

**SAN FRANCISCO**

**CONGESTION  
MANAGEMENT  
PROGRAM**

**2011**

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*prepared by the*

**San Francisco County  
Transportation Authority**



# 2011 San Francisco Congestion Management Program

## Table of Contents

Chapter 1 – Background and Program Overview.....	1
Chapter 2 – Congestion Management Agency Role & Responsibilities.....	8
Chapter 3 – CMP-Designated Roadway Network.....	11
Chapter 4 – Multimodal Performance .....	15
Chapter 5 – Travel Demand Management Element .....	35
Chapter 6 – Land Use Impacts Analysis Program.....	45
Chapter 7 – Capital Improvement Program .....	58
Chapter 8 – Travel Demand Model and Uniform Database .....	80

**CHAPTER 1****BACKGROUND AND PROGRAM OVERVIEW****Key Topics:**

- **CMP Background**
- **Congestion Management in San Francisco**
- **2011 Program Overview and Key changes from 2009 CMP**

**1.1. Background****1.1.A. Purpose of the CMP**

The purpose of the 2011 San Francisco Congestion Management Program (CMP), prepared by the San Francisco County Transportation Authority, (the Authority) is to:

- Comply with state law by adopting a biennial CMP and submitting it to the Metropolitan Transportation Commission (MTC) for a conformance finding. Conformance ensures the City's eligibility for the state fuel tax revenues authorized by CMP legislation.
- Guide San Francisco agencies involved in congestion management;
- Outline the congestion management work program for fiscal years 2011/12 and 2012/13; and
- Set forth policies and technical tools to implement the CMP work program.

**1.1.B. Organization and Approach**

The document follows MTC's *Guidance for Consistency of Congestion Management Programs with the Regional Transportation Plan*, per MTC Resolution 3000, last revised June, 2011.<sup>1</sup>

Each element required by the CMP legislation is discussed in a separate chapter. Each chapter describes the element's context in San Francisco, the work plan, and implementation guidance. The Authority Board will adopt any revisions developed during fiscal years 2011/12 and 2012/13 as amendments to the 2011 San Francisco CMP.

The 2011 CMP updates information from the 2009 CMP and reflects several important developments since 2009. The Authority prepared most of the 2011 CMP. The data in Chapter 4 (Level of Service Monitoring) is derived from a report prepared by Jacobs Engineering Group on behalf of the Authority. Jacobs Engineering Group also compiled the transit performance information found in Chapter 4, based on data provided by SFMTA.

**1.1.C. Origins and Intent of the CMP Legislation**

CMP requirements were established in 1989 as part of a bi-partisan state legislative package, known as the Katz-Kopp-Baker-Campbell Transportation Blueprint for the Twenty-First Century (AB 471). These requirements became effective when voters approved Proposition 111 on June 5, 1990. AB 1963 (Katz) in September 1994 and AB 2419 (Bowler) in July 1996 further modified CMP law. The passage of AB 298 (Rainey), effective January 1, 1997, made the CMP exempt from the California Environmental Quality Act (CEQA). SB 1636 (Figueroa), passed in September 2002, amended CMP requirements to allow local jurisdictions to designate Infill Opportunity Zones (IOZs). For the complete text of the CMP legislation, see Appendix 2.

<sup>1</sup> For the complete text of MTC's guidance please refer to Appendix 1.

The 1989 state legislation not only provided for increases in transportation funding, but also made significant changes in the requirements for planning and programming the transportation projects funded from these revenue sources. The goal of the legislation is to prioritize transportation funding decisions based on transportation system performance, local land use decisions and their impacts on transportation, and transportation control measures that address air quality goals.

The CMP requirements are the legislature's response to the traffic congestion experienced by all urbanized areas of California. Traffic congestion is widely perceived as outpacing the ability of the traditional transportation planning process to provide solutions. In San Francisco, with its high-intensity land uses and extensive transit network, traffic congestion poses a different problem than in lower-density counties, challenging conventional interpretations of the nature of the congestion problem. For the majority of the state's highly suburbanized metropolitan areas, traffic congestion has its roots in the following:

- *Transit does not work well in the suburbs.* The low-density suburban growth pattern throughout the state's metropolitan areas does not lend itself to cost-effective transit service, and therefore mobility depends largely on automobiles and freeways.
- *Freeways full of solo drivers are inefficient investments.* Pricing strategies (e.g., tolls, paid parking at work sites) are politically complicated, and ridesharing strategies (i.e., carpooling and vanpooling) have shown narrow success in sprawled suburbs. Most automobiles still carry just one person, regardless of trip purpose or time of day. The result is inefficient roadway facilities: even when full of cars, they carry only a fraction of the number of *people* they could accommodate.
- *Building freeways and widening roads to address transportation demand is not cost-effective.* These high-cost facilities, which maximize automobile trips but do not maximize the number of *people* carried, result in a high cost per person transported.

- *It is hard to keep up with transportation demand by building freeways and widening roads, and we cannot afford such investments either.* Because land for transportation facilities is scarce, construction costs have escalated, and environmental constraints are significant, the real costs of capital investment in roads have risen dramatically. Combined with an economic downturn, fewer and fewer new miles of roadway facilities are built every year to address a growing demand for transportation.

The CMP legislation aims to increase the productivity of existing transportation infrastructure and encourage more efficient use of scarce new dollars for transportation investments, in order to effectively manage congestion, improve air quality, and ultimately allow continued development. In order to achieve this, the CMP law is based on five mandates:

- Require more coordination between federal, state, regional, and local agencies involved in the planning, programming, and delivery of transportation projects and services;
- Favor transportation investments that provide measurable and quick congestion relief;
- Link local land use decisions with their effect on the transportation system;
- Favor multimodal transportation solutions that improve air quality; and
- Emphasize local responsibility by requiring a Congestion Management Agency (CMA) in each urban county in the state.

## 1.2. Congestion Management in San Francisco

### 1.2.A. Applicability of the Concept

The main impetus for the CMP legislation was worsening *suburban* transportation conditions, caused by land use patterns that perpetuate over-reliance on the private automobile. San Francisco has an extensive transit network and long-standing policies to encourage a multimodal transportation system. Congestion management goals are reinterpreted here (within the constraints of State law) to add value to San Francisco's transportation planning process. The City's Transit First policy, for instance, gives rise to our local interpretation of CMP rules: San Francisco tolerates a certain level of traffic congestion in order to enhance the competitiveness of transit service in comparison to private automobiles. The San Francisco General Plan also specifically discourages roadway capacity increases, stating that:

"The existing vehicular capacity of the bridges, highways and freeways entering the city should not be increased and should be reduced where possible." (SF General Plan, Transportation Element, Objective 3, Policy 1).

If interpreted as improving the throughput of *cars* in the roadway network, congestion management is at odds with this policy. However, by reinterpreting congestion management as maximizing *person* throughput, then we have opportunities to capitalize on the City's significant supply of transit services, high densities, and relatively pedestrian-friendly environment. San Francisco can achieve congestion management goals if the measures of performance support the City's transportation and land use patterns and priorities.

### 1.2.B. History of Congestion Management in San Francisco

Historically, San Francisco has managed travel demand well, especially automobile access to the downtown area during commute periods. Many of the transportation demand management and

land use policies and regulations described throughout this CMP have existed for decades and have allowed growth in downtown activity through investment in transit infrastructure and service. This success has also been the result of the *combined* application of these investments with several major policies, in particular parking supply policies that have limited the provision of parking spaces with new downtown office development.

Other factors aided the City's ability to absorb the extraordinary levels of employment growth between 1970 and 1985, including:

- *the City's historic record of investment in local public transit* – High levels of transit service and coverage within the city provided a credible option to driving and made development impact mitigation fees and parking demand management policies politically viable;
- *the BART system and the demographics of downtown employment* – A large portion of employment growth in this period was absorbed by suburban residents. The opening of BART in 1973 expanded transit capacity to provide: a) excellent regional access to stations within walking distance of most downtown employment locations; and b) no financial burden to the City for providing adequate transit coverage at the residential (suburban) end of the BART trip; and
- *the City's investment in its street system* – San Francisco's dense grid of streets and arterials is seldom recognized as a major transportation asset. It provides multiple travel route options, keeps local trips from clogging the freeway system (as is so often the case in the suburbs), and enhances the system's ability to recover quickly when congestion problems occur.

### 1.2.C. Relationship to RTP Goals

In April 2009, MTC adopted *Transportation 2035*, the region's long-range Regional Transportation Plan (RTP). The CMP provides context and implementation tools for San Francisco in advancing

the goals established in the 2009 RTP: maintenance and safety; reliability, efficient freight travel, and security/emergency management; clean air and climate protection; and equitable access and livable communities. These goals are directly supported in San Francisco's CMP through transportation and land use policies; strategic investments and system management; and the performance measures the Authority uses to monitor transportation system performance. These elements are discussed throughout the 2011 CMP, as appropriate.

### 1.2.D. Future Trends and Strategies

The City's track record highlights the importance of maintaining travel *options*, not just to prevent worsening congestion, but to improve access and mobility for San Francisco residents, workers, and visitors, as the city continues to grow and develop.

Understanding demographic trends is important in charting future action. A development boom in the 1970s and 1980s was characterized by the growth of the city's financial district. This boom was followed by modest employment growth until the mid-1990s. By the late 1990s, San Francisco and the rest of the Bay Area experienced another employment boom accompanied by an increase in construction.

Future economic and population growth will differ significantly in pace and character from historic San Francisco development trends. Bay Area land use forecasts and policies call for focused housing and employment growth in the region's urbanized core areas. This growth, in conjunction with rising incomes and the increase in commuting by San Francisco residents to job locations outside of the city, will bring new pressures to the local and regional transportation networks.

Increasing numbers of San Francisco residents are out-commuting to take advantage of work opportunities in other Bay Area counties: the number of San Francisco residents traveling daily to work in Santa Clara County is approximately twice the number of Santa Clara County residents employed

in San Francisco.<sup>2</sup> In addition, about half of all drive-alone work trips into downtown come from within San Francisco.<sup>3</sup> These trends are disturbing at a time when the fiscal conditions at the State, regional, and local levels have severely curtailed funding for transit operating expenses. Further, efforts to combat global climate change have made clear the imperative to reduce vehicle miles traveled (VMT) at the regional level. Long-distance, auto-dominated commute patterns (such as the peninsular corridor) are heavy contributors to regional VMT.

Also in 2009, the Association of Bay Area Governments (ABAG) adopted its most recent regional land use forecast. *Projections 2009* targets San Francisco to absorb an additional 76,000 households by 2035 over the current level of 339,000 households (2005 baseline). Employment in San Francisco is projected to increase by nearly 50 percent by 2035 to more than 800,000 jobs located in the city. The next set of projections will not be adopted until 2013, as the forecasted development pattern in the SCS. Scenarios under consideration for the 2013 RTP/SCS range widely in terms of growth expected in San Francisco: between 76,000 and 111,000 more households, and between 127,00 and 207,000 more jobs by 2040 (over 2010 levels). Enriching the city's inventory of available and auto-competitive transportation options – particularly transit system development – will be a key strategy for congestion management in San Francisco.

Enhancing transit service and reliability is essential to ensure that transit is a viable option to the private automobile as new residential neighborhoods develop, especially in the city's eastern neighborhoods. Non-traditional transit options (zonal express bus service, demand responsive, etc.) may need to be explored as additional alternatives to drive-alone in some instances.

Bicycling is a primary mode of travel for a growing number of trips. Bicycling can be a suitable modal shift for many San Francisco automobile trips.

<sup>2</sup> MTC regional trip tables.

<sup>3</sup> San Francisco Mobility, Access, and Pricing Study.

Finally, every trip begins or ends as a pedestrian trip, and many San Franciscans make a substantial number of their trips entirely as pedestrians. Pedestrian safety and access are critical to meet the growing demand for pedestrian-friendly neighborhoods and employment centers.

The Prop K Expenditure Plan for the local half-cent transportation sales tax is San Francisco's investment blueprint for congestion relief: on November 4, 2003, San Francisco voters extended the existing half-cent sales tax (Prop B) and approved a new 30-year Expenditure Plan, with a 75 percent approval rate. The primary goal of the Expenditure Plan is to implement the priorities of the Countywide Transportation Plan through investment in a set of projects and programs that include planning, maintenance and rehabilitation, and improvements to the city's multi-modal transportation system.

Congestion and demand management measures are also necessary to avoid further deterioration of transit travel times. San Francisco's congestion management activities will also need to focus on key improvements to congested roadway facilities to enable transit to get out of automobile traffic. Particular attention will be paid to projects that improve the operating efficiency of the existing system, such as bus transit priority treatments. These projects help transit re-gain operating speed and retain its market share.

Bus Rapid Transit (BRT) project development is continuing for two key corridors in the Transit Priority Network: Van Ness Avenue and Geary Boulevard. These efforts are examples of the Authority's commitment to separating transit right-of-way from congested city streets in an effort to improve overall person throughput and reduce transit travel times in key corridors. These BRT corridors, which were identified in the Countywide Transportation Plan and Prop K Expenditure Plan, were also confirmed as priorities in the SFMTA's Transit Effectiveness Project (TEP) *Rapid Network*.

The 2004 Countywide Transportation Plan identified pricing as an important demand management tool in the County's congestion management toolkit. In September 2009, the Authority ap-

proved the final report of the *San Francisco On-Street Parking Management and Pricing Study*, which examined the role of parking pricing to manage demand, increase availability, and reduce excess vehicular circulation. SFMTA is currently conducting pilot implementation of variable pricing of on-street parking through the SFpark program. In December 2010, the Authority approved the final study report on the feasibility of implementing an areawide congestion pricing program to manage weekday peak-period congestion. This *Mobility, Access, and Pricing Study* (MAPS) informs policymakers of the benefits, costs, and impacts of a potential congestion pricing program.

Congestion management activities during the next two fiscal years are set forth in the work plan section at the end of each chapter. These activities will include advancing multiple planning and environmental studies, development of an updated long-range countywide transportation (San Francisco Transportation Plan), and continued neighborhood transportation planning efforts.

The Authority will also continue to develop the San Francisco Travel Demand Model in order to measure performance of the multimodal system, analyze Capital Improvement Program (CIP) changes and perform project delivery oversight, and improve forecasting of system performance impacts associated with transportation investments, policies, and land use changes. Since 2009, the Authority has updated the San Francisco Travel Demand Model to better integrate land use inputs and also through development of a bicycle route choice model.

### 1.3. Program Overview and Key Changes from the 2009 CMP

#### 1.3.A. Mandated Program Components

The following statutory requirements of CMP legislation are mandated for all urban counties in the state:

1. A CMP updated biennially. The CMP must contain the following:

- A designated CMP roadway network
  - Traffic level of service (LOS) standards and a methodology for monitoring LOS on the designated CMP roadway network
  - Transit service standards
  - A multimodal performance element
  - A land use impact analysis methodology
  - A seven-year multimodal CIP;
2. A common database and method to analyze impacts of local land use decisions on the CMP network; and
  3. A designated CMA for the county.

### 1.3.B. Transportation Fund Programming

The CMP legislation included the creation of new funding sources, as well as changes to existing fund programming mechanisms, tied to implementation of CMP requirements. The Authority at the local level and MTC at the regional level have been empowered to make CMP conformance determinations affecting funding eligibility.

- i. **State Fuel Tax Increment:** The CMP legislation established a 9-cent per gallon increase in the state's fuel tax. In order to receive these revenues, urban counties must conform with CMP requirements, particularly performance monitoring and the implementation of required CMP elements. The CMP document itself must be updated every two years.
- ii. **Regional Improvement Program (RIP) and Transportation Enhancement (TE):** These funds are programmed through the Regional Transportation Improvement Program (RTIP), which is biennially developed and adopted by MTC, and subsequently adopted into the State Transportation Improvement Program (STIP) by the California Transportation Commission (CTC). In order to be considered for funding through the RTIP, transportation projects must be included in the CIP of the CMP.

- iii. **Federal Surface Transportation Program (STP) and Congestion Management and Air Quality (CMAQ) Program Funds:** In 1992, the California legislature passed SB 1435, which reconciled the CMP programming process with the then new federal Intermodal Surface Transportation and Efficiency Act (ISTEA). As a result, projects seeking STP or CMAQ funds (continued under TEA-21 and SAFETEA-LU) must be prioritized by each CMA in their biennial CIP for the CMP.

### 1.3.C. Relationship to Ongoing Planning and Programming Efforts

CMPs are a component of a more comprehensive set of ongoing transportation planning and programming efforts at the local and regional levels:

- i. **RTP:** The CMP implements the local portion of the RTP and must be consistent with it. MTC determines consistency among CMPs in the region. MTC makes these determinations as a part of the conformance finding process for CMPs.
- ii. **RTIP:** The RTIP is a 5-year (previously 7-year) programming document for a variety of state (e.g., RIP) and federal (e.g., TE) fund sources that are sub-allocated to the states. In the Bay Area, MTC works with the CMAs to develop the RTIP for our nine-county region. A seven-year transportation capital improvements program must be included in the CMP. For certain projects to be included in the RTIP, they must be included in the CMP CIP. The CMPs are therefore a main source from which the RTIP's program of projects is derived. RTIPs statewide are approved collectively as the STIP by the California Transportation Commission (CTC).
- iii. **City of San Francisco General Plan:** According to the City Charter (section 3.524), the General Plan is a comprehensive, long-term, guide for the future development of the



City and County. The General Plan guides transportation demand management measures that are addressed as part of the CMP. Chapter 6 addresses the Planning Department's role in making consistency findings for the CMP's CIP.

While the General Plan provides the policy framework, State law does not require that the CMP be incorporated into the General Plan.

- iv. Air Quality Attainment Plans:** MTC's RTP is required by federal law to conform to the State Implementation Plan for improvement of air quality. Since the CMP must be found consistent with the RTP, the CMP must therefore also conform to the provisions of the State Implementation Plan. In addition, the San Francisco CMP documents implementation of transportation control measures (TCMs) included in the Clean Air Plan adopted by the BAAQMD pursuant to State requirements. The 2011 CMP addresses the new and revised TCMs in the *2010 Bay Area Clean Air Plan*. Appendix 8 lists the currently adopted regional TCMs and how they are incorporated into San Francisco's congestion management strategies.

#### 1.3.D. Key Changes from 2009 CMP

The following sections highlight the most significant updates proposed for the 2011 CMP.

**Chapter 4:** This chapter has been updated to reflect multimodal performance. It discusses both Legislatively Required and Local (San Francisco-specific) performance measures. This CMP update incorporates the results of the Spring 2011 Level of Service (LOS) monitoring effort. The chapter also includes results from analysis using real time private commercial data and transit speeds on the Muni bus network from the same time period as the roadway LOS monitoring period. The Authority also reports in this chapter on the progress of Transportation Sustainability (TSF) Nexus Study, which is a joint effort of City agencies and the Authority.

**Chapter 5:** The Transportation Demand Management (TDM) Element has been updated to

reflect the TDM Partnership Project, a multi-agency collaboration to streamline existing TDM projects and regulations to provide a more effective way for employers to work with the City toward a mutual goal of climate protection and improved transportation options. This chapter also reflects the completion of the Mobility, Access, and Pricing Study, the implementation of *SFpark* variable pricing parking pilots in eight San Francisco neighborhoods, and the development of the Treasure Island Mobility Management Agency.

**Chapter 6:** This chapter has been updated to reflect the City's adoption of an Infill Opportunity Zone (IOZ) for all eligible areas of San Francisco. In addition, details are provided regarding the Authority's Neighborhood Transportation Planning (NTP) program, as well as ongoing multi-agency work to designate and plan for transit-focused development as part of the regional Focusing our Vision (FOCUS) program. Finally, this Chapter discusses the Authority's work on the Sustainable Communities Strategy as part of its Countywide Transportation Plan update, in conformance with SB 375.

**Chapter 7:** This chapter reflects amendments made to the CIP. Per adopted procedures, the CIP is amended concurrently with Authority programming decisions. An ongoing work program item related to the CIP includes monitoring of state and federal funds to ensure that timely use of funds requirements are met. These requirements impose deadlines for project milestones such as obligation of funds, award of contracts and completion of construction. Failure to meet the deadlines can result in loss of funds to the project, the County, and/or the Bay Area Region.

**Chapter 8:** The Authority's San Francisco Travel Demand Forecasting Model has undergone improvements since 2009, which are discussed in this chapter.

#### 1.3.E. Public Input

A public hearing on the Draft 2011 San Francisco CMP is scheduled for the December 6, 2011 meeting of the Authority Plans and Programs Committee. The Authority Board is scheduled to consider approval of the 2011 CMP on December 13, 2011.

**CHAPTER 2****CONGESTION MANAGEMENT  
AGENCY ROLE & RESPONSIBILITIES****Key Topics:**

- **Legislative Requirements**
- **Legislative Intent and Application to San Francisco**
- **San Francisco County Transportation Authority**

**2.1. Legislative Requirements**

California Government Code section 65089 (a), as amended, states “A congestion management program shall be developed, adopted, and updated biennially, consistent with the schedule for adopting and updating the regional transportation improvement program, for every county that includes an urbanized area, and shall include every city and the county. The program shall be adopted at a noticed public hearing of the agency. The program shall be developed in consultation with, and with the cooperation of, the transportation planning agency, regional transportation providers, local governments, the [California] department [of Transportation], and the air pollution control district or the air quality management district, either by the county transportation commission, or by another public agency, as designated by resolutions adopted by the county board of supervisors and the city councils of a majority of the cities representing a majority of the population in the incorporated area of the county.” For the complete text of the CMP statutes see Appendix 2.

**2.2. Legislative Intent and Application to San Francisco**

One of the main thrusts of the CMP legislation is to foster coordination of local land use and transportation investment decisions at the county or subregional level. In order to ensure local involvement in this process, which becomes more complex when the number of local jurisdictions involved increases, the CMP law vests significant authority and responsibility on the Congestion Management Agencies (CMAs). For example, in order to receive state and federal funds, transportation projects in an urban county must now be recommended by that county's CMA as part of its Congestion Management Program<sup>1</sup>. CMAs therefore act as a policy forum and technical resource to guide and help resolve transportation problems within counties when those problems have implications across city boundaries. San Francisco's distinct status as a city and county dictates a somewhat different role for the CMA in this regard, with the focus of involvement shifting to address problems across county lines (such as the effects of regional commute patterns into San Francisco), as well as issues of coordination of city department activities affecting congestion management, such as trip reduction program implementation or transit service improvements.

**2.3. The San Francisco County Transportation Authority****2.3.A. Designation and Composition**

On November 6, 1990, the Board of Supervisors designated the San Francisco County Transportation Authority (the Authority) as the CMA for the County. The Authority Board of Commissioners consists of the eleven members of the San Francisco Board of Supervisors, acting as Authority Commissioners.

<sup>1</sup> If a county opts out of preparing a CMP, per AB 2419 (Bowler), MTC will work with the appropriate agencies to establish project priorities for funding.

### 2.3.B. Roles and Responsibilities

The Authority is a special-purpose government agency, created on November 7, 1989, when San Francisco voters passed Proposition B. Proposition B increased the local sales tax by ½ cent for a period of 20 years, to fund San Francisco transportation projects and services. In November 2003, voters approved a new Expenditure Plan (Prop K), which superseded Prop B and extends the ½ cent sales tax for 30 years. The Authority administers, prioritizes, and programs Proposition K revenues. These revenues also leverage large amounts of State and Federal funds for transportation investments in San Francisco.

On November 2, 2010 San Francisco voters approved Proposition AA, authorizing collection of an additional \$10 fee annually on motor vehicles registered in San Francisco and approving an Expenditure Plan for the new funds. The fee will fund local street repair, improvements to pedestrian and bicycle conditions, and public transit enhancements. As with Prop K, the Authority administers, prioritizes, and programs Prop AA funds.

In its capacity as the CMA for San Francisco, the Authority has primary responsibilities in the following areas:

- Develop and adopt the biennial CMP and related implementation guidance;
- Monitor City agencies' compliance with CMP requirements;
- Program Federal, State, and regional transportation funds;
- Review the programming of all transportation funds for San Francisco;
- Provide policy input into the regional transportation planning and programming process; and
- Develop and periodically update the long-range countywide transportation plan for San Francisco.

The Authority's dual responsibilities – strategic programming of proposition-authorized funds through Strategic Plan processes, and prioritizing and programming of State and Federal funds through the CMP process – are an opportunity to coordinate San Francisco's transportation planning decisions and optimize the City's investments in transportation infrastructure and services. Leveraging State and Federal funds through strategic use of Proposition K monies is a primary example of the efficacy of this process. The Countywide Transportation Plan improves the effectiveness of this process by linking the General Plan's transportation objectives and policies to a specific list of transportation investments, prioritized across a long-range planning horizon. The CMP's 7-year CIP serves as the main implementation tool for the countywide transportation plan.

As the CMA, the Authority is serving as the lead coordinator for San Francisco involvement in the regional process to develop a Sustainable Communities Strategy (SCS) and update the Regional Transportation Plan (RTP). As required by SB 375 (Steinberg), passed in 2008, the SCS and RTP will integrate long-range land use, housing, and transportation planning in the region to reduce greenhouse gas emissions from motor vehicles.

Assembly Bill No. 981, the Treasure Island Transportation Management Act, authorizes the Board of Supervisors (BOS) of the City and County of San Francisco to designate a board or agency to act as the transportation management agency (TMA) for Treasure Island. Following the approval of the Treasure Island/Yerba Buena Island Development Project (Project) in June 2011, the Treasure Island Development Authority (TIDA) and Authority, together with Treasure Island Community Development, LLC (TICD), the private development partner for the Project, have explored the possibility of the Authority being designated as the TMA for Treasure Island. Based on an initial assessment by the group of substantial benefits of such a partnership, the Authority has worked jointly with TIDA to prepare a Memorandum of Agreement (MOA) regarding the potential designation of the Authority as the Treasure Island Mobility Management Agency (TIMMA), in fulfillment of the TMA role. The MOA describes the intent of TIDA Board of Directors to recommend to BOS formal designation

of the Authority as the TIMMA and of the Authority to accept the designation.

In addition, acting as the CMA, the Authority plays a key role in evaluating and providing guidance on major local transportation projects and land use policies that may affect the performance of the transportation system.

### **2.3.C. Implications of the Board's Multiple Roles**

As described above, the San Francisco Board of Supervisors also serves as the Authority's Board of Commissioners. These multiple roles require careful balancing of the Board's responsibilities. Policy decisions made by the Board of Supervisors may have negative congestion management impacts and place the Board, as CMA, in a position to find the City in non-conformance with the CMP. This may in turn generate difficult Proposition K funding choices for the Authority Board.

In order to minimize the potential for conflict, the Authority cannot limit its role to just monitoring CMP conformance after the fact. Instead, the Authority must take a proactive role to serve as a resource in analyzing the potential transportation implications of transportation and land use related actions, projects, or policies proposed for the City. In order to fulfill this responsibility, the Authority regularly participates in and comments on studies and discussions of key San Francisco transportation and land use issues, such as the Transit Effectiveness Project (TEP), Park Merced Project, Eastern Neighborhood Transportation Implementation Planning Study (EN TRIPS), and the Transit Center District Plan. This approach allows the Board to anticipate potential problems, instead of reacting when congestion impacts reach crisis proportions and require hasty actions.

### **2.3.D. Relationship to City Agencies**

State law mandates that the Authority, acting as CMA, must biennially determine if the City is in conformance with the adopted Congestion Management Program. A finding of non-conformance has potentially significant consequences for transportation funding in the City. Also according to

state law, it is the City's responsibility to ensure that transportation projects, programs, and services are put in place, through its implementing departments, to maintain conformance with the CMP.

In fulfilling its CMA mandate, the Authority must function as an independent agency to be able to objectively and credibly evaluate CMP conformance. This dictates a special relationship with City departments involved in transportation-related actions which must be assessed at least biennially relative to their congestion management impacts. On the other hand, because of the Board's multiple roles, as described in the previous section, the Authority's approach is to act as a resource, maximizing coordination with the City departments responsible for planning and implementation of transportation actions, so that such actions may be evaluated for congestion management impacts before they are put in place.

### **2.3.E. Relationship to Regional Planning/Programming Agencies**

As the Congestion Management Agency for San Francisco, the Authority plays a key liaison role with the Metropolitan Transportation Commission (MTC), the Bay Area's regional transportation planning agency, and with the Bay Area Air Quality Management District (BAAQMD), the agency responsible for implementation and monitoring of the region's Clean Air Plan. The Authority serves as the focal point for local input into MTC's Regional Transportation Plan (RTP), which establishes the overall vision for long-range transportation development and funding in the region, and the Regional Transportation Improvement Program (RTIP). Through its membership in the Bay Area Partnership, the Authority plays a key role in shaping the evolution of planning and programming processes affecting San Francisco's ability to make effective transportation investments and preserve its economic vitality. Further, through its leadership in this regional forum the Authority is in a position to influence the debate over the vision and goals for transportation and land use planning in the Bay Area, bringing to bear San Francisco's unique perspective on multimodal transportation, mobility, and livable communities.

**CHAPTER 3**

**CMP-DESIGNATED ROADWAY NETWORK**

**Key Topics:**

- **Legislative Requirements**
- **San Francisco CMP Roadways**
- **Work Program Items**

**3.1. Legislative Requirements**

California Government Code Section 65089(b)(1)(A) requires that the designated Congestion Management Network include at least all state highways and principal arterials. No highway or roadway designated as part of the system may be removed from the system. The statutes do not define ‘principal arterial.’

The statutes also refer to regional transportation systems as part of the required land use impacts analysis program, California Government Code Section 65089(b)(4). In 1991, the Bay Area’s Congestion Management Agencies (CMAs) developed Congestion Management Program (CMP) networks in coordination with MTC’s Metropolitan Transportation System (MTS). The MTS network, which includes both highways and transit services, was subsequently designated as the Congestion Management System, as required by the federal Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991. The MTC contracted with the congestion management agencies in the Bay Area to help develop the MTS and to use the CMPs to link land use decisions to the MTS.

**3.2. San Francisco CMP Roadways**

CMP legislation requires that all state highways (including freeways) and principal arterials are included in the CMP network. The network must be useful to track the transportation impacts of land devel-

opment decisions, as well as to assess the congestion management implications of proposed transportation projects. San Francisco’s network therefore includes numerous local thoroughfares since most urban traffic occurs on city arterials (rather than on the freeways). The next sections document the network selection criteria and process used in the initial San Francisco CMP in 1991, and describes the current network.

**3.2.A. Selection Criteria**

Consistent with State requirements, the San Francisco CMP roadway network includes all freeways and state highways, as well as principal arterials. San Francisco has defined principal arterials as the Major Arterials designated in the Transportation Element of the City’s General Plan, defined as follows:

*“cross-town thoroughfares whose primary function is to link districts within the city and to distribute traffic from and to the freeways; these are routes generally of citywide significance; of varying capacity depending on the travel demand for the specific direction and adjacent land uses.”*

Several additional arterials – Market Street, Mission Street, Sutter Street, and West Portal – are also included in the CMP roadway network. These streets experience significant conflicts between auto traffic and transit service.

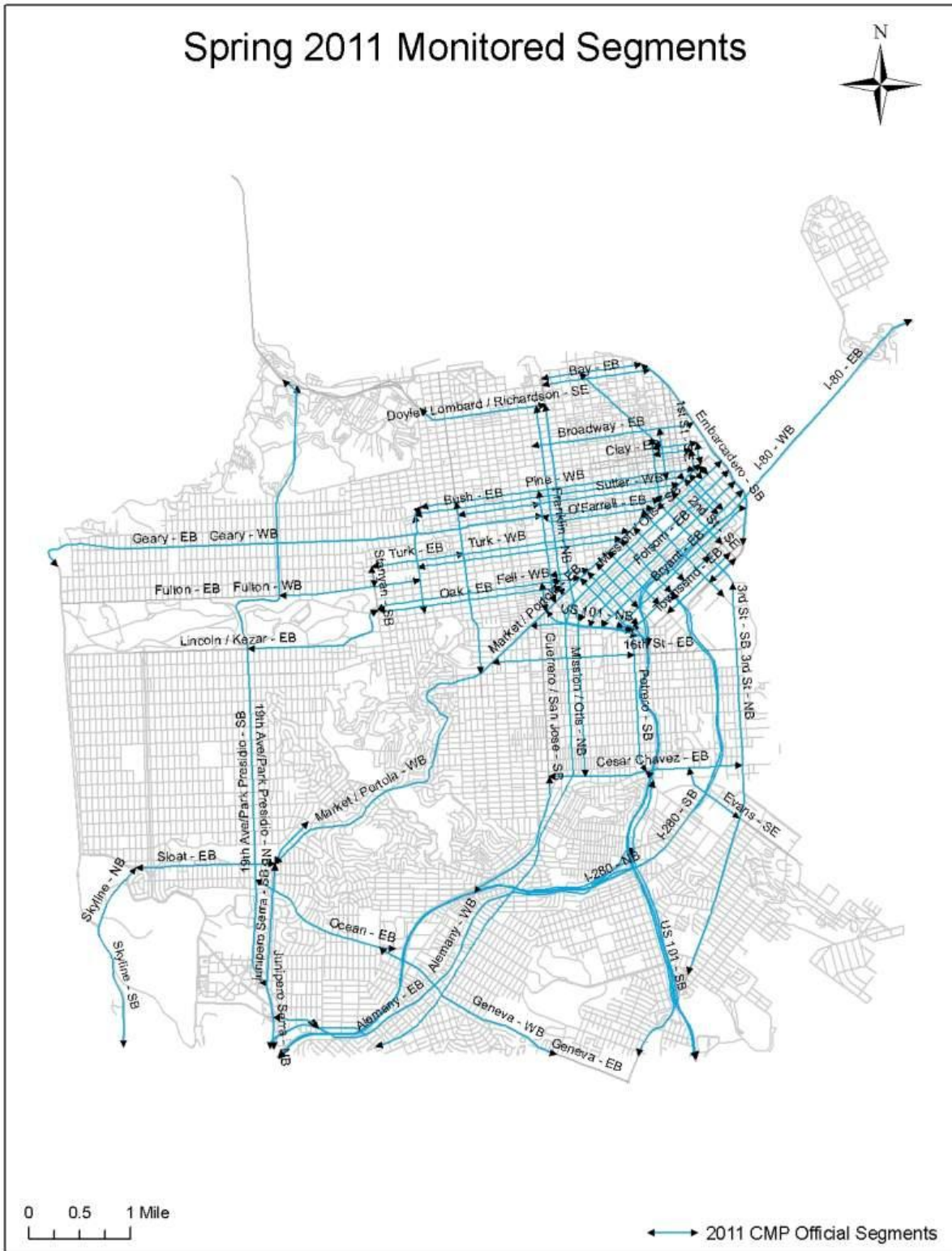
**3.2.B. Current Network**

The complete CMP roadway network for San Francisco consists of 237 directional miles on both arterials and freeways.

Roadway Type	Total Directional Miles
Arterial	202.1
Freeway	34.9
Total	237.0

As discussed in Chapter 4, performance monitoring was conducted in spring 2011 for the entire CMP network. The spring 2011 monitoring network is shown in Figure 3-1, including the distinction between “official” and “additional” segments.

Figure 3.1: Spring 2011 Monitored Segments



## i. Freeways and State Highways

San Francisco's CMP roadway network includes freeway segments on Interstate 80, Interstate 280, and US Route 101. State routes designated along City streets are also part of the CMP roadway network, as follows:

- US Route 101 – Richardson Avenue, Lombard Street west of Van Ness Avenue, and Van Ness between Lombard Street and Market Street; (for the 2011 monitoring cycle, the Doyle Drive portion of US Route 101 was not monitored, as this segment is under construction for a replacement facility known as the Presidio Parkway);
- Route 1 – Park Presidio Boulevard, 19th Avenue, and Junipero Serra Boulevard south of 19th Avenue;
- Route 35 – Sloat Boulevard between 19th Avenue and Skyline Boulevard as well as Skyline Boulevard.

## ii. City Arterials

The remainder of CMP network arterials are city arterials. A table of all arterials included in the CMP network is included in Appendix 3.

### 3.2.C. Network Changes

State law prohibits the removal of roadway facilities from the initially designated CMP network (unless facilities are physically removed from the transportation system, such as the Embarcadero Freeway). New facilities may be added to the CMP network without restrictions, subject to the established criteria for inclusion. No network changes are proposed in the 2011 CMP.

From time to time the Authority may also monitor additional segments that are not part of the official CMP network. These do not constitute official changes to the CMP network, but may be included to support current planning and system management efforts. The Authority has not monitored any additional segments in 2011.

### 3.2.D. Relationship to the MTS

San Francisco's CMP roadway network is broadly consistent with the MTS defined by MTC. The MTS is a regional network of roadways, transit corridors and transfer points. The State highways and major thoroughfares designated in San Francisco's CMP roadway network are all included in the San Francisco portion of the regional MTS network. In a few instances, the local CMP roadway network is not identical to the regional MTS network due to differences in the criteria used to define each network. San Francisco's CMP and MTS networks are coordinated with the networks of adjacent counties, to ensure regional connectivity.

A 1993 agreement delegated responsibility from MTC to the Authority to implement certain mandates in the federal Interstate Surface Transportation and Efficiency Act (ISTEA) of 1991 and by extension, under the Safe, Accountable, Flexible, Efficient Transportation Equity Act—A Legacy for Users (SAFETEA-LU) of 2005. These include the analysis of potential impacts on the MTS of proposed local land use decisions (see Chapter 7). The MTS roadway network was updated in 2001 to reflect “support for ‘smart growth’ and ‘environmental justice’ by including new focus on facilities that serve major areas of high density, and that provide essential access to disadvantaged neighborhoods.”

### 3.2.E. Multimodal Considerations

Transportation performance measures in the San Francisco CMP have broadened to increasingly incorporate multimodal performance. However, the city's dense grid allows parallel streets in the same corridor to serve different transportation functions, and the designated CMP roadway network does not necessarily align with the most important or heavily traveled routes for transit riders, bicyclists, or pedestrians. Therefore, many of the non-auto performance measures in this CMP include data from non-CMP portions of the street network or use citywide metrics. Some multimodal measures, such as transit speed, use data collected along CMP network segments to facilitate comparisons with automobile performance. Chapter 4 provides detail on multimodal performance.

### 3.4. Work Program Items

- Participate in any future MTC efforts to re-define the Metropolitan Transportation System (MTS).



**CHAPTER 4****MULTIMODAL PERFORMANCE****Key Topics:**

- **Legislative Requirements**
- **Legislative Intent and Application to San Francisco**
- **Applications of Multimodal Performance Measures**
- **Legislatively Required Performance Measures (Auto LOS and Transit)**
- **Summary of Monitoring Results**
- **Local Performance Measures (Transit, Bicycle, and Pedestrians)**
- **Work Program Items**

This chapter presents the 2011 CMP multimodal performance results, including analyses of traffic congestion, transit, and non-motorized performance measures. It combines the traffic Level of Service (LOS) and multimodal performance elements required under state CMP legislation, reflecting the legislation's requirement that LOS be included as one of several multimodal performance measures. This approach is also consistent with San Francisco's urban, multimodal environment. Vehicular traffic congestion remains an important metric of transportation performance in San Francisco, but the City and County's Transit First policy and emphasis on person mobility place higher priority on the performance of alternative modes including transit, bicycles, and pedestrians than on private vehicle speeds.

**4.1. Legislative Requirements****4.1.A. LOS Monitoring**

The California Government Code requires that San Francisco use automobile level of service (LOS) standards to measure the performance of the CMP roadway network, but permits CMAs a choice among the following methodologies for measuring LOS:

- Transportation Research Board Circular 212 (TRC 212);
- Transportation Research Board's Special Report 209: *Highway Capacity Manual (HCM)*; or
- A uniform methodology adopted by the CMA that is consistent with *the Highway Capacity Manual*.

The CMA is required to biennially determine the City's conformance with the CMP, including attainment of LOS standards.

In accordance with CMP legislation, the county and city governments are required to show that CMP route segments within their jurisdiction are operating at or above the CMP traffic LOS standard for all segments outside of any designated Infill Opportunity Zone (IOZ). Section 65089(b)(1)(B) states that "In no case shall the LOS standards established be below the LOS E or the current level, whichever is farthest from LOS A except when the area is in an infill opportunity zone. When the level of service on a segment or at an intersection fails to attain the established level of service standard outside an infill opportunity zone, a deficiency plan shall be adopted pursuant to section 65089.4". In addition, Section 65089.3 establishes that "The [California] [D]epartment [of Transportation] is responsible for data collection and analysis on state highways, unless the agency designates that responsibility to another entity."

Senate Bill 1636 (Figueroa), passed in 2002, authorized local jurisdictions to designate IOZs. IOZs must meet eligibility criteria to ensure they are compact, mixed-use areas that are well-served by transit. In December 2009, the San Francisco Board of Supervisors designated all eligible areas

within the City and County of San Francisco as an IOZ (see Appendix 15). Within a designated IOZ, the local jurisdiction is not required to maintain traffic conditions to the LOS standard. Thus, CMP route segments located within an IOZ are exempt from the minimum LOS standards and deficiency plan requirements mandated elsewhere by the CMP legislation.

#### **4.1.B. Multimodal Performance Monitoring**

The CMP legislation also requires a multimodal performance element. AB 1963 in 1994 modified Section 65089(b)(2) of the Government Code to replace the transit service standards requirements previously mandated for the 1991 and 1993 CMPs. The revised statutes state that the CMP shall include “[a] performance element that includes performance measures to evaluate current and future multimodal system performance for the movement of people and goods. At a minimum, these performance measures shall incorporate highway and roadway system performance, and measures established for the frequency and routing of public transit, and for the coordination of transit service provided by separate operators. These performance measures shall support mobility, air quality, land use, and economic objectives, and shall be used in the development of the capital improvement program..., deficiency plans..., and the land use analysis program....”.

#### **4.2. Legislative Intent and Application to San Francisco**

The original CMP legislation defined performance narrowly as roadway level of service (LOS). The amendments acknowledged the need for diversified solutions to complex transportation problems in urban areas, and the inadvisability of tackling them with just one mode. Current performance element requirements recognize that the transportation system performance should be measured for all modes: automobile, transit, bicycle, and pedestrian.

According to the CMP legislation, deficiencies are detected only on the roadway system. Improvements on the LOS scale ensure better travel con-

ditions for motorists, but the LOS scale does not take into account the *person throughput* capacity of a roadway. A city arterial may carry the maximum number of automobiles at acceptable speed, but if each vehicle carries only the driver, then throughput of the facility is suboptimal. San Francisco therefore includes performance standards and measurements that evaluate all aspects of the City’s multimodal transportation network. San Francisco’s high transit, pedestrian, and bicycle mode shares and extensive non-auto mode networks mean that the city benefits from a multimodal approach to system performance.

Consistent with State law, the 2011 San Francisco CMP distinguishes between two categories of performance measures. Legislatively Required measures include roadway LOS plus three transit service performance measures: routing, frequency, and interoperator service coordination. These are the elements of congestion and multimodal performance measurement that are explicitly required by State congestion management statutes. Section 4.4 details the Legislatively Required metrics.

Local performance measures include multimodal metrics that are not used for determination of CMP conformance under State legislation but reflect performance goals for alternative modes in the City of San Francisco. The local measures are used for planning purposes and to track trends over time. Transit measures included in the 2011 CMP include transit speeds and transit-to-auto speed ratios. Non-motorized metrics include volumes, network connectivity, and safety. These measures are discussed in further detail in Section 4.6.

#### **4.3. Applications of Multimodal Performance Measures**

State law requires that link (roadway) LOS be used for determining CMP conformance and conducting deficiency planning, except within a designated Infill Opportunity Zone. Multimodal performance measures will be used for the following purposes:

#### 4.3.A. CMP Conformance Determinations

Link (roadway) LOS will continue to be used for conformance determinations for areas that are not designated by the City as an IOZ. Although areas within the designated IOZ are exempt from deficiency planning requirements, the Authority will continue to monitor multimodal performance, including LOS.

#### 4.3.B. CIP Amendments

The Authority will continue to evaluate the potential impacts of proposed CIP changes on the performance of the multimodal network. This information is used as one of the factors in determining Authority concurrence with such proposals.

#### 4.3.C. Deficiency Plans

Link LOS measurements will be used for deficiency determinations. Portions of the congestion management network within a designated IOZ are exempt from deficiency planning requirements. See Appendix 5 for more information on deficiency plans.

#### 4.3.D. Land Use Impacts Analysis

Multimodal performance measures will be used for the analysis of impacts of local land use decisions on the CMP network.

### 4.4. Legislatively Required Performance Measures

#### 4.4.A. Roadway Level of Service (LOS)

This is the most traditional and best documented performance measure. The CMP legislation defines roadway performance primarily by using the level of service (LOS) traffic engineering concept to evaluate the operating conditions on a roadway. LOS describes operating conditions on a scale of

A to F, with “A” describing free flow, and “F” describing bumper-to-bumper conditions. The HCM defines LOS as “...a quality measure describing operational conditions within a traffic stream, generally in terms of such service measures as speed and travel time, freedom to maneuver, traffic interruptions, and comfort and convenience.”

Designation of much of San Francisco as an Infill Opportunity Zone strengthens the Authority’s efforts to develop and employ multimodal performance measures appropriate to a dense, multimodal, urban environment. Under the CMP legislation, CMP segments within an IOZ are exempt from minimum LOS standards. The Authority continues to work with partner agencies to collect data and develop robust metrics that adequately monitor and evaluate multimodal system performance.

Still, continued monitoring of automobile LOS is useful for a variety of reasons. As the most extensive historical dataset available, LOS allows for the monitoring of traffic conditions over a long period of time. Congestion is also an important factor in the performance of surface-running transit service: where transit operates in mixed traffic, increased congestion will slow transit. Finally, ongoing monitoring of both automobile and transit speeds within the same corridor facilitates the assessment of relative modal performance. As such, the Authority monitored automobile LOS on the designated CMP network during spring 2011.

The traffic LOS standard for San Francisco is consistent with CMP mandated criteria and was established at E in the initial (1991) CMP network. Facilities that were already operating at LOS F at the time of baseline monitoring, conducted to develop the first CMP in 1991, are legislatively exempt from the LOS standards. CMP segments that are within a designated IOZ are also exempt from LOS conformance requirements. All freeway and arterial segments were monitored using the floating vehicle method, which allows for determination of LOS on the basis of average operating speed.

The methodology and results of the 2011 LOS Monitoring effort are detailed in Appendix 4.

### i. Summary 2011 LOS Monitoring Results

Table 4-1, below, presents the change in CMP Network Average Travel Speeds between 2009 and 2011.

**Table 4-1. CMP Network Average Travel Speed**

Category	2009	2011
Arterial AM	18.6 mph	17.7 mph
Arterial PM	16.9 mph	16.6 mph
Freeway AM	48.9 mph	40.6 mph
Freeway PM	31.7 mph	31.4 mph

Average travel speeds on the CMP network have changed little compared to 2009, except on freeways in the AM. Average arterial travel speeds have decreased 5 percent from 18.6 mph to 17.7 mph in the AM peak and decreased 2 percent from 16.9 mph to 16.6 mph in the PM peak. The average travel speed on freeways decreased 17 percent from 48.9 mph to 40.6 mph in the AM peak. The large change in travel speed for these AM freeway segments could be an indication of the low sample size of the monitoring data collection effort - the few travel runs performed as part of this exercise may not be indicative of cyclical fluctuation in speeds. In the PM peak, average freeway speeds decreased 1 percent from 31.7 mph to 31.4 mph.

Average speed on I-280 in the AM peak between Brannan and Junipero Serra dropped significantly this year compared to 2009 in both directions. Also, average speed on US 101 Northbound in the AM peak on all segments dropped significantly this year compared to 2009. These conditions are contributing to the marked decline in the average AM peak freeway speed as compared to 2009.

Out of 249 CMP arterial segments, average AM peak speeds increased on 104 segments and decreased on 145 segments. In the PM peak, average arterial speeds increased on 123 CMP segments and decreased on 126 segments.

The mixed outcome of the analysis, with some arterial segments showing increased speeds since 2009 while others showing decreased speeds may again reflect the small sampling nature of the LOS monitoring. In addition, these results indicate the natural equilibrium of San Francisco's grid network which allows traffic numerous paths of travel; if one segment becomes congested, traffic will often switch to a parallel, less congested segment. Only one arterial CMP route segment and two freeway segments evaluated during the morning peak period were found to operate at LOS F. In the PM peak, one arterial segment and four freeway segments were found to operate at LOS F. All arterial and freeway segments operating at LOS F in the 2011 monitoring cycle are exempt from constituting deficiencies, either because there were operating at LOS F during the baseline 1991 monitoring cycle or because they are located within an IOZ.

### ii. Future Monitoring Approach

Since the adoption of the 2009 CMP update, there has been a proliferation of archived private commercial data. This data is collected through real-time GPS monitoring of a variety of sources such as delivery vehicles, navigational devices, and highway performance monitoring systems. As more data is collected and its reliability is verified relative to results obtained using more established methods, the use of this archived data may be able to serve as a more robust and cost-effective sampling than floating cars for monitoring CMP network LOS in future cycles.

For this reason, the Authority analyzed archived data, compiled by a data vendor (INRIX), from the same time period as the official LOS monitoring period.

Preliminary analysis indicates that private commercial data would provide an equally acceptable data source to meet the requirements of the CMP legislation. As shown in Table 4-2, for the PM peak period analyzed using INRIX data, the difference in average speed across the CMP network using the two methods was about 5% for arterials (16.6 mph vs. 17.5 mph) and less than 9% for freeways (31.4 mph vs. 34.2 mph). Appendix 4

shows a comparison of all CMP segments between the two methods.

**Table 4-2. Comparison of LOS Monitoring Results with INRIX Data for PM Peak CMP Network Average Travel Speed**

Category	LOS Monitoring Results	INRIX
PM Arterials	16.6 mph	17.5 mph
PM Freeways	31.4 mph	34.2 mph

### iii. Caltrans Role

Although Section 65089.3 establishes that Caltrans is responsible for LOS monitoring on the State highway system, Caltrans has not been able to fully address this obligation due to budget constraints. The Authority continues to work with Caltrans District 4, MTC, and the other Bay Area CMAs to ensure that freeway operations data still being collected by Caltrans is put to the best possible use to help satisfy CMP monitoring requirements. Until a budget solution is found, the Authority will continue to include state highways in its periodic LOS monitoring efforts to ensure that the information is available to satisfy CMP conformance determination requirements.

In September 2002 the Governor signed AB 2535 (Diaz). This legislation, called Transportation Congestion Data Collection, requires Caltrans to, within existing resources, collect, analyze and summarize highway congestion data for District 4 (Bay Area) and provide it to Congestion Management Agencies for LOS monitoring on state routes and highways. This bill would put the burden to do the monitoring on state routes back on Caltrans. Ideally, this reform will ensure uniform measurements and save the Authority this ongoing expense.

In light of the current state budget crisis, it unlikely that Caltrans will find the necessary resources to comply with the requirement to provide LOS data on state routes to the CMAs on a biennial basis.

### iv. Deficiency Planning

Since all segments measured at LOS F in the 2011 monitoring were exempt and did not represent a deficiency, and since San Francisco was not found to be deficient for any of the Legislatively Required transit performance measures, no deficiency planning process is triggered by the 2011 CMP. The Authority is continuing to collaborate with other agencies to define alternative LOS mitigation measures for San Francisco's IOZ (see subsequent sections of this Chapter). For a detailed discussion regarding the CMP deficiency planning process, see Appendix 5.

#### 4.4.B. Transit Coverage/Routing

This refers to the pattern and hierarchy of the transit route network (e.g., radial/grid, rapid/local, etc.) and the service area covered (e.g., percent of total population served within one-quarter mile; or percent of total urbanized area served). San Francisco County has the most extensive transit coverage of any Bay Area county. As shown in Table 4-A at the end of this chapter, the Muni coverage standard is to provide service running at least 19 hours per day within a ¼ mile walking distance. Other transit operators serve smaller areas of the City and primarily provide connections to other parts of the region.

#### 4.4.C. Transit Frequency

This is the number of transit vehicles (buses, trains, or ferries) per hour (e.g., 4 buses per hour). The inverse of the frequency is called "headway," which is the time between transit vehicles (e.g., 15 minutes between buses).

Table 4-A, found at the end of this chapter, shows frequency (headway) and coverage standards for the major transit operators that provide service in San Francisco.

A number of transit operators provide connections to and from points outside the city. Because of the predominantly suburban, low-density environment in which they function, which limits the amount and kinds of service they can provide,

these operators have significantly different standards from those that Muni is expected to achieve in San Francisco. These differences are reflected in Table 4-A. The transit standards are essentially established policy and in most cases are taken directly from each operator’s Short Range Transit Plan.

#### 4.4.D. Interoperator Coordination

This addresses the linkages between transit services provided by different operators (e.g., timed transfers at transit centers, joint fare cards, etc.), to facilitate the use of transit.

Initially, Senate Bill 602 required that MTC, in coordination with the Bay Area’s Regional Transit Coordinating Committee (RTCC), develop rules and regulations for fare and schedule coordination in MTC’s nine-county Bay region. More recently, SB 1474 set coordination objectives for the region’s transit services, and MTC has adopted Resolution 3055, Transit Coordination Implementation Plan, to comply with SB 1474. This MTC-led process is considered sufficient to meet the intent of CMP law regarding transit service coordination in the region. Compliance with MTC’s process by Muni and all other operators serving San Francisco will therefore constitute sufficient grounds for a finding of conformance with CMP transit coordination requirements.

The Authority is currently engaged with partner agencies in various efforts that seek to improve transportation system connectivity and ease interoperator transfers. This unified system, centered on a single farecard known as Clipper, is now operational in San Francisco and provides interoperator functionality. Eventually, Clipper will be part of an even more comprehensive multimodal system. This “integrated mobility account” would potentially include non-transit systems, namely FasTrak (automated bridge-tolling), on- and off-street parking payment, and, if implemented, congestion pricing fees. Such a system would provide ready access to account information through web and mobile interfaces. With a centralized mobility management system, users could also be encouraged to make better transportation decisions and evaluate travel costs

and tradeoffs in a more comprehensive manner.

#### 4.5. Local Performance Measures

In measuring performance, we are measuring the ability of the system to satisfy the transportation needs of all San Franciscans, and we must therefore measure performance with reference to particular groups of users—e.g., transit riders, bicyclists, and pedestrians.

Traffic congestion has been measured with a widely recognized, standard approach—LOS—for decades. By contrast, information about the performance of the rest of the transportation network, for those who choose to take transit, bicycle, or walk, is less standardized. Historically, certain transit system data has been collected in response to federal or state requirements tied to eligibility for funding. Typical data collected included total daily ridership—an indicator of current demand for service, and cost per passenger mile, an indicator of cost effectiveness. Increasingly, however, operators are deploying on-board monitoring technologies to help adjust daily operations, improve ongoing system planning, and inform longer-range capital planning.

Similarly, data pertaining to bicycle and pedestrian trips has historically been seldom available. When collected, it is usually in connection with a specific project proposal, and is not a part of a systematic effort that provides a picture of the user’s experience.

Multimodal performance data is increasingly needed not just for system performance measurement pursuant to the countywide plan and congestion management planning, but also for transportation impact analysis and project prioritization. It is necessary to provide better information to the traveling public, as well as to inform policy decisions about funding of transportation projects and services.

By applying the performance measures for travel by car, transit, bicycle, or foot to different neighborhoods in the city, we can produce a *countywide picture of comparative mobility* between neighborhoods, modes (e.g. transit vs. auto), or types of

users (e.g. transit dependent, elderly). We can also evaluate the accessibility of different parts of the city, by analyzing the number of destinations that are reachable by different modes of transportation.

The Authority's travel demand model and GIS database are the main tools for analysis of system performance data.

The Authority also continues its ongoing technical and policy vehicles for development of further local performance measures. The groundwork for further measures has been supported with allocations of Prop K funding for projects devoted to ongoing collection of multimodal data, such as automatic passenger counters (APCs) on transit vehicles, in-pavement bicycle volume counters, and intersection-level automated pedestrian counters.

#### 4.5.A. Transit Speeds

The San Francisco Municipal Transportation Agency (SFMTA) uses both automatic vehicle locator (AVL) and automatic passenger counter (APC) systems to collect robust, real-time data on transit vehicle performance and ridership. AVL and APC data supports a wide range of operations, planning, and customer service activities.

AVL technology is installed on Muni's entire fleet of diesel (including hybrid) buses, electric trolley-buses, and light-rail vehicles. A GPS-based real-time monitoring system, AVL is useful both from an operational perspective (i.e., NextBus) and planning perspective. In 2007, the Authority used AVL data to validate travel demand model improvement efforts, which linked modeled transit speeds dynamically to auto speeds. (The San Francisco model is discussed in further detail in Chapter 10.) The 2007 CMP included, for the first time, reporting of transit speeds on key monitored segments of the Muni system.

APCs are a more robust on-board monitoring tool than AVLs. The SFMTA's APC system provides both running time (i.e., speed) information as well as passenger activity (boardings and alightings) data. In March 2005, the Authority approved the

first of several allocations of Prop K funds to support the procurement and installation of APCs on a portion of Muni's bus fleet. SFMTA's Transit Effectiveness Project (TEP) significantly accelerated the deployment of APCs on Muni's diesel bus and trolley bus fleet, in order to provide the high-resolution (i.e., stop-level and route-level) data necessary for the TEP's comprehensive system analysis.

More generally, the resources and analyses developed for the TEP's original analysis have provided SFMTA with a set of valuable tools and skills for data driven decision-making. Operations-level data, collected in real-time on a sufficient sample of vehicles and runs, supports a range of planning activities, from short-term resource deployment to financial planning and long-range system development. APC data is regularly shared between the SFMTA and the Authority for planning purposes, including for CMP reporting.

The SFMTA currently has APCs deployed on a significant portion of its bus fleet. Guided by a deployment plan, equipped vehicles are rotated across the system each month; thus each individual run (i.e., a particular scheduled departure of a specific route) is sampled on a regular basis (at least once per month). This is valuable for detailed service planning purposes. For broader system performance monitoring and planning purposes, such as the CMP, the APC data can be aggregated to a weekday peak period and have a relatively large sample set.

**APC Analysis:** For the 2011 CMP, the LOS monitoring consultants (Jacobs) processed two months of APC data collected on Muni's bus (diesel and trolley coach) fleet., Muni light rail vehicles are not currently equipped with APCs, and were thus not included in the analysis. After undergoing a quality control "cleaning" to eliminate faulty and outlier data samples, the data was filtered to include only weekday peak periods. The same time periods were as used as in the LOS Monitoring (7:00am-9:00am and 4:30pm-6:30pm).

The APC equipment relies on GPS technology to recognize Muni's designated stop locations as a vehicle traverses its route. The processed dataset

provides stop-to-stop travel speed, inclusive of dwell time. Dwell time is assigned to the “upstream” stop: the segment-level data represents upstream stop-arrival point to downstream stop-arrival point. In this way, the processed data corresponds with the travel time and through-speed experience by a transit rider as he or she passes multiple stops while on-board. (This is comparable to manner in which automobile speed is reported in this chapter by including fully-stopped intersection delay in the calculation of through-travel speed.). Where the transit travel time results have been mapped to CMP segmentation, the bus stop segments were split at CMP boundaries, and the distance of each bus segment within a CMP segment was used to weight the average speed over the segment.

The APC dataset is from April and May 2011—the same period as the roadway LOS monitoring effort. Similar to the LOS monitoring, the week overlapping with San Francisco Unified School District’s spring break, was not used in the analysis. This allowed the comparison of auto to transit speeds on the portions of the CMP network for which Muni data was available. For each segment, the ratio of auto-to-transit speed was calculated. This figure is equivalent to the ratio of transit travel time to auto travel time. A ratio of 2 would indicate that, for a particular route, on-board transit travel time is twice that of auto travel time.

Our findings align with other Authority and SFMTA analyses: surface-running transit in mixed traffic is severely impacted by traffic congestion. During weekday peak periods, bus travel times in many corridors exceed auto travel times by a factor of two or more. Although transit travel time also reflects passenger boarding and alighting time, other Authority studies have found that dwell time accounts for about 25 percent of total travel time; signal delays and mixed-traffic conflicts account for the bulk of negative impacts to the speed of surface-running transit. Congestion also impairs the reliability of transit service. This reinforces the need both to proactively manage congestion and to prioritize transit through signal and lane priority, where warranted and feasible.

Figures 4-1 and 4-2 show average bus speeds on

CMP segments in the AM and PM peak periods, respectively.

Seventy-three CMP segments (where data was available) had a PM peak auto-to-transit speed ratio of 2.0 or greater, indicating that autos travel at least twice the speed of transit vehicles. Table 4-3 displays the 23 segments for which the PM peak ratio is greater than 2.5. The full tabular results are included as Appendix 13.

#### **4.5.B. Muni Service Standards and Milestones**

In November 1999, San Francisco voters passed Proposition E which, among other changes, amended the City Charter to require the creation of service standards and milestones for Muni to attain. The SFMTA Board of Directors updates these periodically. Table 4-B lists the service standards and milestones that directly pertain to the improvement of Muni performance.

#### **4.5.C. Pedestrian and Bicycle Volumes**

The City and County of San Francisco has placed a high priority on shifting travelers’ modes to increase the number of trips made by walking and bicycling. Unlike automobile and transit volumes, increasing volumes of pedestrian and bicycle traffic are a direct indicator of system performance because increased use of these modes alleviates, rather than causes, traffic congestion and transit crowding. Walking and bicycling are space-efficient, healthy, and environmentally beneficial ways to travel, and have minimal negative impact on surrounding communities.

The Authority’s travel demand model estimates that, as of 2010, approximately 20 percent of trips to, from, and within San Francisco were made by walking. A significantly smaller share, about 3 percent, of trips was made by bicycle. In 2010, the San Francisco Board of Supervisors adopted a resolution establishing an ambitious citywide goal of 20 percent of trips being made by bicycle by 2020.



Figure 4-1: 2011 Average Muni Bus Speeds on CMP Network Segments, Weekday AM Peak

## 2011 Average Muni Bus Speeds on CMP Segments: Weekday AM Peak

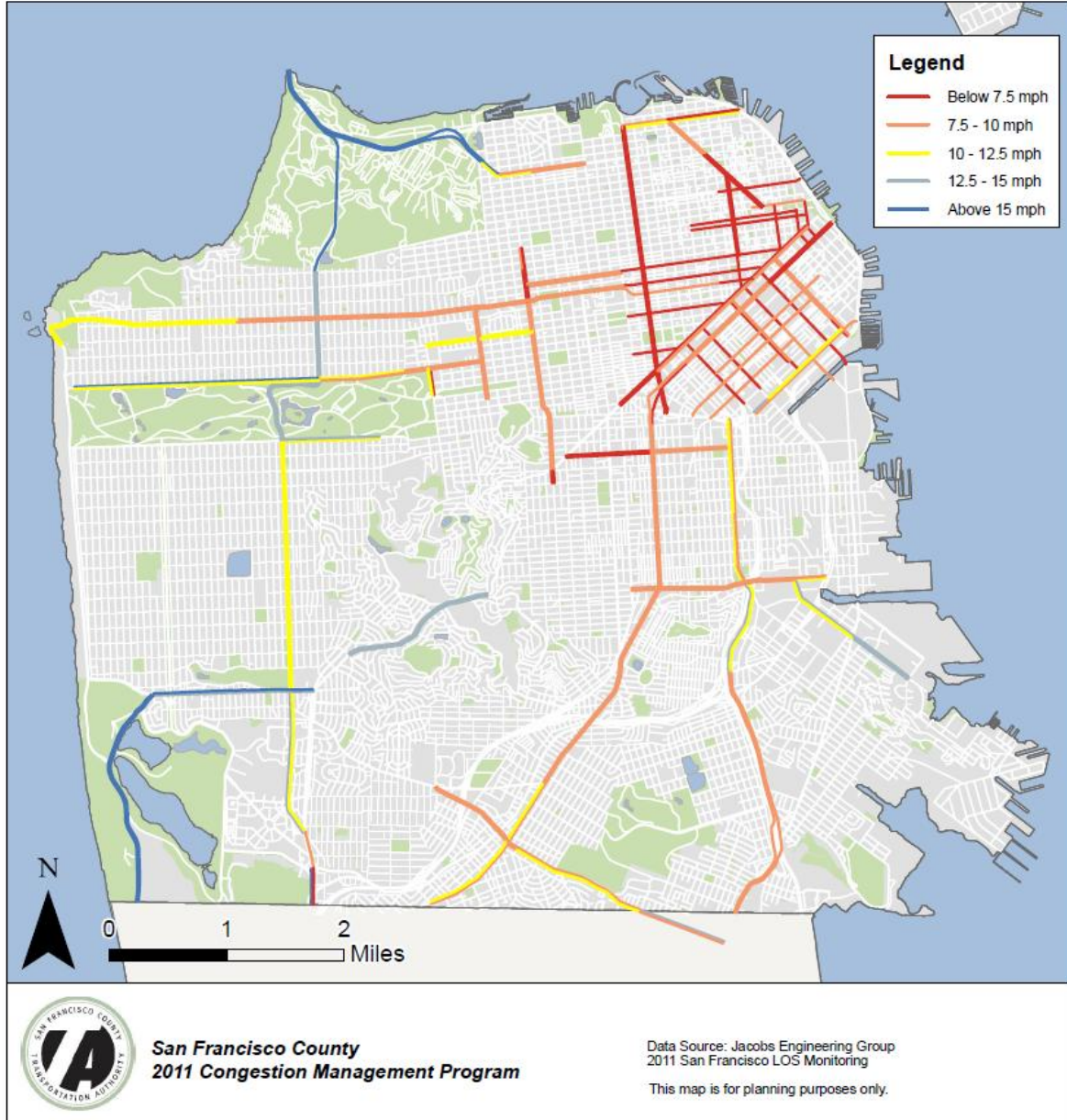


Figure 4-2: 2011 Average Muni Bus Speeds on CMP Network Segments, Weekday PM Peak

## 2011 Average Muni Bus Speeds on CMP Segments: Weekday PM Peak

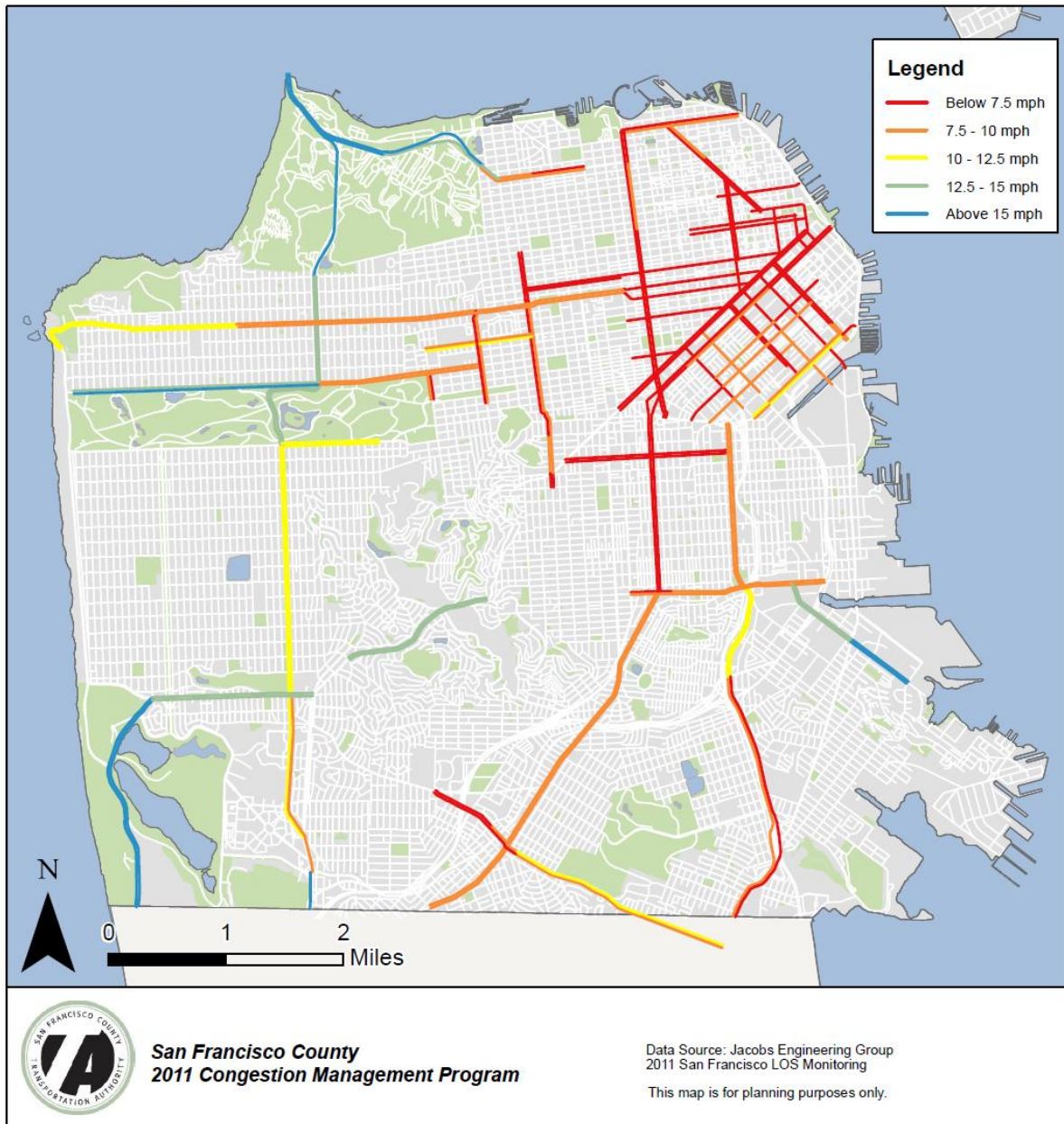


Table 4-3 CMP Segments with Auto-to-Transit Speed Ratios above 2.5 during the PM Peak

CMP Route Name	Auto Start Intersection	Auto End Intersection	Travel Direction	Average Auto Speed (mph)	Average Transit Speed (mph)	Auto/Transit Speed Ratio
Van Ness / South Van Ness	Golden Gate Ave	Washington St	N	21.9	5.5	4.0
Main	Mission St	Market St	NW	14.3	3.6	3.9
North Point	The Embarcadero	Columbus	W	20.2	5.3	3.8
Drumm	Market St	Washington St	N	17.2	4.9	3.5
Bayshore	County Line	Industrial St	N	23.1	6.7	3.5
8th St	Market St	Bryant St	SE	23.8	7.0	3.4
4th St / Stockton	O'Farrell	Harrison	S	15.1	4.6	3.3
Van Ness / South Van Ness	Washington St	Lombard St	N	24.5	7.8	3.1
Cesar Chavez	Pennsylvania Ave	Evans Ave	W	26.9	8.7	3.1
7th St	Brannan St	Market St	N	20.9	7.4	2.8
Mission / Otis	The Embarcadero	3rd St	S	11.0	4.0	2.8
Cesar Chavez	Evans Ave	South Van Ness Ave	W	23.4	8.7	2.7
Van Ness / South Van Ness	Golden Gate Ave	Hwy 101	S	16.5	6.2	2.7
Clay	Kearny St	Davis St	E	16.2	6.1	2.7
5th St	Market St	Brannan	SE	13.8	5.2	2.6
Bayshore	Industrial St	County Line	S	21.8	8.3	2.6
Geary	Gough St	Arguello	W	25.1	9.6	2.6
Potrero	21st St	Division St	N	23.2	8.9	2.6
Van Ness / South Van Ness	Lombard St	Washington St	S	17.1	6.6	2.6
Market / Portola	Laguna St	South Van Ness Ave	E	14.8	5.7	2.6
Geary	25th Ave	Arguello	E	21.5	8.4	2.6
Cesar Chavez	Evans Ave	Pennsylvania Ave	E	24.0	9.6	2.5
5th St	Brannan	Market St	NW	15.7	6.3	2.5

Little data has historically been available to measure the numbers of trips made by walking and bicycling, but City and County agencies are now working together to collect volume data for both modes on a more regular basis.

In 2009, the Authority approved two Prop K allocations to develop SFMTA’s ability to collect pedestrian and bicycle data on a regular basis. Both of these efforts have collected mode-specific volume data at key locations in the city. Unlike for automobile and transit performance, volume information—tracked over time—is a reasonable proxy for the “performance” of a non-motorized mode of travel and the shifting usage to that

The current manual method of data collection is limited by staffing constraints and lacks the ability to quantify bicycle usage at different times of the day, seasonally, and throughout the year. The Citywide Bicycle Counters Project will allow the the SFMTA to utilize automatic bicycle counters to collect more robust bicycle count data.

The Authority, through Prop K, is supporting the SFMTA’s initial project that has installed 16 bicycle counters at seven locations across the city, as well as two modems with wireless service to enable collection of data from two of the seven locations without the need to staff to visit the sites. For the 2010 bicycle count, the most recent for which results are available, the SFMTA implemented a pilot automatic counter on Fell Street.

**Table 4-4**  
**San Francisco Bicycle Counts 2006 - 2010**

	2006	2007	2008	2009	2010
Downtown locations	2,395	2,651	3,375	3,431	3,638
Non-Downtown locations	3,105	3,683	4,509	5,010	5,075
Totals*	5,500	6,334	7,884	8,441	8,713

*\*For comparison purposes, these totals exclude all count locations which were omitted from any previous results (JFK & Transverse, Illinois St. Bridge, Ferry Building).*

Source: SFMTA

mode. Under the City’s Transit First policy, the Countywide Transportation Plan, and numerous other policy documents, increases in pedestrian and bicycle travel are central and explicit goals.

**i. Citywide Bicycle Counting Project:** The SFMTA has conducted manual bicycle counts by sending staff to 33 locations across the city. The annual bicycle counts are completed each August and are conducted for approximately one hour at each location, primarily during the PM peak period. This methodology may be augmented due to the proliferation of automated counters (see below).

Results from bicycle counts through 2010, the most recent for which data is available are shown in Table 4-4. The number of bicycles passing the sample locations increased 3 percent from the 2009 count and 58 percent since the 2006 count, demonstrating a significant and sustained increase in bicycling in San Francisco. Full results of the bicycle count are available in the SFMTA’s 2010 Bicycle Count Report.

As funding becomes available, SFMTA plans to expand its system of bicycle counters across more of the city’s extensive bicycle network, which includes more than 200 miles of lanes, paths, and routes.

Each bicycle counter has a diamond-shaped inductive loop that is installed in the roadway. The system detects the electromagnetic signature of each wheel and validates a count each time a bicycle passes over. The battery-powered counters can identify which direction cyclists are traveling and can differentiate between bicycles and other vehicles.

Data from the bicycle counters will also provide useful information to other agencies, including for the Authority’s travel demand forecasting model.

**ii. Citywide Pedestrian Counting Project:** The Pedestrian Counting Project, led by the SFMTA and supported by Prop K, collects data on pedestrian volumes in order to calculate exposure rates (collisions per overall pedestrian vol-

ume), model pedestrian activity, and help prioritize future transportation improvements.

SFMTA Red Light Camera Enforcement funds were used to conduct initial manual pedestrian counts and will be used for ongoing annual counts, unless outside funding can be identified. Prop K provided funding to purchase six automated pedestrian counters, which use infrared light to detect both pedestrian volumes and directionality. The portable automated pedestrian counters will be rotated between manual count locations to track 24-hour pedestrian activity in order to extrapolate 2-hour manual counts into 24-hour and weekly pedestrian volumes. Prop K funds supported data analysis and construction of a citywide pedestrian exposure model.

The SFMTA conducted the first count of pedestrian crossings at 25 intersections in 2009. The count locations were chosen based on a number of factors, including locations with high pedestrian volumes, locations with high numbers of pedestrian collisions, locations where major improvements are planned, and locations where previous counts have been conducted. In 2010, counts were conducted at 25 different intersections. These additional locations were chosen to provide data for a diverse sample of intersections between the two years for the purpose of building a model to estimate pedestrian activity citywide. The pedestrian crossing model, which provides estimates of exposure, was used to model pedestrian crossing risk throughout San Francisco.

#### 4.5.D. Bicycle Network Connectivity

The extent and connectivity of the pedestrian and bicycle networks are important metrics of non-motorized transportation performance. Comprehensive networks that allow pedestrians and bicyclists to travel easily and safely between destinations are essential to encourage non-motorized travel as an alternative to driving and contributing to traffic congestion.

The San Francisco Bicycle Plan, adopted by the SFMTA in 2009, includes improvements to and expansion of the City's existing bicycle routes, which comprised 208 total miles in 2008. The Plan, which was originally adopted in 2005 but

subject to a four-year court injunction that was lifted partially in 2009 and entirely in 2010, calls for 34 miles of new Class II bicycle lanes in addition to the previously existing 45 miles, 75 miles of shared on-street bike routes to be marked with sharrows, new and improved bicycle parking citywide, as well as additional programs, policies, and projects to improve bicycle connectivity and safety.

Since the Bicycle Plan injunction was lifted, the City has moved rapidly to implement it. The SFMTA installed nearly 15 miles of bicycle lanes from January 2010 through June 2011, with Prop K as well as regional funding for many projects. Progress on the Plan has also included sharrows and pilot installation of separated bikeways, bike boxes at intersections, and colored pavement treatments to increase the visibility and safety of bicycling on City streets.

As of November 2010, the completed network included 234 miles of bike routes, of which 10 percent were Class I paths and 27 percent were Class II designated bicycle lanes. The remainder are Class III signed routes in shared lanes, many of which have wide shoulders or are marked with sharrows.

**Table 4-5**  
**San Francisco Bicycle Facilities, November 2010**

Facility Type	Miles	% Total
Bicycle Path (Class I)	24	10%
Bicycle Lane (Class II)	62	27%
Bicycle Route (Class III)	148	63%
<b>Total</b>	<b>234</b>	<b>100%</b>

The Authority is currently working to adopt an updated Prop K Bicycle Circulation and Safety 5-Year Prioritization Program to identify the highest-priority bicycle improvements to be funded and implemented over the next five years.



#### 4.5.E. Pedestrian and Bicycle Safety

Safety for pedestrians and cyclists are key measures of non-motorized transportation performance. Our primary source of traffic safety data is the California Statewide Integrated Traffic Records System (SWITRS) maintained by the California Highway Patrol, which compiles all local collision reports into a unified database. Fatalities from traffic collisions are tracked, and collisions resulting in injury are classified by severity of injury. Table 4-6, below, displays injury and fatality statistics by involved party for the most recent decade for which traffic collision data has been analyzed (1999-2009).

As shown in Table 4-5, injury collisions among all users have declined from well over 4,000 in 1999 to approximately 3,000 annually, although this decline was largely realized in the first half of the last decade.

Occurrence of pedestrian injury collisions over the past decade has generally tracked with the rate of all injury collisions, with pedestrian injury collisions representing approximately 25 percent of total injury collisions during this period. Pedestrian injury collisions declined steadily to a low of 695 in 2009 (as compared to annual figures exceeding 1,000 in the 1990s).

In recent years, the increase in bicycle injury collisions has been responsible for the majority of the growth in injuries among non-motorized users since 2006. Bicycle injury collisions in the past decade initially fell to a low of 307 in 2002, but subsequently rose to a high of 531 in 2009. This increase is likely due in part both to the significant

rise in bicycling activity observed in recent years and to the citywide injunction on bicycle improvements which was in place from 2006 until August 2010.

Collisions resulting in injury are a more reliable indicator of safety trends than traffic deaths: fatal collisions, being rarer events, are subject to more random fluctuation and greater relative (percentage) shifts on a year-to-year basis. Still, across a longer timeframe, traffic fatalities have declined significantly. Annual traffic deaths among all users in the 1960s regularly exceeded 100 per year; during the 1999-2009 period, annual traffic fatality totals have varied between 26 and 44 annually. Pedestrian fatalities have represented approximately 60 percent of total traffic deaths during this ten-year period, with annual figures varying between 13 and 32 pedestrian fatalities per year..

#### 4.6. Work Program Items

- Monitor CMP network LOS in Spring 2013.
- Analyze the appropriateness of using private commercial data as a substitute for floating cars for monitoring CMP network LOS.
- Work with relevant City agencies to advance a flexible level of service mitigation list for use within the IOZ, building on the TSF process..
- Monitor transit travel times on CMP network and other key corridors in the transit system..
- Monitor and analyze other APC/AVL data metric for the Muni system.
- Coordinate with City departments to improve the availability and collection of data about level of service and performance of all modes,

**Table 4-6**  
**Traffic Collision Injuries and Fatalities by Involved Party, 1999-2009**

	Year	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Injury Collisions	All Users	4,304	4,182	3,917	3,777	3,511	3,038	3,227	2,869	3,021	3,010	2,877
	Pedestrians	915	955	895	862	815	727	747	726	796	799	695
	Bicyclists	429	364	360	307	311	316	343	343	451	468	531
Fatal Collisions	All Users	41	44	35	32	41	33	26	28	42	27	30
	Pedestrians	26	32	19	18	25	20	14	15	24	13	17
	Bicyclists	1	1	4	1	1	1	2	2	1	3	1

particularly project-level “before and after” studies related to pedestrian, transit, and bicycle travel.

- Coordinate with the SFMTA on bicycle counting and pedestrian counting projects.
- Continuously improve the San Francisco Model’s capability to model all modes of transportation, including bicycle and pedestrian trips.
- Continue to participate in citywide pedestrian safety initiatives, including through the Pedestrian Safety Task Force.
- Collaborate with other City agencies to refine and standardize metrics for bicycle and pedestrian performance.
- Continue to participate in multimodal corridor improvement efforts such as the Better Market Street Project.

**Table 4-A**

**Transit Service  
Frequency and Coverage Standards  
Muni**

**Frequency Standard** (headway in minutes)

<b>Weekday</b>	<b>Peak</b>	<b>Base</b>	<b>Evening</b>	<b>Owl</b>
Radial	10	15	20	30
Express	10	--	--	--
Cross-town	15	15	20	30
Feeder	20	30	30	--

<b>Weekend</b>	<b>Base</b>	<b>Evening</b>	<b>Owl</b>
Radial	15	20	30
Cross-town	20	20	30
Feeder	30	30	--

**Coverage Standard**

Walking distance to a route that runs at least 19 hours per day is one-quarter mile or less.

**AC TRANSIT**

**Frequency Standard** (headway in minutes)

<b>SERVICE TYPE</b>	<b>TIME PERIOD</b>				
	<b>Peak</b>	<b>Mid-day</b>	<b>Night</b>	<b>Owl</b>	<b>Weekend/Holidays</b>
Transbay Express	10-30	--	--	--	--
Transbay Basic	10-15	30-45	45-60	--	30

**Coverage Standard**

AC Transit provides two levels of service to the Transbay Terminal in San Francisco. Transbay Express provides medium to high frequency peak-hour service between San Francisco and selected areas of the District where there is demand for transit services which BART cannot meet. Transbay Basic provides direct service between San Francisco and major East Bay areas that are not well served by BART; the service operates all day at a medium to high frequency on a local and/or limited stop basis.



**Table 4-A (cont.)****BART****Frequency Standard** (headway in minutes)**LINE**

<b>TIME PERIOD</b>	<b>Pittsburg/ Bay Point</b>	<b>Dublin/ Pleasanton</b>	<b>Fremont Daly City</b>	<b>Richmond Daly City</b>	<b>Downtown San Francisco (Combined)</b>
Weekday Peak	5	15	15	15	2.7
Weekday Mid-day	15	15	15	15	3.8
Weekday Night	20	20	--	--	10.0
Saturday Day	20	20	20	20	5.0
Saturday Night	20	20	--	--	10.0
Sunday/Holiday all day	20	--	--	10.0	

**Coverage Standard**

BART rail service is provided between the hours of 4:00 a.m. and approximately 1:30 a.m. Monday through Friday, 6 a.m. to approximately 1:30 a.m. on Saturdays, and 8 a.m. to approximately 1:30 a.m. on Sundays and major holidays. Closings for individual stations are timed with the schedule for the last train beginning at approximately midnight.

BART has eight stations in San Francisco: Four spaced a half mile apart on Market Street and four at variable distances in the central and southern areas of the City.

**Table 4-A (cont.)****CALTRAIN****Frequency Standard**

3 trains per hour during peak periods, supplemented by Baby Bullet express service twice per hour during peak periods.

30-minute headways on weekday midday service. 60 minute headways on weekends.

**Coverage Standard**

The Caltrain system operates on a 77.2-mile route between San Francisco and Gilroy. There are 33 stations in the 19 cities that Caltrain serves, including two in San Francisco. San Francisco is also directly served by the Bayshore Caltrain station, located immediately south of the City/County limits in San Mateo County.

**GOLDEN GATE TRANSIT****Frequency Standard** (headway in minutes)

<b>SERVICE TYPE</b>	<b>TIME PERIOD</b>	
	<b>Peak</b>	<b>Base</b>
Commuter Bus	-- <sup>1</sup>	--
Basic Service Bus	30	60
Larkspur Ferry	30	1 hr.
Sausalito Ferry	70	1.5 hrs.

**Coverage Standard**

Commuter bus routes operate weekdays, in the peak travel direction, between residential areas in Marin and Sonoma Counties and the San Francisco Financial District and Civic Center.

Basic service routes operate all day, seven days a week, between the Transbay Terminal and Civic Center in San Francisco and various suburban centers within Marin and Sonoma Counties.

The Sausalito Ferry operates with one boat and can only provide service as quickly as it can travel back and forth between Sausalito and San Francisco, usually an hour and a half.

<sup>1</sup> For commuter bus service, most Golden Gate Transit bus lines operate two to five times per hour during peak periods in the peak direction.

**Table 4-A (cont.)****SAMTRANS****Frequency Standard** (headway in minutes)

<b>SERVICE TYPE</b>	<b>TIME PERIOD</b>	
	<b>Peak</b>	<b>Base</b>
Commuter Bus	30	--
Basic Service Bus	30	60
Trunk Bus routes (El Camino)	15	30

**Coverage Standard**

Within walking distance (0.25 mile) of existing route, which covers the majority of urbanized San Mateo County.

Table 4-B

## 1999 Proposition E Service Standards and Goals (Muni)

STANDARD	FY 99/00 Actual	FY 02/03 Goal	FY 02/03 Actual	FY 03/04 Goal	FY 03/04 Actual	FY 04/05 Goal	FY 04/05 Actual	FY 05/06 Goal	FY 05/06 Actual	FY 06/07 Goal	FY 06/07 Actual	FY 07/08 Goal	FY 08/09 Actual	FY 08/09 Goal	FY 09/10 Actual	FY 09/10 Goal	FY 10/11 Actual
Vehicles that run on time <sup>2</sup>	46%	75%	71%	85%	68%	85%	71%	85%	69%	85%	71%	85%	73.3%	>85%	73.5%	>85%	73%
Scheduled service hours delivered	95.6%	97.5%	94.5%	98.5%	97.3%	98.5%	94.3%	98.5%	94.2%	98.5%	94.3%	98.5%	97%	>98.5	96.6	>98.5	97%
Vehicles too full to board	0.15%	<5%	1.62%	<5%	2.11%	<5%	0.40%	<5%	1.60%	<5%	1.30%	<5%	AM: 3.9% PM: 2.8%	N/A	AM: 4.5% PM: 4.4%	<4%	AM: 5.2 % PM: 8.3%
Peak period load factors (% of capacity)	Various	No greater than 85%	2 lines exceeded goal	No greater than 85%	3 lines exceeded goal	No greater than 85%	6 lines exceeded goal	No greater than 85%	7 lines exceeded goal	No greater than 85%	14.9% of lines exceeded goal	No greater than 85%	TBD in Next SRTP	TBD in Next SRTP	TBD in Next SRTP	TBD in Next SRTP	TBD in Next SRTP
Actual headways vs. scheduled	45%	85%	75%	85%	69%	85%	69%	85%	60%	85%	61%	85%	60.2%	>85%	60.1%	>85%	64.7%
Vehicle availability	99.6%	98.5%	99.6%	98.5%	99.0%	98.5%	98.4%	98.5%	98.3%	98.5%	99.1%	99.0%	TBD in Next SRTP	TBD in Next SRTP	TBD in Next SRTP	TBD in Next SRTP	TBD in Next SRTP

Sources: San Francisco Municipal Railway *FY2008 – FY2027 Short Range Transit Plan*, 2008 and Prop E Annual Reports.

<sup>2</sup> On time defined as no more than one minute early or four minutes late as measured against a published schedule.

**CHAPTER 5****TRAVEL DEMAND MANAGEMENT  
ELEMENT****Key Topics:**

- **Legislative Requirements**
- **Legislative Intent and Application to San Francisco**
- **City TDM Policy Framework**
- **TDM Requirements and Programs**
- **Strategic Initiatives**
- **Work Program**

**5.1. Legislative Requirements**

California Government Code Section 65089 (b)(3) requires development of a “...travel demand element that promotes alternative transportation methods, including, but not limited to, carpools, vanpools, transit, bicycles, and park-and-ride lots; improvements in the balance between jobs and housing; and other strategies, including, but not limited to, flexible work hours, telecommuting, and parking management programs.” Parking cash-out programs can be considered as well.

**5.2. Legislative Intent and Application to San Francisco**

The travel demand management (TDM) element is a key feature of the CMP legislation. While the land use impacts analysis program and level-of-service monitoring activities fulfill primarily a diagnostic function, identifying potential or actual congestion problems so that solutions can be developed, the travel demand management element encourages the local policy, coordinated at the

subregional (county) level, explicitly promoting changes in trip-making behavior.

**5.3. City TDM Policy Framework**

While San Francisco does not have an official citywide travel demand management ordinance, over the last three decades the City has adopted a variety of policies designed to discourage travel by single-occupant automobile and promote other modes of transportation. These policies allowed the city to accommodate unprecedented growth in travel demand without proportionate investments in highway and street capacity. In 1973, the City Planning Commission and the Board of Supervisors adopted the Transit First policy, giving priority to transit rather than accommodating the single occupant automobile. Over the next twenty years, Transit First has evolved into a set of policies advocating travel demand management and prioritization of alternative modes. The City’s Transit First Policy is documented in the City Charter, the Transportation Element of the City’s General Plan, the Planning Code, and other City ordinances.

The General Plan’s objectives and policies that focus on the Transit First policy as well as regional Transportation Control Measures designed to achieve air quality objectives are the policy framework for TDM programs implemented through the CIP. As described below, the Authority is currently partnering with relevant City agencies to undertake the San Francisco Integrated TDM Partnership Project. One of the intended outcomes of the Partnership Project is to develop an updated policy framework for TDM in San Francisco to better reflect and support coordinated activities across the City. See Section 4.5.A for more details.

**5.3.A. Housing and Employment Balance**

Downtown San Francisco has the densest concentration of commercial activity and employment in the Bay Area region. Much of the downtown employment growth occurred in the 1970-79 period. During that time about 100,000 new jobs were created and about 11,300 net new residential units were built in the City. For each 100 new jobs cre-

ated in the city about 11 net new residential units were built during this period. This attracted many new workers from the region and significantly increased the number of suburban commuters into the City.

During the 1980s the rate of downtown employment growth decreased, but at the same time, only about 87 net new housing units were built for every 100 new jobs created during this period. This trend continued through the early 1990s until the dramatic employment growth of the late 1990s occurred, which was accompanied by only a modest increase in residential units.

In recent years, the City has promoted new housing in conjunction with new office developments. Presently new office buildings above 25,000 square feet in the downtown area are subject to housing requirements: Section 313 of the Planning Code, the Office/Affordable Housing Production Program (OAHPP). The project sponsor is required to either build housing at a rate of 38.6 units per 100,000 square feet of office, or pay a housing developer to construct housing, or pay an in-lieu fee to the city-wide Affordable Housing Fund. OAHPP requires that a substantial portion of the units to be allocated for low or moderate-income housing.

Extensive rezonings undertaken in the city since the 1980s have also actively promoted new residential development. The Downtown Plan, as well as the plans for Rincon Hill, North of Market, Chinatown, Neighborhood Commercial, Van Ness Avenue, South of Market, and South Beach, all have measures to retain and increase residential development. The Mission Bay plan area alone will add several thousand new residential units in conjunction with commercial development. More recently, the Market/Octavia, Eastern Neighborhoods, Transbay, Parkmerced, Treasure Island, and Hunters Point Shipyard/Candlestick Point Plans have set the foundation for the production of tens of thousands of new housing.

### **5.3.B. Transportation Control Measures**

In 1991 as required by the California Clean Air Act (CCAA), the Association of Bay Area Gov-

ernments (ABAG), the Bay Area Air Quality Management District (BAAQMD), and the Metropolitan Transportation Commission (MTC) jointly prepared the Bay Area Clean Air Plan, which included measures to reduce the total *number of trips* and miles traveled, (“Transportation Control Measures,” or TCMs). The most recent Plan, the *2010 Bay Area Clean Air Plan*, was adopted by BAAQMD in March 2010. The Plan for the first time addresses greenhouse gases, as well as ozone, particulate matter, and air toxics. It also included new and revised TCMs.

The Bay Area is currently not in attainment of Federal PM 2.5 particulate matter standards under the Clean Air Act. In order to be eligible to receive federal transportation funds, the region must prepare a PM2.5 State Implementation Plan to achieve attainment by December 2014.

Local agencies are expected to incorporate the TCMs into planning and implementation for transportation and land use programs. The region, through the MTC, is held responsible for overall progress toward the stated goals. The CMP process provides an opportunity to integrate local planning and programming into the regional air quality planning process. Appendix 8 lists the currently adopted regional TCMs, and discusses how San Francisco’s congestion management strategies contribute to, or reinforce these measures.

### **5.3.C. Objectives in the General Plan**

The Transportation Element of the General Plan lays out the City’s policy of transit-oriented solutions for accommodating growth in travel demand and discouraging single-occupant automobile travel:

- Objective 3: Maintain and enhance San Francisco’s position as a regional destination without inducing a greater volume of through automobile traffic.
- Objective 4: Maintain and enhance San Francisco’s position as the hub of a regional, city-centered transit system.
- Objective 7: Develop a parking strategy that encourages short-term parking at the

periphery of downtown and long-term intercept parking at the periphery of the urbanized bay area to meet the needs of long-distance commuters traveling by automobile to San Francisco or nearby destinations.

- Objective 10: Develop and employ methods of measuring the performance of the city's transportation system that respond to its multi-modal nature.
- Objective 11: Establish public transit as the primary mode of transportation in San Francisco and as a means through which to guide future development and improve regional mobility and air quality.
- Objective 16: Develop and implement programs that will efficiently manage the supply of parking at employment centers throughout the city so as to discourage single-occupant ridership and encourage ridesharing, transit and other alternatives to the single-occupant automobile.
- Objective 17: Develop and implement parking management programs in the downtown that will provide alternatives encouraging the efficient use of the area's limited parking supply and abundant transit services.
- Objective 20: Give first priority to improving transit service throughout the city, providing a convenient and efficient system as a preferable alternative to automobile use.
- Objective 21: Develop transit as the primary mode of travel to and from downtown and all major activity centers within the region.
- Objective 23: Improve the city's pedestrian circulation system to provide for efficient, pleasant, and safe movement.
- Objective 27: Ensure that bicycles can be used safely and conveniently as a primary means of transportation, as well as for recreational purposes.
- Objective 28: Establish parking rates and off-street parking fare structures to reflect the full costs, monetary and environmental, of parking in the city.
- Objective 32: Limit parking in downtown to help ensure that the number of auto trips to and from downtown will not be detrimental to the growth or amenity of downtown.
- Objective 34: Relate the amount of parking in residential areas and neighborhood commercial districts to the capacity of the city's street system and land use patterns.

## 5.4. TDM Requirements and Programs

Current TDM strategies in San Francisco primarily focus on employers, with strategies that include covering the whole or partial cost of a transit commute as a pre-tax employee benefit (“commuter benefits”), guaranteeing emergency rides home for people who commute by transit, and promoting alternative modes of transportation – such as ridesharing – for commute trips as well as for trips during work hours.

### 5.4.A. Management and Brokerage Services

Transportation Management Programs (TMPs) and Transportation Brokerage Services (TBS) are required under Section 163 of the Planning Code for office buildings in the greater downtown area and the South of Market area. Outside of the downtown area, these programs apply to office and commercial-industrial districts such as the Mission Bay Specific Plan area. Major institutions (e.g., hospitals and universities) subject to institutional master plans can also be required to provide on-site TMP and TBS, depending on the magnitude of development and anticipated transportation impacts. These requirements are imposed when an institution requests approval of building permits.

These programs facilitate transit and rideshare commuting and are intended to minimize the transportation impacts of employment growth at major job centers.

New buildings above 100,000 square feet of gross floor area in the C-3 districts in the downtown area, and above 25,000 square feet of gross floor area in the South of Market area, are required to

provide on-site TMP and TBS for the lifetime of the project.<sup>1</sup>

Under the Planning Code, the TMP and TBS are to be designed to:

- 1) Promote and coordinate effective and efficient use of transit by tenants and their employees, including the provision of transit information and sale of transit passes on-site;
- 2) Promote and coordinate ridesharing activities for all tenants and their employees within the structure or use;
- 3) Reduce parking demand and assure the proper and most efficient use of on-site or off-site parking, where applicable, such that all provided parking conforms with the requirements of Article 1.5 of this Code and project approval requirements;
- 4) Promote and encourage project occupants to adopt a coordinated flex-time or staggered work hours program designed to more evenly distribute the arrival and departure times of employees within normal peak commute periods;
- 5) Participate with other project sponsors in a network of transportation brokerage services for the respective downtown, South of Market area, or other area of employment concentration in the Eastern Neighborhoods Mixed Use Districts; and
- 6) Carry out other activities determined by the Planning Department to be appropriate to meeting the purpose of this requirement.

Under the “Developer’s Manual” the project owner is required to designate a permanent Transportation Management Coordinator (TMC). For buildings with parking, the TMC must submit a Parking Management Plan (PMP) to the Planning Department. The parking plan should allocate parking among various users such as short-term, handicapped, carpools, vanpools, and bicycles and provide a plan to market preferential on-

<sup>1</sup> See the Developer’s Manual, “Transportation Management Programs in Greater Downtown: Developer’s Manual for Procedures and Performance Criteria”

site parking for carpools and vanpools and limit long-term parking leases to employees of the building.

The Transportation Management Association (TMA) of San Francisco was established in 1989. The TMA is a non-profit association of building owners and managers that coordinates and facilitates implementation of the TDM programs of member buildings. Presently, more than 60 buildings are members of the TMA organization.

The Authority’s Strategic Analysis Report (SAR) on the Role of Shuttles in San Francisco’s Transportation System, approved in June 2011, discusses the rationale for helping several downtown employer-based and site-based shuttles coordinate, or potentially consolidate, their operations. The SAR recommends that the San Francisco Municipal Transportation Agency (SFMTA) establish a “Muni Partners” shuttle coordination program and to work with these sponsors to improve the efficiency of shuttle operations. In 2011, the Authority initiated a TDM Partnership Project in collaboration with the SFMTA, the Planning Department, and the Department of the Environment. Among the Partnership Project’s components will be a pilot implementation of the Muni Partners program. See Section 4.5.A for more details.

#### **5.4.B. Carpools**

SFMTA encourages the use of carpools and vanpools during the morning and evening commutes. The City provides a casual carpool pick-up location on Beale Street between Howard and Folsom, adjacent to the Temporary Transbay Terminal site. At this location, there is signage indicating several East Bay destination locations.

SFMTA also administers a program through which major employers (those with Transportation Brokerage Services described above) may provide parking for employee carpool vehicles (3 or more riders) in City-owned garages at a reduced rate. The City also provides a limited amount of designated on-street parking in the downtown area for registered/permitted vanpool vehicles.



### 5.4.C. Parking Management

The General Plan, Planning Code, and Zoning Code guide parking management in San Francisco. San Francisco's existing parking policies are intended to support the city's development, and have been especially successful in the downtown area by limiting the provision of parking provided with new office development. Parking policies are also designed to support the City's Transit First policy through a combination of regulatory controls, revenue transfers, regulations, and incentives. The Countywide Transportation Plan and Prop K Expenditure Plan category D1 provide policy guidance and funding for parking management initiatives. In November 2007, San Francisco voters approved Proposition A, which shifted responsibility for parking regulations, fees, and fines from the Board of Supervisors to SFMTA.

In 2007, the Authority and the Metropolitan Transportation Commission (MTC) applied for and subsequently received a U.S. Department of Transportation (USDOT) Urban Partnership Program (UPP) grant, which includes \$19.4 million for a demonstration of variable parking pricing as part of the Federal initiative to fight congestion. SFMTA is leading the implementation of the variable parking pricing pilots through the *SFpark* program. These pilots will demonstrate the central recommendation of the Authority's On-Street Parking Management and Pricing Study (approved in September 2009) to better manage scarce and valuable curbside space through variable parking pricing.

The *SFpark* pilots, launched in 2010, utilize new pricing approaches and technology to improve the management of San Francisco's parking supply in eight neighborhoods in the city. The first rate adjustment at on-street automobile meters took place in summer 2011. By making it easier to find a legal parking space, *SFpark* is intended to reduce excess vehicular circulation caused by drivers searching for parking and double parking, often obstructing traffic and slowing transit. The program includes new networked parking meters, parking occupancy sensors, and parking information systems. The *SFpark* pilots include approximately 25 percent of the City's metered

parking supply, as well as more than 10 City-owned garages.

The SFMTA has installed sensors at each parking space that is part of the pilot to identify whether the space is occupied. Based on the occupancy data collected, meter rates are adjusted according to parking demand with the goal of achieving occupancy rates of between 60 and 80 percent on each block. Rates vary by location and time of day, and between weekdays and weekends. Rates for each location and time period are adjusted no more than once a month, with a \$0.25 increase if occupancy is above the target range, and a \$0.25 or \$0.50 decrease if occupancy is lower. Management of parking in City-owned garages is coordinated with these on-street price changes, with adjustments made in a similar fashion.

### 5.4.D. City TDM Programs

The San Francisco Department of Environment (DOE) currently conducts many of the City's TDM activities. DOE receives funds for its activities from a combination of sources, including Prop K sales tax funds administered by the Authority.

DOE's Clean Air Program includes multiple sub-programs that advance the City's TDM goals. The Clean Air Program has four components:

1. **Commuter Benefits Program:** The City and County of San Francisco has offered its employees Commuter Benefits incentives since 1999. The DOE promotes Commuter Benefits to private employers throughout the City. In addition to the marketing and promoting Commute Benefits citywide, DOE continues to administer the program for City employees.

Commuter benefits are made possible by tax code changes adopted by the federal government. The benefit must be obtained through participating employers. When an employer offers the benefit, an employee can deduct up to \$230 per month from his or her paycheck, pre-tax, to pay for transit, bicycle, and vanpool expenses. Because no taxes are paid on the money deducted, an

employee saves up to 40% on the cost of transit tickets or vanpool fare. An employer can save money because payroll taxes are reduced. Benefits are delivered either in the form of transit tickets or vouchers that can be redeemed for passes, tickets, and vanpool expenses. This incentive increases the appeal and decreases the cost of using transit or vanpool as the commute mode, ultimately resulting in mode shift, reduced traffic vehicle miles traveled, and improved air quality.

2. Emergency Ride Home Program: DOE's Emergency Ride Home (ERH) program promotes alternative mode commuting by ensuring a free or low cost ride home in cases of emergency. The program pays for a ride home for registered users in the event of illness, severe crisis, unscheduled overtime, or disruption of carpool or vanpool schedules. The program is designed to remove some of the risks and reliability concerns associated with the choice of carpooling or relying on transit service for the commute trip. DOE promotes ERH program to City employees and all San Francisco employers. As of August 2011, there were 397 San Francisco businesses with over 80,000 commuters enrolled in the San Francisco ERH program.
3. Bicycle Fleet Program: DOE has administered and promoted the Bicycle Fleet Program since 2002. The aim of Bicycle Fleet Program is to convert a portion of the vehicle fleet of the City and County of San Francisco to bicycles through departmental efforts supplemented by targeted promotion. A Transportation Fund for Clean Air (TFCA) grant funds the bicycles, trailers, locks, helmets, and bike maintenance plan for bicycles in the City's fleet. DOE staff administers the program, including outreach to all City staff making a significant number of vehicle trips to accomplish their work duties.

Over 500 bicycles have been procured for City employees through the Clean Air Program since 2005. City employees use these bicycles for work-related trips, thereby re-

ducing vehicle miles and the need for City fleet motor vehicles. Bicycle parking is provided by the Bicycle Program through the City Hall Bicycle Room.

4. Regional Ridesharing Program: The Metropolitan Transportation Commission (MTC) delegated the responsibility for providing employer outreach services for its Regional Rideshare Program to the DOE, effective July 1, 2008. DOE pursued delegation of outreach services in order to consolidate TDM-related employer outreach into one contact point in the city and to offer a more tailored menu of driving alternatives to San Francisco employers and commuters not limited to rideshare coordination (e.g., bicycling promotion).

DOE's responsibilities as a delegated county include:

- Identifying employers that do not have TDM programs or are not aware of the services provided through Regional Rideshare Program to introduce these employers to TDM.
- Encouraging and assisting employers that do not have TDM programs to implement programs at their worksite(s), including use of the Regional Rideshare ride-matching system.
- Working with employers that may already have TDM programs and assisting them to improve the quality and substance of the products and services they offer.
- Communicating with employers about City and regional TDM services and other regional programs.
- Maintaining an employer outreach database that includes key employer information.
- Implementing the interface of the Regional Rideshare ride-matching system so that visitors to the DOE TDM website will have direct access to the regional ride-match tool.

- Participating in and promoting regional marketing campaigns to employers in San Francisco.

In August 2008, the City enacted a landmark Commuter Benefits Ordinance, which became effective on January 19, 2009. The ordinance requires San Francisco businesses with more than 20 employees to offer pre-tax transit, vanpool, and bicycle programs to their eligible employees. Over 1,000 businesses have registered to offer commuter benefits to their employees specifically because of the ordinance. Another 1,750 businesses reported that they already offered a commuter benefits program, regardless of the ordinance. DOE will continue its promotional and outreach activities to reach out to businesses with less than 20 employees, as they are not covered by the new ordinance.

## 5.5. Strategic Initiatives

A central theme of the Authority's 2004 Countywide Plan (CWTP) is the need for proactive transportation system and demand management in light of projected employment and housing growth in the San Francisco Bay Area's core urbanized areas. The Countywide Plan analyses found that, in the absence of strategic investments and demand management policies, increasing automobile use will result in mounting traffic congestion, while transit will experience declines in performance, reliability, and mode share. In addition to establishing investment priorities, the CWTP stresses the need to pursue innovative policies to fulfill transportation objectives and to support broader goals, including quality-of-life and environmental protection.

### 5.5.A. TDM Partnership Project

In December 2009, the MTC adopted the Bay Area Climate Initiatives (BACI) program as part of its framework for programming certain federal funds. Within the BACI program, the Innovative Grants Program is one of the competitive grant programs managed by MTC to support high-impact, innovative projects with the greatest po-

tential to reduce greenhouse gas emissions (GHGs) that could be replicated on a larger scale around the region. In August 2010, the Authority, in partnership with the SFMTA), DOE, and the Planning Department, submitted an application for the San Francisco Integrated Travel Demand Management Public-Private Partnership Project (Partnership Project).

In October 2010, MTC awarded \$750,000 in federal Congestion Mitigation and Air Quality Improvement Program (CMAQ) funds to the Authority for the Partnership Project.

The purpose of the Partnership Project is to create an innovative and mutually-reinforcing set of TDM resources and activities at the community-level, in order to measurably reduce emissions of greenhouse gases (GHGs) and criteria pollutants. Goals include: employing multiple, complementary approaches to increase the overall effectiveness of each individual strategy; fostering collaboration between the public and private sectors and among private sector firms and institutions on TDM and climate change issues; and ensuring the sustainability of newly created TDM programs.

The Project will advance these goals through three main areas of activity:

1. Policy Coordination: Reviewing and revising existing TDM policies and programs at each agency and across agencies in a coordinated fashion to meet common goals and objectives, and establishing a consistent policy framework for subsequent implementation of the Integrated TDM Partnership subprojects.
2. Build a Flexible Network of Transportation Management Associations (TMAs): This component will involve facilitated forums for multiple groups of employers to explore areas of mutual TDM interest and potential partnerships as well as implementation of an agreed set of priority projects that directly address common needs. Representative geographical and functional TMA "groups" have already demonstrated interest and commitment to participating in pilot TMA formation.

3. **Pilot Project Implementation:** Implementing, and then conducting an evaluation of, trip reduction and GHG/criteria pollutant reduction results from new TDM programs. The TDM Partnership will pilot two programs: parking cashout; and shuttle coordination and expansion (“Muni Partners”). The Muni Partners Program was a key recommendation emerging from the Authority’s SAR on the Role of Shuttles in San Francisco’s Transportation System, which was approved by the Authority Board in June 2011.

The pilot projects will be undertaken over the course of an approximately two-year period, followed by an evaluation of the program.

### **5.5.B. Mobility, Access & Pricing Study**

In December, 2010, the Authority Board approved the final report of the San Francisco Mobility, Access and Pricing Study (MAPS). The MAPS feasibility study assessed the potential for pricing to manage travel in San Francisco’s most congested core areas (generally, the northeast portion of the city). In addition to detailed technical analyses and extensive interagency consultation, public outreach and stakeholder involvement were central components of the study.

The primary focus of the MAPS effort is management of street-level congestion in the urban core. Significant housing and employment growth is planned for the region’s transit-rich center, due to both policy mandates and demographic trends. Managing the transportation impacts of this growth is a key strategic challenge for San Francisco, particularly in a constrained and dense setting where there is limited ability (and little desire) to accommodate significant growth in auto travel.

MAPS was based on a comprehensive set of analyses, in order to assess the benefits and impacts of congestion pricing to the city’s transportation system, economy, and environment. The Authority studied roadway congestion pricing in the larger context of congestion management, which not only envisions congestion charging, but also includes the improvement of competitive alterna-

tives to driving, in part by using the revenues generated through pricing to fund a package of mobility improvements that raise the level of service for alternatives to the private automobile. This integrated approach has been used successfully in Singapore, Stockholm, London, and other cities, to redefine the transportation choice-set for urban travelers in a way that improves a region’s quality of life while maintaining a vibrant economy.

MAPS included several major areas of work including:

- Analysis of existing and future congestion conditions and impacts to autos and transit vehicles;
- Development and evaluation of potential roadway pricing scenarios, including reinvestment of program funds;
- Assessment of technology systems and financial performance;
- Evaluation of program benefits and impacts, including economic, geographic, and modal considerations;
- Investigation of possible institutional arrangements; and
- General and targeted public outreach and market research.

MAPS identified a refined variation of medium-sized pricing area (the “Northeast Cordon” program design) as the congestion pricing scenario with the highest performance. The Northeast Cordon program would yield significant benefits with manageable impacts. The program would entail a weekday peak-period charge of about \$3.00 for private vehicles crossing in or out of the cordon area. The cordon area’s approximate boundaries are Laguna, Guerrero, and 18th Streets and the northeast waterfront (Bay Bridge access points). Fee revenues would be reinvested in a comprehensive package of multimodal improvements focused on improving travel conditions and options for affected travel corridors. The result would be 12 percent fewer vehicle trips in the cordon area during peak hours, reduction of peak-period congestion delay by more than 30 percent, and increased surface-running transit speeds of up

to 20 percent in affected corridors. The program would also reduce surface transportation greenhouse gas (GHG) emissions within the priced area by 16 percent (5 percent citywide), and decrease particulate matter (PM2.5) pollutants by up to 17 percent.

MAPS also found that a six to eight month pilot program of more modest scope could be pursued as a practical first step. Pilot options include a Modified Northeast Cordon design, which would entail an outbound charge of \$6 during the p.m. peak only. A pilot would demonstrate the effectiveness of proposed strategies, test new technologies and institutional arrangements, and measure and monitor benefits and impacts in a real-world environment. Stockholm and New York proposed such trial periods of congestion pricing for similar reasons. In the case of Stockholm, voters responded by endorsing pricing after a seven-month pilot period; New York's program was not initiated due to the lack of state authorizing legislation.

A pricing program would leverage existing Fas-Trak account technology with context-sensitive (low urban design impact) camera-based detection technology and multiple payment methods to facilitate convenient use of the system. A simple set of discounts would be available to specific groups of concern, including low-income drivers and zone residents. MAPS also contemplated a daily cap of \$6, in response to the concerns of families and small businesses.

MAPS identified steps and issues to be addressed to undertake further planning and analysis of a congestion pricing program for San Francisco. These include: refining analysis tools to analyze innovative policies such as robust area-wide parking pricing/management as an alternative or companion to roadway pricing; completion of State and Federal environmental review and alternatives analysis leading to selection of a locally preferred alternative; obtainment of legislation to authorize pricing activities and to designate a lead agency and governance structures for oversight and operations of a pricing program; development of system design and integration requirements; selection of a procurement/financing method and program contractor; execution of operating agreements

with regional partner agencies; and construction of a pricing system and associated mobility improvements prior to the start of operations.

In a separate but related action taken at the time of approval of the MAPS Final Report in December 2010, the Authority Board adopted a resolution directing staff to advance further study of congestion pricing options for San Francisco and to pursue funds to conduct environmental review and alternatives analysis for this purpose. As discussed below, congestion pricing is a central element of the Treasure Island Transportation Program, to be overseen by the Treasure Island Mobility Management Agency. Implementation of congestion pricing on Treasure Island could potentially serve as a testbed for the institutional arrangements and technologies associated with a comprehensive pricing approach in San Francisco.

#### **5.5.C. Treasure Island Mobility Management Agency**

The Treasure Island Transportation Management Act of 2008 (AB 981) granted the San Francisco Board of Supervisors the authority to create or designate a Treasure Island-specific transportation management agency to implement the Treasure Island Development Program's transportation plan. In October 2011, the Authority Board recommended to the Board of Supervisors and the Treasure Island Development Authority (TIDA) that the Authority be designated as the Treasure Island Mobility Management Agency (TIMMA). Consideration of TIMMA formation documents will follow during 2012.

The purpose of the TIMMA is to implement a comprehensive and integrated program to manage travel demand on the island as development occurs (Transportation Program). The centerpiece of this innovative approach to mobility is an integrated and multi-modal congestion pricing demonstration program that applies motorist user fees to support enhanced bus, ferry, and shuttle transit, as well as bicycling options, to reduce the traffic impacts of the Project. As described in AB 981, the goals of the Transportation Program are to:

- Develop a comprehensive set of TDM programs to encourage and facilitate

transit use and to minimize the environmental and other impacts of private motor vehicles traveling to, from, and on Treasure Island.

- Manage Treasure Island-related transportation in a sustainable manner, to the extent feasible, with the goal of reducing vehicle miles traveled and minimizing carbon emissions and impacts on air and water quality.
- Create a flexible institutional structure that can set parking and congestion pricing rates, monitor the performance of the transportation program, collect revenues, and direct generated revenues to transportation services and programs serving Treasure Island.
- Promote multimodal access to, from, and on Treasure Island by a wide range of local, regional, and statewide visitors by providing a reliable source of funding for transportation services and programs serving Treasure Island that will include bus transit service provided by the City's municipal transportation agency, or its successor agency, and ferry service.

The TIMMA will be responsible for overseeing implementation of numerous TDM and transportation activities, including (but not limited to):

- Public information and transportation coordination services for residents and employers of Treasure Island
- Contracting of transit services, including: ferry service, East Bay bus service, SFMTA bus service, shuttle service
- Demand responsive on-street parking pricing
- Congestion pricing related to the on-ramps for the San Francisco Oakland Bay Bridget
- Carshare services
- Bicycle facilities (fleets)
- Carpool/vanpool services
- Guaranteed ride home services

As the congestion management agency for San Francisco and lead agency for recent congestion pricing sector work, the Authority is well-prepared to serve as the TIMMA. From a policy perspective, the 2004 Countywide Transportation Plan and planning documents since then, such as the City's Climate Action Strategy and draft San Francisco Transportation Plan, all highlight the need for the City to explore robust demand management strategies that can generate revenue to fund Transit First mobility options in order for the City to achieve its economic development and livability goals. The Treasure Island Transportation Program is an excellent demonstration opportunity for this concept.

## 5.6. Work Program

- Monitor and coordinate the integration of new and revised regional TCMs from the BAAQMD's 2010 Clean Air Plan into the City's Climate Action Strategy and San Francisco Transportation Plan, as appropriate.
- Continue to support and evaluate the City's TDM activities, including through the implementation of Prop K's TDM/Parking Management category.
- Continue to participate in the evaluation of the Bay Area Urban Partnership Program, including the SFpark pilot project.
- If designated as the Treasure Island Mobility Management Agency, pursue implementation of Treasure Island Transportation Plan.
- Act as lead agency for the TDM Partnership Project, and implement and evaluate the pilot project components of this effort in collaboration with City agencies.
- Through the TDM Partnership Project, conduct an assessment of existing TDM practices and programs, and develop an integrated TDM framework to guide the development of TDM activities across the City.

**CHAPTER 6****LAND USE IMPACTS ANALYSIS PROGRAM****Key Topics:**

- **Legislative Requirements**
- **Legislative Intent and Application to San Francisco**
- **Institutional Framework for a CMP Land Use Analysis Program**
- **Neighborhood Transportation Planning**
- **Infill Opportunity Zones**
- **Transportation Impact Analysis**
- **Work Program Items**

**6.1. Legislative Requirements**

The California Government Code section 65089(b)(4) requires that Congestion Management Programs (CMPs) include a program to analyze the transportation system impacts of local land use decisions. These analyses must measure impacts using CMP performance measures, and estimate the costs of mitigating the impacts. The estimates should exclude costs associated with inter-regional travel and provide credit for public or private contributions to regional transportation system improvements. The legislation specifies that land use analysis programs should be coordinated with California Environmental Quality Act (CEQA) efforts, wherever applicable.

The CMP legislation also requires the Authority, as the Congestion Management Agency to “develop a uniform database on traffic impacts for use in a countywide transportation computer model...” that will be used “to determine the quantitative impacts of development on the circulation sys-

tem...” (California Government Code section 65089(c)). The database must be consistent with the modeling methodology used by regional planning agencies, the Metropolitan Transportation Commission (MTC) and the Association of Bay Area Governments (ABAG), to comply with the CMP.

The Authority’s GIS database, including ABAG Projections data, updated CMP networks, and numerous other data items (such as roadway level of service, transit ridership, travel behavior survey results, etc.) constitutes the uniform database for San Francisco. In addition, the Authority has an activity-based travel demand forecasting model used in combination with the uniform database. This is further detailed in Chapter 8.

In September of 2002 the legislature passed SB 1636, which is intended to “remove regulatory barriers around the development of infill housing, transit-oriented development, and mixed use commercial development” (65088(g)) by enabling local jurisdictions to designate “infill opportunity zones.” These zones (IOZs) are defined as areas with compact, transit-oriented housing and mixed use in close proximity to transit service.

The CMP network segments within a designated IOZ are exempt from CMP traffic LOS standards. In their place, a CMA must use “an alternative areawide LOS standard or multimodal composite or personal LOS standard,” [65088.4(b)(1)], or “approve a list of flexible mitigation options that includes... investments in alternative modes of transportation” [65088.4(b)(2)]. IOZs are further discussed below.

**6.2. Legislative Intent and Application to San Francisco**

The General Plan and the City Charter are the primary institutional parameters that frame the City’s process for reviewing land development impacts on the transportation network. San Francisco is a Charter City, and it has a consolidated city and county government. An eleven-member Board of Supervisors serves as the legislative body for the City’s unified city and county government. The City Planning Commission (CPC) has responsibility for land use decision-making throughout the City. The Mayor appoints the seven members

of the CPC. Among the responsibilities of the CPC are the following:

- Exclusive authority to act on General Plan policies and area land use plans (per City Charter);
- Holding public hearings on all appeals to Negative Declaration determinations and certification of local Environmental Impact Reports; and
- Discretionary actions on Conditional Use permits, (which can be appealed to the Board of Supervisors) and decisions by the Zoning Administrator, Discretionary Reviews, and others that can be appealed to the Board of Appeals.

In addition, both the CPC and the Board of Supervisors must approve all rezoning.

The Planning Department's land use responsibilities include transportation matters. The Planning Department has primary responsibility for assessment of the transportation impacts of development proposals, and to determine consistency with land use and transportation policies in the General Plan. The existing local regulations include measures to mitigate project-specific transportation impacts within the policy and priority framework of the General Plan, the long-range transportation plan, and the Capital Improvement Program (CIP) of the CMP.

As CMA for San Francisco, the Authority ensures that the City complies with CMP requirements including land use impact monitoring. AB 1619, passed by the California State Assembly in 1994, stipulates that the CMA should prepare any countywide transportation plan. Pursuant to a December 1994 action, the Board of Supervisors directed the Authority to prepare a countywide transportation plan, and to coordinate City Departments. A Memorandum of Agreement (MOA), executed in December 1997, between the Authority and the Planning Department, outlines roles and responsibilities for developing the Countywide Transportation Plan (CWTP). The Plan was adopted by the Board in July of 2004. The Authority initiated an update of the CWTP,

known as the San Francisco Transportation Plan (SFTP) in 2010.

## 6.2.A. Policy Issues in Land Use and Transportation Demand

### i. Local Transportation Impact Analysis

The CMP-based land use analysis program links the City's land development decisions to conditions on the regional transportation system. This link already exists at the regional level in MTC's Regional Transportation Plan, which links long-range planning for transportation investment with estimates of land development based on regional demographic growth and economic development.

The City already has in place an extensive process for evaluating the transportation impacts of land development proposals. This process, which ensures the City's compliance with State and Federal environmental review requirements, is the responsibility of the Planning Department. Nevertheless, as CMA, the Authority has a role in ensuring that the impacts of land use decisions on the transportation system are analyzed with a uniform methodology, consistent with the long-term strategic goals of the General Plan and the Countywide Transportation Plan.

### ii. Uniform Methodology

The Authority, as CMA, retains its own GIS database and travel demand model to analyze transportation and provide uniform assumptions for City departments. For major land use decisions, the Authority's tools are used to assess transportation impacts and ensure that the methodology used to assess them is consistent with MTC models and ABAG data.

One key aspect of the CMP approach to land use impacts analysis is that, pursuant to state law, the Authority will also be responsible for reviewing transportation analysis of specific development projects under CEQA and determining the consistency of these "sub-area" analyses with the citywide model. Examples of this role include our work to support the Bayview Hunters Point Redevelopment Area Environmental Impact Report (EIR), the Transbay Center District Plan EIR, and the Market/Octavia Better Neighborhoods Plan EIR.



The primary purpose of the land use analysis program is, therefore, to inform decisions on the supply of transportation infrastructure to the City and how the City should best spend scarce transportation dollars. This program adds no new requirements to the existing local project environmental review process, but it provides a long-term transportation investment policy context for local environmental review information. It also informs decision-making in the reverse direction: as CMA, the Authority is responsible for commenting on local land use decisions and making such comments with an understanding of how land use choices will shape future transportation demand.

Currently, the Authority is collaborating with the Planning Department in the implementation of a software-based simulation model for the integrated planning and analysis of urban development that incorporates the interactions of land use, transportation, and public policy. The first module of this model is a land use allocation model which is being used in the SFTP. By design, this model is being run in conjunction with and parallel to the Authority's travel demand model in order to analyze the interaction of transportation and land use variables.

### **iii. Consistency with Long Term Strategic Goals of General Plan and Countywide Transportation Plan**

San Francisco has been able to maintain one of the highest levels of transit use among U.S. cities because of its relatively high-density development and because topography and geography limit vehicular access routes to and from the City.

There have been significant numbers of non-resident commuters into the city for over a century. To improve the balance of housing with jobs, during the 1980s, San Francisco actively promoted new residential development. Extensive revisions to the City's General Plan, and rezonings were undertaken. Each of these land use plans—the Downtown Plan, Rincon Hill, North of Market, Chinatown, Neighborhood Commercial, Van Ness Avenue, South of Market, and Mission Bay—incorporated measures to retain and enhance opportunities for residential development.

In recent years, several more area plans have been developed or adopted including: the Market/Octavia Plan, Eastern Neighborhoods Plan, Balboa and Glen Park BART Station Area Plans, the Treasure Island Plan, and the Transbay Center District Plan. In addition, housing development has been promoted by the policies of the San Francisco Redevelopment Agency in various areas, including the Rincon Point/South Beach, Yerba Buena Center, Transbay, and the Bayview Hunters Point Redevelopment Plan Areas.

San Francisco's continued role as a regional employment center and its policy of housing development have had an impact on the demand for transportation in the city. A primary mission of the Authority is to strategize investment in the city's transportation infrastructure and promote the development of demand management tools to meet address growing travel demand. Infrastructure investment is intended both to address future growth in transportation demand and to improve the city's current transportation system. Demand management is needed to promote a balanced and cost-effective transportation system.

In past decades San Francisco's primary transportation challenge was to absorb new jobs downtown without proportionately increasing the number of workers commuting by car. That challenge was successfully met with the construction of BART and MUNI services focused on downtown commuting, combined with limits on parking provision.

Today San Francisco's transportation challenges are more varied. They are numerous and located across the city, throughout the various neighborhoods as well in core areas, which can expect not only employment growth but also extensive residential growth. Challenges include competitive transit service for non-commute trips; neighborhood parking needs; safety for pedestrians and bicyclists; improved transit reliability and speed through the development of a transit priority network; and reducing emissions of pollution and greenhouse gasses. Increasingly, the imperative to address regional land use and transportation relationships is moving to the fore, with the targeting of resources to Priority Development Areas (PDAs) and development of a regional High Occupancy/Toll (HOT) lane system. In addition,

state laws promulgated in 2006 and 2007 require greater integration of land use and transportation planning processes in recognition of the climate change challenge. Climate change issues and initiatives are discussed further in Section 3.4, below.

Underlying these needs is the challenge of finding new mechanisms to pay for needed transit and other improvements as development decisions are made. A discussion of the city's initiative to update transportation impact and mitigation fees is provided in Chapter 4.

**NOTE:**

California Government Code Section 65089(b)(4) requires the land use program to assess the impacts of land development on regional transportation systems. In the 1991 San Francisco CMP this was interpreted to mean impacts on the CMP roadway network. However, the federal Intermodal Surface Transportation Efficiency Act (ISTEA), passed in 1991, explicitly requires the development of a metropolitan transportation system (MTS), including both transit and highways. As discussed in Chapter 3, MTC contracted with the Authority, acting as CMA, to help develop the MTS and to use the CMP process to link land development decisions to impacts on the MTS. For purposes of the land use analysis program, the San Francisco CMP will use the San Francisco component of the MTS, but conformance with roadway level of service (LOS) standards will continue to be assessed using the CMP roadway network, which is a subset of the multi-modal MTS.

### **6.3. Institutional and Policy Framework for a CMP Land Use Analysis Program**

#### **6.3.A. Prop K Mandate**

When voters approved Prop K in November 2003, they approved various policies and priorities in the Expenditure Plan designed to implement San Francisco's Transit First policy, and improve the coordination of land use and transportation.

Transit investment accounts for 65 percent of the San Francisco transportation sales tax expenditure plan (74 percent if paratransit is included), and the

investment program supports the City's future growth plans.

The Expenditure Plan directs the Authority to "give priority for funding to major capital projects that are supportive of adopted land use plans with particular emphasis on improving transit supply to corridors designated for infill housing and other transit-supportive land uses."

The Plan goes on to define transit-supportive land uses as "those which help to increase the cost-effectiveness of transit service by improving transit ridership and reducing traffic along transit corridors."

All projects must also demonstrate consistency with the Prioritization Criteria in the Expenditure Plan. This includes "compatibility with existing and planned land uses, and with adopted standards for urban design and for the provision of pedestrian amenities; and supportiveness of planned growth in transit-friendly housing, employment and services."

Finally, the Expenditure Plan provides funding for neighborhood planning studies and local match for regional planning and capital grants such as the Community-Based Transportation Planning (CBTP) and Transportation for Livable Communities (TLC) grant program. TLC supports transit-oriented development and funds related improvements for transit, bicyclists, and pedestrians including streetscape beautification improvements such as landscaping, lighting, and street furniture.

#### **6.3.B. MTC/CMA Transportation/Land Use Work Plans**

MTC provides the nine Bay Area CMAs with a share of regional planning funds ("3% Planning Funds") to support local and county-level planning functions established under state and federal law. These activities include the development of the CMP.

In 2003, MTC approved the San Francisco CMA's Transportation – Land Use Coordination Work Program (T-PLUS). T-PLUS recognizes the expanded role for the CMAs in coordinating trans-

portation and land use planning, such as through the Transportation for Livable Communities (TLC) program. Pursuant to MTC's CMA Transportation/Land Use initiative, the Authority focuses on the following activities to help integrate transportation and land use decisions:

First, the Authority prioritizes transportation planning funds and capital investments that meet performance criteria or demonstrate a strong vision for coordinated land use and transportation development.

The Authority provides technical guidance and assistance with the planning process to partner agencies, communities, and project sponsors, including neighborhood planning, thereby facilitating access to discretionary state and regional grants and providing for coordinated county-level input into the regional transportation planning process.

The Authority promotes legislative activities that encourage smart growth, more sustainable transportation and development-related investment decisions by the City and developers, and more efficient travel decisions by all transportation system users. Examples include the Authority's support of the State Resources Agency's revisions to the CEQA Guidelines Transportation Checklist and our work with local partner agencies to reform the City's CEQA transportation impact analysis process.

The Authority coordinates county-level input into the regional Sustainable Communities Strategy, the Regional Transportation Plan, and related regional land use planning efforts, as discussed in Sections 6.3.C. and 6.3.D. below.

Finally, the Authority conducts project and program delivery oversight to ensure efficient use of funds and effective project delivery.

### **6.3.C. FOCUS Priority Development Areas**

ABAG and MTC jointly lead the region's *Focusing Our Vision* (FOCUS) program to identify Priority Development Areas (PDAs) and coordinate regional investments in a way that supports smart growth. The initiative is "bottom-up" in that local

governments nominate areas in their jurisdiction for targeted growth.

In June 2007, the Authority, together with the San Francisco Mayor's Office of Housing, and in cooperation with several city and regional agencies, submitted an application for PDA designation across a largely-continuous network of approved, proposed, and potential transit-oriented development projects. The areas designated in the application provide the collective capacity and planning for over 50,000 new homes and apartments, at least 25 percent of which will be affordable to extremely-low, very-low, low, and/or moderate income households.

Each individual area is either in the midst of, or has completed, an extensive community participation process. All are comprehensively planned neighborhoods with parks, transportation, and other key public amenities. In addition each plan area is heavily mixed-use in nature and incorporates the City's approach to creating mixed-income neighborhoods through inclusionary housing and strategic investment of public funding for affordable housing.

The distinct San Francisco Priority Development Areas are:

- 19th Avenue Corridor (County Line to Euclid Drive)
- Better Neighborhoods (Balboa Park, Market/Octavia)
- Bayview Hunters Point / Candlestick Point
- Downtown Neighborhoods/Transit Infill
- Eastern Neighborhoods
- Mission Bay
- Mission-San Jose Corridor
- Port of San Francisco
- San Francisco/San Mateo Bi-County Area
- Transbay Terminal Area
- Treasure Island

Collectively, this set of areas represents a potentially enormous implementation of the FOCUS vision. Individually, the proposed San Francisco PDAs represent several unique models of transit-oriented development and smart growth.

While encouraging more local action, MTC, ABAG, and BAAQMD have historically identified only limited funding and investment policies to support PDAs in the form of station area planning grants and an expanded Transportation for Livable Communities program. However, in July 2011, MTC/ABAG released a proposal for a new framework for distributing Surface Transportation Program/Congestion Mitigation Air Quality (STP/CMAQ) funds that would require CMAs to spend 70% of funds to support PDAs, and consider jurisdictions' historical housing production and future housing plans as a part of the distribution formula. While the impact of this policy, if implemented, is not expected to increase San Francisco's share of funding, it does establish a new and important policy direction of linking land use planning with transportation investment. The Authority, along with San Francisco's Planning Department, Mayor's Office of Housing, and Municipal Transportation Agency, continue to advocate for more appropriate investment policies that provide resources commensurate to the amount and quality of desirable development produced by local jurisdictions.

### 6.3.D. Climate Change Initiatives

AB 32, enacted in 2006, established a statewide target for greenhouse gas (GHG) emissions reduction and gave the California Air Resources Board (CARB) the authority to regulate GHG emissions, including those from private vehicles. The target reduction is to reach 1990 emission levels by 2020. In 2008, CARB approved a Scoping Plan that outlines the state's approach to reducing GHG emissions. Among other strategies, AB 32 calls for implementation of a cap-and-trade program to regulate GHGs; CARB is currently undergoing the rulemaking process for a system that is expected to commence in 2012.

SB 375, passed in 2008, provides a mechanism for the implementation of AB 32 for the transportation sector, which is responsible for approximately forty percent of the state's GHG emissions. As required by SB 375, the Metropolitan Transportation Commission (MTC) and the Association of Bay Area Governments (ABAG) are developing the Bay Area's first Sustainable Communities

Strategy (SCS), an integrated transportation, housing, and land use plan that will form the basis for the 2013 Regional Transportation Plan (RTP) and Regional Housing Needs Allocation (RHNA) process. The must meet two basic requirements: 1) achieve a greenhouse gas emission (GHG) reduction target; and 2) identify a strategy to house the region's entire housing need by income level.

The 2013 RTP/SCS has the potential to transform the distribution of funding in the RTP (discretionary funds are estimated at \$68 billion over the 28-year plan period), as well as develop new policies and incentives to support the implementation of RTP/SCS goals, including realization of Priority Development Areas (PDAs) in San Francisco.

Further proactive approaches that are both realistic and effective in addressing GHG reduction are needed to achieve AB 32 goals. It is also only prudent to recognize that there are limits to what can effectively be achieved in any one region. Climate change is not a local issue, and the federal government will need to play an expanded role in helping the state and region achieve GHG reductions. The effectiveness of that role will depend, in large measure, on the direction of federal Climate legislation and the degree to which the anticipated update to federal surface transportation legislation will be able to secure reliable and stable revenues for transportation infrastructure projects and services, beyond what the state is able to fund in the foreseeable future.

It is inescapable that, in order for GHG reduction efforts to be effective, there will be a need to realign not just travel behavior, but locational choices for many economic activities that take place in the region. A timid approach will only produce marginal results. Local jurisdictions will be called to do their part in accepting growth, density and changes in travel behavior, and the region will need to realign its transportation investment priorities, to some extent at least, to provide funding for the infrastructure necessary to support those choices.

Locally, the City of San Francisco has adopted a citywide ordinance (81-08) that sets ambitious goals for local reduction to achieve an 80% reduction below 1990 levels by 2050. The Authority's SFTP effort is exploring strategies to meet that

goal for the transportation sector, finding that even significant increases in investment in non-auto transportation infrastructure, strong pricing and other demand management policies, and accelerated penetration of electric vehicles into the private vehicle fleet, will not get the City to its GHG reduction goals, and that unprecedented behavior change is necessary. The Authority also coordinated with the Department of the Environment (DOE) and the SFMTA on the 2011 update to the Climate Action Strategy (CAS) for the Transportation Sector, a component of the City's Climate Action Plan.

### 6.3.E. Regional Land Use Forecasts

For most forecasting activities, the Authority is required to use regionally-adopted projections of future Bay Area land use growth, including the distribution and nature of that growth across the region's individual jurisdictions.

In 2009, ABAG adopted its most recent regional land use forecast. *Projections 2009* targets San Francisco to absorb an additional 76,000 households by 2035 over the current level of 339,000 households (2005 baseline). Employment in San Francisco is projected to increase by nearly 50 percent by 2035 to more than 800,000 jobs located in the city. The next set of projections will not be adopted until 2013, as the forecasted development pattern in the SCS. Scenarios under consideration for the 2013 RTP/SCS range widely in terms of growth expected in San Francisco: between 76,000 and 111,000 more households, and between 127,00 and 207,000 more jobs by 2040 (over 2010 levels).

ABAG Projections form a key planning tool and input for the Authority, MTC, and other Bay Area transportation, land use, and planning agencies. Already, the previously-adopted *Projections 2009* envisioned substantial land use intensification in San Francisco. The development of the currently-adopted RTP, *Transportation 2035*, resulted in some modest new initiatives that seek to better align transportation and land use decision-making toward the achievement of pressing policy objectives. such as: 1) establishing a Climate Initiatives program to pilot innovative strategies to reduce GHGs from the transportation sector, and in-

creasing capital funding for the Transportation for Livable Communities (TLC) program, while establishing a policy that TLC funds may only be spent in Priority Development Areas (PDAs). These initiatives must be built upon and significantly expanded if the region is to realize its transportation, land use, and climate protection goals and meet new statutory and regulatory requirements following the passage of SB 375.

For example, the requirement for integrated transportation and land use modeling means that the relationship of subregional growth forecasts will need to be realistically represented and defensibly aligned with regional transportation investments and policies. The region will require bold investment and system management policies—both in order to achieve a future in which Bay Area growth is more focused and to reach targets that cannot be attained with land use strategies alone. The need for substantial VMT reduction to reduce climate change impacts makes transit investment a priority need, with increased funding necessary for operations, maintenance, and prioritized capital projects. Transit is most constrained in the region's core areas, as was demonstrated by even the moderate ridership increases experienced during the gas price spike of summer 2008.

System management and demand management must also begin to be more of a focus in the City's and region's investment programs. Pricing strategies, in particular, will be a crucial growth management tool and means of self-help for the region, system operators, and local jurisdictions. Pricing policies are already regionally-supported through development of a regional HOT lane system and regional parking pricing initiatives.

The region must recognize the real and pressing infrastructure and service needs of core areas if the RTP/SCS and related regional planning work is to be meaningful. San Francisco is committed to playing a central role in the region's sustainable growth.

### 6.4. Neighborhood Transportation Planning

MTC's Lifeline Transportation Program (LTP) program has two components: a planning component consisting of various community-based

transportation planning efforts, and an implementation component. The overall intent of the program is to encourage residents and other stakeholders in low income and minority communities to participate in identifying priorities for transportation improvements and ultimately, to see those improvements through implementation.

As part of the planning component, MTC provides Community-Based Transportation Planning (CBTP) grants to the 9 Bay Area congestion management agencies (CMAs) to help fund planning efforts in minority and low income communities – referred to by MTC as *Communities of Concern* – that MTC identified in its Transportation 2030 Equity Analysis. In San Francisco, MTC has identified several Communities of Concern, which include areas in the Tenderloin, Bayview Hunters Point, South of Market, Outer Mission, Potrero/Inner Mission, Chinatown, and Western Addition. The Authority has incorporated these planning efforts into our Prop K-funded Neighborhood Transportation Planning Program.

The Prop K Transportation/Land Use Coordination category includes funds for strengthening neighborhood transportation planning efforts, through technical assistance in the development of Neighborhood Transportation Plans (NTPs). This program is designed to build on initial transportation planning efforts by neighborhoods to identify priority needs and potential solutions. The goal of the program is help neighborhoods advance the highest priority solutions from planning studies in order to create a pipeline of grant-ready projects that have a high degree of community and agency consensus. Another objective of the program is to increase the capacity of neighborhoods and Community-Based Organizations (CBOs) to undertake neighborhood transportation planning.

## 6.5. Infill Opportunity Zones

SB 1636 granted local jurisdictions the authority to designate Infill Opportunity Zones (IOZs) in areas meeting certain specified requirements. Within a designated IOZ, the CMA must use an alternative to automobile level of service (LOS) as the main performance standard for congestion management purposes. The San Francisco Board of Supervisors adopted San Francisco's IOZ on December 8, 2009.

Per SB 1636, IOZs must be compact, mixed-use areas that are well-served by transit:

1. The area must be zoned for compact residential or mixed use development;
2. The area must be located within a specified distance of certain types of transit service;
3. The area must be located in a county with a population of 400,000 or more; and
4. IOZs can only be designated in areas where infill development is consistent with the local jurisdiction's general plan and any applicable specific plan.

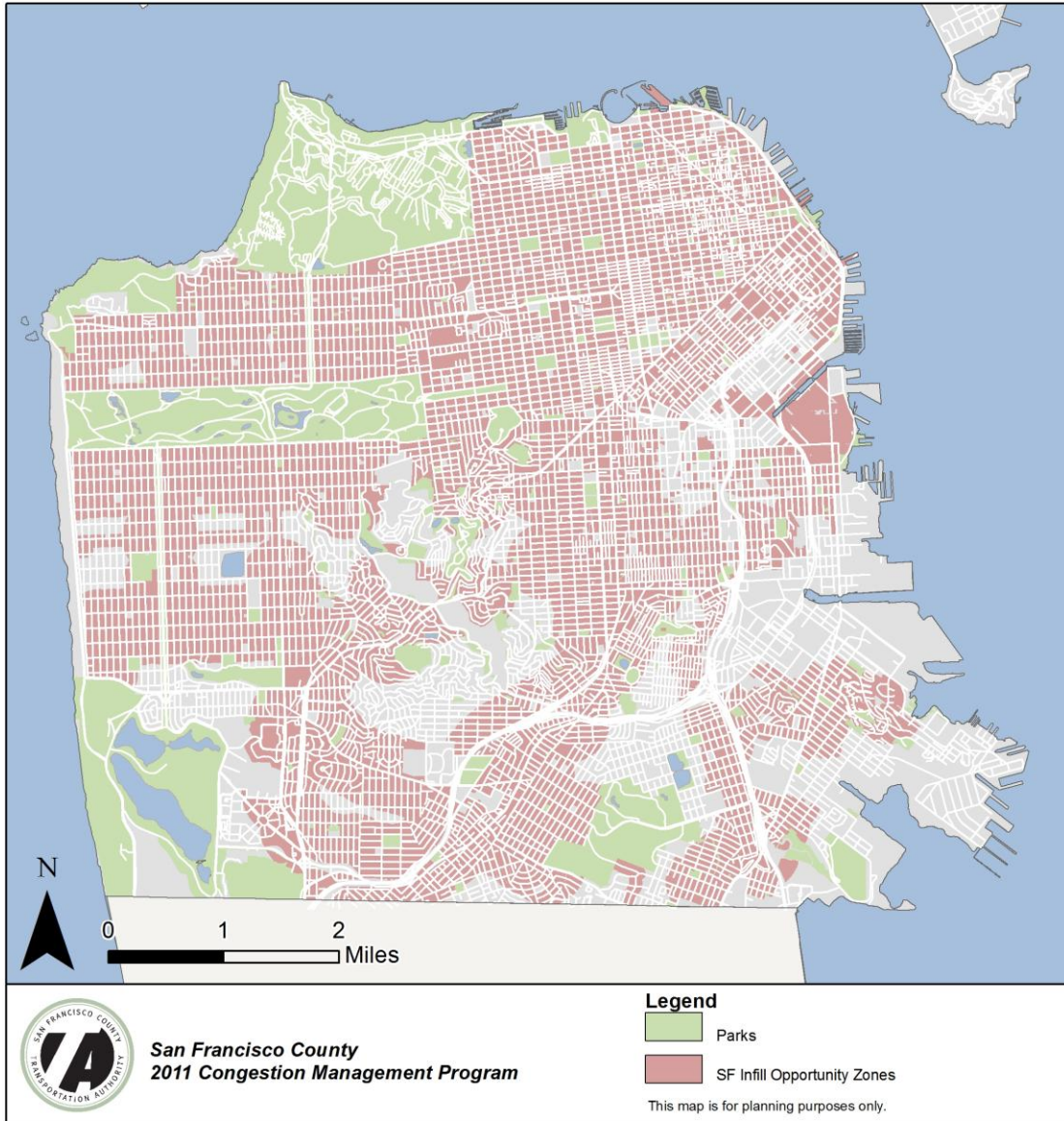
San Francisco meets the county-level population requirement. The General Plan (Housing Element) recognizes the role of infill development in addressing the city's housing needs, thus satisfying the fourth requirement.

Using Geographic Information Systems (GIS) data reflecting currently-adopted zoning controls and transit network attributes, the Authority analyzed which portions of San Francisco meet both the zoning and transit requirements.

The resulting map, shown in Figure 7-1, identifies the IOZ areas in San Francisco. (Treasure Island is omitted because it does not meet the transit requirement and is therefore ineligible.) See Appendix 15 for the Board of Supervisors resolution on the IOZ.

Figure 6-1. San Francisco IOZ Areas

## San Francisco Infill Opportunity Zones (IOZs)



### 6.5.C Congestion Management Agency Requirements

State congestion management law requires CMAs to establish LOS standards for a designated countywide network of roadways (see Chapter 3). Within a designated IOZ, CMP automobile LOS standards are not applicable. Instead, an alternative to the automobile LOS standard applies for local analysis of transportation impacts. The Authority is coordinating with relevant City agencies through the Transit Sustainability Fee effort to develop and implement the alternative to LOS, consistent with statutory requirements.

Under SB 1636, a CMA must apply one of two alternatives to the current LOS standard:

1. *Alternative Measure.* The first option is to continue to use a scale or threshold, but to establish an alternative metric that would apply to network segments within an IOZ. State CMP law grants wide discretion to local authorities in determining this metric, which can be either “[1] an alternative areawide level of service standard or [2] a) multimodal composite or [3] a) personal level of service standard.”

The only requirements for the alternative measure are that it takes into account both of the following:

- a. Regional traffic reduction benefits associated with residential development that reduces long auto commutes and improves an area’s jobs-housing balance.
  - b. Increased use of non-automobile modes.
2. *LOS Mitigation List.* The second option is to not apply a measure or threshold within IOZs, but to instead establish a *list* of “flexible level of service mitigation options.”

SB 1636 does not provide clear guidance on developing and implementing an Alternative Measure (option 1, above), and there is not a practical measure that would meet the legislation’s specific

yet imprecise requirements.<sup>1</sup> The LOS Mitigation List approach is the preferable option (option 2, above).

The Mitigation List approach is a more efficient approach consistent with the City’s related effort to measure transportation impacts under CEQA by an alternative to traffic LOS. The Mitigation List could include a range of strategies and programs that the City is undertaking (or could undertake) to discourage vehicle trips, encourage the use of other transportation modes, and improve the integration of transportation and land use. The Authority is working on developing this list in collaboration with City agencies through the Transit Sustainability Fee effort. The Nexus study is scheduled to be considered for adoption in 2012. If approved, the study would then enter into environmental review phase (see Chapter 4 for more details).

## 6.6. Transportation Impact Analysis

San Francisco’s approach to conformance with the CMP land use impacts analysis requirements is based on the existing process administered by the Planning Department. The Planning Department works from their Transportation Impact Analysis Guidelines for Environmental Review (see Appendix 6).

The Authority is currently partnering with the Planning Department and other City agencies to improve the City’s CEQA transportation impact analysis methodology and process, by advancing a motorized trip generation measure for assessing transportation impacts.

### 6.6.A. Uniform Land Use Analysis Methodology

The SFITP and its list of investment priorities will be the main vehicle for addressing the transporta-

<sup>1</sup> For example, though *mode share* is a straightforward concept, it is burdensome to monitor with precision on a regular basis and is not dependent on (or explanatory to) the relationship between jobs-housing balance and regional traffic reduction.



tion needs generated by land use changes in the City. In updating the long-range plan the Authority will use land use forecasts developed by the Planning Department (subject to regional requirements for consistency with ABAG), generate new estimates of future travel demand, and test alternative projects and investment strategies to address those future transportation needs. The detailed methodology for accomplishing this is outlined in the 2004 CWTP.

**6.6.B. Transit Impact Development Fee**

First enacted in 1981, the Downtown Transit Impact Development Fee (TIDF) ordinance was enacted as a means to have new development pay its fair share for expanded transit capacity to serve that development. TIDF assesses a one-time fee per square foot on new or converted office space in the downtown area.

In 2004, the Board of Supervisors recognized that a significant number of new transit trips would be generated by non-residential development. The Board approved an amendment to the TIDF legislation that expanded the ordinance to include the following land uses: visitor services; medical and health services; cultural, institutional, and educational (CIE); retail and entertainment; office use; and production, distribution, and repair (PDR). The legislation was also amended to include all new developments citywide, rather than just in the downtown office area. The 2004 TIDF ordinance established a fee schedule, which is subject to annual adjustment without further action by the Board of Supervisors to reflect changes in the relevant Consumer Price Index, as determined by the City Controller. The current fee schedule was last updated in May 2011, and is shown in Table 5-1.

**Table 5-1. 2011 TIDF Ordinance Fee Schedule**

Land Use Category	TIDF per sq. ft. of development
Visitor Services	\$9.34
Medical and Health Services	\$11.68
Cultural/Institution/Education	\$11.68
Retail/Entertainment	\$11.68
Office Use/Business Services	\$11.68
Production/Distribution/Repair	\$9.34

Appendix 7 contains a copy of the 2004 TIDF ordinance.

The revenues from the fee may subsidize capital and operating expenses for existing and new transit service. New development generates more transit trips, which add to the already heavily utilized transportation system, especially in the downtown area during peak periods. This, in turn, creates a greater burden on the City transit system. Because transit operates at or near capacity during peak periods, ridership growth must be addressed through increased Muni service frequencies. However, constrained infrastructure (e.g., Market Street tunnel) and reduced operating funding (e.g., from the state) limit the ability of Muni to increase peak-period service.

The impact fee levied on developers must be related to providing new or expanded transit service to support peak period travel generated by new development (including any costs associated with operations or capital). The need for transit services as a result of new development must be established. Furthermore, the proposed expenditures of the fee and the dollar amount of the fee must also have a “nexus” to the development project impacts.

The current TIDF is not adequate to support ongoing operational transit subsidies. The impact fee is a one-time charge, while the cost of subsidizing transit operations is a recurring need.

**6.6.C. Transportation Sustainability Fee Nexus Study**

**i. CEQA Transportation Impact Analysis and Impact Fee Mitigation Reform**

CEQA requires California’s public agencies to determine the potential for proposed projects to have significant impacts on the environment, including transportation impacts. CEQA also encourages agencies to develop thresholds of significance—the quantitative point at which an environmental effect may be considered significant—to facilitate these determinations. Although CEQA gives local jurisdictions discretion to adopt impact measures and significance thresholds, California agencies usually measure project effects on transportation using the Highway Capacity Manu-

al's intersection Level of Service (LOS) measure which measures delay to automobile users.

In October 2008, the Authority adopted the Final Report on the Automobile Trip Generation Impact Measure as an alternative to automobile LOS. The Report recommends that the City measure the transportation impacts of projects under CEQA based on the net new automobile trips generated (ATG) by a project. Project sponsors could mitigate trip generation impacts by paying a new auto trip mitigation fee (ATMF) that would fund a set of citywide and local area projects designed to address environmental impacts caused by the project.

The proposed replacement measure and mitigation approach was considered superior to the existing practice because it was:

- A better indicator of environmental effect than LOS;
- Consistent with the City's Transit First Policy and other environmental and health goals;
- More efficient and transparent for the Planning Department to implement and for project sponsors to understand; and
- A more effective approach to transportation impact mitigation.

In 2011, the Authority, together with the Planning Department, SFMTA and Mayor's Office of Economic and Workforce Development (OEWD), completed a Nexus Study for the proposed fee. The fee would be based upon the trips generated by a project and fund a package of improvements designed to off-set the transportation impacts of development including transit service and priority improvements, transportation demand management projects and bicycle and pedestrian network enhancements.

In the coming months, it is anticipated that the city agencies will propose to change the City's CEQA transportation impact analysis measure from "Intersection Delay for Automobiles" to "New Trips Generated (by car and transit)" and combine this with a "Transportation Sustainability Fee" or TSF. The TSF would replace and expand the city's current TIDF (Transit Impact Develop-

ment Fee). The TSF would be legislated as a Development Impact Fee under the Mitigation Fee Act and serve as CEQA mitigation for most development projects. The next steps will be for the proposed project to undergo public and environmental review with potential adoption of the CEQA transportation impact measure changes and TSF ordinance expected in late 2012 or early 2013.

In a separate but related development the Authority worked with the State Office of Policy and Research in 2009 to revise the CEQA Guidelines section on transportation impact analysis, which removed the exclusive reference to automobile LOS and replaced it with an option for local jurisdictions to select an alternative measure of transportation impact. The revisions also deleted references to parking as a transportation impact area.

## ii. Bi-County Study ATG Implementation

Since adoption of the ATG study final report, the Authority has utilized an Automobile Trips Generated measure as part of the Bi-County Transportation Study. The Bi-County Study, conducted in partnership with several agencies on both sides of the San Francisco/San Mateo county line, evaluates potential transportation improvements needed to address significant land use growth on both sides of the border.

A portion of the funding for transportation improvements in the bi-county area will be contributed by the sponsors of major planned development projects. To determine the fair share contributions expected of each development project and jurisdiction, the Authority modeled the expected automobile trips each project would generate in the 2030 horizon year (above projected background trip growth in the surrounding area). Each project's proportional ATG contribution will be the basis for its expected fair share contribution to the funding plan for delivering a package of infrastructure investments for the area.

## 6.7. Work Program Items

The Authority will continue to work jointly with City departments and regional agencies to assess

the transportation impacts of planned growth, to better link transportation and land use planning, and advance climate change-related goals related to transportation. Specifically, the Authority will:

- Complete the development of a fully-integrated transportation and land use model, in partnership with the Planning Department.
- Continue to develop applications of land use data within the GIS and model databases to conduct multimodal performance measurement and analysis (e.g., the relationship of land use patterns to transit usage and coverage).
- Participate in statewide, regional, and local SB 375 implementation activities by coordinating San Francisco input and advocating for San Francisco priorities in such activities as the setting of targets and preparations for the next RTP/SCS.
- Coordinate with appropriate City departments to reform transportation impact analysis in San Francisco through participation in the Transit Sustainability Fee Nexus Study and follow-up efforts.
- Continue development of the Neighborhood Transportation Planning and FOCUS/PDA programs.
- Develop the SFTP, including close coordination with City agencies and MTC for San Francisco's inputs into the RTP/SCS.
- Continue to review and provide technical support to ongoing area plans and land use studies under development, including the Transbay Transit Center District Plan, Better Market Street Plan, Central Corridor Study Plan, and the Eastern Neighborhoods transportation study (EN-TRIPS).
- Complete key station area and land use coordination studies such as the Bi-County Transportation Study, the Bayshore Intermodal Station Access Study, and the Central Freeway Octavia Circulation Study.
- Continue partnering with City agencies on the Transportation Nexus Study and following study phases.

**CHAPTER 7****CAPITAL IMPROVEMENT PROGRAM***Key Topics:*

- **Legislative Requirements**
- **Legislative Intent and Application to San Francisco**
- **Transportation Investment and System Performance**
- **CIP Components**
- **Relationship to Other Plans and Programming Documents**
- **The Authority's Capital Priorities Programming Process**
- **CIP Review and Amendment Procedures**
- **CIP Project Delivery**
- **Program Overview**
  - **Transit Program**
  - **Roadway Program**
  - **Waterborne Program**
  - **Bicycle and Pedestrian Program**
- **Work Program Items**

provement Program (CIP), developed by the CMA, to maintain or improve the transportation system performance measures established in the CMP, and to address impacts on the regional network, as identified through the land use impact analysis program. Capital improvement projects must conform to air quality mitigation measures for transportation-related vehicle emissions, as detailed in the BAAQMD's Clean Air Plan and related documents.

**7.2. Legislative Intent and Application to San Francisco**

The CMP legislation intended that future transportation needs would be estimated through the land use analysis program. Demand would be managed to the extent possible through actions in the trip reduction element and addressed through a fund programming mechanism to manage and supply new transportation projects and services. That mechanism is the CIP, which coordinates transportation improvements needed to accommodate land development and manage congestion. The legislation defines the CIP as a seven-year program. This makes it a medium-range programming tool, clearly not intended to replace long-range plans, but rather to provide a vehicle for implementation of improvements consistent with long-range policies.

CMP legislation emphasizes expeditious project delivery. However, new projects are typically programmed in the outer two years of each CIP. This makes it difficult for the CIP to immediately address newly identified needs. In order to be effective, the CIP must at the same time function as a transportation project *delivery* mechanism and as a programming framework, including a re-programming feedback loop, to ensure that changes are incorporated promptly, and that the information is always current. This kind of flexibility is essential to deal with San Francisco's complex and dynamic transportation funding program.

The legislation does not provide guidance as to whether the 7-year CIP period is a programming period or a project delivery period. The fact that programming transportation funds through the State Transportation Improvement Program (STIP)

**BACKGROUND****7.1. Legislative Requirements**

California Government Code 65089(b)(5) requires that the CMP contain a seven-year Capital Im-

also followed a 7-year cycle<sup>1</sup> at the time the CMP legislation was developed gives weight to the interpretation that the CIP's 7-year period is a programming horizon. Of course, the delivery timelines of projects programmed in the outer years of the 7-year CIP will likely extend beyond the 7-year programming period.

### 7.3. Transportation Investment and System Performance

One of the key purposes of the CMP is to link transportation investment with system performance. The 9-cent-per-gallon state fuel tax increase became politically viable in 1989 only after it was coupled with a requirement for CMPs. This was the Legislature's way to reassure Californians that the new revenues would be spent in ways that would make a tangible difference in mobility. Specifically, the legislation established the requirement for a 7-year CIP clearly intended to help maintain or improve operating conditions on the transportation system.

Furthermore, state law establishes that if the CMA finds a local jurisdiction to be in non-conformance with the CMP, the State Controller must withhold revenues from the 9-cent per gallon gas tax increase (Sections 65089.5 (b)(1) and 65089.2 (c)(1)), and the regional transportation planning agency (MTC in the Bay Area) cannot program federal Surface Transportation Program (STP) funds or Congestion Mitigation and Air Quality (CMAQ) funds to transportation projects in that jurisdiction. With this requirement, the emphasis on system performance is effectively linked to the power of the purse: while transportation investment can be used to address a number of goals, such as community redevelopment, urban beautification, safety, and the like, the CMP *must* focus on transportation system performance, and the CIP must identify improvements that maintain or improve system performance, or the county risks a finding of non-conformance and potential loss of transportation funding.

The changes to CMP law introduced by AB 1963 in 1994 further emphasized the focus of the CMP on performance by mandating a new performance ele-

ment, which replaced the transit element. Reaching beyond the roadway-oriented approach of the original CMP language, AB 1963 calls for a performance element that addresses a *multimodal* system that is concerned with transit, shared-ride, bicycle, pedestrian, and other types of trips in addition to trips by single-occupant automobiles. (For more details on this topic, see Chapter 4.) In particular, section 65089(b)(2) explicitly requires that multimodal performance measures developed as part of the performance element be used to inform the decisions about the composition of the CIP.

In 2003, San Francisco voters approved Proposition K (Prop K), extending the existing local half-cent sales tax for transportation and adopting a new 30-year Expenditure Plan. The new Expenditure Plan complements the CMP system performance objectives by establishing that project sponsors for all programmatic categories develop performance measures that are consistent with CMP requirements and guidelines issued by the Authority. (Refer to Sections 4.2 and 4.3 for details.)

The CIP is not the only factor affecting system performance. Other key factors influencing the performance of San Francisco's multimodal CMP network are: land use decisions, trip reduction programs, and system operations decisions. Land use decisions and trip reduction programs affect the *demand* for transportation: development decisions result in new trips or in changes in trip patterns, and trip reduction programs eliminate some single-occupant automobile trips. Nevertheless, the CIP is a key determinant of system performance because it can directly affect the *supply* of transportation infrastructure in the city. Any proposed changes to the CIP must first be evaluated to estimate their impacts on expected system performance, to ensure that the established performance standards are maintained and that San Francisco remains in conformance with the CMP.

Chapter 4, the multimodal performance element, guides the establishment of multimodal system performance standards and describes procedures for evaluating the performance of system components. This is in addition to the roadway LOS monitoring and standards described in Chapters 3 and 4.

<sup>1</sup> The STIP now follows a 5-year cycle.

## CIP CONTENTS AND CONTEXT

### 7.4. CIP Components

In order to satisfy the State requirements described above, the CIP includes the following components:

- All projects and/or expenditures included in previous CMP CIPs, as amended or modified since the 2009 CMP.
- All transportation projects and/or expenditures programmed for projects in San Francisco in the STIP and/or in the federal Transportation Improvement Program (TIP), in addition to those in previous CMP CIPs.
- All projects contained in the most recent Proposition K Strategic Plan (2009), 5YPPs, and in subsequent amendments and updates.
- All projects in the Transportation Fund for Clean Air (TFCA) program for San Francisco that were programmed by the Authority as part of the 40 percent discretionary portion (i.e., county program manager) of that program.

Some projects referenced above are located in San Francisco but sponsored by entities not directly within the City's jurisdiction such as BART and the Peninsula Corridor Joint Powers Board (Caltrain).

Appendices 9 through 12 also reference projects currently in the CIP. Over the past decade there has been a consistent and expanding trend at the federal, state, and regional levels of imposing increasingly stringent timely-use-of-funds requirements as a condition of receiving discretionary funds. Failure to meet these deadlines can result in a loss of funds to the project, San Francisco, or even the Bay Area region. The trend has its roots at the federal level, where worsening financial conditions have drawn attention to large grant balances that had in some cases been accumulating for many years. Given the new timely-use-of-funds requirements, which are also an integral part of MTC project delivery guidelines, and Prop K Strategic Plan policies, project delivery oversight is increasingly important. The Authority tracks project progress through a variety of mechanisms including 5YPPs and ongoing pro-

ject management oversight activities, but a more sophisticated project delivery tracking system is needed. Development and implementation of an enhanced system covering Prop K, TFCA, Prop AA, and CMA-funded projects will be a primary work plan task during 2012 and 2013. Further discussion on project delivery mechanisms is found in Section 7.8: Project Delivery.

For a detailed discussion of the Authority's process for review and approval of CIP changes, please refer to Section 7.7: CIP Review and Amendment Procedures.

### 7.5. Relationship to Other Plans and Programming Documents

#### 7.5.A. Relationship to the Countywide Long-Range Transportation Plan

The CIP is the most significant implementation tool of the CMP. Pursuant to State law, in order to be included in the Regional Transportation Improvement Program (RTIP), and therefore be eligible to receive state and federal funds, a project must first be included in the CIP. In addition, the CIP is a 7-year document, designed to ensure the delivery of transportation projects needed to maintain system performance. The CIP is intended to serve as a short or medium-range implementation vehicle for a longer-range list of priority projects, such as would be provided by a countywide transportation plan.

San Francisco's General Plan includes a Transportation Element, which contains 40 general objectives and 200 associated policies. Under state law, the Authority, as CMA, must prepare San Francisco's long-range Countywide Transportation Plan (CWTP). The plan's action element includes a list of specific investment priorities (i.e., transportation projects and services). By following that list, the CIP is then the main implementation tool for the CWTP. The CWTP is discussed in further detail in Chapter 6 (Land Use Impacts Analysis).

The 2003 Prop K sales tax Expenditure Plan was developed as part of the long-range CWTP. The ability to design a new sales tax expenditure plan as part of the development of the CWTP offered a rare opportunity to coordinate planning and programming. The long-range plan also provides an analysis

of citywide and multimodal need, system performance, and context for other issues in programming and funding strategy.

### 7.5.B. Relationship to the Prop K Strategic Plan

Proposition B was the first half-cent local sales tax for transportation in San Francisco, approved by San Francisco voters in 1989. Proposition K, passed by the voters in November 2003, extended the half-cent local sales tax for transportation and adopted a new 30-year Expenditure Plan, superseding the prior one. As with Prop B, the Prop K Expenditure Plan details specific projects and programs that are eligible for the sales tax revenues. Prop K is expected to generate close to \$2.82 billion (2003 dollars) for transportation projects in San Francisco over the next 30 years. The significance of these revenues, in part, is that they are used to provide local matching funds required to attract state and federal dollars. Depending on the funding program, the proportion may be as low as 11.47% local to 88.53% federal. This is the leveraging effect of the Prop K dollars. In addition, some Prop K revenues are used to pay entirely for certain projects that are of local interest but do not compete well for discretionary state or federal funding.

The Prop K Expenditure Plan established four categories of investment and attached mandatory percentage shares of total Prop K revenues, as shown below:

Transit	65.5%
Streets & Traffic Safety	24.6%
Paratransit	8.6%
Transportation Systems Management (TSM)/ Strategic Initiatives	<u>1.3%</u>
	100%

Appendix 9 provides a summary of the Expenditure Plan, which lists the eligible projects and programs along with their shares of Prop K funds and expected leveraging goals (e.g. in 2003 dollars, \$2.82 billion in Prop K funds is expected to leverage \$9.62 billion in other federal, state, and local funds). To achieve these goals, the Authority developed the 2005 Prop K Strategic Plan and related 5YPPs. The Strategic Plan is intended to provide the Authority

with an accurate picture of anticipated transportation funding needs, which are then reconciled with expected revenues to arrive at the most favorable financial strategy for delivering San Francisco's transportation program.

The Prop K Expenditure Plan requires that each programmatic category (i.e., not project specific) develop a 5YPP as a requirement prior to receiving Prop K allocations. Appendix 9 provides a list of programmatic categories in the Expenditure Plan and refers to the current 5YPP project lists. The 5YPPs provide a stronger link between project selection and expected project performance, and support on-time, on-budget project delivery, and timely and competitive use of state and federal matching funds. Specifically, the purpose of the 5YPPs is to:

- establish a clear set of criteria for prioritizing projects;
- improve agency coordination at the earlier stages of the planning process;
- allow and ensure public input early and through the planning process; and
- establish performance measures, which are consistent with the CMP.

While the Strategic Plan provides the long-term (i.e. 30-year) road map for managing Prop K revenue, the 5YPPs ensure that the Authority Board, project sponsors and the public have a clear understanding of how projects are prioritized for funding within each particular programmatic category.

The Strategic Plan and 5YPPs are updated quadrennially in coordination with updates to the Regional Transportation Plan (RTP) and may, between quadrennial updates, be amended as needed, as determined and recommended by the Executive Director. The first Prop K Strategic Plan and 5YPPs were adopted in 2005. The Strategic Plan and most of the 5YPPs were updated in 2009, with the remaining 5YPPs updated in early 2010.

The Strategic Plan and 5YPPs are designed to identify the best possible funding and financing strategy for San Francisco's transportation program and provide a picture of investment need in each transportation area (transit, roads, etc.). The CIP, because of its focus on system performance, serves as a framework for analysis of trade offs among pro-

posed transportation projects eligible for Prop K and other funds. Beyond the analysis of funding feasibility or financial strategy, *the CIP ensures that the proposed investments will result in tangible improvements in access and mobility* for people using San Francisco’s multimodal transportation system. The CMP’s overarching emphasis on system performance may from time to time trigger adjustments to the Prop K Strategic Plan and 5YPPs.

**7.5.C. Relationship to the Future Prop AA Strategic Plan**

In October 2009, SB 83 became law, which authorized CMAs to impose an annual vehicle registration fee increase of up to \$10 on motor vehicles registered within their respective counties. The funds must be used for programs and projects having a relationship to or benefiting the people paying the fee, and must be consistent with regional transportation plans. In November 2010, San Francisco voters approved Prop AA, which authorized the Authority, as CMA for San Francisco, to impose an annual vehicle registration fee increase of \$10 on motor vehicles registered within the county to fund projects and programs identified in the Expenditure Plan.

The Prop AA Expenditure Plan established four categories of investment and attached mandatory percentage shares of total Prop AA revenues over the 30-year life of the Expenditure Plan, as shown below:

Street Repair & Reconstruction	50%
Pedestrian Safety	25%
Transit Reliability & Mobility	
Improvements	<u>25%</u>
	100%

These projects and programs are consistent with the purpose of the fee and are intended to help implement the long-range vision for the development and improvement of San Francisco’s transportation system, as articulated in the San Francisco Long Range Countywide Transportation Plan.

Total revenues are estimated over the next 30-year period at approximately \$150 million (year of expenditure) or approximately \$5.0 million annually.

A number of guiding principles were used to help guide development of the Prop AA Expenditure Plan:

- All programs and projects must provide a documentable benefit or relationship to those paying the fee.
- Limit the Expenditure Plan to a very small number of programmatic categories, and within the categories focus on smaller, high-impact projects that will provide tangible benefits in the short-term.
- Stretch limited revenues as far as possible by complementing or enhancing projects that receive Prop K and other funds (e.g. support leveraging of revenues)
- Fill gaps in fund eligibility by supporting projects that are ineligible, have very limited eligibility, or compete poorly to receive Prop K or other discretionary funds.
- Provide a fair geographic distribution that takes into account the various needs of San Francisco’s neighborhoods.
- Ensure accountability and transparency in programming and delivery.

The Department of Motor Vehicles began collecting the vehicle registration fee in May 2010. The Authority has used the initial revenues to pay off some of the costs of development of the fee and to build a capital reserve to support the program which will operate on a pay-as-you-go basis. In Fiscal Year 2011/12, prior to allocation of any Prop AA funds, the Authority will prepare a Prop AA Strategic Plan. Input will be sought from the public as well as from potential project sponsors and other affected planning and implementation agencies. The Strategic Plan will include a detailed 5-year prioritized program (5YPP) of projects to be funded from each of the three Expenditure Plan categories, and will be consistent with the Countywide Transportation Plan, the City’s General Plan, and the CMP. The Strategic Plan will be reviewed and adopted by the Authority Board.

The Strategic Plan’s 5YPP of projects shall, at a minimum, address the following factors:

- A. Project readiness, including schedule for completion of environmental and design



phases; well-documented preliminary cost estimates, and documented community support as appropriate. Priority shall be given to projects that can implement the funded phase(s) within twelve months of allocation.

- B. Compatibility with existing and planned land uses, and with adopted standards for urban design and for the provision of pedestrian amenities; and supportiveness of planned growth in transit-friendly housing, employment and services.
- C. A prioritization mechanism to rank projects within each category, addressing, for each proposed project:
- Relative level of need or urgency
  - Cost effectiveness
  - Number of beneficiaries (e.g. modes of travel that would benefit)
  - Level of community support
  - Leveraging of other funds
  - A fair geographic distribution that takes into account the various needs of San Francisco's neighborhoods.
- D. Funding plan, including sources other than the vehicle registration fee.

#### **7.5.D. Relationship to the RTP**

The Authority, as CMA, provides input to MTC for the periodic updates of the RTP. State law provides that where countywide transportation plans have been developed, they will be used by MTC as a basis for RTP assumptions for that county. The CWTP for San Francisco is consistent with MTC's guidelines for countywide transportation plans in order to facilitate its incorporation in the RTP. MTC adopted the most recent RTP (Transportation 2035) in April 2009 and is currently undergoing the next update process, to be completed by May 2012.

#### **7.5.E. Relationship to the RTIP**

Pursuant to state law, the CIP list of projects is used by MTC in compiling the biennial RTIP, which in

turn feeds into the STIP and the Federal TIP. Under state law, projects proposed for funding through specific federal sources programmed through the STIP/TIP must first be included in the CMP's CIP. The Authority is currently working with MTC and project sponsors on developing the 2012 RTIP, which is expected to be approved by MTC in December 2011, followed by adopted of the 2012 STIP by the California Transportation Commission in March 2012.

#### **7.5.F. Relationship to the San Francisco General Plan**

The San Francisco City Charter assigns responsibility to the Planning Department for consistency review of capital improvements with the General Plan. This consistency review function is incorporated into the Authority's programming process as described in Section 7.6 below.

#### **7.5.G. Relationship to City Department Activities**

The changes in programming introduced by the 1995 CMP, as explained in this chapter, do not substantially alter programming-related activities currently performed by City departments. The goal of the process is, in fact, to streamline the programming process so that complete and timely information is available to the Authority Board, providing a well-defined context that facilitates strategic programming policy decisions.

It is important to note, for example, that each City department will continue to develop its own capital investment plans. The Authority's intent is not to suggest changes to the priorities within those plans, but rather to steer the overall programming strategy and analysis of trade-offs.

The Authority review process, as explained in the following sections, provides the required structure to analyze programming and performance data that will inform those Authority Board decisions. It is important to note that the process is intended to function using information already developed by City departments, and that except as requested by the Authority Board, no new information will be required.

The most significant value added by the Authority's review process is in providing an overall context for

transportation programming strategy and system performance, to facilitate Authority Board decisions.

Exhibit 7-A provides a summary of key roles and responsibilities of the Authority and City departments in the transportation programming process.

**Exhibit 7-A****Transportation Programming Roles and Responsibilities****A. City Departments**

1. Prepare plans, prioritize capital improvement programs and develop financial plans on an annual basis
2. Use financial constraints and strategies imposed by external agencies in addition to those established by the Authority and departments for various funding sources
3. Revise financial plans at regular intervals to reflect changes in project scope, budget or schedule, and changes in funding projections
4. Process CIP Amendments through the Authority, and obtain Authority Board approval or administrative review before submittal of new information to outside agencies
5. Check eligible project list consistency with the San Francisco General Plan before adoption by Authority Board (performed by the Planning Department)
6. Make prioritization recommendations at the time of eligible project consistency review.
7. Planning Department assessment of priorities based on the General Plan.

**B. Authority**

1. Develop, adopt, and update the CMP and its CIP
2. Process CIP Amendments according to the established procedures
3. Provide input into MTC, state, and federal agencies' process for the preparation and updates of the Regional, State, and Federal Transportation Improvement Programs (RTIP, STIP, and TIP).
4. Provide Prop K and Prop AA revenue estimates and advise on financial strategies
5. Develop Strategic Plan updates to respond to revisions in departments' and other project sponsors' (e.g. regional transit operators) capital and financial plans and to reflect CIP Amendment decisions
6. Notify outside programming agencies of decisions on CIP amendments
7. Program the local (40%) portion of the TFCA funds

### 7.5.H Relationship to Short Range Transit Plans

In addition to the SFMTA, five regional transit operators serve San Francisco: BART, AC Transit, SamTrans, Golden Gate Transit, and Caltrain. The Short Range Transit Plans (SRTPs) developed by these operators are the basis for their programming requests to the Authority for inclusion in the San Francisco CIP.

The Authority uses the SRTPs as an input into its programming process, to ensure better coordination of San Francisco programming decisions with regional priorities.

## PROCESS AND PROCEDURES

### 7.6. The Authority's Capital Priorities Programming Process

Figure 7-1 describes the Authority's Capital Priorities Programming Process. As a result of the Authority's combined role as Prop K and Prop AA administrator and CMA, this process, though focused on funds that are required by state law to be programmed through the CMP (i.e., state and federal dollars), also incorporates Prop K and Prop AA programming strategy.

The process starts with an evaluation of transportation demand or need, as evidenced by two general categories of information: programming requests from City departments and other transportation agencies, and data about expected travel patterns and monitoring of system performance. At the center of this evaluation are the CMP's multimodal system performance standards, which provide guidance on what constitutes an acceptable level of performance.

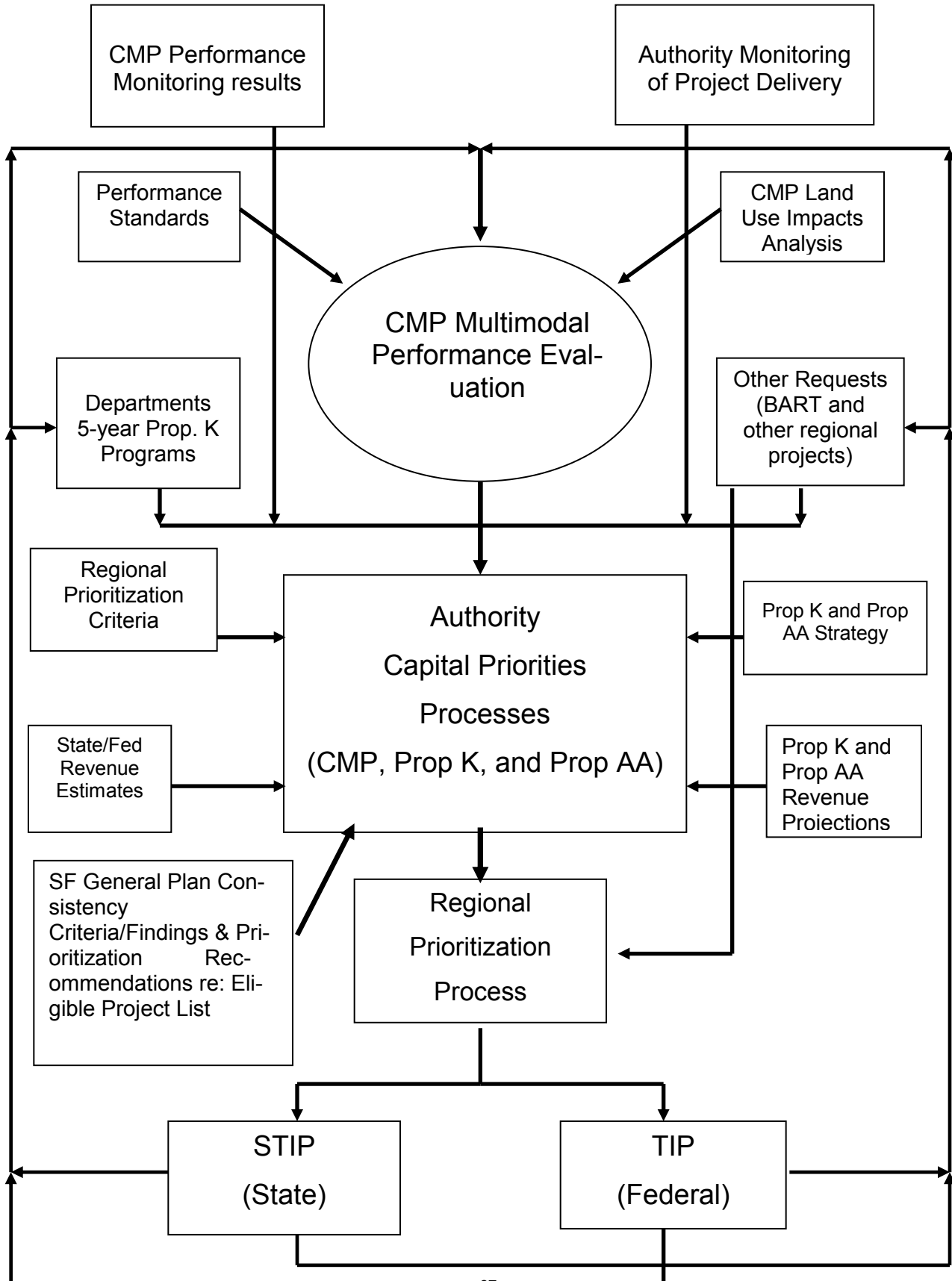
The performance standards are a *policy* decision, arrived at by weighing what kinds and amounts of transportation we would *like* against how much of it we can *afford*, and against other competing policy objectives (such as air quality or other environmental or community impacts). This requires coordination with General Plan goals and objectives and it necessitates periodic consultation with

the SFMTA and other transit providers serving San Francisco, to ensure that the established standards are realistic and can be met. The Authority's Capital Priorities process takes into account those standards, as well as current information from the Authority's own monitoring of project delivery (to further understand potential impacts on system performance), and draws up a list of transportation investment priorities that considers Prop K financing strategy, regional prioritization criteria (to ensure that San Francisco projects will compete well for state and federal funds), eligibility and timely-use-of-funds requirements, and adjusts the list to revenue projections for Prop K, Prop AA and state and federal funding sources. The result is the recommended CIP, which is adopted by the Authority Board through the CMP.

The CIP is also part of the regional prioritization process, where San Francisco projects compete with projects from the other eight Bay Area counties for state and federal funds. The result of this process is a final regional priorities list, which is adopted as part of the RTIP, which, in turn, becomes the basis for the STIP and for the federal TIP for California. San Francisco projects included in the STIP and TIP will then be ready to receive state and federal funds. Note that the programming of projects considered regional, such as certain BART projects, can be initiated at the regional level (e.g., directly through MTC).

At this point, there is an important feedback loop that takes place as part of the Authority's programming process. Programming documents and performance standards will need to be adjusted to reflect the projects that did not receive funding. For example, if a project in the SFMTA's SRTIP does not receive federal funds, it may become infeasible, or it may require a change in the Authority's Strategic Plan to devote more Prop K funds to close the gap left by the lack of federal funds, or it may require re-prioritization or re-scheduling of other SFMTA projects to ensure that system performance is maintained. On a broader scale, it may require revisiting General Plan policies as well. This feedback loop is therefore an essential step to reconcile transportation investment and transportation system performance.

Figure 7-1  
Authority Programming Process



## 7.6.A. CIP Development - Schedule

### i. Programming of CMP-Based Funds

The CIP development process follows the biennial CMP cycle for funding sources subject to programming through the CMP by state law. Pursuant to regional agreements, development of the CIP is ideally tied to the development of the STIP and the TIP. It typically starts with a call for projects, issued by the Authority, as CMA, around September/October of the first year of the cycle.

It should be noted that the process described below is subject to change depending upon various factors external to the Authority. For instance, delays in the release of the State Fund Estimate can impact the STIP programming schedule. Given the recent economic downturn and ongoing state budget crisis, state and federal programming cycles have been more subject to delay than usual. Interested parties should contact the Authority for the latest information on programming processes and schedules.

Project sponsors submit applications in the regionally developed format for funds programmed through the RTIP (state RIP and Transit Enhancements funds) and federal STP and CMAQ funds. MTC has divided the region's share of STP and CMAQ funds into multiple regional programs, each of which typically has its own application package and associated policies and guidelines. Project sponsors typically have about two months to prepare complete project applications. The Authority screens all projects for eligibility, scores projects (when applicable), reconciles funding assumptions with the Prop K Strategic Plan, and develops a draft eligible project list for San Francisco.

If necessary, the list may be submitted to the Planning Department for a General Plan consistency check (see Section 7.5.F, above). However, in practice, this is not typically required: the Prop K Expenditure Plan and the Countywide Transportation Plan are consistent with the San Francisco General Plan and thus are generally relied upon to ascertain the consistency of proposed projects with the General Plan and its Transportation Element. The Authority typically has approximately one month to complete its review, adopt

the prioritized draft list, and submit it to MTC for the regional process. After clarification is sought from project sponsors on any project details affecting eligibility, scores or ranking, a draft regional list is developed and adopted by MTC. The state and federal approval of the TIP happens subsequently.

The final project list for San Francisco is adopted by the Authority Board, and it becomes the final CIP list for the biennial CMP cycle. CMP updates, addressing not just the CIP but the entire CMP document, as necessary, are also adopted near the end of the second year of each biennial cycle.

### ii. Programming of Other Funds

The programming process described above does not include all funding sources available for transportation projects in San Francisco. Below is a description of the programming process for the main sources of funding not covered in Section 7.6. Because of the implications for the overall transportation programming strategy for San Francisco, programming applications for these sources will require review and concurrence consistent with the procedures described in Section 7.7 below.

**a. FTA Funds:** These are funds that are specifically designated for transit projects as set forth in the Federal Transit Act Amendments of 1991 (the Act). Sections 3 (Fixed Guideway – now called 5309) and 9 (now called 5307) provide for formula-based block grant programs based on population, population density, and level of transit service. Section 5309 funds are programmed for capital projects only, while Section 5307 funds are available for both capital and operating assistance. Section 5309 also contains discretionary capital grant programs for bus equipment and facilities, and for new rail starts. Required matching funds for these programs come from various state, regional, and local sources, including Prop K.

In the Bay Area, Federal Transit Administration (FTA) funding is programmed through a process established by MTC, primarily MTC's Transit Capital Priorities process. MTC Resolution 3908 spells out the rules by which transit operators in the region submit programming applications to

MTC, which ranks them by funding source in a regional master list.

**b. Prop K Funds:** As previously described, these are the half-cent sales tax revenues collected for specific transportation expenditures in San Francisco. The Authority administers this process through the development and implementation of a Strategic Plan and 5YPPs. Details of these documents are provided in Section 7.5 above. The Strategic Plan is updated quadrennially, and it may need to be amended if significant discrepancies appear between what was originally programmed and the actual level of project funding requested at any given time. These documents provide information not only about the anticipated demand for Prop K funds but also about full funding plans and status for all project phases.

**c. Prop AA Funds:** As described in Section 7.5 above, these funds consist of revenue collected from the \$10 vehicle registration fee. As CMA, the Authority will administer allocation of these revenues through the development of a Strategic Plan, which will include a 5YPP for each of the three Expenditure Plan categories. The Strategic Plan and 5YPPs will provide information not only about the anticipated demand for Prop AA funds but also about full funding plans and status for all project phases.

### 7.6.B. Programming Status: Cost/Funding Matrices

For every project included in the CIP according to the criteria discussed in Section 7.4 above, there will be a separate cost/funding matrix including project name, project identification number, a detail of specific project costs covering the following specific cost categories:

- Planning
- Environmental
- Design
- ROW Acquisition
- Procurement
- Construction
- Contingency
- Incremental O&M Costs

Details of funds programmed to each project by year of programming and by funding source are available from the Authority. Any changes to current programming status information affecting one or more projects will trigger the development of a new cost/funding matrix for the affected projects. All cost/funding matrices will be stored in the Authority's computerized Programming Management Information System (PMIS) and related databases. The data contained in the PMIS will be updated to reflect programming changes every time they are approved through the CIP Amendment process described in Section 7.7 below, as well as after adoption by the Authority board of periodic updates of the Prop K and Prop AA Strategic Plans. Information contained in the PMIS then serves as the basis for the Authority's monitoring of projects to facilitate compliance. Given the rapid growth in regional fund programs and proliferation of application formats, the Authority will be working on implementing enhancements to its PMIS and related systems to facilitate tracking and project delivery oversight of both Props K/AA and non-Prop K/AA funded projects.

## 7.7. CIP Review and Amendment Procedures

Changes to the CIP project list that need to be processed outside the biennial CMP updates are subject to administrative review and in some cases must be approved by the Authority Board through CIP Amendments.

### 7.7.A. Applicability

The previous sections describe the central role of the CMP in establishing standards and measuring or otherwise assessing the performance of the multimodal transportation system, and the role of the CIP in helping to maintain that level of performance. Any proposed changes to projects included in the CIP must therefore first be assessed by the Authority, for potential effects on the performance of the multimodal transportation system. This requirement applies to changes in the scope, schedule, or programming package for all CIP components, as described in Section 7.4. Because project viability can be affected by changes

in any component of its funding package, the requirement for Authority review applies to all funding components of CIP projects, whether they are directly programmed by the Authority or not.

The Authority's review process applies not just to proposed programming changes to the CIP, but also to initial programming applications for funds not directly administered by the Authority, but which are part of the CIP (see Section 7.4). Note that this requirement applies to the programming of funds, not to applications for receipt of already programmed funds (also known as *grant applications*). This is true unless the grant application introduces changes in programming.

### 7.7.B. Kinds of Amendments

There are two kinds of CIP Amendments: policy level and administrative level.

#### i. Policy-Level CIP Amendments

These apply to changes that are deemed by the Authority to be significant enough that they have the potential to affect the performance of the multimodal transportation system.

Policy-level CIP Amendments are required for all programming or schedule changes to CIP projects where the change will affect the scope of the project, or the year of delivery (completion) of the project, or the amount or availability of operating funds for that project, or the year of programming of Authority-programmed funds for that project, or the fund source designation or any other aspect of the funding packet requiring action by MTC or the CTC. See exceptions to this under 7.2.2 below.

Policy-level CIP Amendments require approval by the Authority Board prior to processing of the change by the implementing department. The requirement for policy-level CIP Amendments will apply to all pertinent actions (as noted above) for at least the following funding sources: STP, CMAQ, county share TE, RIP, CMAQ Match (state STIP funds), State TSM, FTA 5309 and 5307, State Rail Bonds (Props. 108 and 116), and Emergency Relief Funds.

#### ii. Administrative-Level CIP Amendments

These apply mostly to programming changes that can alter the overall transportation programming strategy for San Francisco, even though their individual effects on system performance may only be very marginal. Such programming changes will trigger the need for administrative level CIP review even if they are not tied to a specific project listed in the CIP, as long as they affect San Francisco's share of a transportation funding source listed in the CIP.

Administrative level CIP Amendments will only require notification to, and concurrent review by the Authority's Executive Director. The purpose of this requirement is to ensure that the Authority has the required information to evaluate programming strategy and the performance of CIP projects in the context of the entire universe of programming and project delivery decisions in San Francisco. Administrative level CIP Amendments may involve any of the following funding sources:

Federal:	TE (programmed by MTC), TLC, TSCP
State:	ITIP, TCI, and SHOPP
Regional:	STA, TDA, TFCA (60%)
Local:	SFMRIC, TIDF, TFCA (40%)

In addition, proposed changes to Prop AA and Prop K programming will automatically trigger administrative-level review and, at the Executive Director's discretion, may require policy-level CIP Amendments.

#### iii. Sources Not Covered By CIP Amendments

Certain funding sources, such as Highway Safety Improvement Program (HSIP), are programmed through state or regional processes. Typically, the funds become available to City project sponsors through a separate application procedure. In some cases, the funds are allocated on a first-come, first-served basis, so that the ability of City departments to act quickly is crucial. For funding sources in this category (listed below), which are not subject to a local programming action, there is still a need to include the data in the Authority's database, but no CIP amendments are required. Project sponsors are required to submit to the



Authority a copy of the grant application request at the same time as the application is made to the funding agency. Project sponsors are also required to submit to the Authority a copy of the grant award letter, as soon as it is received.

Funds subject to this requirement include at least the following:

State: Gas Tax, HSIP, HBP, and TEE.

#### **iv. Exceptions to Policy-Level Amendments**

Regardless of the funding source or other programming aspects affected, the Executive Director may rule that a requested CIP Amendment is administrative if the proposed changes, involving one or more projects and one or more funding sources, requires programming actions that can be authorized at the staff level at MTC or CTC, or at the Regional Office level for Federal Agencies, such as administrative TIP amendments, or if it results in the following:

- no net change in the total amount of funds allocated to each of the projects involved; and
- no change to the total amount of dollars of each funding source, all affected projects combined; and
- no increase in Prop K match required, all affected projects combined; and
- when a programming year change is involved, it will have no effect on the delivery schedule for the project because that schedule is determined by documented external factors.

### **7.7.C. Requirements for Submittal of CIP Amendment Requests**

#### **i. Application Contents - Format**

In order to avoid additional reporting burdens on City departments, there is no specific form or format for submittals to the Authority. However, project sponsors wishing to make application to regional, state, or federal programming agencies for changes affecting current CIP programming,

or sponsors who are planning to submit initial applications for new programming to regional, state, or federal agencies, must submit two (2) copies of those preliminary applications to the Authority, for review prior to filing their applications with those programming agencies. If this is not available at the time, a short note explaining the reasoning behind the change, and accounting for the full amount of the funds being programmed should be submitted to the Authority. In addition, a marked-up copy of the cost/funding matrix for each project for which programming actions are being proposed must be included with the application, editing all cells that are affected by the proposed programming action.

It is not the Authority's intent to question the priorities of City departments, or to suggest different projects (particularly regarding applications for new programming), but rather to evaluate departments' programming requests for impacts on multimodal system performance and for impacts on Prop K and overall CIP strategy.

### **7.7.D. The Authority's Review Process**

The sections below detail the Authority's process, which includes an initial administrative level review, to determine the need for further application information as well as to suggest the appropriate level CMP amendment required. This is followed by detailed, concurrent reviews for programming and performance implications. The process also calls for discussions with project sponsors to resolve any issues identified by the Authority's review, and establishes basic procedures to ensure disposition of the requests for review within a reasonable period of time. The timelines proposed below will vary depending upon the urgency of the request and external factors such as deadlines established by MTC or Caltrans.

#### **i. Application In-take Review**

Upon receipt of an application for programming changes, the Authority will perform an initial staff-level review. Within ten (10) working days after receipt of the application, the Authority will communicate in writing to the applicant the need for any additional information, necessary in order to further process the application.

Within ten (10) working days after receipt of all information necessary to complete the application, the Authority will issue a *letter of initial findings*, notifying the applicant in writing about the level of CIP Amendment required.

If the Authority finds that a policy-level CIP Amendment will be required (involving Authority Board action), the communication will include:

- a schedule for Authority Board approval;
- a preliminary list of unresolved conformance or consistency issues identified in connection with the application; and
- a proposed course of action for resolution of these issues, including, at least, consultation and joint efforts with the applicant.

## ii. Detailed Review

Unless otherwise specified in the proposed schedule for resolution of issues, within ten (10) working days after issuance of the letter of initial findings, the Authority will complete a detailed review of the application. The detailed review will include two components: a programming review, and a performance review. To expedite the process, both reviews will be carried out concurrently at the Authority. The conclusions from the detailed review will form the basis for an administrative finding of concurrence or for a recommendation to the Authority Board, as appropriate.

### a. Programming Review

The programming review will evaluate issues of Proposition K Strategic Plan consistency and CMP CIP conformance.

#### Programming Review Criteria

The evaluation of impacts of proposed programming changes on the CIP (including the Prop K program) is structured to provide information about three key strategic programming and fiscal policy factors for the Authority:

- a) **Cost of Money.** The analysis will address questions such as: does the proposed change limit availability of funding by Prop K category or by state or federal funding source? Does

it require or bring the Authority closer to the need to bond in order to deliver the Prop K program? Does it otherwise affect other CIP funding sources so as to increase the cost of money?

- b) **Leveraging Capacity.** The analysis will address questions such as: Does the proposed programming change improve or worsen the Authority's prospective ability to capture state and federal funds for San Francisco projects? Does it increase the required local (Prop K or other) match?
- c) **Other Programming Policy Consistency.** The analysis will address questions such as does the proposed programming change result in a skew of the funding category targets established in the Prop K Strategic Plan? Does it substantially alter the programming priorities established in the Strategic Plan of 5YPPs? Does it substantially alter the programming priorities established in the latest CMP CIP?

In addition, the Planning Department will be asked to provide a consistency review on the basis of General Plan criteria, as appropriate. This review will be incorporated into the Authority's process subject to the Planning Department's ability to meet strict turnaround timelines specified in 7.7.D.i. and 7.7.D.ii above, to ensure timely response to other City departments.

### b. Performance Review

The performance review will evaluate impacts on the performance of San Francisco's multimodal transportation system.

#### Performance Review Criteria

The evaluation of potential impacts of proposed programming changes on multimodal system performance will be performed according to the criteria described below. These analyses are intended to provide order-of-magnitude findings about future system performance, particularly cumulative impacts on operating conditions at the facility, corridor, or systemwide level. The process is not focused on prediction of minor changes in individual CMP network segments. The Authority's Transportation Analysis Database (TAD) will

support these analyses. The TAD will be improved incrementally over time and complemented with information from city departments and other available sources. For a more detailed discussion of multimodal system performance, please refer to Chapter 4.

An evaluation will be undertaken for each CIP amendment request, addressing all applicable questions from the sections below:

- a) **Effects of Schedule Changes on Performance.** The analysis will address questions such as does the proposed programming change involve or result in a delay in the delivery (completion) of any CIP projects? Are there significant anticipated impacts on system performance because of completion delays?
- b) **Effects of Scope Changes on Performance.** The analysis will address questions such as does the proposed programming change result in a downsizing of CIP projects?
- c) **Potential Deficiencies.** The analysis will address questions such as does the proposed programming change create the potential for a deficiency on the CMP network? Does it adversely affect the City's ability to implement already adopted deficiency plans? Does it adversely affect the likely effectiveness or delivery timelines for an already adopted deficiency plan?
- d) **Multimodal Balance.** The analysis will address questions such as does the proposed programming change affect the multimodal balance of the CIP? Does it significantly degrade performance conditions for one mode vis-à-vis other modes? Is it likely to significantly affect certain categories of travelers vs. others (e.g., will it adversely affect off-peak transit riders vs. drivers, or local vs. through trips?).
- e) **Subarea Impacts.** The analysis will address questions such as is the proposed programming change likely to result in disproportionate adverse impacts to system performance for one subarea of the City vs. the others?

### iii. Disposition of Amendment Requests

#### a. Administrative-Level Amendments

If the outstanding issues identified during the review process are resolved, the Authority will issue a *letter of concurrence* with the proposed programming change. If there is no resolution within 30 days of the issuance of the *letter of initial findings*, the request will be scheduled for Authority Board consideration at the next meeting.

#### b. Policy-Level Amendments

If there are no outstanding issues identified during the review process, the item will be scheduled for Authority Board action at the next meeting, with a recommendation for approval. If the review process identifies issues, and they are not resolved within the time frame specified in the Authority's *letter of initial findings*, the Authority will establish a schedule for final resolution of these issues, and invite the pertinent programming agencies to facilitate the process. The findings and recommendations from this process will be agendaized for Authority Board action on a schedule determined by the Executive Director.

#### 7.7.E. Adjustments to Prop K Strategic Plan

As part of the evaluation process for all CIP Amendments, the Authority will explicitly consider and recommend adjustments to the Prop K and Prop AA Strategic Plans and to the TFCA program, as appropriate, to maintain consistency. Such adjustments will be scheduled for Authority Board action concurrently with the corresponding CIP Amendments.

#### 7.7.F. Notification of Programming Agencies

The Authority will notify the pertinent regional, state, or federal agencies, in writing, within 5 working days of Authority Board action on policy level CIP Amendments, and/or staff-level approval of Administrative-Level CIP Amendments.

## 7.8. Project Delivery

One of the key purposes of the CMP is to establish the link between transportation investment and system performance. In the CMP, this is primarily achieved through the CIP (see Section 7.3: Transportation Investment and System Performance). Programming projects in the CIP is only half of the picture. In order to be effective, the CIP must also function as a transportation project *delivery* mechanism.

Failure to deliver projects or delays in implementation can affect system performance. Further, depending upon the fund source, delay in obligating funds or implementing a project can result in loss of funds to the project and/or permanent lost to San Francisco and/or the Bay Area. In the long run, poor project delivery rates can influence state and federal authorization levels for transportation funding, leading to fewer resources to dedicate to maintaining and improving the transportation system.

The Authority has mechanisms in place for tracking Prop K project delivery (i.e., the Strategic Plan, 5YPPs, and ongoing project management oversight activities). As CMA, the Authority continues to work with MTC and Caltrans to monitor project delivery rates for projects programmed in the RTIP and federal TIP.

In 2011 and 2012 we will continue to refine and implement a more formalized process and new system for tracking project delivery of Prop K and non-Prop K funded projects in order to respond to the increasingly stringent timely use of funds requirements for state and federal funds, which are in response to concerns about poor project delivery. This will allow us to be more pro-active in identifying and helping to resolve project delivery issues for sponsors and help sponsors keep track of and meet timely use of funds requirements. Our intent is to create user-friendly systems which the sponsors can also access to assist their own internal oversight and project management processes.

## 7.9. Program Overview

Appendices 11 and 12 contain CIP improvements programmed to date. They show information for relevant program cycles completed since publication of the 2009 CMP. Information for these projects is consistent with data reflected in the 2009 Prop K Strategic Plan and 5YPP updates, the 2012 STIP project list for San Francisco, and in the region's federal TIP. The project lists will be modified as necessary to reflect the final 2012 STIP, expected to be adopted by the CTC in March 2012.

The CIP includes transit, bicycle, pedestrian, waterborne transportation, and roadway improvements funded with a variety of local, regional, state and federal transportation sources. San Francisco's program is truly multimodal, with the majority of funds going to transit, pedestrian and bicycle projects.

Since the inception of the TFCA program in 1992, the Authority has programmed a total of \$16 million to eligible San Francisco projects. These funds are devoted to projects that improve air quality. Highlights of the TFCA program include significant commitments to clean air vehicles, shuttle operations, various bicycle projects, arterial management projects, and several electric vehicle charging stations and compressed natural gas (CNG) fueling facilities.

### 7.9.A. Transit Program

Many of the projects included in the CIP of the 2011 CMP are large-scale multi-year transit projects that were already reflected in previous CMPs. The program addresses maintenance and rehabilitation as well as construction of new lines and facilities. The CIP includes Muni projects, as well as BART, Golden Gate Transit, PCJPB (Caltrain), and other regional transit projects that benefit San Francisco.

In 2001, MTC adopted its Regional Transit Expansion Program, Resolution 3434, which identified nine new rail extensions, including a downtown Caltrain extension to a rebuilt Transbay Terminal and the SFMTA's Central Subway project. MTC amended Resolution 3434 in Septem-

ber 2008 to add the Van Ness Bus Rapid Transit (BRT) project, as well.

One of the changes introduced by the passage of Prop K was that for the first time it provides sales tax funds that can be programmed to regional transit operators. The 2009 Prop K Strategic Plan therefore includes funding for Caltrain Electrification; vehicles, facilities and guideways rehabilitation and upgrade funds for BART and Caltrain; and the Transbay Joint Powers Authority's (TJPA's) Downtown Extension to a Rebuilt Transbay Terminal (Transbay Transit Center).

One of the significantly expanded initiatives included in the 2005 RTP, which was continued in the 2009 RTP, was MTC's Lifeline Transportation Program (LTP). The program has two components: a planning component consisting of various community-based transportation planning efforts and an implementation component. The Authority's prioritization process yielded projects (see Appendix 11) that improve a range of transportation choices for low-income persons by addressing gaps or barriers identified through community-based transportation plans, welfare-to-work plans or other documentation of need. Projects stemming from these plans receive priority for LTP funds and are aided in their competitiveness for some other regional programs designed by MTC.

The Prop AA Expenditure Plan designates 25% of the projected Prop AA revenue or approximately \$37.5 over 30 years for transit reliability and mobility improvements. Prop AA funds will be prioritized to projects on corridors with high transit ridership and those that support proposed rapid transit. Specific Prop AA project improvements may include transit station and stop improvements, transit stop consolidation and relocation, transit signal priority, traffic signal upgrades, travel information improvements, wayfinding signs, innovative parking management pilots and projects, and transportation demand management.

## **i. Muni Projects**

Among the most significant projects are:

- Construction of a 1.75-mile light rail extension from 4<sup>th</sup> and King Streets to Chinatown, including a mile-long subway (Central Subway);
- implementation of BRT on Geary Street and Van Ness Avenue;
- replacement of the trolley bus and diesel bus fleets;
- improvements to key transit stops and stations to comply with the accessibility requirements of the Americans with Disabilities Act (ADA);
- extensive streetcar track replacement;
- installation of signal traffic signal preemption devices along diesel coach and trolley bus routes;
- replacement of trolley bus overhead wires;
- purchase of historic streetcars for F-line service;
- Balboa Park Intermodal station improvements;
- construction of the new Islais Creek bus maintenance facility;

Funding for this capital program involves many sources, most importantly federal funds and local transportation sales tax. The remainder of needed funds is programmed from local and regional sources, such as bridge tolls, transit impact development fees, and the regional allocations of TDA and STA funds.

## **ii. Regional Transit Operator Projects**

Programmed regional transit projects include STIP funds (i.e., RIP funds) for Caltrain electrification and the Transbay Transit Center.

The CIP also contains several Caltrain commuter rail projects, with the PCJPB as lead agency, including track rehabilitation, locomotive rebuild, railcar rehabilitation, and a centralized train control system.

Construction of the Transbay Terminal building is underway and expected to be complete in FY 2016/17, with the TJPA as the lead agency. Construction of the downtown extension is expected in FY 2020/21, though the project faces a significant funding shortfall and the schedule is likely to change unless the funding outlook improves. The schedule for Caltrain electrification is being reconsidered to enable close coordination with the state's high speed rail project, and as a result this project's original schedule is delayed.

As noted above, our program has some strategic expansion projects (e.g. new or extended service), though most of our regional transit projects involve maintenance and rehabilitation or system operations improvements intended to enhance the safety and efficiency of the existing transit system.

### **7.9.B. Roadway Program**

All roadway projects included in the 2011 CMP involve rehabilitation, replacement, maintenance, and/or efficiency (including safety) improvements for existing facilities. The signature roadway project in the program is the replacement of Doyle Drive, the southern approach to the Golden Gate Bridge, with a parkway that will greatly increase the seismic and operating safety of the existing facility, provide direct transit access to the Presidio from the parkway, and make pedestrian and bicycle improvements in the Presidio. The Presidio Parkway project has benefitted from \$46 million in federal American Recovery and Reinvestment Act (ARRA) funds programmed through Caltrans that have enabled it to start construction earlier than anticipated and accelerate project delivery by an anticipated 22 months. Construction of Phase 1 began in November 2009 to meet this accelerated schedule. Phase 1, which is being built as a traditional design-bid-build project lead by Caltrans, is expected to be completed in June 2013, about 22 months earlier than previously anticipated.

In May 2010, the CTC authorized construction of Phase 2 as a public private partnership (P3). The P3 was delayed to litigation but is anticipated to reach financial close by December 2011/early 2012, and if approved, substantial completion (e.g.

open for use) of Phase 2 in December 2014. The P3 agreement would require the concessionaire to operate and maintain the facility to specified standards for 30-years, ensuring that the new parkway remains in a state of good repair until transferred back to the State at the end of the 30-year period. The estimated total project cost including the 30-years of availability payments (covering operations, maintenance and replacement of a federal TIFIA loan) is \$1.65 billion.

Replacement of Doyle Drive and the seismic retrofit of the Golden Gate Bridge (with the Golden Gate Bridge Highway and Transportation District as the lead agency for the latter project) are major capital projects necessary to accommodate travel between San Francisco, the peninsula and the North Bay.

The Authority is also working with the Treasure Island Development Authority (TIDA) and the Office of Economic and Workforce Development (OEWD) on the development of the I-80/Yerba Buena Island (YBI) Ramps Improvement Project to improve traffic safety and operation. A draft Environmental Impact Report/Environmental Impact Statement for the project was circulated for a public review period, which ended in April 2011. The project is being funded by TIDA, Highway Bridge Program (HBP), and TIDA.

Other significant projects and programs include the traffic calming program, street resurfacing, the new and upgraded signals program, and continued implementation of the Integrated Traffic Management System for San Francisco (SFgo). Appendix 12 summarizes the funding levels in the 2009 Strategic Plan last amended in December 2010.

The SFMTA's Traffic Calming Program began in response to neighborhood concern about traffic speed and commuters cutting through neighborhood streets. The program seeks to reduce traffic impacts and increase safety for pedestrians and other street users through the redesign of streets and sidewalks. The Authority worked with the SFMTA to facilitate a Technical Working Group and a Community Working Group, which help to develop guidelines for the program. The passage of Prop K in 2003 provided the first stable source of funding for this program. The first five years

focused on planning efforts. The 2009 5YPP started a shift to implementation over the next five years, as well as ongoing planning work.

Having completed construction of its Traffic Management Control Center and installation of Traffic Operating System (TOS) devices primarily in the downtown area, the SFMTA's SFgo program is focusing more on implementing improvements in key corridors and ensuring that signal and other infrastructure citywide is SFgo-ready. Funding for ITMS deployment on Oak and Fell Streets is secured and the project is nearing completion. Funding for the Van Ness corridor to support the Van Ness BRT project is also secured.

The Prop AA Expenditure Plan designates 50% of the projected Prop AA revenue or approximately \$75 over 30 years for repairing and reconstructing local streets and roads to augment federal STP/CMAQ funds from made available by MTC for this purpose), state gas tax subvention and AB 105 revenue (Prop 42 replacement), and Prop K. Prop AA funds will be prioritized to streets located on San Francisco's bicycle and transit networks and to projects that include complete streets elements such as curb ramps, bicycle infrastructure, pedestrian improvements, and traffic calming.

### **7.9.C. Waterborne Program**

This section of the program focuses on improvements to the Downtown Ferry Terminal complex, which are intended to allow for increased frequency and reliability of ferry service. The Port and Water Emergency Transportation Authority (WETA) have recently entered into a collaborative planning process to develop and implement the Downtown Ferry Terminal Expansion project. The project area includes the following property under the Port's jurisdiction: Pier ½ at the north end, extending south to include the Ferry Building and Agriculture Buildings, Downtown Ferry Terminal improvements, Ferry Pier, and Pier 14 Ferry Terminal Breakwater and Public Pier. In addition, the planning area includes Seawall Lot 351 on the west side of The Embarcadero at Washington Street. The plan would provide an implementation

program for water transit and intermodal connection improvements. The plan would consider anticipated increases in ferry ridership, passenger security requirements, public access and impacts to affected Port facilities and businesses.

The project will focus on improvements to the Downtown Ferry Terminal to handle the expected tripling of ferry ridership within fifteen years and provide the following:

- Ferry Terminals and Emergency Facilities – Develop up to three additional terminals and related ferry facilities.
- Land use Implementation Strategy – Develop a long-term land use implementation strategy that balances transportation and the other multi-uses in the area (e.g. Farmer's Market, Agricultural Building).
- Landside Transportation, Circulation, and Parking – Strengthen and coordinate the intermodal transportation connections to the Ferry Building.
- Public Access Plan and Program – Enhance public use and enjoyment of the Bay.

The project is currently in the planning stage, which is ongoing. Preliminary cost estimates for all phases of the program from planning to implementation (starting in 2013) range from about \$56.4 million to \$100 million. Thus far, the funding plan includes Prop K, State Bond (Prop 1B), Regional Measure 2, and GGBHTD funds.

### **7.9.D. Bicycle and Pedestrian Program**

The 2011 CMP includes funds for a significant number of new bicycle and pedestrian projects. Many of these projects fall under the SFMTA's programs related to traffic calming, pedestrian and bicycle projects, and school area safety. The traffic calming program was briefly discussed under Section 7.9.B – Roadway Program. The Authority has recommended programming 2012 TE funds to two citywide pedestrian projects, including a crosswalks conversion project and a targeted safety outreach campaign. The injunction against the City's Bicycle Plan was in effect from June 2006 to August 2010. During that time there was essential-

ly no implementation of SFMTA bicycle projects, although safety and outreach efforts continued.

Since the injunction was lifted, the SFMTA has completed over half of the near-term projects included in the Bicycle Plan, which equates to over 19 miles of bicycle lanes. In addition, the SFMTA has installed approximately 2,800 sharrows along 38 miles, installed 200 bicycle parking racks, and has installed eight on-street bicycle parking corals.

The Authority has worked closely with the SFMTA to develop a funding plan, including Prop K and TFCA funds, to support a steady stream of bicycle design and capital projects, and ensure the best use of local funds and leveraging of competitive regional, state and local funds. The SFMTA, bicycle advocates, and the Authority are working to ensure that the project pipeline smoothly transitions to incorporating piloting, project development and implementation of the next generation of bicycle projects after the current bike plan projects are largely implemented.

The City's interest in promoting walking and improving pedestrian safety is growing, as highlighted in mayoral Executive Directive (10-03). The Authority is working with various City agencies to develop a citywide strategy to prioritize, coordinate, and implement pedestrian improvements on multiple fronts, such as the Pedestrian Safety Task Force (created through the Executive Directive to reduce pedestrian injury and increase walking share) and WalkFirst efforts (led by the Department of Public Health to identify key walking streets and establish prioritization criteria for pedestrian improvements, funded by the CA Office of Traffic Safety).

The City has received funding for bicycle, pedestrian, and traffic calming projects from various sources, including TDA, TFCA, TE, TLC, Prop K, STP, BTA, SR2S, SR2T, and RBP. In addition, state and federal programming guidelines and the Authority's prioritization process (see TFCA, LTP, LSR, TE and Strategic Plan project lists in Appendices 11 and 12) support the inclusion of bicycle and pedestrian-friendly features in roadway and transit projects, as appropriate.

The Prop AA Expenditure Plan designates 25% of the projected Prop AA revenue or approxi-

mately \$37.5 million over 30 years for improving pedestrian safety and usability. Prop AA funds will be prioritized to projects that shorten crossing distances, minimize conflicts with other modes, and reduce pedestrian hazards. Specific projects may include crosswalk improvements, sidewalk widening and bulbouts, sidewalk repair, repair or upgrade of stairways connecting to transit stops, pedestrian countdown signals, pedestrian lighting, and traffic calming.

## 7.10. Work Program Items

- Process CIP amendments and update description of CIP in CMP – Ongoing

We are continuing to develop improved database and tracking systems for all projects in the CIP, utilizing accounting software, a relational database for program management (PMIS), and other existing databases where necessary. We are in the initial stages of development of a third generation programming database that will relate all stages of project delivery, from our long-range programming of funding categories through commitment of funds to reimbursement of the implementing agencies. We expect to implement this in phases starting in 2011-12, and will continue to refine systems and approach in response to changes in fund program guidelines and related timely-use-of-funds requirements. The first phase intended to provide immediate benefits to Authority and project sponsor staff alike is development an on-line interface for Prop K sponsors to submit quarterly reports called Prop K Portal. The portal is being beta tested by some project sponsors right now and will be fully launched for submittal of the reports for the second quarter of FY 2011/12. Additional work program items include improving the portal and identifying and implementing expanded features over the next 2 years.



- Track project delivery as needed to ensure compliance with all state and federal timely use of funds requirements and obligation deadlines (to avoid loss of funds and to facilitate timely project delivery), and to monitor for efficient use of Prop K sales tax funds and Prop AA vehicle registration fees – Ongoing

**CHAPTER 8****TRAVEL DEMAND  
MODEL AND UNIFORM  
DATABASE****Key Topics:**

- **Legislative Requirements**
- **Legislative Intent and Application to San Francisco**
- **Technical Approach**
- **Work Programs Items**

**8.1. Legislative Requirements**

California Government Code section 65089 (c), requires that each Congestion Management Agency, in consultation with the regional transportation planning agency (the Metropolitan Transportation Commission (MTC) in the Bay Area), the county, and local jurisdictions, develop a uniform database on traffic impacts for use in a countywide transportation computer model. The CMA must approve computer models used for county sub-areas, including models used by local jurisdictions for land use impact analysis. All models must be consistent with the modeling methodology and databases used by the regional transportation planning agency.

**8.2. Legislative Intent and Application to San Francisco**

Congestion management legislation was enacted in part to help transportation planning agencies identify the source of the transportation impacts of land use decisions. All Bay Area counties except San Francisco include multiple local jurisdictions each of which has authority over land use within its boundaries. The transportation impacts

of decisions made in one local jurisdiction are felt across local jurisdictional boundaries. The travel demand model is intended as a technical tool to analyze land use impacts across local jurisdictions from a uniform technical basis.

As a unified City and County, San Francisco is spared the need to estimate transportation impacts across city boundaries, although inter-county impacts must still be considered. San Francisco's travel demand forecasting challenge is primarily the accurate forecasting of travel by modes other than the private automobile, (e.g. transit and pedestrian trips).

The Authority continually updates and refines the San Francisco Travel Demand Forecasting Model. Since the creation of the original San Francisco Model in 2000, the model's geographic scope has been extended to the full nine-county Bay Area, along with significant improvements to pricing sensitivity and time-of-day modeling. The Metropolitan Transportation Commission (MTC) has also now developed an activity based model with a similar structure.

A major update to the Authority's San Francisco Travel Demand Forecasting Model known as SF-CHAMP 4.0 was operationally complete in the summer of 2009. Like SF-CHAMP 3.0, the model was calibrated using Census 2000 and MTC Bay Area Travel Survey (BATS) 2000 data. The Model Consistency Report for CHAMP 4.1, which includes minor updates to CHAMP 4.0, is included as Appendix 14.

The Authority continues to use its Geographic Information System (GIS) database as a supplemental analysis tool for appropriate CMP purposes.

The model is integrated with the Authority's GIS database. The GIS is ideally suited for the graphic display of model outputs and more detailed spatial analysis. Together, GIS and the San Francisco Travel Demand Forecasting Model can be very effective both for sketch planning and the policy-level travel demand and performance forecasting exercises associated with long-range planning. The Authority's integrated model and GIS allow the ready presentation of data using graphics and maps.

The following section provides an overview of the San Francisco Travel Demand Forecasting Model and the GIS database.

### 8.3. Technical Approach

#### 8.3.A. The San Francisco Travel Demand Forecasting Model

The San Francisco Travel Demand Forecasting Model, known as SF-CHAMP, is a computer-based tool used to assess the impacts of land use, socioeconomic, and transportation system changes on the performance of the transportation system. SF-CHAMP was developed to reflect the unique transportation, socioeconomic, and land use characteristics of San Francisco and the Bay Area. The Model uses residents' observed travel patterns; detailed representations of the region's transportation system, population and employment characteristics; transit line boardings during specific time periods; roadway volumes; and the number of vehicles available to households to simulate daily travel activity and measure performance. Future year transportation, land use, and socioeconomic inputs are used to forecast future travel demand.

##### i. Activity-Based Microsimulation

The San Francisco Model incorporates a state of the art approach to forecasting travel demand. This activity-based microsimulation model is sensitive to a broader array of conditions that influence travelers' choices.

One of the fundamental differences between SF-CHAMP and traditional models is that it is *tour*-based not *trip*-based. A tour is a sequence of trips made by an individual that begins and ends at home without any intermediate stops at home, whereas a trip is a single movement from an origin to a destination. Furthermore, the Authority's model predicts tours for individual household members (over five years old) and the resulting trips that comprise each tour, rather than just trips for each household, as in most traditional travel demand models. Tour-based models do not require data beyond what is needed to develop a

four-step travel model system. However, the tour-based methodology allows the model to:

- deal more realistically and precisely with trip chaining and interrelationships between individual trips made over the entire day;
- separate travel into mandatory and discretionary tours; and
- provide a more precise estimate of volumes that can support microsimulation models.

The second fundamental difference between SF-CHAMP and traditional models is that each individual's travel patterns are *microsimulated*, allowing previous decisions and preferences to inform subsequent decisions. Importantly, the combination of microsimulation and tour-based methodology allows decision-makers to understand not just the changes in the magnitude and direction of trip-making associated with a transportation or land use change, but also which San Francisco or Bay Area residents are most directly affected by that change. This equity analysis is a key advancement over traditional four-step models. Tour-based models also account more reliably for the complexities involved in multi-mode trip making. The San Francisco Model addresses the tradeoffs between modes for the full tour, as well as the tradeoffs between modal options of trips within a tour.

##### ii. Model Applications

The Authority uses the San Francisco Model to provide detailed forecasts supporting a number of specific planning applications, including the Doyle Drive Traffic Management Plan (construction phase), the Countywide Transportation Plan, the Authority's Strategic Analysis Reports (SARs), policy analyses, mobility assessments, Muni's Transit Effectiveness Project (TEP), and environmental analyses. Current model applications include the Central Subway FTA New Starts analysis, the Mobility, Access, and Pricing Study, the Bi-County Transportation Study, and the Geary and Van Ness Bus Rapid Transit (BRT) environmental studies.

The Authority also applied the model to assess Proposition K Expenditure Plan performance and

impacts, as well as the full Countywide Transportation Plan package.

### iii. Model Development and Enhancements

The key inputs required to develop and apply a travel demand forecasting model include information on household and individual travel behavior (obtained in a household travel survey), representations of the pedestrian, transit, and roadway networks, and spatial representations of employment and residential characteristics. In the San Francisco Model, most of the model components were estimated (the process of establishing the relationship between various relevant inputs) using household travel data collected by the Metropolitan Transportation Commission (MTC). In addition to the household travel survey, a “stated preference” survey collected preference data on transit reliability, crowding, personal security, and auto parking availability and cost.

Note that while the model system is referred to as the “San Francisco Travel Demand Forecasting Model,” it is, in fact, a series of component models that operate in a coordinated fashion, each with its own unique purpose. The following paragraphs provide brief overviews of the model inputs and components. Figure 1 illustrates how the model components are structured to produce travel demand forecasts.

SF-CHAMP was one of the first activity-based travel demand models used in practice and has been continuously used and updated for a variety of projects and plans. While for many studies SF-CHAMP 3.0 is an appropriate and robust forecasting tool, it lacks the toll and time-of-day sensitivity and geographic breadth necessary for evaluating key policies, namely the congestion pricing scenarios analyzed in the Authority’s Mobility, Access, and Pricing Study. Therefore, CHAMP 4.0 was developed.

CHAMP 3.0 is a hybrid model that forecasts the daily activity patterns and travel for San Francisco residents, but uses the Metropolitan Transportation Commission’s (MTC) BAYCAST-90 model for non-San Francisco residents. This approach was appropriate to keep the initial implementation of an advanced tool manageable. For modeling pricing policies in San Francisco, however, this

approach is limiting because much of the travel activity within San Francisco is generated by residents of other counties. In order to treat the entire Bay Area region in a consistent manner, CHAMP 4.0 predicts the daily activity patterns and tours of every Bay Area resident in all nine counties.

CHAMP 4.0 also includes new capabilities with respect to pricing sensitivity. Previous model versions did not have an explicit toll-choice model. Rather, CHAMP 3.0 considered any bridge tolls during the “highway assignment” model component. CHAMP 4.0 uses a “nested logit” approach for modeling tolls, which more accurately represents carpool cost-sharing, variations in travelers’ values-of-time, and relationship to mode choice. Through this enhancement, it is possible to represent the choice of driving around a congestion pricing zone for free, or paying a toll to take advantage of time savings offered by reduced congestion in the priced area.

The CHAMP 4.0 model was also enhanced to use continuous value-of-time distributions, rather than a single value of time for each of three income groups. This particular enhancement allows for a much greater range of variability across individuals, and is very well suited to models, such as CHAMP, implemented in a micro-simulation framework. A new stated-preference survey was used to analyze the elasticities of mode and time-of-day choice to pricing policies. In addition, the following structural changes were made:

- Destination choice for non-work tours was moved up in the model chain so that chosen destinations can inform time-of-day choice (work destination choice already preceded time-of-day choice); and
- A detailed half-hourly trip time-of-day choice model was added to the end of the model chain, specifically to model peak spreading for auto trips.

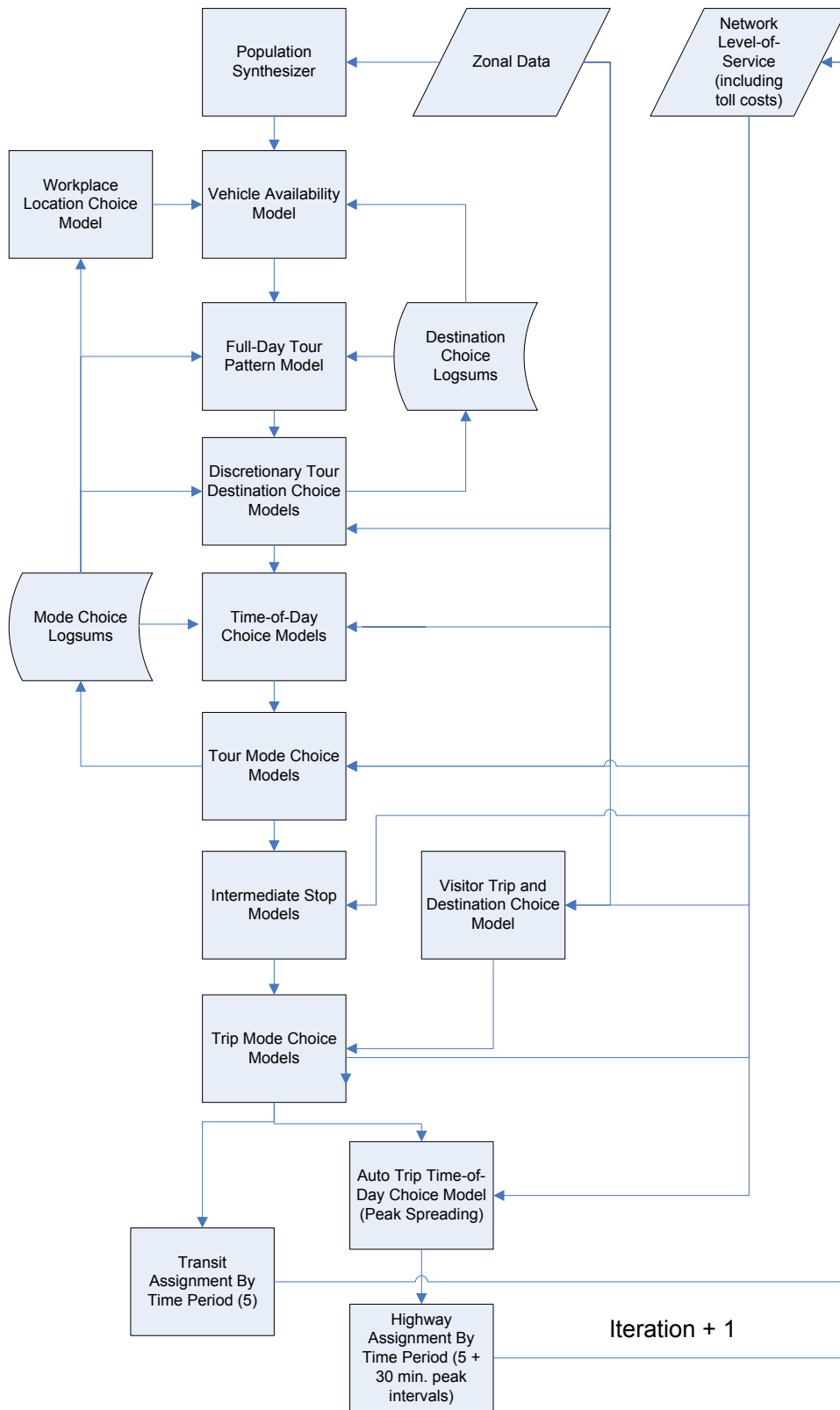


Figure 8-1. CHAMP 4.0 Model Components

#### iv. Model Input and Components

The San Francisco Model has the capability to use any standard set of ABAG land use projections as an input. Currently, most projects use either the Projections 2009 ABAG forecast, or the Sustainable Communities Strategy's Current Regional Plans series for population, households, jobs, and employed residents. Outside of San Francisco, the direct land use inputs to the MTC model are used. Within San Francisco, the San Francisco Planning Department allocates the countywide control totals for population, households, jobs, and employed residents to TAZs. Base year and future year forecasts were developed using a parcel-level residential and employment database, inventories of new development projects under construction, approved, and under review, and information on development potential for major area plans.

The San Francisco 981 Traffic Analysis Zone (TAZ) system is used within the City and County of San Francisco. Outside of the City, the San Francisco Model zone system is the same as the MTC Model 1454 zone system. Overall the model has approximately 2250 zones. As part of the CHAMP 3.0 release, the model zone system was updated in 2007 to reflect MTC's new 1454-zone system. The number of zones within San Francisco was also increased from 766 to 981 as part of this update.

Additional zone-level model inputs were developed to help refine the model to reflect San Francisco conditions. One key set of inputs developed by the Authority to support the model is a set of Pedestrian Environment Factors. These factors provide a qualitative assessment of the pedestrian-friendliness of different areas of the city.

The San Francisco Model transportation networks are very detailed and use network assumptions consistent with the MTC Regional Transportation Plan. Within San Francisco, the network is the City base map developed by the San Francisco Department of Public Works. It is highly spatially accurate and it includes every street segment within the City. For external counties, the San Francisco Model's roadway network is the MTC

regional model highway network. All local and regional transit route alignments and all stop locations are coded in the San Francisco Model's transit networks. Outside San Francisco, the MTC regional model transit network is used to represent the pertinent transit services. The model networks are ground-truthed and updated on an ongoing and project-specific basis.

#### v. Population Synthesis

The model uses a synthesized population of Bay Area residents. As described earlier, the San Francisco Model is an activity-based microsimulation model. This means that the model works at the level of the individual decision-maker – each Bay Area resident. It is therefore necessary to create a representation of each decision-maker. TAZ-level totals of households, population, and employed residents, as well as census-based distributions of household configuration, age, and income-level serve as inputs to the population synthesis model.

The model samples the Census Public Use Microdata Sample (PUMS) (i.e. long form respondents) household records, and then assigns these to the TAZ, based on the control totals and marginal distributions. The result is a file with one record for each decision-maker. It matches all control totals and distributions when aggregated to the TAZ-level.

#### vi. Vehicle Availability

The vehicle availability model predicts the vehicles available in each household for each Bay Area resident. The model estimates the probabilities of having zero, one, two, or three or more vehicles available. The Model accounts for tradeoffs for auto ownership based on the employment locations of workers in the household. This is a significant factor for auto ownership in a transit-rich environment such as San Francisco. According to the 2000 Census, San Francisco has the second highest percentage of transit usage of any county in the U.S. and the third highest percentage of other non-single occupancy vehicle modes for travel to and from work.

The vehicle availability model was validated primarily on two key variables, number of workers

per household and super district<sup>1</sup>, using the 2000 Census as the primary source of observed data. A second validation test was used to evaluate the total number of vehicles estimated by the vehicle availability model compared to Department of Motor Vehicle (DMV) estimates of auto registration.

### vii. Full Day Pattern Model

The main feature of the full day pattern approach is that it simultaneously predicts the main components of all of a person's travel across the day. Predicting tours (a sequence of trips made by an individual that begin and end at home without any intermediate stops at home) rather than trips is a significant improvement over traditional trip generation procedures because of the relationships between trips on any tour. Figure 2 illustrates the difference between trips (as estimated in the traditional four-step process) and tours.

Several models are used to predict the full day pattern. The **Primary Tour Generation Models** predict whether each individual will make either no tour on a typical weekday or will make a primary tour for one of the following purposes: work, school, or other. The individual's primary tour is defined as the longest tour in elapsed time made with a stop at work, school, or for other purposes. All of these tours are home-based. Work-based tours and secondary home-based tours are also predicted. The models also predict whether there are intermediate stops on each primary tour: none, one, or more on the outbound portion only, one or more on the inbound portion only, or one or more on both portions. Subsequent models predict the exact number of intermediate stops on each tour leg.

By using tours as a key unit of travel, we capture the interdependence of different activities in a trip chain. This provides a better understanding of non-home-based trips, especially in the case of the work-based sub-tours that represent a significant proportion of non-home-based travel.

The full-day pattern tour models were validated by converting tours to trips and comparing these to the 2000 Bay Area Transportation Survey (BATS).

### viii. Time of Day Models

The time-of-day model predicts the period when the traveler leaves home to begin the primary tour simultaneously with the period when the traveler leaves the primary destination to return home. It also predicts the time period of any intermediate stops. The periods used in the San Francisco Model are defined as:

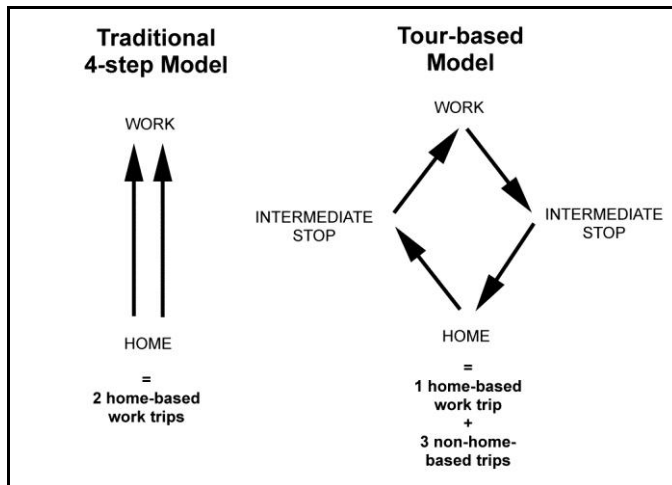
- Early (3:00 AM to 5:59 AM)
- AM peak (6:00 AM to 8:59 AM)
- Midday (9:00 AM to 3:29 PM)
- PM peak (3:30 PM to 6:29 PM)
- Late (6:30 PM to 2:59 AM)

Activity-based models can account for tradeoffs between trip chaining and time of day by evaluating time of day decisions at the tour level rather than the trip level. Pricing policies (such as parking or toll policies) can be tested more accurately by including these tradeoffs between the need to travel for purposes that are time-dependent (such as day care or work) and the desire to avoid peak period pricing. Activity-based models can also account more reliably for the complexities involved in multi-mode trip making.

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<sup>1</sup> Superdistrict is a geographic area defined by MTC.

Figure 8-2. Trip Definitions: 4-step model vs. tour-based model



### ix. Destination Choice Models

Given that the full day activity model has predicted that a traveler makes a tour with a primary destination as well as potentially some number of intermediate stops, the destination choice models select the likely destinations for these trips. The San Francisco Model includes two types of destination choice models.

The **Primary Tour Destination Models** predict the destination of tours such as the workplace or school. The **Intermediate Stop Location Models** predict the location of intermediate stops for tours with stops on the way to and/or from the primary destination, where those stops are conditional on where the primary destination is located. Factors considered in destination choice include distance, accessibility for various modes (for that individual's auto-ownership level), and the land use density and type at various locations (i.e. retail, office, etc).

The Destination Choice Models were validated against the 2000 BATS survey data and Census 2000 CTPP data (for workplace location) for primary destinations by purpose and trip length frequency distributions

### x. Mode Choice Models

After the Full Day Pattern Models and the Destination Choice Models have predicted the number, timing, and destination of trips, the Mode Choice Models predict the mode used by the traveler to

reach their destination. Mode refers to the type of transportation, such as walking, bicycling, riding transit (such as light rail or bus), driving alone, or sharing a ride. The San Francisco mode choice models differ from traditional trip-based mode choice models in that there are two distinct sets of mode choice models. The Tour Mode Choice Model determines the primary mode for the tour, while the Trip Mode Choice Models determine the mode for each individual trip made on that tour, based on the mode chosen for the tour.

An analysis of trips by mode revealed the significant percentage of transit trips and non-motorized (walk and bike) trips made by San Francisco residents. It also showed that a number of transit trips are made using several transit modes; i.e., local bus access to BART. San Francisco can be considered a transit-rich environment, where most residents can walk to transit, and a limited supply of parking is available with a high cost. Based on this analysis, a detailed representation of available modes was developed, including:

- Muni Light Rail
- Muni Local Bus
- Regional bus routes (Golden Gate Transit, AC Transit, SamTrans)
- Caltrain
- BART
- Ferry
- Walk
- Bike



- Drive Alone
- Shared Ride 2
- Shared Ride 3+

The mode choice models were validated against the MTC household travel surveys and existing modal count information including the 2004 Onboard Survey.

The 2004 Multimodal Onboard Survey accomplished a major goal of ongoing model development and improvement efforts. The key product from this survey was a robust data set for calibration of the San Francisco mode choice and transit assignment submodels. Rich data on Muni passenger origins, destinations, and demographics were leveraged as part of the 2007 CHAMP 3.0 model update. The survey covered all Muni transit lines at all times of day, and provided transit passenger demographics, origin/destination patterns, transfer rates, fare payment types, access/egress modes, and other transit travel demand characteristics. In addition, the survey collected information on tour characteristics such as tour purpose, which was critical for the tour submodel calibration effort.

### **xi. Visitor Models**

Given San Francisco's popularity as a tourist destination, trips made by visitors from beyond the San Francisco Bay Area had to be accounted for in the San Francisco Model. A series of models were estimated to predict the visitor trips by mode for San Francisco tourist destinations. These models were not based on BATS household travel survey of Bay Area residents, but rather were estimated using San Francisco Visitor & Convention Bureau data, and coefficients derived from the Honolulu model visitor development effort.

The visitor models are significantly less complex than the San Francisco resident models. They estimate the number of visitors to 29 key visitor destinations for each of three modes. The destinations include among others, Alcatraz, Golden Gate Park, North Beach, Union Square, and a cable car ride.

### **xii. Assignment**

The detailed estimate of activity patterns of Bay Area travelers (including the type and timing of

trips, destinations, and modes of travel) results in tables of trips by mode of travel from zone to zone by time of day. For example, a matrix may contain the number of transit trips during the AM peak, while another may contain a matrix of drive alone trips in the evening time period. This time period-specific demand is then assigned to the regional roadway and transit networks.

There are two primary components to the assignment process – transit and roadway. Transit assignment uses detailed information from the mode choice models to determine the particular route that a traveler uses. For example, the mode choice models may predict that a traveler uses a bus to get from the Inner Sunset to Civic Center, but it does not predict which bus. The Transit Assignment Model predicts the specific route chosen, and any transfers, based on walking time to the nearest stop, expected wait time, presence of other transit alternatives (such as the multiple routes that serve a significant portion of Van Ness Avenue), fares, in-vehicle travel time, and walk time to the final destination. The transit assignment algorithm is based on the minimization of travel time for a certain origin-destination pair by time period. The trip mode choice model dictates which of six transit modes is the “primary mode” for each user. Depending on the primary mode, other secondary modes may be made available as access and egress modes (e.g., walk access mode to BART primary mode).

Roadway assignment predicts the specific route chosen by travelers based primarily on congested travel times and traveler cost (distance and tolls), collectively summed into a *generalized cost* function. If a particular route between two points has a smaller generalized cost than another, it will attract drivers until the generalized cost on all routes between two points is equal. This equilibrated state is often referred to as Static Deterministic User Equilibrium.

The validation of transit and highway assignments is done separately, using observed volumes of vehicles and passengers on the highway and transit systems, respectively. Assignment validation at the county level was completed using aggregated volumes by corridor (identified by screenlines), type of service (facility type, mode or operator), size (volume group), and time period. Speeds and travel times are also used in highway and transit

validations to ensure that these are accurately represented in the models.

### **xiii. Further Information**

More detail about the San Francisco Travel Demand Forecasting Model can be found in the model development documentation. Information pertaining to the CHAMP 4.0 update effort can be found in the CHAMP 4.0 documentation.

### **8.3.B. GIS Database and ArcGIS 9.3**

The Authority uses a GIS database coupled with ESRI's ArcGIS 10.0 software to complement the strategic analysis facilitated by the San Francisco Travel Demand Model. The Authority's GIS database includes a large repository of shape files corresponding to local and regional street networks, census tracts, census block groups, census blocks, TAZs, transit routes, public facilities, and more.

The GIS database is refreshed on an ongoing basis with data obtained from our citywide and regional partner agencies, as the Authority generally does not directly develop comprehensive GIS files in-house.

However, the Authority is obligated to maintain a geodatabase of CMP level-of-service shape files. These shape files contain travel time and speed data for all auto CMP segments. The auto data is updated every two years as part of our CMP update. Transit data is also available.

For all other GIS shape files, the City provides a website complete with Census data for San Francisco geography and street centerline files for throughout San Francisco.

### **8.3.C MTC Model Consistency**

The Authority completed a Model Consistency Report in October 2011 to demonstrate the consistency of CHAMP 4.1 with the MTC regional model and modeling requirements. The MTC Consistency Guidelines list the items that need to be documented as part of this Consistency Report. The CHAMP 4.1 Model Consistency Report is included as Appendix 14.

## **8.4. Work Program Items**

The Authority will continue to work collaboratively with the Planning Department, MTA, other City agencies, regional transit operators, Caltrans, and MTC to:

- Work with the Planning Department to finalize the development and implementation of the integrated Land Use Growth Allocation Model.
- Continue to apply the model to assess impacts of policy and transportation changes on local and regional trip making behavior and network conditions. Geary BRT, the Transit Effectiveness Project EIR, and the San Francisco Transportation Plan will depend heavily on modeling support.
- Finalize ongoing work to incorporate more refined metrics of bicycle, transit, and pedestrian accessibility including the bicycle trip assignment model. This project was approaching completeness as of October 2011.
- Continue the development of a citywide Dynamic Traffic Assignment model.