SAN FRANCISCO

CONGESTION MANAGEMENT PROGRAM 2009

December 2009

prepared by the

San Francisco County Transportation Authority

San Francisco Congestion Management Program 2009

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CHAPTER 1

BACKGROUND AND PROGRAM OVERVIEW

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1. Background

Purpose of the CMP

The purpose of the 2009 San Francisco Congestion Management Program (CMP), prepared by the San Francisco County Transportation Authority, (the Authority) is to:

i. 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.

ii. Guide San Francisco agencies involved in congestion management;

iii. Outline the congestion management work program for fiscal years 2009/10 and 2010/11; and

iv. Set forth policies and technical tools to implement the CMP work program.

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 May, 2009.[1]

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 Municipal Transportation Agency (MTA), Department of Public Works (DPW), Planning Department, MTC, regional transit operators, and the Bay Area Air Quality Management District (BAAQMD) provided input to the Travel Demand Management and Multimodal Performance chapters of the CMP.

The Authority Board will adopt any revisions developed during fiscal years 2009/10 and 2010/11 as amendments to the 2009 San Francisco CMP.

The 2009 CMP updates information from the 2007 CMP and reflects several important developments since 2007. The Authority prepared most of the 2009 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 5, based on data provided by MTA.

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

[1] For the complete text of MTC's guidance please refer to Appendix 1.

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.

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:

a. *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.

b. *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.

c. *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.

d. *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:

a. Require more coordination between federal, state, regional, and local agencies involved in the planning, programming, and delivery of transportation projects and services;

b. Favor transportation investments that provide measurable and quick congestion relief;

c. Link local land use decisions with their effect on the transportation system;

d. Favor multimodal transportation solutions that improve air quality; and

e. Emphasize local responsibility by requiring a Congestion Management Agency (CMA) in each urban county in the state.

2. Congestion Management in San Francisco

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 re-interpreting 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.

The City's Congestion Management Track Record

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 regulations described in Chapters 6 and 7 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.

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 2009 CMP, as appropriate.

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.[2] In addition, about half of all drive-alone work trips into downtown come from within San Francisco.[3] 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.

Earlier 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. 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.

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.

[2] MTC regional trip tables.

[3] San Francisco Mobility, Access, and Pricing Study.

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 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 MTA'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 adopted 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. MTA is currently developing pilot implementations of variable pricing of on-street parking through the SF*park* program. The Authority will also soon complete its study of the feasibility of implementing an areawide congestion pricing program to manage weekday peak-period congestion. This *Mobility, Access, and Pricing Study* (MAPS) will inform policy-makers of the potential 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 Countywide 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.

3. Program Overview and Key Changes from the 2007 CMP

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.

B. Changes to 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.

1. 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.

2. 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 first included in the CIP of the CMP.

3. 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 first be prioritized by each CMA in their biennial CIP for the CMP.

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:

1. 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.

2. 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).

3. 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 8 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.

4. 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 RTIP, 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.

D. Key Changes from 2007 CMP

The following sections highlight the most significant updates proposed for the 2009 CMP.

Chapter 4: This CMP update incorporates the results of the Spring 2009 Level of Service (LOS) monitoring effort.

Chapter 5: In this CMP update, the Authority reports on the adoption of the Authority's Automobile Trip Generation Measure Final Report and discusses the current Automobile Trips Generated (ATG) Mitigation Fee Nexus Study, which is a joint effort of City agencies and the Authority. This chapter also includes reporting of transit speeds on the Muni bus network from the same period (Spring 2009) as the roadway LOS monitoring period.

Chapter 6: The Transportation Demand Management (TDM) Element has been updated to reflect the progress of our On-Street Parking Management and Pricing Study and Mobility, Access, and Pricing Study. These studies examine the potential for pricing to be used in combination with new technology and transportation enhancements made possible by the generation of revenue from user fees. This Chapter also reports on the City's TDM program, including the recent enactment of a landmark Commuter Benefits Ordinance.

Chapter 7: This chapter has been updated to reflect the City's anticipated designation 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 recent state legislation, SB 375, which establishes new requirements for linking transportation and land use planning in support of climate change goals.

Chapter 8: 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. This Chapter also discusses the quadrennial update to the Authority's Prop K Strategic Plan and accompanying 5-Year Prioritization Programs (5YPPs).

Chapter 10: The Authority's San Francisco Travel Demand Forecasting Model has undergone a major overhaul, which is discussed in this chapter. The updates include an expansion of daily travel simulation to cover the entire nine-county region and improved modeling of pricing sensitivities.

E. Coordination and Public Input

The 2009 San Francisco CMP was developed with input from the Authority's Technical Working Group, comprised of City departments, regional transit operators, and other interested agencies.

A public hearing on the 2009 San Francisco CMP was held at the December 8, 2009 meeting of the Authority Plans and Programs Committee.

The Authority Board adopted the 2009 CMP on December 15, 2009.

CHAPTER 2

CONGESTION MANAGEMENT AGENCY ROLE & RESPONSIBILITIES

Key Topics:

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

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. 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 turns 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[1]. 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.

3. The San Francisco County Transportation Authority

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.

[1] 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.

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.

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 K funds through the ongoing Strategic Plan process, 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.

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.

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) 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.

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.

e. Relationship to Regional Planing/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**

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.

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 development 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.

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.

b. Current Network

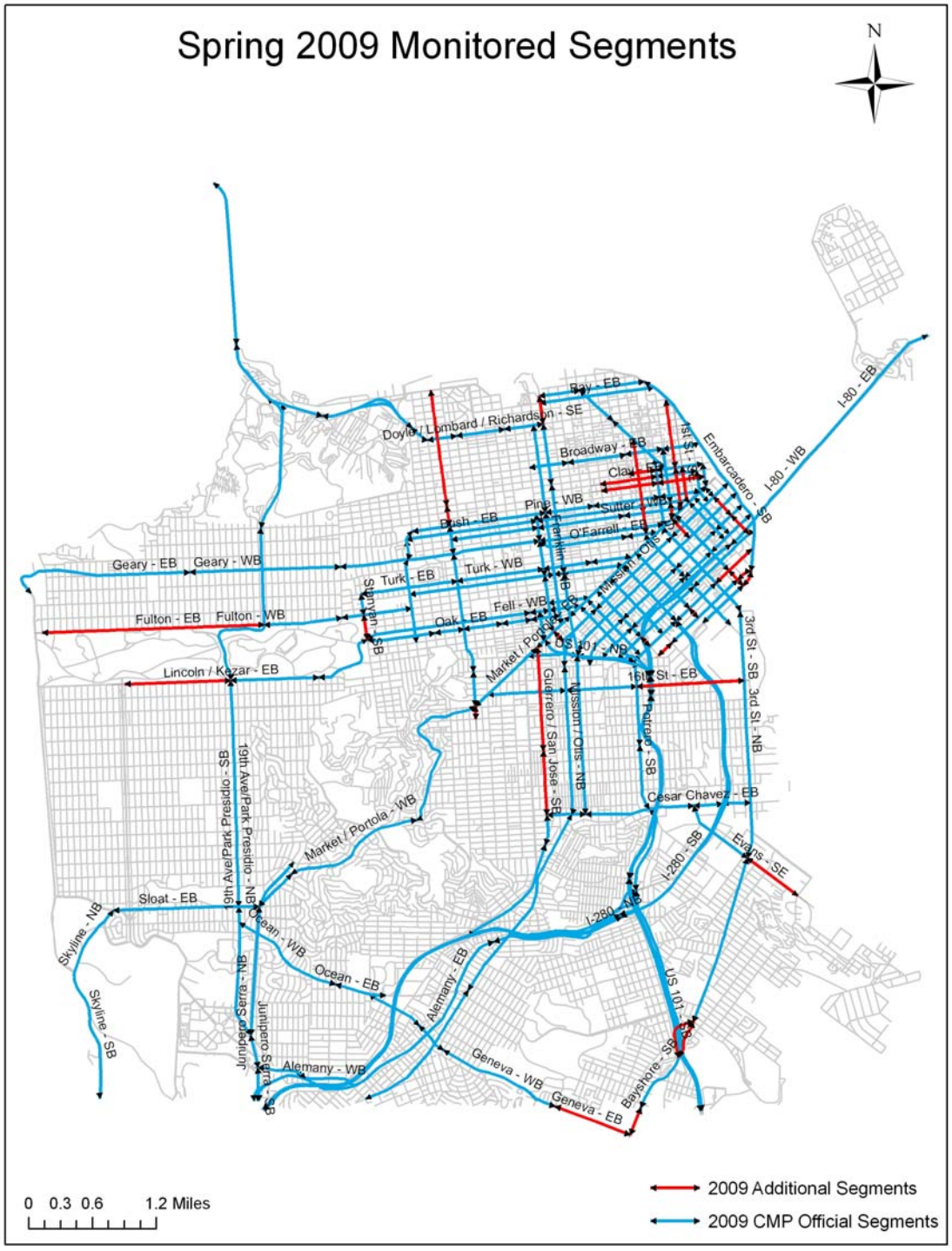
The complete CMP roadway network for San Francisco consists of 237 directional miles on both arterials and freeways.

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 2009 for the entire CMP network. In addition, 28 miles of supplemental city arterial segments were monitored to support planning and system management efforts and to take advantage of the deployment of monitoring resources. These supplemental segments do not con-

stitute official additions to the designated CMP network. The spring 2009 monitoring network is show in Figure 3-1, including the distinction between "official" and "additional" segments.

Figure 3.1



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;
- 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.

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.

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 2009 CMP.

However, as part of the spring 2009 monitoring effort, a number of additional segments were included in the data collection. These are not official changes to the CMP network, but were included to support continuing planning and system management efforts.

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."

4. Work Program Items

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

CHAPTER 4

ROADWAY LEVEL OF SERVICE (LOS) MONITORING

Key Topics:

- **Legislative Requirements**
- **Legislative Intent and Application to San Francisco**
- **Technical Approach**
- **Monitoring Results**
- **Future Monitoring Approach**
- **Caltrans' Role**
- **Work Program Items**

This chapter discusses the results of the Spring 2009 Level of Service (LOS) Monitoring effort, which was conducted on behalf of the Authority by Jacobs Engineering Group. The full consultant report will be made available on the Authority's CMP website at www.sfcta.org/cmp.

1. Legislative Requirements

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.*

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

If actual system performance falls below the set LOS standards, (i.e. congestion worsens) actions must be taken to restore or improve conditions. 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. When the level of service on a segment or at an intersection fails to attain the established level of service standard, 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."

State law provides for an alternative to the use of automobile LOS by the CMA if a local jurisdiction designates an area as an Infill Opportunity Zone (IOZ). SB 1636 (Figueroa), passed in 2002, allows jurisdictions to adopt IOZs for areas meeting certain specified requirements. Within a designated IOZ, the CMA must apply an alternative to automobile LOS standards for CMP conformance purposes.

SB 1636 requires that local jurisdictions make IOZ designations by December 31, 2009. The Board of Supervisors will consider the designation of all eligible areas in San Francisco as an IOZ in December 2009. If an IOZ is established in San Francisco, the Authority will use an alternative to LOS for network segments within designated areas beginning with the 2011 CMP. The Authority would continue to report automobile LOS on the CMP network for system monitoring and planning purposes.

2. Legislative Intent and Application to San Francisco

LOS is a traffic engineering concept designed to describe 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."

As a result, LOS is used as the main indicator of traffic congestion and as the primary yardstick for measurement of improvement in transportation service under CMP law. The choice of LOS for this purpose reflects the suburban roots of the congestion management legislation: congestion relief is to be measured by the ability of the transportation system to move automobiles, because in the suburbs the single-occupant automobile is still the dominant mode of transportation. It also reflects the fact the LOS has been used and codified more extensively and systematically than any other transportation facility performance method. Therefore, LOS is also the method that offers least potential for controversy or challenge when a CMA makes a finding of non-conformance.

Improvements on the LOS scale ensure better travel conditions for motorists, but the LOS scale does not take into account the *people throughput* potential 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 faces a double challenge on this issue: on the one hand the City must comply with the LOS standards where required and prevent LOS conditions from deteriorating below the set standards. On the other hand, it must strive to identify and utilize performance measurement metrics and tools that reflect San Francisco's transportation realities and policies more appropriately than automobile LOS. The Authority has already begun the effort to develop multimodal performance measures appropriate to San Francisco. These are described in detail in Chapter 5, *Multimodal Performance Element*. The designation of a San Francisco IOZ would further the Authority's efforts to more comprehensively articulate and monitor transportation system performance in a transit-rich setting.

Performance measurement on CMP roadways in San Francisco requires a comprehensive, multimodal approach that takes into account the congestion relief potential of transit and other non-automobile based solutions, as well as land use strategies that reduce the quantity and length of private vehicle trips.

3. Technical Approach

The Authority monitors LOS biennially on the CMP network. The Authority, as the CMA, assesses the City's conformance with LOS standards based on the monitoring results. The CMA ensures that LOS measurement methods used by its contractors, Caltrans, or any other agencies involved in monitoring the CMP network are consistent with State law.

a. LOS Standard and Monitored Facilities

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. Since 2005, monitoring has included the exempt facilities in addition to the rest of the CMP network.

During the Spring 2009 monitoring effort, all CMP network segments were evaluated. Additional segments identified by the Authority were also monitored for the first time for reference and planning purposes; these additional segments are not subject to performance requirements nor do they constitute additions to the designated CMP network.

b. Methodology

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 Authority has historically used the 1985 HCM methodology to monitor LOS on the CMP network and continues to calculate LOS using this method. The 1985 HCM methodology was utilized in the baseline monitoring cycle and is necessary to maintain historical comparisons, identify exempt segments, and monitor potential network deficiencies. As part of the 2009 study, all the arterial segments were also evaluated using HCM 2000 classification. Both the HCM 1985 and 2000 results are presented in Appendix 4.

i. Global Positioning System (GPS)

Historically, CMP travel time runs were done manually using stop watches. Jacobs Engineering Group Inc. (formerly Carter & Burgess, Inc.) introduced the GPS methodology to the Authority starting in 2007. In general, the equipment received consistent GPS signals across San Francisco.

Before performing the travel time runs, all roadways were mapped using GPS technology. The GPS receiver uses differential GPS (DGPS) to provide position information to sub-meter accuracy. This information was recorded with each travel time run to obtain accurate travel speed information.

This is the second monitoring cycle that the Authority has used GPS to monitor LOS on the CMP network. GPS data collection was also chosen to be compatible with transit data analysis, which this CMP utilizes to incorporate transit performance measures (see Chapter 5).

ii. Mapping Runs

Before performing travel time runs, roadway mapping was conducted in-vehicle using GPS equipment and software. Mapping was done in one direction for each roadway segment during off-peak periods.

During mapping, certain traffic elements were recorded such as the posted speed limit, presence of traffic signals, number of through lanes, and construction areas.

iii. Travel Time Runs

Travel time runs were conducted using the floating car method. In the floating car method, the driver of the test vehicle "floats" with the traffic by attempting to safely pass as many vehicles as pass the test vehicle.

Travel time runs were conducted during the morning and afternoon peak periods on all roadway segments; runs were only conducted on Tuesdays, Wednesdays, or Thursdays, and holidays and school district spring break periods were avoided. Four runs were made in each direction during each peak period. Where arterial LOS F was found, two additional runs in the respective direction were performed to verify results. During the travel time runs, the GPS equipment recorded position and time at one-second intervals into a personal digital assistant (PDA) device. The driver of the monitoring vehicle drove the speed limit if no other cars were present.

Where the positional accuracy of the vehicle did not meet the system requirements due to the "urban canyon effect" (where the Global Positioning System (GPS) signals are blocked by high buildings and there are not enough satellites signals to accurately estimate the positions of the user), the driver used the GPS display as a stop-watch and called out the times into a tape recorder for later coding of the GPS points in the Geographic Information System (GIS).

For quality control purposes, precautions were taken to ensure that outliers were excluded from the calculations.

iv. Factors That May Affect Results

Construction on roadways can potentially affect travel times. In 2009, construction and related lane closures were observed on the segments shown in Table 4-1.

Table 4-1 – Arterial Segments With Observed Construction

Street Name	Construction From	Construction To
Divisadero St	Ellis St	Geary Blvd
7th St	Cleveland St	Folsom St
Pine St	Front St	Battery St
Golden Gate	Van Ness	Polk St
Howard St	6th St	Russ St
	Rausch St	8th St
	10th St	12th St
Harrison St	Hawthorne St	Lapu-Lapu St
Sacramento St	Grant Ave	Stockton St

The San Francisco side of the Bay Bridge freeway approach is undergoing construction due to a seismic retrofit. This construction has been ongoing for years, and may affect the observed travel times on I-80 in San Francisco.

c. Network Segmentation Documentation of Method and Criteria

The 1993 CMP documented the criteria used in 1991 to segment the CMP roadway network in San Francisco, including freeway facilities (see Appendix 3). The following five criteria determine segment limits for the city arterials in the CMP: predominant development patterns (e.g., number of driveways, institutional uses); changes in speed limits; major cross streets; significant changes in traffic volumes; and freeway ramps. These criteria are generally recognized as significant in explaining the operating profile of a roadway.

For freeway facilities the segmentation criteria are simpler. They include major interchange on and off ramps, and points were two freeway facilities merge or bifurcate.

Segmentation changes

Appendix 3 also lists all CMP arterials where segmentation changes were introduced as part of the 1993 CMP, including a technical justification. All CMP network segments were evaluated in the Spring 2009 monitoring cycle with no segmentation changes. The most recent segmentation change occurred in 2007: the Brannan Street segmentation was changed from two discontinuous segments to four adjoining segments. This change was approved by the MTC and is documented in Appendix 3.

4. Monitoring Results

a. Overview

Table 4-2, below, presents the change in CMP Network Average Travel Speeds between 2007 and 2009.

Table 4-2. CMP Network Average Travel Speed

Category	2007	2009
Arterial AM	17.8 mph	18.6 mph
Arterial PM	16.5 mph	16.9 mph
Freeway AM	47.8 mph	48.9 mph
Freeway PM	40.3 mph	31.7 mph

Average travel speeds (weighted) on the CMP network have generally changed little compared to 2007, except on freeways in the PM, where speeds decreased significantly. Average arterial travel speeds have increased 4 percent from 17.8 mph to 18.6 mph in the AM peak and increased 2.4 percent from 16.5 mph to 16.9 mph in the PM peak. The average travel speed on freeways increased 2 percent from 47.8 mph to 48.9 mph in the AM peak. In the PM peak, freeway speeds decreased 21 percent from 40.3 mph to 31.7 mph.

Average speeds on I-80 eastbound in the PM peak from US-101 to Fremont Street exit dropped significantly this year compared to 2007 conditions. This is contributing to congestion on US-101 upstream of the I-80 transition, causing average speed to also drop significantly on US-101 northbound. These conditions contributed to the marked decline in the observed PM peak freeway average speed as compared to 2007.

Out of 231 CMP arterial segments, average AM peak speeds increased on 127 segments. Average AM peak speeds decreased on 104 segments.

In the PM peak, average speeds increased on 128 arterial segments. Average PM peak speeds decreased on 99 segments.

Despite the economic downturn, weekday peak-period traffic conditions have remained relatively unchanged since the 2007 monitoring cycle, with the exception of PM peak freeway speeds. Across the network, arterial traffic congestion continues to be highly concentrated in the city's greater downtown.

Figures 4-1 and 4-2 display LOS results graphically for the AM Peak and PM Peak periods, respectively.

Figure 4-1

Spring 2009 LOS Monitoring: AM Peak

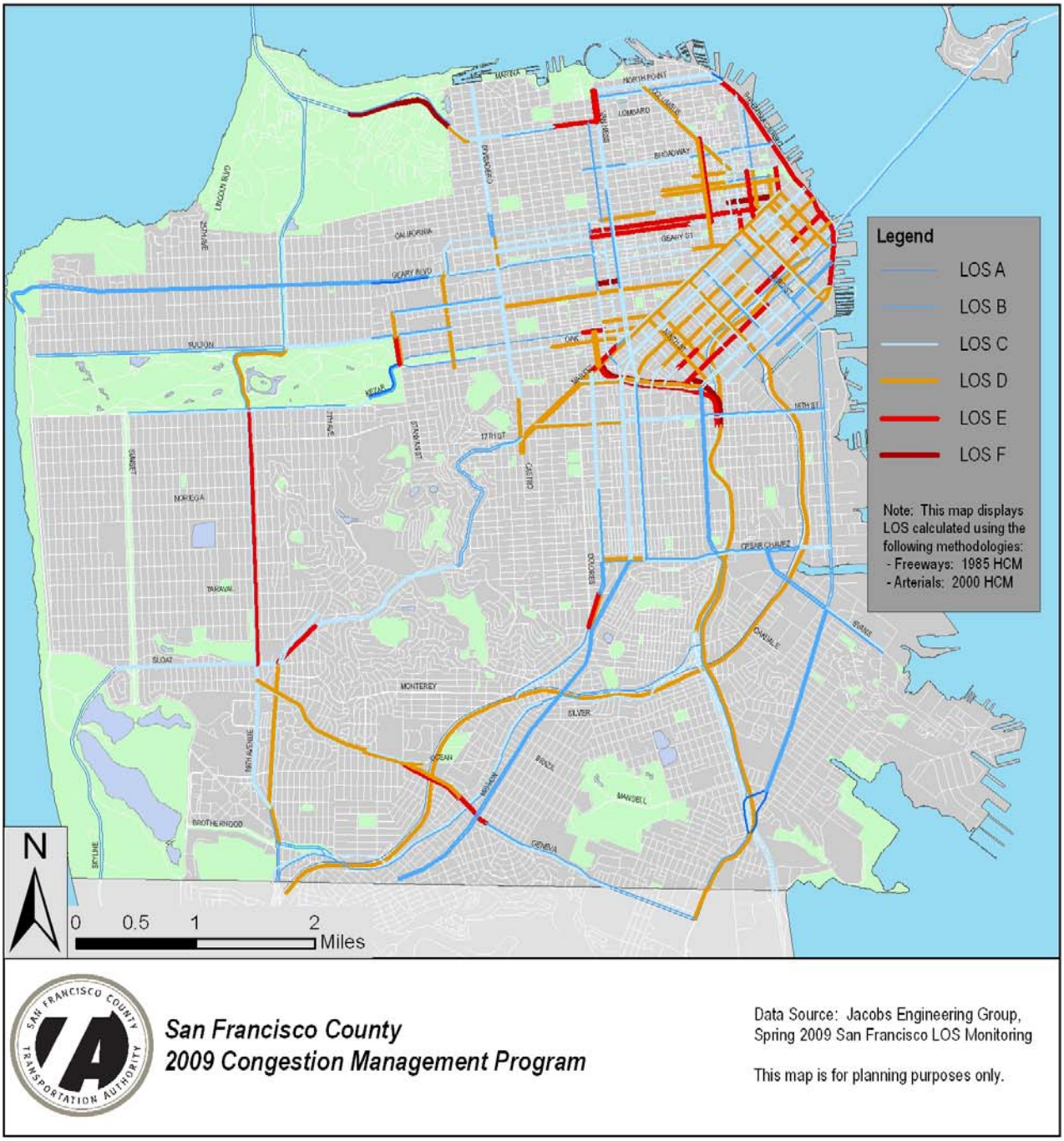


Figure 4-2

Spring 2009 LOS Monitoring: PM Peak

b. LOS F Segments

Appendix 4 presents LOS monitoring results for all segments of arterials and freeways in the CMP network. For arterials, results are presented for both the 1985 and 2000 HCM methodologies. The information includes segment length, direction of travel, time of day (AM and PM peak), average operating speed measured, and LOS results for all monitoring cycles.

For LOS monitoring purposes, the CMP segments are categorized by exempt or non-exempt status:

- **Exempt** – segments which were at LOS F during the inaugural (baseline) monitoring cycle and are legislatively exempted from the LOS E standard.
- **Non-exempt** – all other segments. If a non-exempt segment fails for three consecutive CMP cyles, it is classified as deficient.

As noted above, the Authority uses the 1985 HCM for calculating LOS when making historical comparisons to the baseline cycle.

The segments monitored at LOS F (1985 HCM) are shown in Figures 4-3 and 4-4. All exempt segments are shown in Figures 4-4 and 4-5.

Figure 4-3

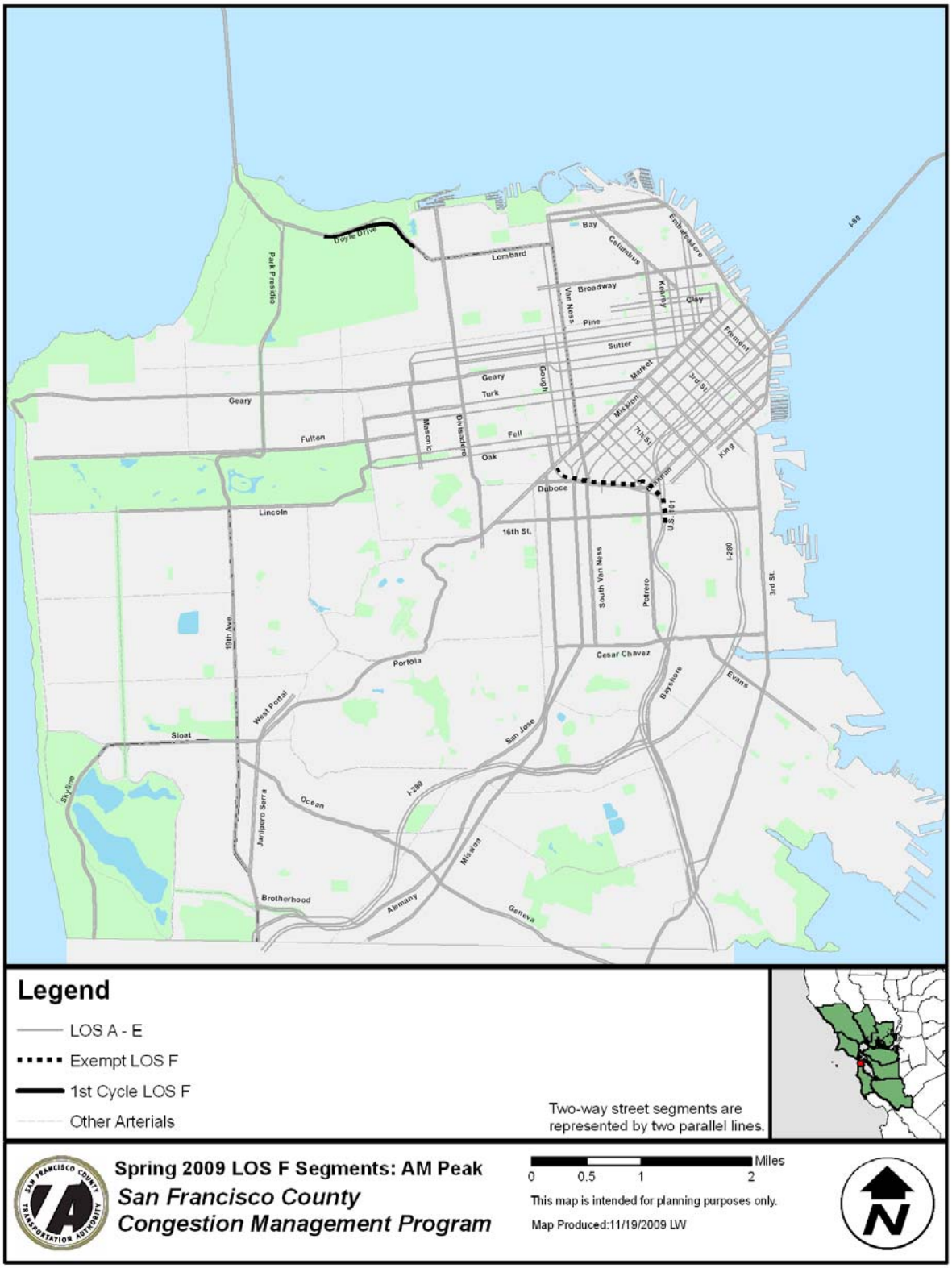

Legend
LOS A - E
Exempt LOS F
1st Cycle LOS F
Other Arterials
Two-way street segments are represented by two parallel lines.
Spring 2009 LOS F Segments: AM Peak
San Francisco County
Congestion Management Program
Miles
0 0.5 1 2
This map is intended for planning purposes only.
Map Produced:11/19/2009 LW
Doyle Drive
Lombard
Bay
Embarcadero
Columbus
Broadway
Van Ness
Pine
Sutter
Geary
Turk
Market
Mission
Fremont
3rd St
King
Fulton
Masonic
Divisadero
Fell
Oak
Duboce
Lincoln
16th St
South Van Ness
Potrero
I-280
US 101
19th Ave
Portola
Cesar Chavez
Bayshore
Evans
West Portal
Sloat
San Jose
Skyline
Ocean
Junipero Serra
Mission
Brotherhood
Alemany
Geneva

Figure 4-4

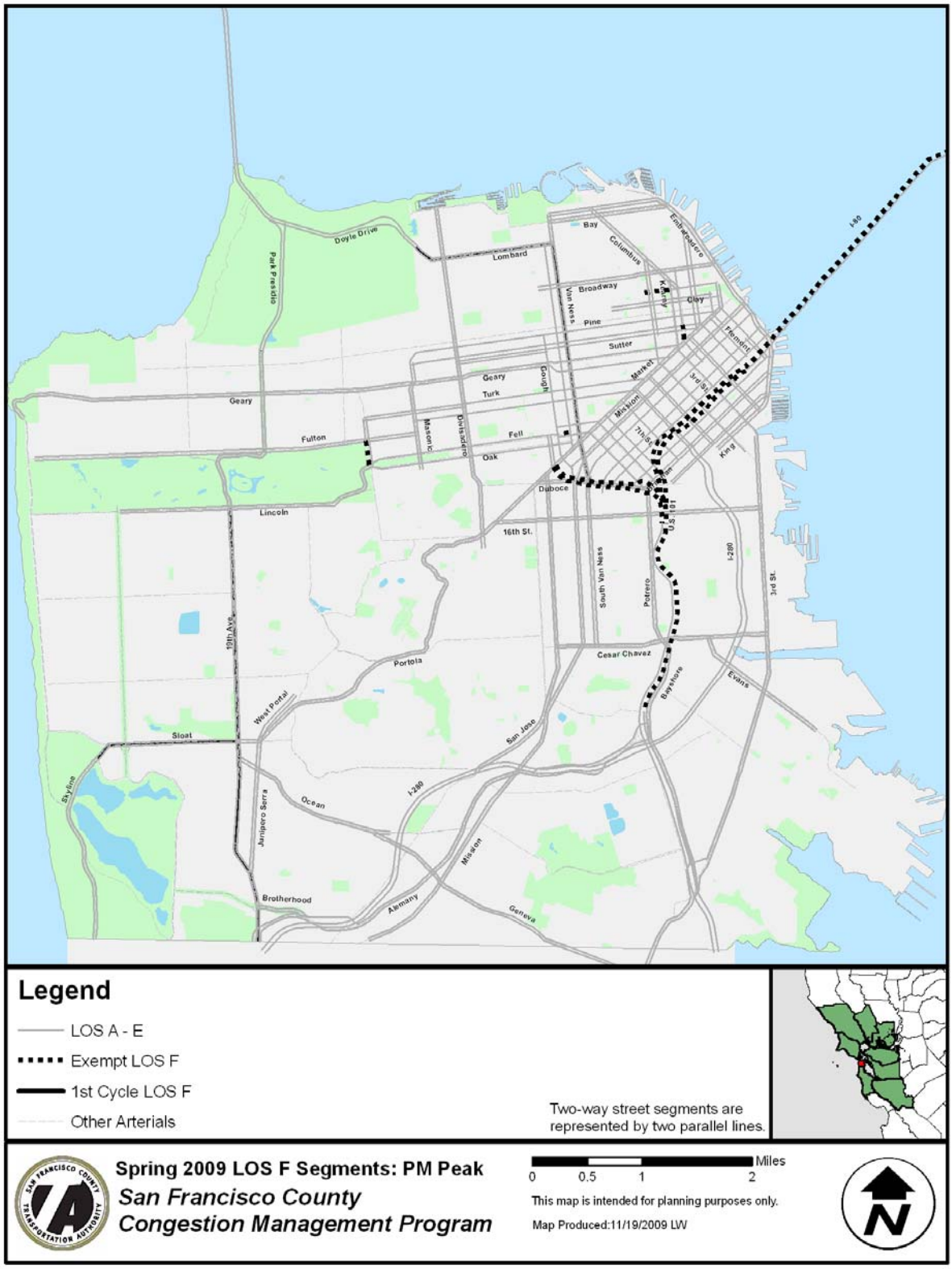

Doyle Drive
Bay
Embarcadero
Lombard
Columbus
Broadway
Van Ness
Market
Clay
Pine
Sutter
Geary
Turk
Fulton
Oak
Fell
Duboce
Lincoln
16th St.
Mission
Valencia
3rd St.
King
Potrero
South Van Ness
Cesar Chavez
Evans
Bayshore
Portola
19th Ave
West Portal
Sloat
San Jose
Ocean
Junipero Serra
Brotherhood
Alemany
Geneva
Skyline
I-280
I-80
U.S. 101
Park Presidio
Masonic
Divisadero
Gough
Franklin
Kearny
Fremont
1st St.
2nd St.
Legend
LOS A - E
Exempt LOS F
1st Cycle LOS F
Other Arterials
Two-way street segments are represented by two parallel lines.
Spring 2009 LOS F Segments: PM Peak
San Francisco County
Congestion Management Program
Miles
0
0.5
1
2
This map is intended for planning purposes only.
Map Produced:11/19/2009 LW
N

Figure 4-5

San Francisco County CMP

Segments Exempt from Mitigation Requirements: AM period

Level of Service (LOS)

Exempt

Not exempt

Two-way street segments are represented by two parallel lines.

Other arterials

Segments which were at LOS F during the first (1991) monitoring cycle are exempted from CMP legislation mitigation requirements.

Figure 4-6

San Francisco County CMP

Segments Exempt from Mitigation Requirements: PM period

Level of Service (LOS)

Exempt

Not exempt

Two-way street segments are represented by two parallel lines.

Other arterials

Segments which were at LOS F during the first (1991) monitoring cycle are exempted from CMP legislation mitigation requirements.

Table 4-3
2009 Roadway Monitoring Results – LOS F Segments (1985 HCM), AM Peak

Route	From	To	Dir.	Ave Speed (mph)	LOS	Status/Comments
Doyle / Lombard / Richardson	SF National Cemetery	Francisco	SE	2006: 28.3 2007: 19.3 2009: 12.5	B D F	1st Cycle LOS F: Segment requires follow-up monitoring per CMP procedures
US-101*	I-80	Market	N	1991: 18.7 2006: Closed 2007: 20.9 2009: 21.9	F n/a F F	Exempt: Segment monitored at LOS F during baseline cycle and therefore does not constitute a deficiency
** Study Results prior to 2004 are for the US-101 segment from/to I-80 to/from Fell/Laguna.*						

As shown in Table 4-3, only one arterial CMP route segment and only one freeway segment evaluated during the morning peak period were found to operate at LOS F based on HCM 1985. The arterial segment was measured at a LOS F for the first time (first cycle LOS F). Follow-up monitoring is not relevant for this segment, however, as it is part of a facility (Doyle Drive) that is being replaced by an entirely new facility (the Presidio Parkway) for which construction is currently getting underway

The AM freeway segment on US-101 measured LOS F in 2009 was measure at LOS F during the baseline 1991 monitoring cycle and therefore is exempt from constituting a deficiency. This segment monitored at LOS F in the previous cycle in 2007 as well.

Table 4-4 shows the 2009 CMP route segments that had LOS F during the PM Peak based on HCM 1985. Six freeway segments evaluated during the evening peak period were found to operate at LOS F. None of the official CMP arterial segments operated at LOS F during the PM peak period. The six freeway segments in Table 4-4 were also measured at LOS F during the baseline 1991 monitoring cycle and therefore are exempt from constituting a deficiency. Four freeway segments that measured at LOS F in 2009 also were at LOS F in 2007. The other two were at LOS D or LOS E in 2007.

Table 4-4
2009 Roadway Monitoring Results – LOS F Segments (1985 HCM), PM Peak

Route	From	To	Dir.	Ave Speed (mph)	LOS	Status/Comments
I-80	Treasure Island	Fremont Exit	S	1991: 27.5 2006: 41.9 2007: 21.9 2009: 26.8	F D F F	Exempt: Segment monitored at LOS F during baseline cycle and therefore does not constitute a deficiency
I-80	Fremont St	US-101	SW	1991: 18.6 2006: 22.4 2007: 18.2 2009: 24.5	F F F F	Exempt: Segment monitored at LOS F during baseline cycle and therefore does not constitute a deficiency
I-80	US-101	Fremont	N	1991: 19.0 2006: 8.9 2007: 19.6 2009: 7.0	F F F F	Exempt: Segment monitored at LOS F during baseline cycle and therefore does not constitute a deficiency
US-101	Cortland Ave	I-80	N	1991: 24.6 2006: 53.1 2007: 48.6 2009: 23.6	F C D F	Exempt: Segment monitored at LOS F during baseline cycle and therefore does not constitute a deficiency
US-101*	I-80	Market St	N	1991: 12.2 2006: Closed 2007: 32.8 2009: 22.8	F n/a E F	Exempt: Segment monitored at LOS F during baseline cycle and therefore does not constitute a deficiency
US-101*	Market	I-80	S	1991: 18.8 2006: 8.9 2007: 18.9 2009: 21.3	F F F F	Exempt: Segment monitored at LOS F during baseline cycle and therefore does not constitute a deficiency

** Study Results prior to 2004 are for the US-101 segment from/to I-80 to/from Fell/Laguna.*

5. Future Monitoring Approach

With the 2009 monitoring cycle, the Authority is calculating LOS based on two methodologies—Highway Capacity Manual (HCM) 1985 and HCM 2000. This dual reporting facilitates historical comparisons while also reporting LOS based on the more current methodology. Because the 1985 methodology was utilized in the baseline monitoring cycle, it is necessary to continue calculating results based on this method to maintain historical comparisons, consider statutorily exempt segments, and monitor potential network deficiencies.

For freeways, only HCM 1985 LOS was calculated, as the HCM 2000 methodology requires traffic volume information for all unique freeway segments and ramps. Collection of comprehensive freeway traffic volumes is beyond the scope of the CMP monitoring effort. However, HCM 2000-based segmentation was determined, and speed information for these segments is included in Appendix 4.

The Authority is also actively engaged with partner agencies in the collection and analysis of multimodal data, both for countywide planning activities such as the CMP, and for project-level evaluation. As discussed in Chapter 5, the Municipal Transportation Agency (MTA) currently uses on-board equipment to monitor various transit operational measures. This data is also used for planning purposes.

If, as discussed in Section 1 above, an Infill Opportunity Zone (IOZ) is established in San Francisco before the end of 2009, the Authority would continue to be responsible for monitoring system performance on all CMP segments for planning and evaluation purposes, including those network segments within IOZs. In addition, the Authority would continue its ongoing efforts to enhance the monitoring and reporting of non-automobile LOS system performance measures.

IOZs and their potential impact on subsequent (i.e., 2011+) monitoring cycles are discussed further in Chapter 7 of the 2009 CMP.

6. 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.

7. Work Program Items

- Monitor CMP network LOS in Spring 2011.
- Work with relevant City agencies to develop an alternative to automobile LOS for use within an IOZ, if so designated by the City in December 2009.
- Monitor transit travel times on CMP network (see Chapter 5).

CHAPTER 5

MULTIMODAL PERFORMANCE ELEMENT

Key Topics:

- **Legislative Requirements**
- **Legislative Intent and Application to San Francisco**
- **Applications of Multimodal Performance Measures**
- **Multimodal Performance Measures: Progress**
- **Work Program**

1. Legislative Requirements

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....".

2. Legislative Intent and Application to San Francisco

The original CMP legislation defined performance narrowly as level of service (LOS) on roadways. 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 State Law [Government Code 65089.3 (b)(1)(A)], deficiencies are detected only on the roadway system. San Francisco, however, should have performance standards and measurements for the transit network, bicycle network, and pedestrian facilities. San Francisco's high transit mode share and extensive transit network mean that the City benefits from a multimodal approach to system performance.

3. Applications of Multimodal Performance Measures

State law requires that link (roadway) LOS be used for determining CMP conformance and conducting deficiency planning, with certain exceptions. Multimodal performance measures will be used for the following purposes:

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 Infill Opportunity Zone (IOZ).

Senate Bill 1636 (Figueroa), signed by the Governor in September 2002, allows local jurisdictions to designate IOZs. 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. IOZs, if designated by the City, would complement efforts to redefine the system performance monitoring concept to better address the needs of all modes. Per SB 1636, if the City designates an IOZ, the Authority will utilize an alternative to the cur-

rent automobile LOS standard within the IOZ. See Chapter 7 for further discussion of potential City designation of a San Francisco IOZ, including a review of alternatives to LOS allowed by state law under SB 1636.

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. See Chapter 8 for further details.

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.

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. Multimodal Performance Measures: Progress

Consistent with state law, the 2009 San Francisco CMP distinguishes between two tiers of performance measures. Tier 1 includes roadway LOS plus three transit service performance measures: routing, frequency, and interoperator service coordination. These are the elements of multimodal performance measurement that explicitly required by state congestion management statutes.

Tier 2 includes multimodal performance measures that are not used for determination of CMP conformance but are used for planning purposes and to track trends over time. With the 2007 CMP, the Authority introduced new quantitative measures of transit performance—transit speeds and transit speeds relative to auto speed—based on automatic vehicle locator (AVL) data. This effort was continued and expanded with the 2009 CMP, as discussed in Section 4.3.

The Authority also continues its ongoing technical and policy vehicles for development of further Tier 2 performance measures. The groundwork for further measures has been supported with recent 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. The Authority is also currently collecting bicycle route choice data in order to further develop the San Francisco Travel Demand Forecasting Model (see Chapter 10).

Finally, in 2008 the Authority adopted the Final Report of the Automobile Trips Generated (ATG) Impact Measure Study. The Study recommends replacing LOS as the metric for assessing the transportation impacts of projects undergoing environmental review under the California Environmental Quality Act (CEQA). The Authority is currently partnering with City agencies on the Automobile Trip Mitigation Fee (ATMF) Nexus Study to further this effort. This issue is discussed in Section 4.4, below.

4.1. Tier 1 Performance Measures

a. Roadway Level of Service (LOS): This is the most traditional and best documented performance measure, but it is not adequate to assess multimodal performance in a system which includes a major transit component, as well as substantial pedestrian and bicycle travel. And of course, every trip begins or ends with a pedestrian component, even if that means walking down the street to a parked car. Roadway LOS is described in detail in Chapter 4: LOS Monitoring.

b. Transit Coverage/Routing: This refers to the pattern of the transit route network (e.g., radial, grid, 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.

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 5-A, found at the end of this chapter, shows frequency (headway) and coverage standards for all 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 established significantly different standards from those that Muni is expected to achieve in San Francisco. These differences are reflected in Table 5-A. The transit standards are essentially established policy and in most cases are taken directly from each operator's Short Range Transit Plan.

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 efforts to substantially improve system connectivity and ease interoperator transfers. This unified system, centered on a single farecard known as TransLink, is now operational in San Francisco and provides interoperator functionality. Eventually, TransLink will be part of an even more comprehensive multimodal system. This "integrated mobility account" will also 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.

4.2. Tier 2 Performance Measures: Approach

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—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 walk, bike, or take transit, is less standardized. Historically, transit system data has been collected primarily 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 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.

4.3. Transit Speeds

The Municipal Transportation Agency (MTA) uses both automatic vehicle locator (AVL) and automatic passenger counter (APC) 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 trolleybuses, 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. MTA's APC system provides both running time (i.e., speed) information as well as passenger activity (boardings and alightings). In March 2005, the Authority approved the first allocation of Prop K funds to support the procurement and installation of APCs on a subset of Muni's bus fleet. Since then, subsequent allocations have furthered the percentage of Muni vehicles equipped with APCs. MTA'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.

In July 2006, the Authority allocated $609,400 in Prop K funds to MTA for the procurement of 67 APCs to support the TEP. In accordance with this allocation, the Authority and MTA are working to establish protocols and procedures for the regular dissemination of APC data between the two agencies for planning purposes. APC analysis conducted for the 2009 CMP (see below) has been instrumental in advancing these efforts and in developing the capacity and skills necessary to process and analyze complex APC data.

More generally, the resources and analyses developed for the TEP's original analysis have provided MTA 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.

MTA 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 2009 CMP, the LOS monitoring consultants (Jacobs Engineering Group) processed an entire month of APC data collected on Muni's bus (diesel and trolley coach) fleet. (Muni light rail vehicles are not currently equipped with APCs.) 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 "up-stream" 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 Chapter 4 by including fully-stopped intersection delay in the calculation of through-travel speed.)

The APC dataset is from March 2009—the same period as the roadway LOS monitoring effort. 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 MTA 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.

Table 5-1 displays those CMP segments (where data was available) for which the auto-to-transit ratio is greater than 2.0. The full tabular results are included as Appendix 13.

Figures 5-1 and 5-2 graphically display the full data set for the AM and PM peak periods, respectively.

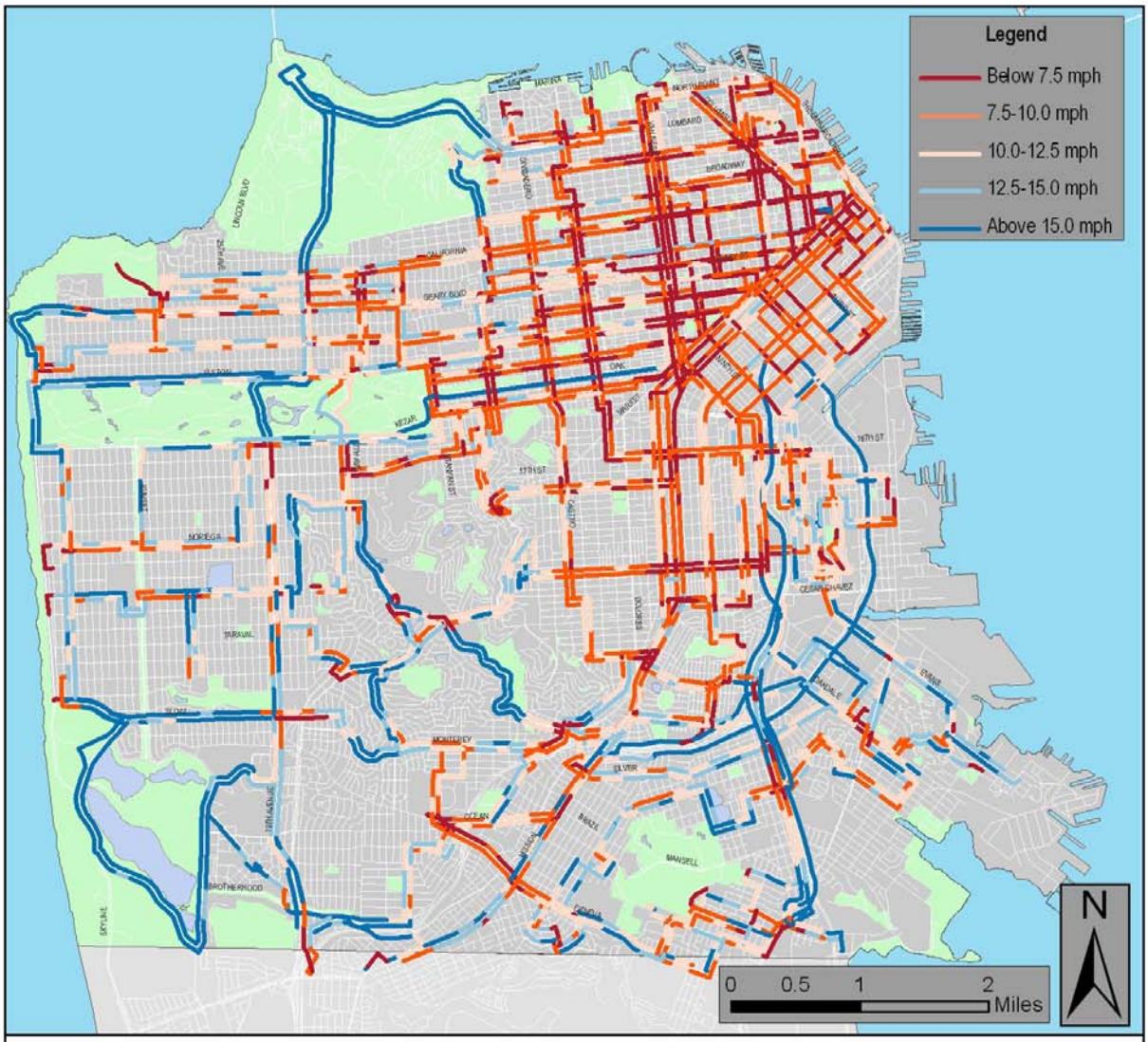
Table 5-1. CMP Segments with High Auto-to-Transit Speed Ratios

CMP Route Name	Auto Start Intersection	Auto End Intersection	Average Auto Speed (mph)	Transit Segment (stop-to-stop)	Transit Route	Average Transit Speed (mph)	Auto/Transit Speed Ratio
Van Ness / South Van Ness - NB	Washington St	Lombard St	26.4	Jackson to Chestnut	49 Inbound	8.5	3.12
Van Ness / South Van Ness - NB	Washington St	Lombard St	26.4	Jackson to Chestnut	47 Inbound	8.6	3.09
Geary - EB	25th Ave	Arguello	22.9	25th Ave to Arguello	38 Inbound	7.6	3.01
Drumm - NB	Market St	Washington St	16.2	Main & Market to Sacramento & Davis	1 Outbound	5.4	2.97
Junipero Serra - SB	19th Ave	Brotherhood Way	39.2	19th Ave to Font	28 Outbound	13.4	2.94
Van Ness / South Van Ness - NB	Golden Gate Ave	Washington St	17.4	Turk to Jackson	49 Inbound	6.2	2.83
Van Ness / South Van Ness - NB	Golden Gate Ave	Washington St	17.4	Turk to Jackson	47 Inbound	6.2	2.82
Geary - WB	Gough St	Collins	25.3	Gough to Collins	38 Outbound	9.0	2.82
Potrero - SB	21st St	Cesar Chavez St	19.4	21st St to 25th St	9 Outbound	7.0	2.79
Geary - EB	Collins	Gough St	24.7	Collins to Gough/Starr King	38 Inbound	9.1	2.72
Geary - WB	Gough St	Collins	25.3	Van Ness to Presidio	38L Outbound	9.3	2.71
Doyle / Lombard / Richardson - SE	Pierce St	Laguna	21.1	Pierce to Laguna/Chestnut	28 Inbound	8.1	2.61
Potrero - NB	Cesar Chavez St	21st St	18.8	25th St to 22nd St	9 Inbound	7.3	2.58
Geary - EB	Collins	Gough St	24.7	Presidio to Van Ness (via Starr King)	38L Inbound	9.6	2.57
Potrero - SB	Division St	21st St	25.2	Alameda to 21st St	9 Outbound	10.0	2.53
Bayshore - SB	Industrial St	County Line	26.3	Alemany to Sunnydale	9 Outbound	10.6	2.47
Van Ness / South Van Ness - NB	Hwy 102	Golden Gate Ave	14.7	Mission to Turk	49 Inbound	6.0	2.47
Columbus - NW	Montgomery St	Greenwich St	14.1	Washington/Montgomery to Union	41 Outbound	5.7	2.47
Turk - WB	Divisadero St	Stanyan St	25.6	Broderick to Stanyan	31 Outbound	10.4	2.46
Castro / Divisadero - SB	Clay St	Pine St	16.5	Clay to Pine	24 Outbound	6.8	2.41
Geary - EB	26th Ave	Arguello	22.9	25th Ave to Arguello	38L Inbound	9.6	2.38
Doyle / Lombard / Richardson - NW	Laguna	Pierce St	17.6	Laguna/Chestnut to Pierce	28 Outbound	7.5	2.36
17th St - WB	Potrero Ave	Mission St	15.2	Potrero to Mission	33 Inbound	6.5	2.35
Market / Portola - WB	Drumm St	South Van Ness Ave	13.5	Fremont to Montgomery	38 Outbound	5.8	2.34
Mission / Otis - SB	14th St	Cesar Chavez St	15.2	14th St to 26th St	14 Outbound	6.5	2.34
Geneva - EB	Santos St	Bayshore	24.4	Santos to Schwerin & MacDonald	9 Inbound	10.5	2.32
North Point - WB	Columbus	Van Ness Ave	16.4	Columbus & North Point to Polk	30 Outbound	7.1	2.31
5th St - NW	Brannan	Market St	15.6	Harrison to Market	27 Inbound	6.8	2.30
Castro / Divisadero - NB	Pine St	Clay St	18.4	Bush to Clay	24 Inbound	8.1	2.27
Mission / Otis - SB	15th St	Cesar Chavez St	15.2	14th St to 26th St	49 Outbound	6.8	2.25
Mission / Otis - SB	Ocean Ave	Sickles Ave	20.3	Norton to Sickles	14 Outbound	9.0	2.25
Sutter - WB	Mason St	Gough St	14.6	Mason to Gough	3 Outbound	6.5	2.24
Fulton - WB	Masonic	Arguello	20.6	Masonic to Arguello	5 Outbound	9.2	2.24
Mission / Otis - NB	Sickles Ave	Ocean Ave	22.4	Acton to Brazil	14 Inbound	10.0	2.24
Geary - WB	Arguello	25th Ave	17.0	Arguello to 25th Ave	38 Outbound	7.6	2.23

CMP Route Name	Auto Start Intersection	Auto End Intersection	Average Auto Speed (mph)	Transit Segment (stop-to-stop)	Transit Route	Average Transit Speed (mph)	Auto/Transit Speed Ratio
Sutter - WB	Mason St	Gough St	14.6	Mason to Gough	2 Outbound	6.6	2.21
Folsom - EB	11th St	08th St	16.9	11th to 8th St	12 Inbound	7.7	2.20
Geary - WB	25th Ave	Great Hwy	22.0	25th Ave to 42nd Ave/Point Lobos	38 Outbound	10.0	2.20
Columbus - NW	Montgomery St	Greenwich St	14.1	Stockton to Greenwich/Mason	30 Outbound	6.4	2.19
Van Ness / South Van Ness - NB	Hwy 101	Golden Gate Ave	14.7	Mission to Turk	47 Inbound	6.7	2.18
Castro / Divisadero - SB	Pine St	Geary Blvd	13.5	Pine to Geary	24 Outbound	6.2	2.16
Fulton - EB	Park Presidio Blvd	Arguello	24.1	Park Presidio to Arguello	5 Inbound	11.2	2.15
7th St - NB	Brannan St	Market St	16.4	Brannan to Market	19 Inbound	7.7	2.13
8th St - SE	Market St	Bryant St	17.0	Market to Bryant	19 Outbound	8.0	2.13
Geneva - EB	Moscow St	Santos St	28.5	Munich to Santos	9X Inbound	13.4	2.13
Mission / Otis - NB	Cesar Chavez St	16th St	13.9	26th St to 14th St	49 Inbound	6.5	2.13
Doyle / Lombard / Richardson - NW	Pierce St	Broderick	16.9	Pierce to Lyon & Lombard	43 Outbound	8.0	2.11
19th Ave/Park Presidio - SB	Lincoln Way	Sloat Blvd	23.0	Lincoln to Sloat	28 Outbound	10.9	2.11
5th St - SE	Market St	Brannan	13.2	Market to Harrison	27 Outbound	6.3	2.10
16th St - WB	Potrero Ave	Mission St	15.2	Potrero to Mission	22 Inbound	7.3	2.10
North Point - WB	Columbus	Van Ness Ave	16.4	Jones to Polk	47 Outbound	7.9	2.09
Sacramento - WB	Drumm	Kearny St	11.9	Davis to Kearny	1 Outbound	5.7	2.07
19th Ave/Park Presidio - NB	Sloat Blvd	Lincoln Way	23.6	Sloat to Lincoln	28 Inbound	11.4	2.07
Broadway - EB	Montgomery St	The Embarcadero	14.7	Montgomery to The Embarcadero	12 Outbound	7.1	2.07
Market / Portola - WB	Drumm St	South Van Ness Ave	13.5	Fremont to Golden Gate & Taylor	5 Outbound	6.5	2.07
5th St / Stockton - SB	Harrison	Channel	14.3	Folsom to Townsend	45 Inbound	6.9	2.06
Doyle / Lombard / Richardson - SE	Broderick	Pierce St	20.4	Broderick to Pierce	43 Inbound	9.9	2.06
Geary - WB	Collins	Arguello	24.1	Collins to Arguello	38 Outbound	11.7	2.05
4th St - NB	Berry St	Market St	15.7	Brannan to Market	45 Outbound	7.7	2.04
Van Ness / South Van Ness - SB	Washington St	Golden Gate Ave	12.2	Jackson to McAllister	49 Outbound	6.0	2.04
Van Ness / South Van Ness - SB	Golden Gate Ave	Hwy 102	12.3	McAllister to Otis & S. Van Ness	49 Outbound	6.1	2.03
3rd St - NB	Berry St	Market St	15.7	Brannan to Market	30 Outbound	7.7	2.03
Van Ness / South Van Ness - SB	Washington St	Golden Gate Ave	12.2	Jackson to McAllister	47 Outbound	6.0	2.02
Mission / Otis - NB	Cesar Chavez St	14th St	13.9	26th St to 14th St	14 Inbound	6.9	2.01
Geary - WB	Collins	Arguello	24.1	Presidio to Arguello	38L Outbound	12.0	2.01

Figure 5-1

Spring 2009 Muni Bus Speeds: Weekday AM Peak



San Francisco County
2009 Congestion Management Program

Notes: This map was prepared by the San Francisco County Transportation Authority for the 2009 Congestion Management Program (CMP) for San Francisco County. The transit performance information was compiled by Jacobs Engineering Group based on data provided by the San Francisco Municipal Transportation Agency. This map is for planning purposes only.

Data Source: Muni Bus (diesel and trolley coach) APC Data (stop-to-stop segments), March 2009 Weekdays, AM Peak Period (7:00am-9:00am). Segments with insufficient or missing data are not displayed. Two-way route segments are represented by parallel lines.

Further details regarding this analysis is available in Chapter 5 of the 2009 CMP.

Figure 5-2

Spring 2009 Muni Bus Speeds: Weekday PM Peak

San Francisco County
2009 Congestion Management Program

Notes: This map was prepared by the San Francisco County Transportation Authority for the 2009 Congestion Management Program (CMP) for San Francisco County. The transit performance information was compiled by Jacobs Engineering Group based on data provided by the San Francisco Municipal Transportation Agency. This map is for planning purposes only.

Data Source: Muni Bus (diesel and trolley coach) APC Data (stop-to-stop segments), March 2009 Weekdays, PM Peak Period (4:30pm-6:30pm). Segments with insufficient or missing data are not displayed. Two-way route segments are represented by parallel lines.

Further details regarding this analysis is available in Chapter 5 of the 2009 CMP.

4.4. Transportation Fees Nexus Study

a. Automobile Trips Generated Measure Study: 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 Manual's Level of Service (LOS) measure.

In December 2003, the Authority adopted a Strategic Analysis Report (SAR 02-03) on the Transportation System LOS Methodologies, which examined alternative methodologies for assessing the transportation impacts of projects pursuant to CEQA and reported that LOS is not an appropriate measure of the environmental impact of proposed projects in San Francisco because it is:

- inferior at reflecting negative effects of transportation activity on the environment;
- inefficient for the Planning Department and project sponsors; and
- inconsistent with the Transit First policy in the San Francisco City Charter.

The SAR recommended convening a technical working group (TWG) to refine the SAR's recommendations for the Authority Board's approval and action. In October 2008, the Authority adopted the Final Report on the Automobile Trip Generation Impact Measure. 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. Projects that generate automobile trips would subject to 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 provides an impact analysis tool that is:

- 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.

ATG as a better indicator of environmental effects: An ATG impact measure recognizes that new land use or transportation projects have a negative environmental impact when they add new vehicle trips to the transportation system. Automobile volumes are a better indicator than LOS for the range of environmental effects identified above (such as pedestrian safety, carbon emissions, noise levels, and water quality).

New ATG Measure More Consistent with City Policy: An ATG-based measure of transportation impact is consistent with the Transit First policy, which recognizes that short-term automobile congestion will result from shifts of rights-of-way from automobile to transit, bicycling, and pedestrians. The ATG measure recognizes that constraining the growth in automobile trips on San Francisco streets is critical for improving transportation system efficiency and preventing further degradations to environmental quality. Projects which would not generate any net new automobile trips would not have transportation impacts under this approach.

Improved efficiency for Planning Department and project sponsors: While the current intersection-based LOS methods require intensive studies of existing and future traffic assignment patterns, the per-trip method requires only a vehicle trip generation estimate—a task routinely performed as the first step in the current intersection-based LOS analysis and widely understood by city staff, policy-makers, project sponsors and the public.

Determination of impact and mitigation is also made predictable early on in the project development and environmental review process under the proposed approach, increasing certainty for project sponsors. Analysis of automobile LOS could still be used in the planning and project develop-

ment process, but would no longer be a requirement for environmental review.

ATG measure combined with mitigation fee program as more effective impact mitigation: A per-trip ATG threshold coupled with a per-trip mitigation fee program provides a superior approach to mitigating the citywide and localized impacts of traffic growth. The fee program will be designed to charge a set fee to a project sponsor based on the number of automobile trips generated or induced by the project.

b. Transportation Nexus Study: The final report on the ATG impact measure recommended that the Authority partner with City agencies on the initiation of a nexus study to support the new program.

In 2009, the Authority and partner City agencies began a three-part nexus study to support existing and proposed transportation-related development impact fees. In addition to the Authority, the involved agencies are the Office of Economic and Workforce Development (OEWD), the Planning Department, and MTA.

Part One of the Study will develop a legal basis for continued collection of the existing Transit Impact Development Fee (TIDF) and is being managed by MTA and will be reviewed by all parties. Part Two of the Study will develop a legal basis for the potential future adoption of a new Comprehensive Transportation Impact Development Fee (CTIDF) that will expand upon the existing TIDF to address the effects of new development on the entire City transportation system, including pedestrian, bicycle and automobile modes, in addition to transit services. This part of the Study will be managed by OEWD and jointly reviewed by all four parties.

Part Three of the Study will develop a legal basis for the potential adoption of the ATMF that will mitigate significant transportation-related environmental effects identified pursuant to CEQA. This part of the Study will be managed by OEWD and jointly reviewed by all four parties to this agreement.

In support of OEWD's Study management, the Authority is providing technical services to model cumulative future growth, transportation impacts, and mitigation, using the Authority's travel demand forecasting model and other City and Authority data. This includes providing a countywide program of transportation improvements to mitigate cumulative transportation impacts, based on the 2004 Countywide Transportation Plan and updated with relevant information from city and regional transportation agencies.

4.5. Pedestrian and Bicycle Data Collection

In 2009, the Authority approved two Prop K allocations to develop MTA's ability to collect pedestrian and bicycle data on a regular basis.

Both of these efforts will collect 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 specific mode of travel and the shifting usage of a particular 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.

The Authority is also currently collecting real-time bicycle data using a mobile device application that bicyclists can download. Known as CycleTracks, the application anonymously collects data regarding bicycle trips taken by cyclists in the city and region. This data will be used to develop a bicycle route choice component for the Authority's travel demand model.

In subsequent CMPs, the Authority plans to report on the progress and results of these data collection efforts and begin reporting changes in pedestrian and bicycle activity over time, as appropriate and feasible.

a. Citywide Bicycle Counting Project: MTA has historically conducted manual bicycle counts by sending staff to 33 locations across the city. The MTA's annual bicycle counts are completed each August and are limited to approximately one hour per year per intersection based on staffing limitations. The manual method of data collection 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 MTA to utilize automatic bicycle counters to collect more robust bicycle count data.

The Authority, through Prop K, is supporting MTA's initial project that will install 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. As funding becomes available, MTA 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. The counter technology is comparable to Automated Passenger Counters (APCs) found on Muni buses.

Specific benefits from the counters include:

- Helping to track changes in cycling patterns over time;
- Evaluating the impacts of new transportation facilities on specific locations;
- Ranking sites by usage;
- Justifying investments in future bicycle programs and infrastructure projects;
- Understanding bicycle circulation better;
- Using precise figures at public meetings, for grant applications, and for other purposes; and
- Monitoring seasonal variations in cycling patterns.

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

b. Citywide Pedestrian Counting Project: The Pedestrian Counting Project, led by MTA and supported by Prop K, will collect data on pedestrian volumes in order to calculate exposure rates (collisions per overall pedestrian volume), model pedestrian activity, and help prioritize future transportation improvements. MTA Red Light Camera Enforcement funds will be used to conduct initial manual pedestrian counts in as well as conduct ongoing annual counts, unless outside funding can be identified. Prop K funds will be used 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 will also support analysis of count data and construct a citywide pedestrian exposure model.

Count locations in this project phase are as follows:

- 3rd St & Howard
- 6th St, Golden Gate, Market, & Taylor
- 7th St & Folsom
- 9th Ave & Irving
- 16th St & Mission
- 24th St & Castro
- 25th Ave & Geary
- 34th Ave & Ulloa
- Bayshore & Cortland
- Beach & Hyde
- Castro & 18th St
- Chestnut & Steiner
- Divisadero & Geary
- Embarcadero & Washington
- Geary & Laguna
- Geneva, Phelan & Ocean
- Golden Gate & Jones
- Ingalls & Palou
- John F Kennedy Dr & Stanyan
- Market & Hyde & 8th St
- Mission & 6th St
- Mission & Silver
- San Jose & Randall
- Stockton & Ellis
- Taraval & 19th Ave

The count locations were chosen by MTA 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. Staff from the Department of Public Health and the Planning Department who work on similar pedestrian counting efforts were also consulted on count location and methodology. A framework for sharing information is being developed and all counts and exposure data will be made publicly available.

4.6. Tier 2 Performance Measures Derived from Existing Data

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 MTA Board of Directors updates these periodically. Table 5-B lists the service standards and milestones that directly pertain to the improvement of Muni performance.

5. Work Program Items

- Coordinate with appropriate City departments to develop an approach for CMP performance monitoring within a San Francisco IOZ, should an IOZ be designated by the City.

- Monitor and analyze APC/AVL data for the entire Muni fleet and finalize a data-sharing agreement with MTA for the regular dissemination of planning-level data.

- Complete the Transportation Nexus Study and provide recommendations for an Automobile Trips Mitigation Fee in partnership with MTA, OEWD, and the Planning Department.

- Coordinate with City departments to improve the availability and collection of data about level of service and performance of all modes, particularly project-level "before and after" studies related to pedestrian, transit, and bicycle travel.

- Coordinate with MTA on the bicycle and pedestrian counting projects.

- Continuously improve the San Francisco Model's capability to model all modes of transportation, including bicycle and pedestrian trips.

- Develop a methodology to report on bicycle and pedestrian safety trends.

Table 5-A

Transit Service
Frequency and Coverage Standards
Muni

Frequency Standard (headway in minutes)

Weekday	**Peak**	**Base**	**Evening**	**Owl**
Radial	10	15	20	30
Express	10	--	--	--
Cross-town	15	15	20	30
Feeder	20	30	30	--

Weekend	**Base**	**Evening**	**Owl**
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)

SERVICE TYPE	**TIME PERIOD**				
	Peak	**Mid-day**	**Night**	**Owl**	**Weekend/Holidays**
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 5-A (cont.)

BART

Frequency Standard (headway in minutes)

LINE

TIME PERIOD	Pittsburg/ Bay Point	Dublin/ Pleasanton	Fremont Daly City	Richmond Daly City	Downtown San Francisco (City Center)
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 5-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)

	TIME PERIOD	
	Peak	**Base**
SERVICE TYPE		
Commute Bus	--[1]	--
Basic Service Bus	30	60
Larkspur Ferry	30	1 hr.
Sausalito Ferry	70	1.5 hrs.

Coverage Standard

Commute 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.

[1] For commute bus service, most Golden Gate Transit bus lines operate two to five times per hour during peak periods in the peak direction.

Table 5-A (cont.)

SAMTRANS

Frequency Standard (headway in minutes)

SERVICE TYPE	TIME PERIOD Peak	Base
Commute 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 5-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
Vehicles that run on time[2]	46%	75%	71%	85%	68%	85%	71%	85%	69%	85%	71%	85%
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%
Vehicles too full to board	0.15%	<5%	1.62%	<5%	2.11%	<5%	0.40%	<5%	1.60%	<5%	1.30%	<5%
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%
Actual headways vs. scheduled	45%	85%	755%	85%	69%	85%	69%	85%	60%	85%	61%	85%
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%

Source: San Francisco Municipal Railway *FY2008 – FY2027 Short Range Transit Plan*, 2008.

[2] *On time defined as no more than one minute early or four minutes late as measured against a published schedule.*

CHAPTER 6

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**

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. Each local jurisdiction was expected to adopt a Trip Reduction and Travel Demand Ordinance that incorporates these policies no later than November 1992.

2. Legislative Intent and Application to San Francisco

The travel demand management 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.

3. City Policy Framework

While San Francisco does not have an official city-wide travel demand management ordinance, over the last two 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 any TDM programs implemented through the CIP.

A. Housing and Employment Balance

A better balance between jobs and housing—meaning, in job-abundant San Francisco, more housing—would reduce pressure to accommodate incoming auto trips. Downtown San Francisco has the largest 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 created 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 1980's 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 project alone will add several thousand new residential units in conjunction with the commercial development. Most recently, the Market/Octavia, Eastern Neighborhoods and Transbay Plans have set the foundation for the production of tens of thousands of new housing units to the central part of the city.

B. Transportation Control Measures

In 1991 as required by the California Clean Air Act (CCAA), the Association of Bay Area Governments (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 *Bay Area 2005 Ozone Strategy*, was adopted by BAAQMD in January 2006.

Local agencies are expected to incorporate these 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.

In October 2003, after several years of attempting to be in conformance with federal air quality standards the Bay Area was found to be in attainment of Federal ozone standards, under the Clean Air Act. Being "in attainment" is required of regions in order to be eligible to receive federal transportation funds. Appendix 7 lists the currently adopted regional TCMs and discusses how San Francisco's congestion management strategies contribute to, or reinforce these measures.

BAAQMD is currently preparing a major update to the Clean Air Plan. The 2009 Clean Air Plan will for the first time address greenhouse gases, as well as ozone, particulate matter, and air toxics. The 2009 Plan can be expected to include substantive revisions to TCMs.

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.

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.

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.[1]

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-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 TSM programs of member buildings. Presently, more than 60 buildings are members of the TMA organization.

The Authority's recently released Draft Strategic Analysis Report (SAR) on the Role of Shuttles in San Francisco's Transportation System discusses the rationale for helping several downtown employer-based and site-based shuttles consolidate their operations. The Draft SAR encourages the Municipal Transportation Agency (MTA) to establish a shuttle coordination program and to work with these sponsors to improve the efficiency of shuttle operations.

B. Carpools

MTA promotes use of carpools and vanpools during the morning and evening commutes. The City provides a casual carpool pick-up location on the east side of Beale Street between Howard and Folsom Streets. At this location, there is signage indicating several East Bay destination locations.

MTA 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..

C. Parking Management

The General Plan, Planning Code, and Zoning Code guide parking management in San Francisco. San Francisco's existing parking policies are in-

[1] See the Developer's Manual, "Transportation Management Programs in Greater Downtown: Developer's Manual for Procedures and Performance Criteria"

tended 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 expanding 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 MTA. In addition, the Authority and the Metropolitan Transportation Commission (MTC) applied for and 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. MTA is leading the implementation of the variable parking pilots through the SF*park* program. The SF*park* pilots will utilize new pricing approaches and technology to improve the management of San Francisco's parking supply in several locations in the city.

The SF*park* pilot projects will test new networked parking meters, parking occupancy sensors, and parking information systems. Price-based regulatory strategies will be deployed, including variable pricing and progressive pricing. The SF*park* pilots will include approximately 25 percent of the City's metered parking supply, as well as many City-owned garages.

In September 2009, the Authority adopted the San Francisco On-Street Parking Management and Pricing Study, which is discussed below in Section 4, Strategic Initiatives.

D. City TDM Programs

The San Francisco Department of Environment (DOE) conducts 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 subprograms 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. Over the next five years, the DOE will promote this program to private employers throughout the City. In addition to the marketing and promoting Commute Benefits citywide, DOE will continue 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 $115 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 May 2009, there are 197 San Francisco businesses with over 60,000 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 150 bicycles have been procured for City employees through the Clean Air Program since 2005. City employees use these bicycles for work-related trips, thereby reducing vehicles 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. Since the ordinance's enactment, over 300 businesses have registered to offer commuter benefits to their employees. 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.

E. Transit Impact Development Fee

First enacted in 1981, the Downtown Transit Impact Development Fee (TIDF) ordinance was a way 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 the fee schedule shown below in Table 6-1. The schedule 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.

Table 6-1. 2004 TIDF Ordinance Fee Schedule

Land Use Category	TIDF per sq. ft. of development
Visitor Services	$9.00
Medical and Health Services	$14.00
Cultural/Institution/Education	$14.00
Retail/Entertainment	$35.00
Office Use/Business Services	$14.00
Production/Distribution/Repair	$9.00

Appendix 6 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.

As discussed in Chapter 5, the Authority is partnering with City departments to conduct a three-part nexus study to support existing and proposed transportation related development impact fees. Part One of the Study, managed by MTA, will develop a legal basis for continued collection of the existing TIDF. Part Two of the Study, managed by the Office of Economic and Workforce Development (OEWD) will develop a legal basis for the potential future adoption of a new Comprehensive Transportation Impact Development Fee (CTIDF) that would expand upon the existing TIDF to address the effects of new development on the City's entire transportation system, including pedestrian, bicycle, and automobile modes, in addition to transit. Part Three of the Study, relating to CEQA transportation mitigation, is discussed in Chapter 5.

4. 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.

The CWTP called for more detailed study of pricing/user fee approaches to improve system performance, manage travel demand, and generate new funds for transportation investment. Specifically, the CWTP recommended study of price-based parking regulation and area-wide roadway congestion pricing.

A. On-Street Parking Management and Pricing Study

Parking management is a crucial element of comprehensive transportation demand management. San Francisco's on-street parking management toolkit has historically relied upon conventional strategies, specifically: time limits; colored curbs; meters; low-cost residential permits; and manual enforcement. These strategies, which have evolved incrementally over time, address block faces designated as "commercial" or "residential" independently, rather than in an integrated manner at the neighborhood or area level.

The Countywide Plan recommended further study of the potential for utilizing innovative parking management strategies to support policy goals and improve on-street parking conditions in San Francisco's neighborhoods. The Authority undertook the On-Street Parking Management and Pricing Study (Study), in partnership with MTA and the Planning Department, in order to investigate the potential for using innovative technologies and approaches, including variable pricing of on-street parking, more widely to manage demand and increase availability.

The Authority Board adopted the final report of the Parking Study in September 2009. The central findings of the Study were as follows:

- Effective parking management requires a neighborhood-level approach.
- San Francisco's diverse neighborhoods confront different parking challenges, but availability and utilization (quantity of users served) are consistent issues.
- The most promising management approach for addressing imbalances between supply and demand is price-based regulation, which also has significant secondary benefits, namely the reduction in excess vehicular circulation associated with drivers "cruising" in search of an inexpensive on-street space.
- Underpriced on-street parking theoretically represents a significant source of untapped revenue that could be dedicated to transit-first uses; however, attempts to close this pricing gap must be planned and executed carefully, in a manner that the public will understand and support.
- The Residential Parking Permit (RPP) program has a weak link to *Transit First* policy goals, is ineffective at addressing key neighborhood parking challenges, and warrants reform.
- Neighborhoods should be encouraged to proactively participate in the management of on-street parking, potentially through a parking benefit district (PBD) approach, which would allow neighborhoods to realize tangible localized transportation improvements in the short term as a result of the MTA's increases in meter and/or permit rates at the neighborhood level.

Since the Study's initiation, MTA has advanced the central recommendations of the Study—improving the management of scarce on-street parking through demand-responsive pricing, new technology, and enhanced enforcement. As discussed above, MTA has developed the SF*park* program, with federal UPP funds, to demonstrate variable parking pricing strategies in several pilot locations in the city. The final report of the Parking Study provides policy-level guidance on the SF*park* pilot program and potential future broader implementations of parking pricing.

B. Mobility, Access & Pricing Study

The Authority is currently finalizing the San Francisco Mobility, Access and Pricing Study (MAPS), which is a multi-year study of area-wide congestion pricing. This feasibility study has 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 are 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 is 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's approach is to study roadway congestion pricing in the larger context of congestion management, which not only envisions congestion charging, but also includes the improvement of competitive alternatives to driving, in party 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 comprises 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 pricing scenarios;
- Assessment of technology systems and applications;
- Evaluation of program benefits and impacts, including economic, geographic, and modal considerations;
- Investigation of institutional arrangements and legal issues; and
- General and targeted public outreach and market research.

A major finding of the analysis to date is that a congestion pricing program for San Francisco would be technically and financially feasible. The most effective pricing policy would assess a $3 fee per vehicle trip during weekday peak periods (i.e., approximately 6:00-9:00 a.m. and 3:30-6:30 p.m.). Taxis and transit vehicles would be exempt, and several other groups could be offered discounts ranging from 25 to 50 percent. These groups would include zone residents, low-income motorists, and disabled motorists. Commercial transportation fleets could also potentially receive discounts. Net revenues would be reinvested in transportation system improvements for all travelers, with a focus on transit service enhancements.

Although there is some variation across congestion pricing scenarios, such a program would contribute to local, regional and statewide goals for congestion management, sustainable economic growth, and reduced climate change impacts through the following:

- Approximately 15 percent decrease in peak-period auto person trips to the Focus Area with virtually no change in person trips across the course of the day;
- Up to 20 percent decrease in peak to off-peak auto travel time ratios to the Focus Area;
- Approximately 30 percent reduction in vehicle miles traveled during peak-periods within the Focus Area;
- More than 30 percent decrease in vehicle hours of delay within the Focus Area during peak periods;
- Approximately 15 percent reduction in greenhouse gas emissions from transportation; and
- Up to 10 percent increase in transit mode share to the Focus Area (4 percentage points)

Significant concerns exist about potential diversions, loss of business in the charged area, adequacy of transit, and impacts to low-income drivers. The Authority is addressing each of these concerns through program design and targeted discount policies.

The MAPS final report will be completed in early 2010.

C. Parking Pricing and Congestion Pricing

Both the Parking Study and MAPS have been developed pursuant to the Countywide Plan's direction to assess the potential for utilizing road user pricing approaches to manage transportation demand and generate revenue. Although the two strategies are complementary, parking pricing and congestion pricing address two different challenges:

- Variable parking pricing addresses on-street parking shortages and can be expected to have a limited effect on peak-period road use in San Francisco's most congested areas.
- Roadway congestion pricing is targeted at peak-period congestion and would likely have a stronger effect on peak-period traffic, particularly commute trips.

The distinction regarding the effect of each program on reducing peak-period congestion stems from the different markets that each strategy targets, as well as the total supply of road space each program affects. The SF*park* program's focus on metered on-street parking and City-owned parking garages means that it primarily targets short-term, non-work trip purposes—such as shopping trips, personal business, and office visits. In contrast, peak-period traffic is largely associated with work trips and other long-term parking purposes.

The areas most affected by chronic peak-period congestion are generally the areas with the largest quantity of commuter-serving privately provided off-street parking spaces. These spaces will not be affected by SF*park* and are in general much more difficult for the City to effectively regulate. In the downtown core, parking managed by the City represents less than 20 percent of the overall supply. Table 6-2, below, compares the supply of parking controlled by the City to the total supply of available parking.

Table 6-2. Downtown Parking Supply (quantity of spaces)

	Downtown Core	Greater Downtown
City-Owned	9,300	10,700
On-Street	1,500	4,200
Total Parking	49,400	66,800

Source: On-Street Parking Management and Pricing Study

Although some spaces in City-owned garages are currently rented by commuters (where excess capacity exists), a central tenet of San Francisco's *Transit First* policy is that these parking resources be prioritized for short-term use, to support retail commercial and visitor-related activities. In addition, more than half of the curbside spaces in the downtown core are reserved for commercial loading activities. Downtown on-street parking supply is further reduced during peak periods by the conversion of curbside spaces to travel lanes on certain corridors.

The central rationale for parking pricing is the need to address parking availability and to improve the efficiency of on-street parking utilization. However, reductions in excess vehicular circulation resulting from appropriately-priced on-street parking are an important secondary benefit of parking pricing programs. These congestion mitigation effects have the potential to improve transit operations in the city. This benefit is especially important for numerous surface-running routes that must navigate constrained local commercial corridors with high levels of parking activity and double parking impacts—locations where localized congestion is not primarily caused by commute travel.

Variable parking pricing and roadway congestion pricing programs both address an important need to better manage scarce transportation resources and institute appropriate price signals to encourage more efficient travel behaviors. Both programs also utilize new technologies to benefit users and system operators alike, as well as potentially generate significant new sources of revenue for transportation services and infrastructure.

5. Work Program

- Monitor and coordinate the integration of new regional TCMs from the impending adoption of BAAQMD's new Clean Air Plan into the City's Climate Action Plan and Countywide Transportation Plan, as appropriate.
- Continue to fund and evaluate the City's TDM activities, including through the implementation of Prop K's TDM/Parking Management category.
- Participate in the evaluation of the Bay Area Urban Partnership Program
- Advance the recommendations of the On-Street Parking Management and Pricing Study.
- Complete the Mobility, Access and Pricing Study.
- Continue partnering with City departments on the Transportation Nexus Study.

CHAPTER 7

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**

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 system..." (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 10.

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 would be 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.

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 all 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 will initiate an update of the CWTP in 2010.

2.1. Policy Issues in land use and transportation demand

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.

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) 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 will be used in the 2010 CWTP update. By design, this model will be 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.

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. San Francisco's daytime population is more than one million, compared with a resident population of about 800,000. Non-resident commuters fill about half of the city's jobs.

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 Development 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 continued 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 Oc-

cupancy/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 5.

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 multimodal MTS.

3. Institutional and Policy Framework for a CMP Land Use Analysis Program

3.1. 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.

3.2. 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 ex-

panded role for the CMAs in coordinating transportation and land use planning, such as through the 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, such as state Housing and Community Development Infill and Transit Oriented Development (TOD) grants, TLC (regional) and new regional funding programs established by the 2009 Regional Transportation Plan (RTP).

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 proposed revisions to the CEQA Guidelines Transportation Checklist and our work with local partner agencies to reform the City's CEQA transportation impact analysis process.

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

3.3. 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 Eucalyptus Drive)
- Better Neighborhoods (Balboa Park, Market/Octavia)
- Bayview Hunters Point / Candlestick Point
- Downtown Neighborhoods/Transit Infill
- Eastern Neighborhoods
- Mission Bay
- 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, the Metropolitan Transportation Commission, ABAG, and BAAQMD (collectively through the Joint Policy Committee) have identified only limited funding and investment policies to support PDAs in the form of station area planning grants and an ex-

panded Transportation for Livable Communities program. The Authority, along with San Francisco's Planning Department and Municipal Transportation Agency, continue to advocate for more appropriate investment policies that provide resources commensurate to the level of desirable development produced by local jurisdictions.

3.4. 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.

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. SB 375 requires that CARB adopt, by September 30, 2010, GHG reduction targets for cars and light trucks for each region in the state for the years 2020 and 2035.

MTC's next long-range Regional Transportation Plan (RTP), scheduled for adoption in 2013, will be subject to SB 375's requirements. This next RTP must include a Sustainable Communities Strategy (SCS) that meets regional GHG targets through an integrated plan for land use growth and transportation investment and policy. The SCS must also meet the RTP's fiscally-constrained requirement, such that the investment component aligns with reasonably foreseeable forecast revenues. Should the RTP's SCS fail to meet the regional target, MTC may then, and only then, develop an Alternative Planning Strategy (APS) that would meet the target.

In October 2009, the Joint Policy Committee (JPC) adopted the region's policies for implementing SB 375. (The JPC coordinates the planning activities of the Bay Area regional agencies—MTC, ABAG, BAAQMD, and the Bay Conservation and Development Commission (BCDC).) The policies are scheduled to be adopted by the individual regional agencies in the near future.

The region's SB 375 policies recognize the need for local participation and involvement, particularly through the involvement of CMAs, transit operators, local jurisdictions, and the general public. Some of the most important considerations in SB 375—effecting a workable relationship between land use and infrastructure investment decisions, forecasting and assessing impacts on the transportation system, and prioritizing funding to truly efficient transportation system improvements—are all central tenets of the CMP.

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.

The Authority's impending update to the CWTP will further explore issues of GHGs and climate change goals. The Authority also continues to coordinate with the Department of the Environment (DOE) and MTA on updates to the City's Climate Action Plan.

3.5. 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.

Earlier 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.

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 2007* envisioned substantial land use intensification in San Francisco. The development of the current RTP, Transportation 2035, resulted in some modest new initiatives—including designation of Priority Development Areas (PDAs) and increased capital funding for the Transportation for Livable Communities (TLC) program—that seek to better align transportation and land use decision-making toward the achievement of pressing policy objectives. These discussions 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 ABAG Projections and related regional planning work is to be meaningful. San Francisco is committed to playing a central role in the region's sustainable growth.

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 and Outer Mission. The Authority has incorporated these planning efforts into our Prop K-funded Neighborhood Transportation Planning Program. Future plans will be developed in other Communities of Concern in San Francisco.

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.

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. In San Francisco, an IOZ designation action would be taken by the Board of Supervisors. SB 1636 requires that any IOZ designations be made no later than December 31, 2009.

5.1 Benefits

The legislative intent in enabling IOZs was to reduce barriers to transit-oriented housing and improvements to alternative modes caused by the automobile LOS standards established in the CMP.

The adoption of a San Francisco IOZ would strengthen current efforts by the Authority and City agencies to reform California Environmental Quality Act (CEQA) transportation impact analysis practices within San Francisco by replacing the current LOS impact measure with an automobile trips generated (ATG) measure.

The State's draft revised CEQA Guidelines Checklist calls for public agencies/jurisdictions to apply performance measures that are consistent with local plans in the determination of transportation impact. Thus, a key potential benefit of IOZ designation in San Francisco is to align CMP policies with the City's effort to reform CEQA transportation impact analysis by replacing the current LOS impact measure with a new measure based on the net new ATG by a project. (See Chapter 5 for further discussion of this current study.)

In addition, IOZ designation in San Francisco would:

- *Better support San Francisco's Transit First policy through CMP practices.* Automobile LOS standards in the state's congestion management law reflect the original legislation's suburban roots. The City's Transit First policy recognizes that automobile congestion is a likely short-term outcome of efforts to increase transit, bike, and walking mode shares.

- *Formally recognize San Francisco's efficient land use characteristics, alternative-rich transportation network, and current land use planning efforts through CMP practice.* IOZ designation is intended for urban locations with relatively dense and mixed land uses and an established transit system. San Francisco's existing land use patterns and multimodal transportation system warrant a tailored and locally-sensitive approach to congestion management and system performance monitoring.

5.2 Eligible Areas

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

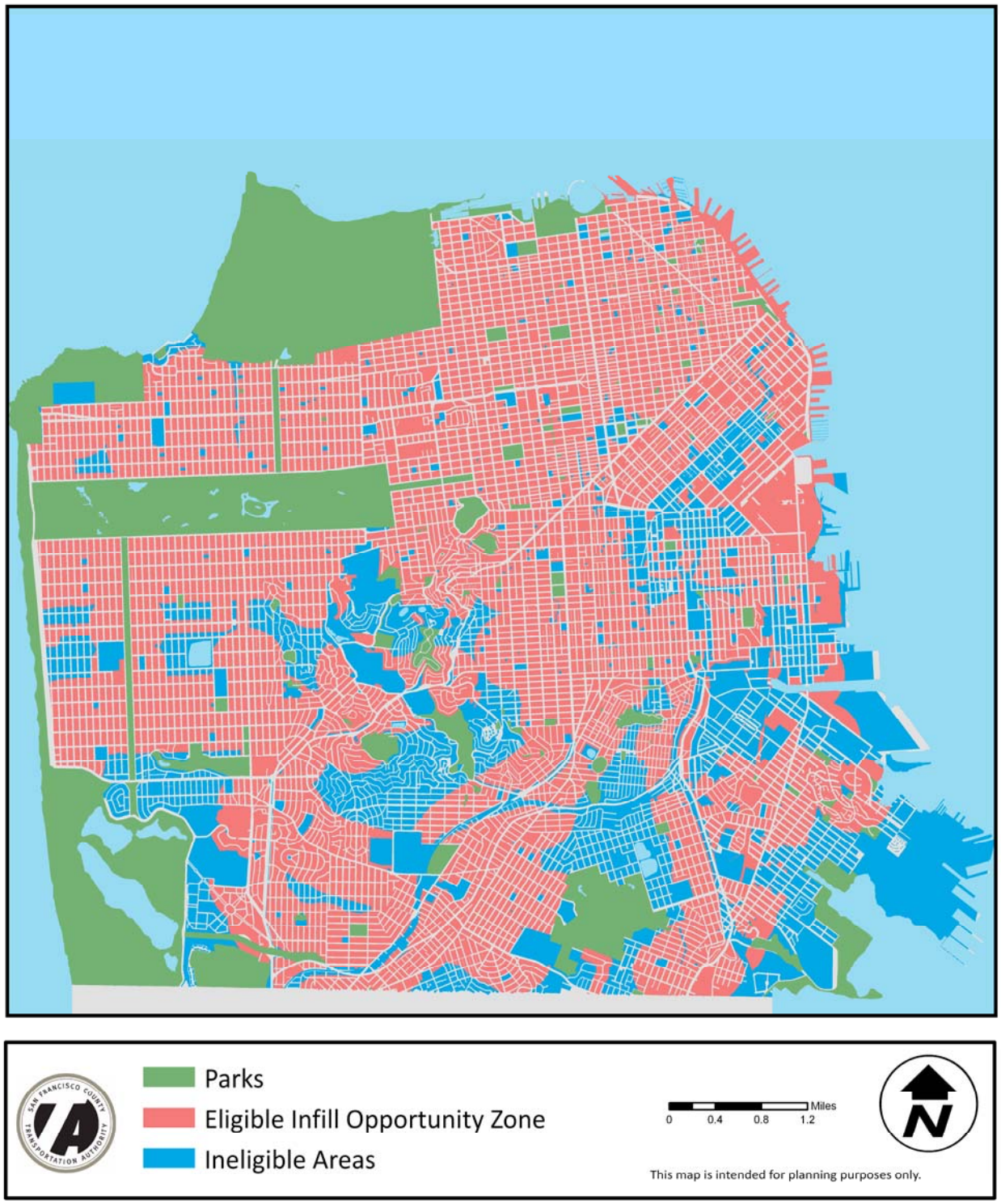
with the local jurisdiction's general plan and any applicable specific plan.

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. This analysis is documented in Appendix 15.

The resulting map, shown in Figure 7-1, identifies the IOZ-eligible areas in San Francisco. (Treasure Island is omitted because it does not meet the transit requirement and is therefore ineligible.)

Figure 7-1. San Francisco Eligible IOZ Area



5.3 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, the CMA must use an alternative to automobile LOS standards for CMP purposes. If the City takes an IOZ designation action, the Authority will coordinate with relevant agencies 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 and 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."

Although it is not necessary or desirable to officially adopt an alternative to the LOS standard prior to or in conjunction with City action to designate an IOZ, it is worthwhile to consider the options and their implications. (Use of an alternative to LOS would commence with the next CMP update in 2011 if an IOZ is designated.) 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.[1] 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.

If a San Francisco IOZ is established, the Authority would continue monitoring system performance in subsequent CMP cycles (i.e., 2011+) on all CMP network segments for planning and evaluation purposes, including those network segments within the IOZ. In addition, the Authority would further its ongoing efforts to enhance the monitoring and reporting of alternative system performance measures.

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 5).

As discussed above and in Chapter 5, 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 an ATG measure for assessing transportation impacts.

[1] 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.

5.1 Uniform Land Use Analysis Methodology

The periodic updates of the CWTP and its list of investment priorities will be the main vehicle for addressing the transportation 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 CWTP.

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 develop an approach for CMP performance monitoring within a San Francisco IOZ, should an IOZ be designated

- Continue development of the Neighborhood Transportation Planning and FOCUS/PDA programs.

- Participate in the Transportation Nexus Study for updated Transportation Development Impact Fees and a potential ATG CEQA Mitigation Fee.

- Develop the Update to the Countywide Transportation Plan, including coordination with the DOE and MTA update to the city-wide Climate Action Plan.

- Continue to review and provide technical support to ongoing area plans and land use studies under development, including the Transbay Transit Center District Plan, Candlestick Point and Hunters Point Shipyard Development Plan, and the Eastern Neighborhoods transportation study (ENTRIPS).

CHAPTER 8

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**

BACKGROUND

1. Legislative Requirements

California Government Code 65089(b)(5) requires that the CMP contain a seven-year Capital Improvement 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 Clean Air Plan and related documents.

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) also followed a 7-year cycle[1] at the time the CMP legisla-

[1] The STIP now follows a 5-year cycle.

tion 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.

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 element, 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 5.) 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 Section 5.2 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 5, 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.

CIP CONTENTS AND CONTEXT

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 2007 CMP.
- All transportation projects and/or expenditures programmed for projects in San Francisco in the State Transportation Improvement Program (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 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 8 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 project management oversight activities, but a more sophisticated project delivery tracking system is needed. Development and implementation of an enhanced system covering Prop K, TFCA, and CMA-funded projects will be a primary work plan task during 2010. Further discussion on project delivery mechanisms is found in Section 8: Project Delivery.

For a detailed discussion of the Authority's process for review and approval of CIP changes, please refer to Section 7: CIP Review and Amendment Procedures.

5. Relationship to Other Plans and Programming Documents

5.1. 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 7 (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 program-

ming. 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.

5.2. 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	1.3%
	100%

Appendix 8 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 expected to be 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 frame-

work for analysis of trade offs among proposed 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.

5.3. 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's most recent RTP (Transportation 2035) was adopted in April 2009.

5.4. 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 2010 RTIP.

5.5. 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 6 below.

5.6. 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 8-A provides a summary of key roles and responsibilities of the Authority and City departments in the transportation programming process.

Exhibit 8-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 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

5.7 Relationship to Short Range Transit Plans

In addition to Muni, 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

6. The Authority's Capital Priorities Programming Process

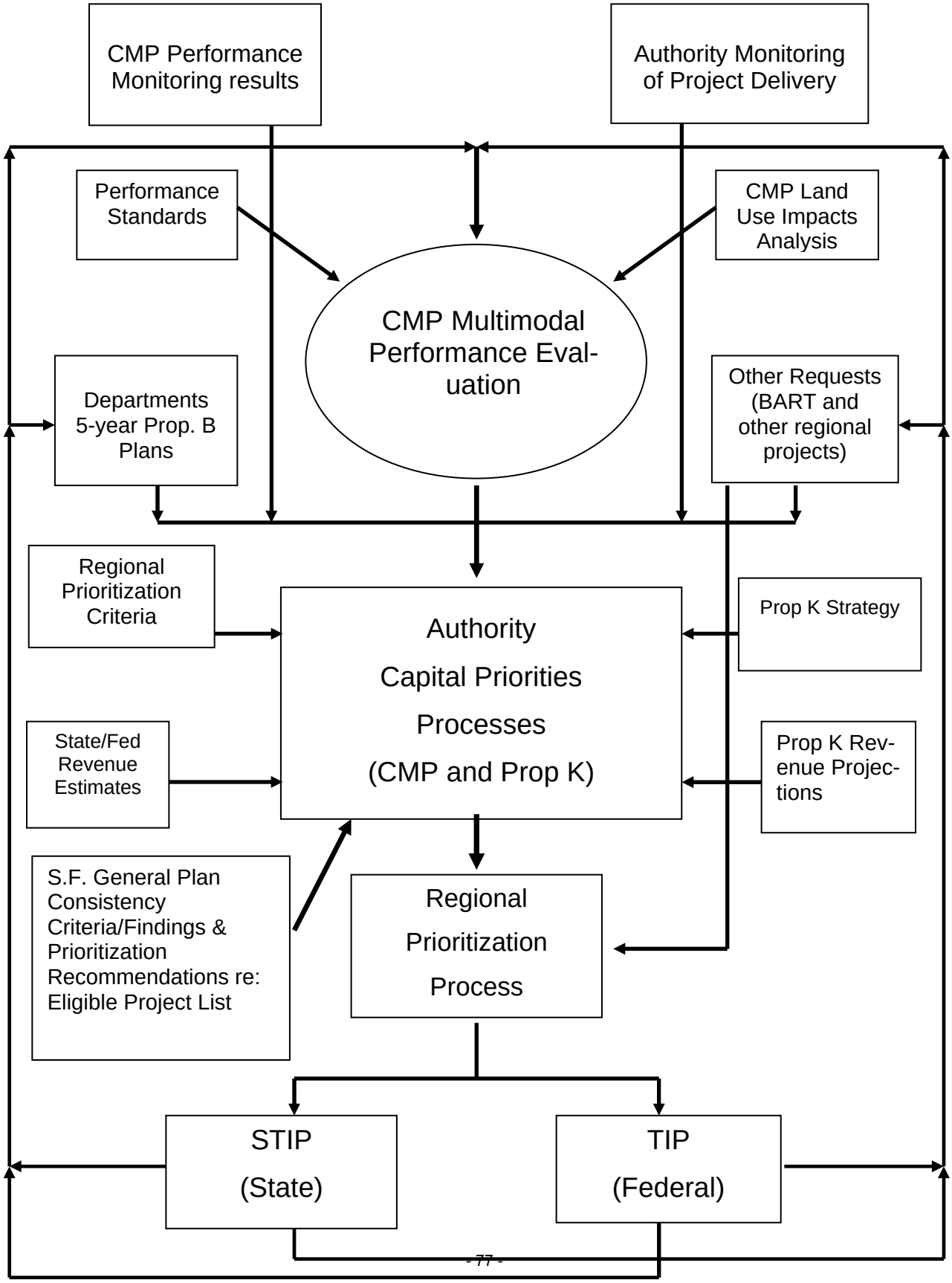
Figure 8-1 describes the Authority's Capital Priorities Programming Process. As a result of the Authority's combined role as Prop K administrator and CMA, this process, though focused on funds that are required by state law to be programmed through the CMP (i.e., state and federal dollars), also incorporates Prop K 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 Muni 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 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).

Figure 8-1
Authority Programming Process



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 Muni's SRTP 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 rescheduling of other Muni 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.

6.1. CIP Development - Schedule

6.1.1. 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 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 5.6, 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.

6.1.2. 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 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 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, 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 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.

6.2 Documentation of Project Programming Status: Cost/Funding Matrices

For every project included in the CIP according to the criteria discussed in Section 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 Information Management System (PIMS). The data contained in the PIMS will be updated to reflect programming changes every time they are approved through the CIP Amendment process described in Section 7 below, as well as after adoption by the Authority board of periodic updates of the Prop K Strategic Plan. Information contained in the PIMS 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 PIMS and related systems to facilitate tracking and project delivery oversight of both Prop K and non-Prop K funded projects.

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.

7.1. 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 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 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.

7.2. Kinds of Amendments

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

7.2.1. 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 California Transportation Commission (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.

7.2.2. 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 K programming will automatically trigger administrative-level review and, at the Executive Director's discretion, may require policy-level CIP Amendments.

7.2.3. Sources Not Covered By CIP Amendments

Certain funding sources, such as 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, SLPP, and TEE.

7.2.4 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.

7.3. Requirements for Submittal of CIP Amendment Requests

7.3.1. 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.

7.4. 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.

7.4.1. 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.

7.4.2. 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 7.4.1. and 7.4.2, 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 5.

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?

7.4.3. Disposition of Amendment Requests

For 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.

For 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 agendized for Authority Board action on a schedule determined by the Executive Director.

7.5. 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

Strategic Plan and to the TFCA program, to maintain consistency. Such adjustments will be scheduled for Authority Board action concurrently with the corresponding CIP Amendments.

7.6. 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.

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 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 2009, as part of the Prop K Strategic Plan update, we undertook a comprehensive assessment of the status of the delivery of projects funded under the Prop K program. This provided a benchmark measure of the amount of funding so far allocated versus the allocation capacity of the program. It also provided a snapshot of the percent of work completed on projects receiving Prop K allocations. The results of this assessment are summarized in Appendix 11. We plan to update the program-wide percent complete data quarterly.

In 2010 we will develop 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 proactive in identifying and helping to resolve project delivery issues for sponsors and help sponsors keep track of and meet timely use of funds requirements.

9. Program Overview

Appendices 10 and 12 contain CIP improvements programmed through the 2009 San Francisco CMP. They show information for relevant program cycles completed since publication of the 2007 CMP. Information for these projects is consistent with data reflected in the provisionally adopted 2009 Prop K Strategic Plan and subsequently approved 5YPPs, the 2010 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 2010 STIP, expected to be adopted by the California Transportation Commission by May 2010.

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 $14.1 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,

shuttles to high employment centers, various bicycle projects, and two compressed natural gas (CNG) fueling facilities.

9.1. Transit Program

Many of the projects included in the CIP of the 2009 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 Muni's Central Subway project.

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, Caltrain CIP, Transit Vehicles, Facilities and Guideways for BART and Caltrain, and the Transbay Joint Powers Authority's (TJPA's) Downtown Extension to a Rebuilt Transbay Terminal.

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 10) 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.

Muni Projects

Among the most significant projects are:

- Construction of a 1.75-mile light rail extension from 4th and King Streets to Chinatown, including a mile-long subway;
- implementation of Bus Rapid Transit 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.

Regional Transit Operator Projects

Programmed regional transit projects include STIP funds (i.e., RIP funds) for Caltrain electrification and the downtown extension to a rebuilt Transbay Terminal.

The CIP also contains several Caltrain commuter rail projects, with the Peninsula Corridor Joint Powers Board (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 2013/14, with the TJPA as the lead agency. Construction of the downtown extension is expected in 2011. The schedule for Caltrain electrification is being reconsidered to enable close coordination with the state's high speed rail project.

While 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, there have been some expansion projects (e.g. new or extended service) as well.

9.2. Roadway Program

All roadway projects included in the 2009 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. This project has benefitted from $50 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 began in November 2009 to meet this accelerated schedule, which will result in a cost savings of $91 million, reducing the overall project cost from $1.045 billion to $954 million. We are continuing to work closely with Mayor's office, MTC and Caltrans to secure an additional $50 million in federal discretionary ARRA funds from the Transportation Investment Generating Economic Recovery (TIGER) discretionary grant program to fully fund the project. 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.

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 provisionally adopted in the 2009 Strategic Plan in July 2009.

MTA'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 MTA 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 last five years have seen a focus on planning efforts. The 2009 5YPP anticipates 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, MTA'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 funding for the Van Ness corridor to support the Van Ness BRT project is being actively pursued.

9.3. 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 anticipated to end by 2010. 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.

9.4. Bicycle and Pedestrian Program

The 2009 CMP includes funds for a significant number of new bicycle and pedestrian projects. Many of these projects fall under MTA's programs related to traffic calming, pedestrian and bicycle safety, and school area safety. The traffic calming program was briefly discussed under section 9.2 – Roadway Program. The Authority has recommended programming 2010 TE funds to a number of traffic calming, landscaping and bike parking projects, and earlier in the year prioritized pedestrian countdown and accessible pedestrian signals for San Francisco's share of ARRA-TE funds. There has been essentially no implementation of MTA bicycle projects since a June 2006 injunction against the City's Bicycle Plan took effect. To address the injunction, the City completed and certified an Environmental Impact Report for the Bicycle Plan in mid-2009. It is hoped that the injunction will be lifted soon to enable implementation of 60 bike network projects that have been environmentally cleared, 45 of which have been legislated by the MTA Board. On November 25, 2009, a San Francisco Superior Court ruled that the City can move forward with a handful of the least intrusive and most easily reversible projects, but did not lift the injunction. Projects approved by the court include installation of bike lanes on eight streets, bike racks, shared lane markings, and painted bike boxes. The Authority has been working closely with MTA to identify a funding and implementation strategy that can be put into place once the injunction is lifted.

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 RBPP (to become 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 10 and 12) support the inclusion of bicycle and pedestrian-friendly features in roadway and transit projects, as appropriate.

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, the successor to our earlier PIMS system), and other existing databases where necessary. We are in the initial stages of development of a third generation program-

ming 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 2010, and will continue to refine systems and approach in response to changes in fund program guidelines and related timely-use-of-funds requirements.

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 – Ongoing

CHAPTER 9

DEFICIENCY PLANS

Key Topics:

- **Legislative Requirements**
- **Legislative Intent and Application to San Francisco**
- **Deficiency Planning Process**
- **Special Issues**
- **Work Program Items**

1. Legislative Requirements

The Authority, as CMA, is required by state law to ascertain the City's conformance with the CMP, including Deficiency Plans prepared by City departments. If the LOS of roadways on the CMP is not maintained to the established standard, state CMP legislation requires that the local jurisdiction develop a Deficiency Plan to improve operating conditions on the segment.[1]

Deficiency Plans must contain the following components:

- An analysis of the causes of the deficiency;
- A list of improvements that would have to be made to remedy the deficiency, including cost estimates;
- A list of proposed improvements; and
- An implementation plan including a schedule.[2]

[1] California Government Code section 65089.4(a) states *"A local jurisdiction shall prepare a Deficiency Plan when highway or roadway level of service standards are not maintained on segments or intersections of the designated system. The Deficiency Plan shall be adopted by the city or county at a noticed public hearing."*

[2] 65089.4(c)

The Deficiency Plan must "measurably improve multimodal performance" on the designated CMP roadway network, and "contribute to significant improvements in air quality." Proposed improvements must be drawn from an inventory of acceptable actions compiled by the air quality management district. The statutes also require that the city or county forward the Deficiency Plan to the Congestion Management Agency, which must hold a public hearing within 60 days of receipt of the Deficiency Plan, and either accept or reject it, but not modify it. Rejection of a Deficiency Plan by the Congestion Management Agency will result in a finding of non-conformance with the CMP.

Unfortunately, the statutes make no provisions for funding City departments' deficiency plans, and similarly, CMAs do not receive state funding for their activities. In the absence of dedicated funding, the deficiency planning process has been designed to use existing data and coordinate with the City's budgetary process.

2. Legislative Intent and Application to San Francisco

This section provides background information on Deficiency Plans and their applicability to San Francisco.

2.1. About Deficiency Plans

In 1990, the California voters approved Proposition 111, increasing the gasoline tax by nine cents per gallon of gasoline sold in the state. The year prior to Proposition 111's approval, the State Legislature approved AB 471 (Katz), the original CMP legislation.[3] AB 471 required all local jurisdictions to maintain the adopted LOS standard on all CMP roadways or risk losing their Proposition 111 gas tax revenues. The Legislature then revised the original legislation to allow jurisdictions to continue to receive their share of Proposition 111 gas tax moneys when the level of service (LOS) on a CMP road segment or intersection falls be-

[3] The 1989 CMP legislation was part of the AB 471 legislation known as the Katz-Kopp-Baker-Campbell Transportation Blueprint for the 21st Century. Voter approval of Proposition 111 on June 5, 1990 effectively enacted the CMP legislation into law.

low LOS "E" provided local jurisdictions prepared Deficiency Plans for those segments.

The intent of Deficiency Plans, therefore, is to allow development to continue as long as any resulting traffic congestion is "offset." Deficiency Plans are *reactive* solutions applied after the impacts to LOS are actually measured.

The Deficiency Plan legislation offers local jurisdictions two alternatives:

1) Eliminate the problem (correct the deficiency where it manifests itself). This is known as *direct remediation*; or

2) Implement other actions that improve the overall performance of the CMP network, even if the actions do not directly improve the original deficiency. These are known as *offsetting actions*.

A Deficiency Plan may include both remediation and offsetting actions. Direct mitigation involves removing the deficiency such that the LOS is improved above LOS F. Direct mitigations of LOS impacts may have prohibitive costs, regulatory obstacles, or overwhelming environmental consequences. Offsetting actions provide alternative compensations that may leave the facility no less deficient from an LOS perspective, but provide improvements in other part of the system. Offsetting actions, as opposed to direct remediation, include capital improvements, transportation programs, services, or other activities that improve the average countywide level of service.

One major legislative change to the deficiency plan process is SB 1636 (Figueroa), which was signed by the Governor in September 2002. This bill allows local jurisdictions to designate areas meeting certain land use and transportation requirements as Infill Opportunity Zones (IOZs). Network segments within these zones would be exempt from automobile LOS standards. Within a designated IOZ, the CMA must use an alternative to automobile LOS for CMP purposes

In San Francisco, the Board of Supervisors would take the action to designate an IOZ. The Board of Supervisors is expected to consider designating all eligible areas of San Francisco as an IOZ on in December 2009. CMP network segments within a designated IOZ are exempt from deficiency planning requirements. IOZs are discussed further in Chapter 7.

2.2 Deficiency Plans and Environmental Review

Deficiency Plans are distinct from City processes for review of development projects pursuant to the California Environmental Act (CEQA) and do not replace local Transportation Impact Analyses (TIAs). The San Francisco Planning Department requires project sponsors to prepare TIAs for projects that may have significant negative impacts on transportation conditions. The City's TIA guidelines include some analyses that may be relevant for preparing CMP deficiency plans. However, while environmental analysis conducted pursuant to CEQA may provide information useful in the preparation of Deficiency Plans, these Plans serve a separate and distinct purpose. The Deficiency Plan process should avoid duplicating past CEQA analyses; these guidelines should not create additional review processes for individual development or public construction projects.

One fundamental difference between a TIA and the CMP is that a TIA *forecasts* the severity of a project's expected impacts on facilities, while a Deficiency Plan *implements* actions to mitigate – or offset – problems already detected (i.e., deficiencies *actually measured* on a facility). A TIA or EIR is prepared prior to project implementation, in an attempt to predict a project's future negative impacts.

A TIA or EIR considers the cumulative impacts on a transportation facility of a proposed project in combination with other foreseeable similar projects. The Deficiency Plan, because its focus is on a *facility* rather than an individual project, considers multiple causes of the existing deficiency.

3. Deficiency Planning Process

This overview accompanies the flow charts in Figures 1, 2, and 3. These three figures represent the Deficiency Plan process from detection through Authority Board approval of the Plan.

3.1. Deficiency Detection and City Notification

See Figure 1. The Authority monitors the CMP roadway network and reports a potential deficiency when the level of service (LOS) on any non-exempted segment of the CMP roadway network measures LOS F. LOS F is defined by travel speeds below a threshold set by the 1985 HCM for any of three specified arterial types.

The Authority determines whether a reported deficiency may have been caused by external, exempt, or temporary causes. State legislation requiring Deficiency Plans has specifically exempted the trips generated by specific activities [Government Code § 65089.4. (f)]. Exempt activities are:

- Inter-regional travel (i.e., pass through trips which have neither origin or destination in San Francisco);
- Construction, rehabilitation, or maintenance of facilities that impact the CMP roadway network;
- Impact of freeway ramp metering;
- Traffic signal coordination by the state or multi-jurisdictional agencies;
- Traffic generated by low- and very low-income housing;
- Traffic generated by high-density residential or mixed-use development located within a quarter mile of a fixed passenger rail station[4]; and
- Roadway segments located within infill opportunity zones.

[4] "High density residential development" means a minimum of 24 dwelling units per acre and equal to 120 percent of the maximum density allowed under the local general plan and zoning ordinance, or a minimum density of 75 dwelling units per acre. "Mixed use development" must have more than one half the land area or floor area used for high-density housing.

A detected deficiency may be corrected when a roadway improvement already programmed in the CIP increases the capacity of the deficient roadway. If the lead department determines that the effects of any CIP improvement scheduled to begin within the seven year time horizon of the CIP will remove the deficiency, the Authority – after review – can make a Finding of No Deficiency. The lead department, however, must demonstrate this CIP improvements will be completed and functioning within ten years of the current CIP.

If any trips are exempt and if the deficiency still exists after removing the exempt trips from the deficient roadway segment, a Deficiency Plan must be prepared. The Authority will consult with MTC to determine whether external or pass through trips may have caused the deficiency. It will also review all relevant CEQA traffic analysis and/or TIAs of recently completed projects. It will then use the San Francisco Travel Demand Forecasting Model, GIS analysis, sketch planning techniques, and other means to isolate and examine the cause(s) in more detail. If modeling suggests that a deficiency is not caused by any of the above, then the Authority Board must adopt a finding of "Deficiency" and notify the City (Mayor's Office) of the nature and cause of the deficiency.

The Mayor's Office assigns a City department to act as the lead department for the preparation of a Deficiency Plan. The timelines in Figure 1 assume that LOS is monitored in September and October, and that all follow up verification monitoring is completed by the following April. This schedule allows City Departments to incorporate funding requests for Deficiency Plan activities into the City's budget process in April and May.

3.2. Deficiency Analysis and Remediation Plan Preparation

Once the cause(s) of the deficiency have been determined, State law [Government Code § 65089.4 (c) (2)] requires that the lead department identify:

"A list of improvements necessary for the deficient segment or intersection to maintain the minimum level

of service otherwise required and the estimated costs of the improvements."

The lead department will use sketch-planning methods consistent with both MTC and Authority practices and data to estimate the effects of capacity improvements on the level of service and whether the improvements provide capacity at an order-of-magnitude commensurate with the deficiency.

State law requires that a Deficiency Plan first seek direct action to correct a roadway LOS deficiency by preparing a Remediation Plan. The lead department prepares a Remediation Plan that includes: a) a description of the causes of the deficiency; b) a list of all improvements necessary to fully remediate the problem on the deficient roadway itself; and c) an estimate of the cost and available funding for those improvements. The lead department includes a statement as to the feasibility of the Remediation Plan (Section 4.2.1). A Remediation Plan usually involves adding sufficient capacity to the roadway to allow traffic to flow at LOS "E" or better. The Remediation Plan should include any relevant projects included in the CIP or CEQA mitigation measures included in specific EIRs as mitigation requirements. A proposed Remediation Plan may include improvements already specified and funded in an EIR, the CIP, or developer exactions or dedications found to be relevant, including scheduled implementation, project characteristics, and funding sources. This gives the City credit for any required EIR mitigation measures to remediate the deficiency.

The lead department should also prepare cost estimates for improvements to mitigate the deficiency as well as of the funding sources.

If the lead department finds that the package of remediation measures is feasible, it must prepare an Implementation Plan.

The lead department submits the Remediation Plan and an Implementation Plan to the Authority for evaluation and approval. The Authority will evaluate Deficiency Plans based on effectiveness, financial feasibility, environmental compatibility, and consistency with the City's transportation planning priorities and policies. If the lead department finds it cannot remediate the deficiency and the Authority concurs, the lead department prepares a Deficiency Plan (presented in Figure 3).

The resulting Remediation Plan must include estimates of the following:

- Extra roadway capacity needed to remove the deficiency;
- Total costs of the capacity increases; and
- Improvements already funded through the CIP or developer exactions or dedications.

The Authority evaluates the feasibility of the Remediation Plan and accepts or rejects the lead department's findings. Within 30 days of receiving the Remediation Plan from the lead department, the Authority evaluates the adequacy of the Plan conclusions according to the following three criteria:

1) **Effectiveness:** Are the proposed improvements adding sufficient capacity to the roadway in question to increase the LOS to level "E" or better?

2) **Financially Reasonable:** Are the cost estimates for the proposed improvement reasonably accurate?

3) **Implementability:** In environmental, regulatory, and community terms? Is the Plan consistent with the General Plan?

The Lead Department prepares an Implementation Plan, identifying responsible departments, funding sources, and regulatory authority. If the Authority accepts the Implementation Plan, the Authority modifies the CIP to conform to reflect the remediation measures. All departments called upon to implement portions of the Remediation Plan must enter into an inter-agency agreement stating each department's responsibility and funding sources. If the Authority finds that the Remediation Plan is feasible, the lead department will prepare an Implementation Plan If the Authority finds that the Remediation Plan is not feasible, the lead department will prepare a Deficiency Plan Action List.

3.3. Deficiency Plan Evaluation and Approval

If the Authority determines that the Remediation Plan is infeasible, the lead department prepares a list of offsetting actions that will improve the system-wide multimodal level of service but may have only limited effect on the deficient facility itself.

The lead department prepares a Deficiency Plan Action List. The lead department may select actions that have some direct mitigating effect on the deficiency; and/or actions that will improve system-wide LOS (as measured by the multimodal performance measures). The Bay Area Air Quality Management District (BAAQMD) has prepared a list of approved Deficiency Plan actions. The CMP legislation requires that all Deficiency Plan actions come from that list.

The lead department may choose to prepare (or Authority may request) one or more alternative action plans to explore alternative approaches.

For deficiencies caused by large projects, some of the analysis required in these steps may have been completed through the projects' EIRs. While the analysis and any other relevant documentation may be used *verbatim* for the Deficiency Plan or Implementation Plan, the Final Deficiency Plan documentation must conform to the requirements outlined in the six steps above and described in more detail below.

The lead department has 60 days to prepare a Preferred Action Plan List. Each action on the list must show its estimated capital (or start-up) and operating (or on-going) costs. The lead department submits this list to the Authority for its consideration.

The Authority will review this proposed list and approve or reject it. The Authority will evaluate the preferred Deficiency Plan Action List, including each action's estimated cost within 30 days of submittal by the lead department. The Authority evaluates the effectiveness of the Action Plan and confirms General Plan consistency with the Planning Department. If the Authority accepts the lead department's proposed list of Deficiency Plan actions, the lead department prepares an Implementation Plan and submits this plan for the Authority's approval.

The Authority evaluates Implementation plans using similar adequacy criteria as for Remediation Plans (Figure 2). If the Authority accepts the Implementation Plan, the Authority Board will hold a noticed public meeting and adopt a Finding of Conformance. If the Authority and the lead department are unable to agree on an Implementation Plan, the lead department may either try again, or submit its Final Deficiency Plan (including its Implementation Plan) to the Authority Board for Board action. If the Authority Board issues a Finding of Non-Conformance, the Authority must notify the State Controller to withhold funds. The funds are held in escrow for 12 months and then turned over to the Authority (as the City's Congestion Management Agency). Deficiency Plans must be completed within one year of the CMA's official notice of a deficiency.

Figure 1: Deficiency Detection and City Notification

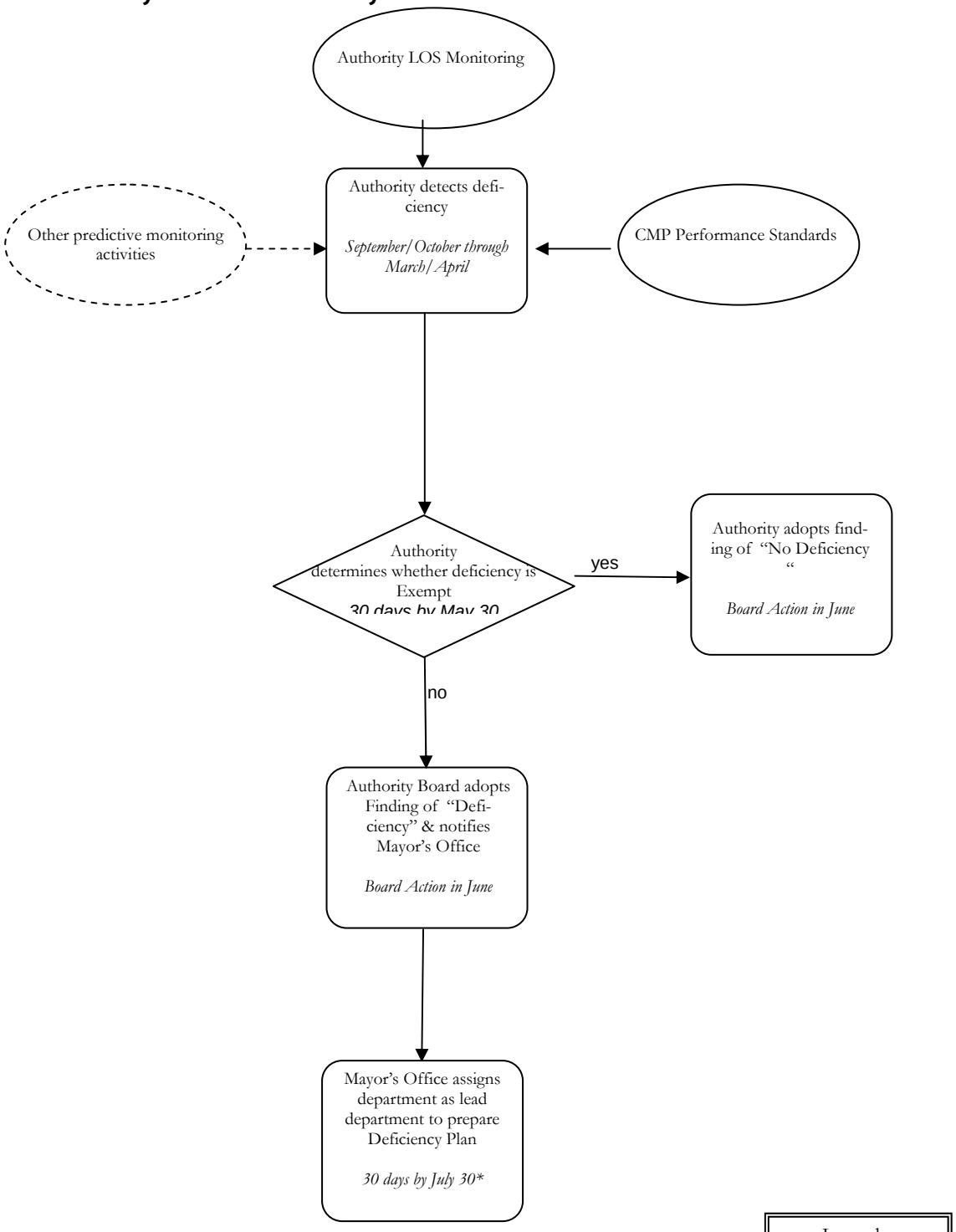


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Figure 2: Deficiency Analysis and Mitigation Plan Preparation

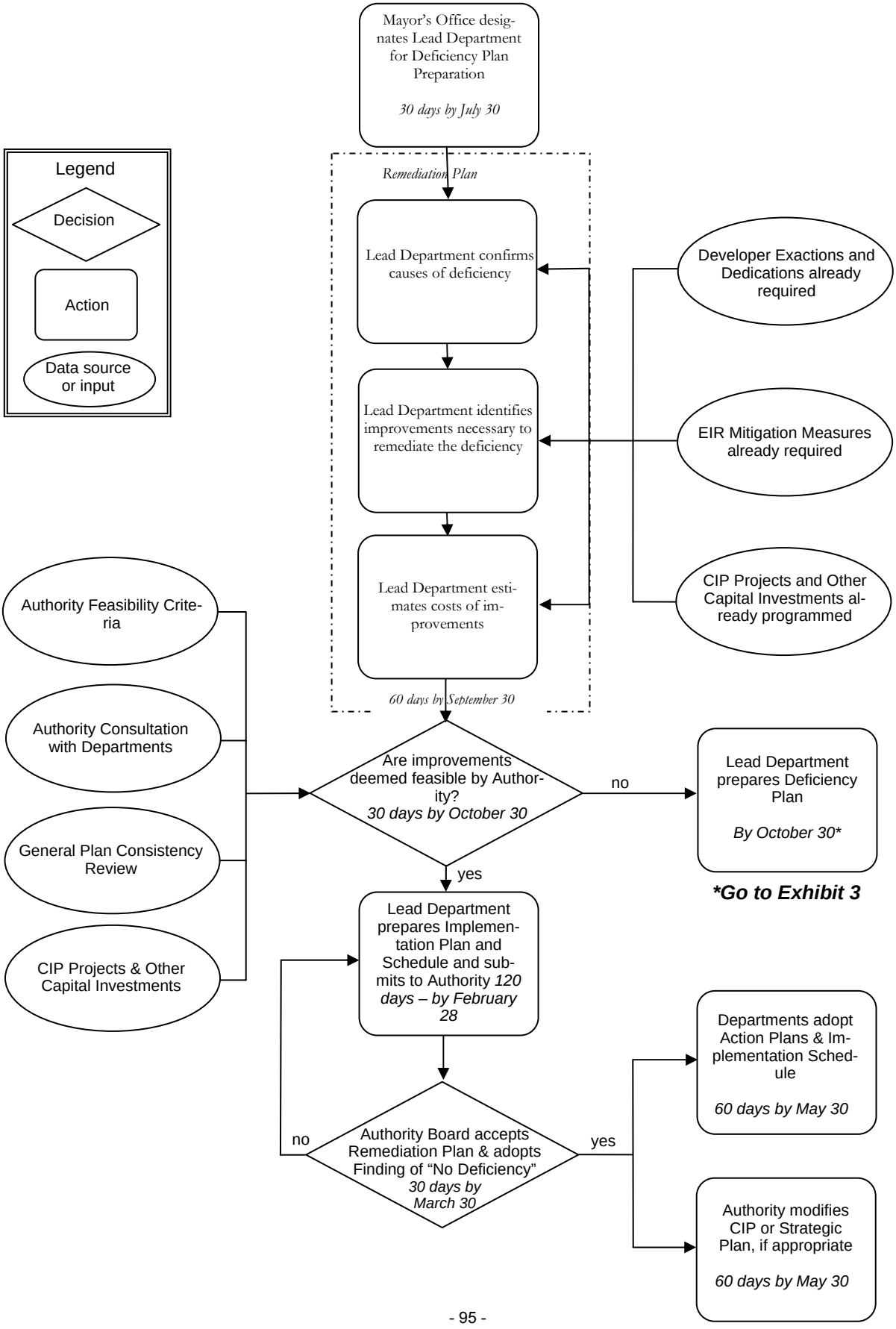
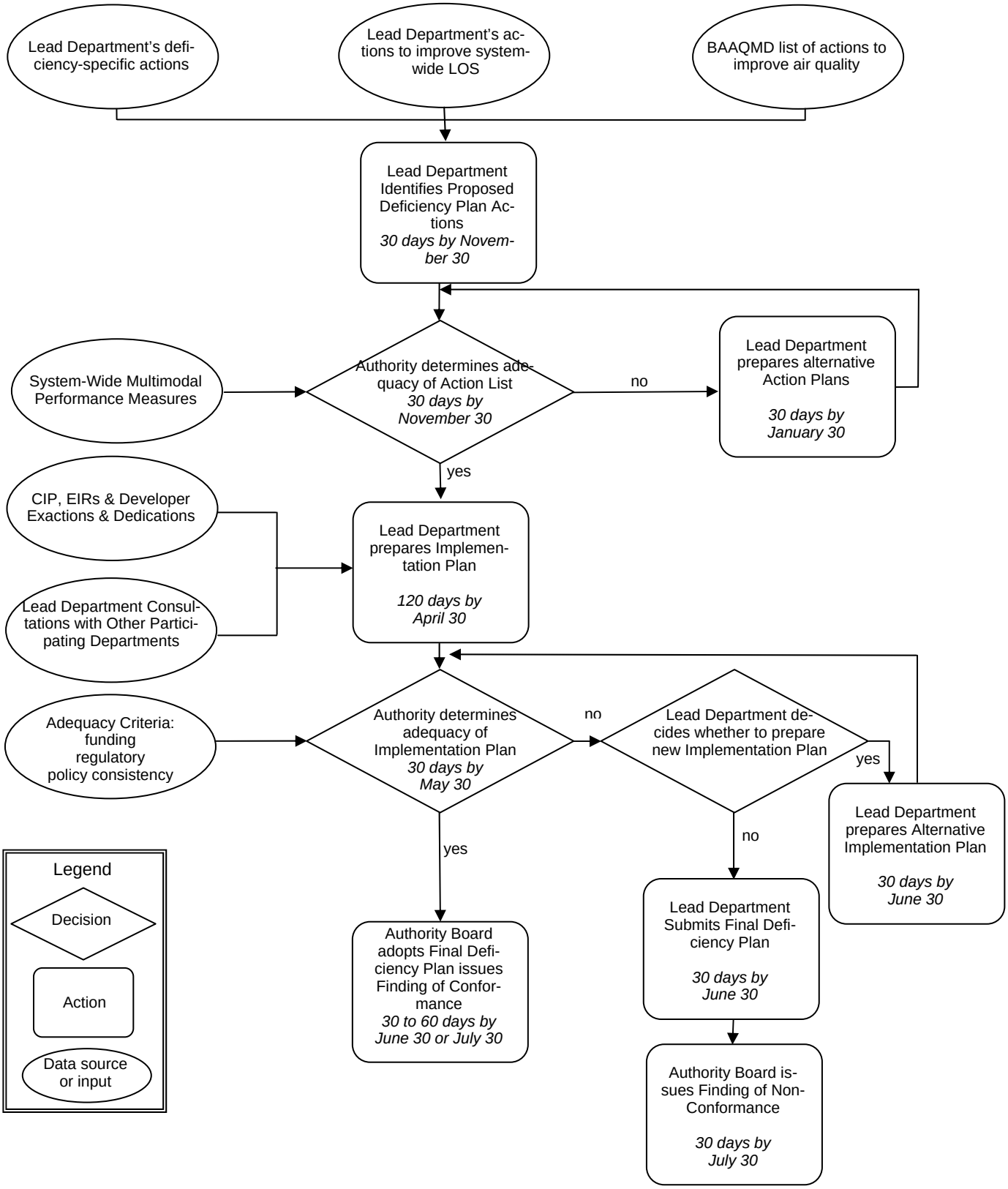


Figure 3: Deficiency Plan Evaluation and Approval



Adequacy Criteria

The CMP legislation, as amended, includes three transit performance measures (in addition to the LOS performance measure) for the evaluation of current and future system performance and the effectiveness of Deficiency Action Plans [Government Code § 65089. (b)(2)]: transit frequency, routing, and service coordination among separate operators.

As required by CMP legislation, the Authority has developed multimodal performance measures beyond the traditional roadway Level of Service (LOS) measures. Our emphasis has been on user-based measures that help explain mode choice in the City. The Authority Board adopted the first set of multimodal performance measures in August 1998 (see Chapter 5). These include bicycle and pedestrian safety (number of accidents/mile of roadway), transit reliability (% of scheduled runs that do not occur) and other measures. After these measures have been further refined and fully tested, they will then be used to evaluate the proposed list of Deficiency Plan Actions. Additional measures may be developed in the future.

3.4. Implementation Plan

The Authority requires the lead department to prepare an Implementation Plan within 90 days of the Authority's finding as part of the Deficiency Plan Document. The Implementation Plan identifies the responsible implementing department(s) for each action, and the sources of funding.

3.4.1 Implementation Plan Development

The lead department is responsible for developing the Implementation Plan. For each action in the Deficiency Plan, the lead department must specify the following:

1) The final cost of the actions and the sources of capital (up-front) and operating (on-going) funds. Note any correspondence with EIR mitigation measures or CIP projects.

2) A monitoring program that conforms to CEQA monitoring requirements.

3) An implementation schedule. All actions must be implemented within the seven-year time horizon for the current CIP. If a Deficiency Plan action is programmed for funding in the sixth or seventh year of the CIP, it will need to be fully implemented within three years of its initiation in order to be considered a feasible action within the Deficiency Plan's ten-year horizon.

4) Identification of city departments responsible for the action's funding, implementation, and on-going operations. Clear identification of all departments responsible for implementation, therefore, is essential for the Authority's approval of the Final Deficiency Plan. One way for partner agencies to demonstrate this would be through an interdepartmental agreement among all responsible implementing departments stating each department's agreement to fulfill their responsibilities for implementing Deficiency Plan actions.

3.4.2 Identification of Funding

The Implementation Plan must include a detailed funding plan.

3.4.3 Implementation Plan and Deficiency Plan Approval

Within 30 days of submittal by the lead department, the Authority will either accept or reject the Implementation Plan. The Authority will make its determination based on the required elements of the Implementation Plan discussed in 4.4.1. Implementation Plans without a funding plan will be rejected. Once the Authority has approved the Implementation Plan, the lead department will have additional 30 days to finalize and submit the Final Deficiency Plan for Authority Board approval. Upon submittal of the final Deficiency Plan by the lead department, the Authority Board will hold a noticed public meeting and either approve or reject it within 30 days. If the Authority rejects the Implementation Plan, the lead department may either propose an alternative Implementation Plan within 30 days, or choose to submit the Final Deficiency Plan with the Implementation Plan as is. In the latter case, the Authority will notify the Mayor's Office of its intent to reject the Final Deficiency Plan due to Implementation Plan inadequacy.

If the Authority Board rejects the Final Deficiency Plan and issues a finding of non-conformance, pursuant to the State law (Government Code 65089.5), the Authority must submit its findings to MTC and the State Controller for the withholding of State funds.

3.4.4 Deficiency Plan Document Structure

A Deficiency Plan Report must include the following sections:

1.0 Introduction Identification of the Deficiency's Causes, including:

1.1 Description of the Deficiency (i.e., road segment;

1.2 Description of the adjacent facilities;

1.3 Analysis of the causes of the deficiency;

1.4 Description of the existing traffic conditions within the boundaries;

1.5 Projection of future transportation conditions for at least the next 10 years; and

1.6 A map of the area, the deficiency, and adjacent facilities and transit routes.

2.0 Remediation Plan, consisting of:

2.1 An estimate of the extra roadway capacity needed to remove the deficiency;

2.2 An estimate of the total costs (operating and capital) of the capacity improvements; and

2.3 A description of improvements that are already programmed through individual project conditions of approval, the CIP, or developer exactions or dedications.

3.0 List of Actions, broken out into:

3.1 Deficiency-Specific Action; and

3.2 Global Actions To Improve System-wide LOS.

4.0 Implementation Plan, specifying the following:

4.1 The final cost of the actions and the sources of capital (up-front) and operating (on-going) funds;

4.2 A monitoring program to verify the action's implementation;

4.3 A schedule for implementation; and

4.4 Identification of city departments responsible for the action's funding, implementation, and on-going support/operation.

5.0 Identification of Other Departments' Responsibilities for Implementation

6.0 Identification of Funding

4. Special Issues

The following sections discuss special circumstances where the Deficiency Plan process, as described in Section 4.0, may have to be modified. Treatment of these issues is not intended to be exhaustive. .

4.1 Multi-County Deficiency Plans

Deficiencies may occur because of the activities of other counties or they may occur on a regional facility (e.g., the Bay Bridge). Under such circumstances, the Authority will take the lead in coordinating the preparation of a Deficiency Plan, following MTC's process and mutual agreements with other agencies. More specifically, the Authority will coordinate with other congestion management agencies (CMAs) and regional agencies (e.g., MTC, BAAQMD, ABAG, etc.). The Authority may request the Mayor's Office to designate other city departments to prepare the Remediation Plan, Deficiency Plan Action List, or the Implementation Plan. Furthermore, other departments may be designated as the responsible agencies for the implementation of the Deficiency Plan.

4.2 Deficiency Plans Addressing Multiple Deficiencies

The Mayor's Office may request that the lead department prepare a Deficiency Plan that covers more than one deficient roadway segment.

Multiple deficiencies may be likely if an area or transportation corridor is impacted by large land use projects (e.g., Mission Bay), significant transportation infrastructure projects (e.g., demolition of the Central Freeway), or pronounced socioeconomic trends (e.g., increased commuting from the East Bay). When multiple deficiencies are within close geographical proximity, distributed along a single corridor (or parallel facility), or are functionally related, the Authority may encourage a single area-wide, or corridor Deficiency Plan.

The process would be similar to that described in Section 4.0. Nevertheless, the lead department must:

1) Review relevant EIRs for their assessment of impact and proposed mitigation measures;

2) Perform modeling of traffic within the area or corridor to determine the effectiveness of the Remediation Plan improvements;

3) Consider funding and/or regulatory feasibility of the proposed Implementation Plan; and

4) Coordinate with the CIP and other transportation programming and/or planning documents designed to address transportation planning for a subarea of the city, a specific corridor, or multiple facilities or modes.

4.3 Future Deficiencies

The legislation does not require that local jurisdictions address future anticipated deficiencies. Deficiency Plans are only based on actual CMP network conditions.

4.3.1 Future Deficiencies Caused by Changes in Transportation Infrastructure or Land Use

Future changes to the transportation infrastructure or services may cause deficiencies. There are many potential causes of deficiencies, particularly changes to the transportation infrastructure in the City as well as land use changes.

The Planning Department is responsible for land use planning and development management. This role, stipulated in the City Charter, gives the Planning Department direct or oversight responsibility for every land use project from its initial design stages through environmental impact analysis, to final completion. Large-scale projects may have major impacts. Example of such projects include, but are not limited to:

- Mission Bay;
- Rincon Point South Beach Redevelopment Area;
- Candlestick Point and Hunters Point Shipyard Development Plan;
- Revised South of Market Specific Plan; and
- Transbay Terminal Replacement.

In addition, the Planning Department oversees preparation of Transportation Impact Analyses (TIAs) and its Office of Environmental Review (OER) coordinates CEQA review and EIR preparation for development projects. All of these documents are intended to anticipate the impacts of a proposed project on the transportation system; thus, they have direct relevance to the Deficiency Plan if a project's impacts cause a deficiency.

5. Work Program Items

- Monitor any potentially deficient segments again in Spring 2011. If "F" is registered for three consecutive cycles, and the segment is not within a designated IOZ, then the deficiency planning process is triggered.

CHAPTER 10

TRAVEL DEMAND MODEL AND UNIFORM DATABASE

Key Topics:

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

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.

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 4.0 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.

3. Technical Approach

3.1 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.

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.

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.

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.

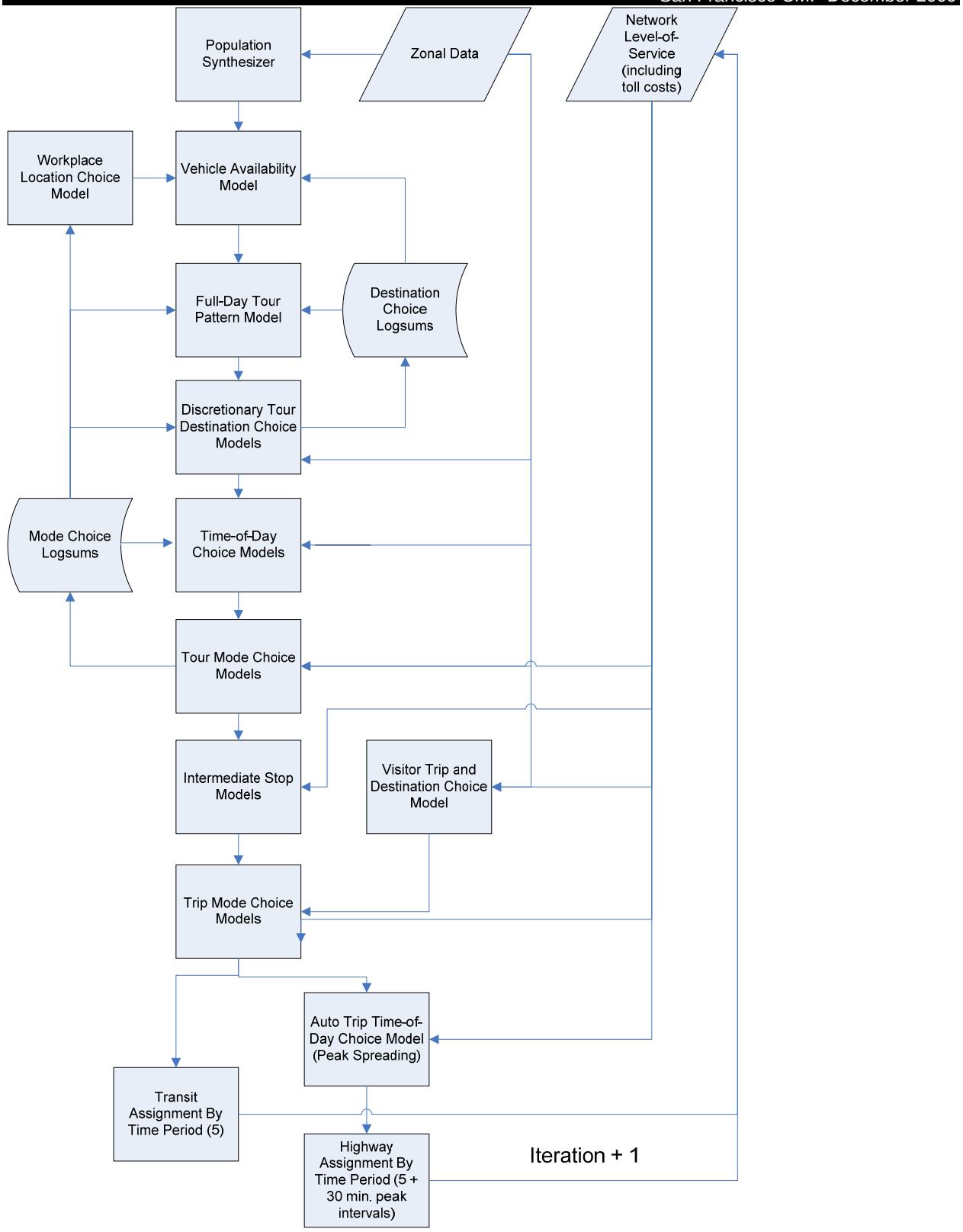


Figure 1. CHAMP 4.0 Model Components

MODEL INPUT AND COMPONENTS

The San Francisco Model currently uses the Projections 2007 ABAG forecast 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 Authority is currently working with the San Francisco Planning Department to develop updated detailed population and employment inputs that are consistent with the county-wide control totals from the latest Association of Bay Area Government (ABAG) land use forecasts (Projections 2009).

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..

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.

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[1], 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.

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).

Time Of Day Models

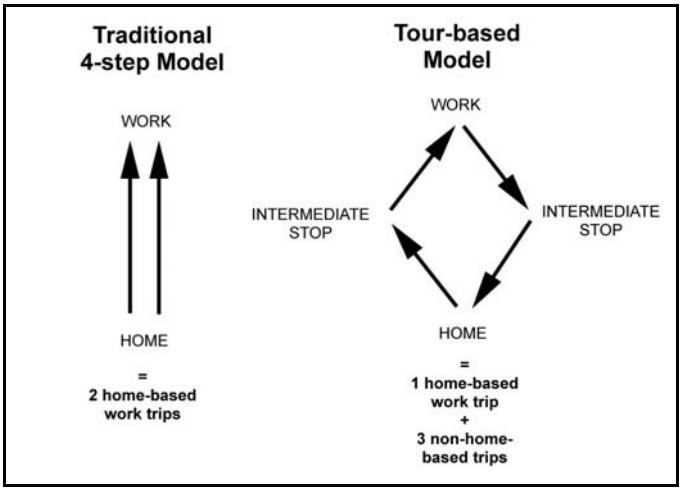
The time-of-day model predicts the period when the traveler leaves home to begin the primary tour simultaneously with the period when the traveler leaves the primary destination to return home. It also predicts the time period of any intermediate stops. The periods used in the San Francisco Model are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

[1] Superdistrict is a geographic area defined by MTC.

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



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

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.

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.

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.

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.

3.2 GIS Database and ArcGIS 9.3

The Authority uses a GIS database coupled with ESRI's ArcGIS 9.3 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.

3.3 MTC Model Consistency

The Authority completed a Model Consistency Report in October 2009 to demonstrate the consistency of CHAMP 4.0 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 4.0 Model Consistency Report is included as Appendix 14.

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. The Pricing Study, Geary BRT and Van Ness BRT environmental studies, and the Bi-County Study will depend heavily on modeling support.

- Complete the bicycle route choice model, currently under development, to forecast bicycle trip assignments. This project is funded by a Caltrans grant and will be completed in 2010..

- Continue ongoing research and development of model improvements, with special emphasis on those needed to support the Pricing Study, including a parking model.

- Further explore the development of a citywide Dynamic Traffic Assignment model.