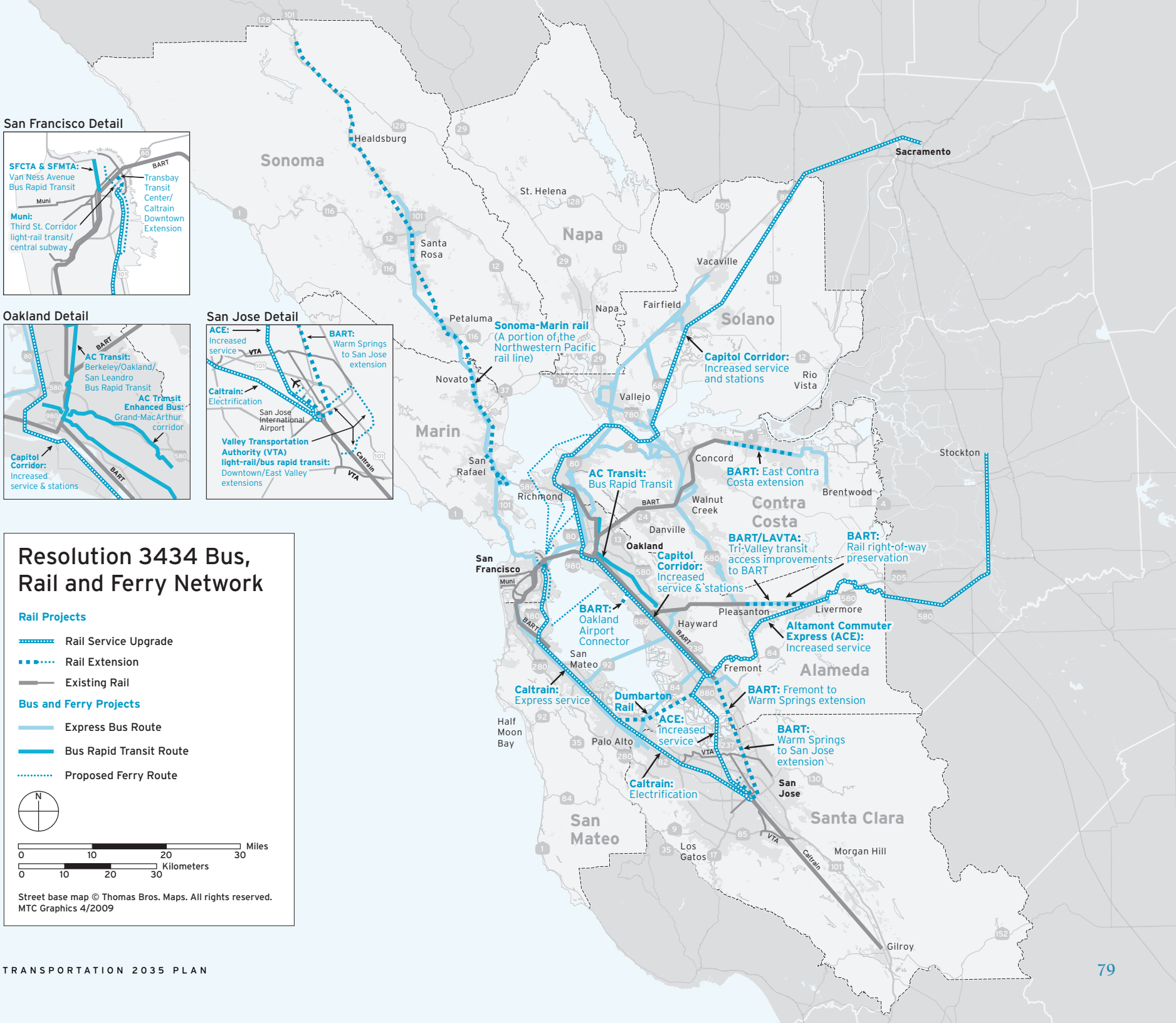
- Incorporates the MTC Resolution 3434 Strategic Plan, an updated framework to successfully deliver nearly $18 billion in key transit projects as part of the Regional Transit Expansion Program.
- Facilitates integration of the California High-Speed Train system into the Bay Area rail network.

Deliver the Next Generation of Transit

The 2001 adoption of MTC Resolution 3434, the Regional Transit Expansion Program, marked a major milestone in Bay Area transportation history. Resolution 3434 is a long-term, multifaceted funding strategy for directing local, regional, state and federal dollars to nearly two dozen high-priority bus, rail and ferry expansions. Because it signifies a firm consensus on this important issue, Resolution 3434 allows the region to effectively focus its advocacy in both Sacramento and Washington, D.C., to deliver the next generation of transit expansion for the Bay Area.

When fully implemented, these transit expansions will:

- provide 140 new route miles of rail
- provide expanded express bus service throughout the region and new bus rapid transit services in urban corridors
- institute several new ferry routes on San Francisco Bay
- build major new transit hubs in downtown San Francisco and San Jose


San Francisco Detail
SFCTA & SFMTA: Van Ness Avenue Bus Rapid Transit
Muni: Third St. Corridor light-rail transit/ central subway
Transbay Transit Center/ Caltrain Downtown Extension
Oakland Detail
AC Transit: Berkeley/Oakland/ San Leandro Bus Rapid Transit
AC Transit Enhanced Bus: Grand-MacArthur corridor
Capitol Corridor: Increased service & stations
San Jose Detail
ACE: Increased service
BART: Warm Springs to San Jose extension
Caltrain: Electrification
San Jose International Airport
Valley Transportation Authority (VTA) light-rail/bus rapid transit: Downtown/East Valley extensions
Resolution 3434 Bus, Rail and Ferry Network
Rail Projects
Rail Service Upgrade
Rail Extension
Existing Rail
Bus and Ferry Projects
Express Bus Route
Bus Rapid Transit Route
Proposed Ferry Route
N
Miles
0 10 20 30
Kilometers
0 10 20 30
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Petaluma
Novato
Vallejo
Rio Vista
Sacramento
Stockton
Concord
Brentwood
Walnut Creek
Danville
Richmond
San Rafael
Oakland
San Francisco
Pleasanton
Livermore
Hayward
San Mateo
Fremont
Half Moon Bay
Palo Alto
San Jose
Los Gatos
Morgan Hill
Gilroy
Sonoma-Marin rail (A portion of the Northwestern Pacific rail line)
Capitol Corridor: Increased service and stations
AC Transit: Bus Rapid Transit
BART: East Contra Costa extension
BART/LAVTA: Tri-Valley transit access improvements to BART
BART: Rail right-of-way preservation
Capitol Corridor: Increased service & stations
BART: Oakland Airport Connector
Altamont Commuter Express (ACE): Increased service
BART: Fremont to Warm Springs extension
Caltrain: Express service
Dumbarton Rail
ACE: Increased service
BART: Warm Springs to San Jose extension
Caltrain: Electrification

A Framework for Project Delivery

In fall 2008, the Commission adopted the Resolution 3434 Strategic Plan. The purpose of the Strategic Plan is to provide a framework for successful program and project delivery. It serves as a vehicle to address project delivery challenges; reassess project costs, scopes and funding; monitor project progress and milestones; provide advocacy support; and take specific funding actions to allow ready-to-go projects to move into implementation. The Strategic Plan establishes agreements between MTC, transit providers and funding partners to work together to expedite delivery of important transit improvements.

Transit Expansion and Focused Growth Go Hand in Hand

Resolution 3434 includes a Transit-Oriented Development (TOD) policy, adopted by the Commission in 2005, that addresses multiple goals: improving the cost effectiveness of regional investments in new transit expansions; easing the Bay Area's chronic housing shortage by creating vibrant new communities; and helping preserve regional open space. The TOD policy will help stimulate the construction of at least 42,000 new housing units along the Bay Area's major new transit corridors, and help the region boost overall transit ridership by over 50 percent by 2035.

High-Speed Rail on a Fast Track

The California High-Speed Rail Authority (CHSRA) plans to build an 800-mile High-Speed Train (HST) system for intercity travel in California between the major metropolitan centers of Sacramento and the San Francisco Bay Area in the north, through the Central Valley, to Los Angeles and San Diego in the south. The HST system would use electrically propelled steel-wheel-on-steel-rail trains capable of maximum operating speeds of 220 miles per hour on dedicated, fully grade-separated lines. The HST system is projected to carry as many as 93 million passengers annually by the year 2030.

High-speed trains would offer the Bay Area a new transportation option, providing a high-speed rail connection to Southern California from San Francisco (via San Jose), utilizing the Caltrain corridor along the Peninsula. After an exhaustive review of route options (including an MTC analysis completed as part of the Regional Rail Plan), a Pacheco Pass alignment was selected by the CHSRA as the fastest and most environmentally responsible route into the Bay Area, minimizing impacts on wetlands and eliminating the need for another San Francisco Bay crossing, bridge or tunnel. In addition, the CHSRA is committed to enhancing existing and pursuing new "regional rail" commuter and HST service via the Altamont Pass between Sacramento/Northern San Joaquin Valley and

Oakland/San Jose in partnership with local and regional agencies and transit providers.

The passage in November 2008 of Proposition 1A, a $10 billion dollar bond measure, is a huge first step in the realization of the high-speed rail dream, raising $9 billion for building the high-speed train system and $950 million for improvements to other rail services that connect to the high-speed train service. The Bay Area is slated to receive $408 million of the $950 million for improvements to the Altamont Corridor Express, BART, Caltrain, San Francisco Muni, and Valley Transportation Authority light rail. In addition, the American Recovery and Reinvestment Act (2009) includes $8 billion for high-speed trains in the United States — the most ever allocated for rail at one time.