

CHAPTER 5**MULTIMODAL PERFORMANCE ELEMENT****Key Topics:**

- **Legislative Requirements**
- **Legislative Intent In San Francisco Context**
- **Applications of Multimodal Performance Measures**
- **Multimodal Performance Measures: Progress**
- **Work Program - Key Milestones**

amendments acknowledged the need for diversified solutions to complex transportation problems in urban areas, and the impossibility of tackling them with just one mode. Current performance element requirements recognize that the transportation system performance should be measured for all modes: Auto, transit, bicycle, and pedestrian.

According to the State legislation [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 share and extensive transit network mean that the City will benefit from a multimodal approach to system performance. This is especially true since Deficiency Plans depend on the transit, bicycle and pedestrian systems to offset LOS deficiencies on the roads and intersections, and any Infill Opportunity Zones (see discussion of SB1636, in paragraph 3d below) designated by the City will require performance measures for all modes.

1. Legislative Requirements

AB 1963 in 1994 modified Section 65089(b)(2) to replace the transit service standards requirements in 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 legislation defined performance narrowly as Level of Service (LOS) on roadways. The

3. Applications of Multimodal Performance Measures

In measuring performance we are measuring the ability of the system to satisfy the transportation needs of all San Franciscans, and we must therefore measure performance with reference to particular groups of users. System performance attributes also vary with trip purpose and time of day. Thus, the same trip origin and destination may have several different performance ratings depending on age, physical disability, time of day, or trip purpose.

Multimodal performance measures will be used for the following purposes:

a. CMP Conformance Determinations: Link (roadway) Level of Service (LOS) will continue to be used for conformance determinations; additional performance measures are introduced.

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 deciding Authority concurrence with such proposals. See Chapter 8 for further details.

c. Deficiency Plans: Only link LOS measurements will be used for deficiency determinations.

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.

For example, the City will implement multimodal performance measures in support of any designation of Infill Opportunity Zones in the future. Senate Bill 1636, signed by the Governor in September 2002, allows cities to designate Infill Opportunity Zones which are exempt from CMP Level of Service Requirements. Infill Opportunity Zones, if designated by the City, would complement efforts to redefine the level of service monitoring concept to better address the needs of transit and bicycle users and pedestrians. We would use multimodal performance measures in place of conventional LOS measures within these zones.

Another relevant legislative change with implications for multimodal performance measurement is SB 1492, signed by the Governor in September 2002. This bill requires MTC to establish performance goals and measures, to evaluate transportation projects and programs proposed for Track 1 (highest priority) in the 2004 RTP. The Authority has been advocating for project and corridor-specific performance measures for many years. We should also consider whether any of these performance measures are appropriate for the CMP for transit, or for land use impacts analysis of projects.

4. Multimodal Performance Measures: Progress

Consistent with state law, the 2001 San Francisco CMP distinguishes between two tiers of performance measures. Tier 1 includes roadway LOS plus three transit service performance measures: routing, frequency, and inter-operator service coordination. These are the most traditional measures, with a more substantially documented record of reliability in terms of our ability to measure and interpret them accurately. Roadway LOS is used in connection with CMP conformance determinations.

Tier 2 includes multimodal performance measures that are not yet applied to the CMP conformance process. Standards must eventually be developed for these performance measures. The Authority's technical and policy vehicles for development of a final set of Tier 2 performance measures are the policies and strategies in the Countywide Plan; a near term Model update which will dynamically link estimated transit speeds to roadway speeds; and the development of multimodal LOS methodologies based on the Authority's Level of Service SAR and Technical Working Group.

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 the most adequate to assess performance in a system which includes a major transit component, as well as substantial walk 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).

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 current 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 SB1474. 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.

4.2. Tier 2 Performance Measures: Approach

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 sketchier and the information that is available tends to be of limited value to the user. For example, transit system data is collected mostly in response to federal or state requirements tied to eligibility for funding. Typical data collected includes total daily ridership, an indicator of current demand for service, and cost per passenger mile, an indicator of cost effectiveness. However, while these are useful *management* tools, they say little about the *quality* of service, either in terms of system performance, or service as experienced by the user. Similarly, data pertaining to

bicycle and pedestrian trips is 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, and it is also required 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 *citywide 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.

In order to minimize data collection efforts, performance measures should be reliable, intuitive, and the data required should be readily available from City departments or from other Authority activities. In addition, these measures must be relevant to the evaluation of mobility issues as described in Section 3 above, and applicable to the specific CMP uses described in Section 4 above.

The Authority's GIS Database is the main tool for analysis of system performance and it will be the main repository for performance-related data. The database facilitates measurement and evaluation of non-traditional performance aspects, such as those related to pedestrian and bicycle travel. The Authority, in cooperation with MUNI is undertaking a major update of transit data by conducting an on-board transit survey which will collect origin-destination and other data for purposes of recalibrating the SF Model's transit sub-model.

In future monitoring cycles, the Authority aims to measure average transit link speeds in addition to average auto link speeds. This has several purposes.

One, it will allow us to monitor transit speeds over time. Average speeds are one of the most important factors in transit Level of Service. In addition, this monitoring will provide data to help us validate a near term Model improvement that will make transit speeds dynamic rather than fixed. This means that as auto speeds change in the model, transit speeds will change in response. This will allow us to monitor the effects of congestion and changes in auto trip volumes on transit speeds.

Scheduled near-term improvements to the San Francisco Travel Demand Model will link the Model's transit speeds to the Model's congested highway network. Currently transit speeds are hard-coded and do not vary with traffic congestion. Collecting transit travel time data will enable the Authority to use the CMP monitoring cycle as a tool for continually updating and calibrating this valuable Model component.

The Network for monitoring these transit speeds would need to be defined in coordination with MTA, including appropriate link segments based on transit service frequency and other variables.

4.3. Transportation System Level of Service Methodologies SAR

In December 2003, the Authority Board adopted the Transportation Level of Service (LOS) Methodologies Strategic Analysis Report (SAR) examining alternative measures for the transportation impacts of projects pursuant to CEQA. The SAR concluded that current transportation impact measures and review process should be redefined to better support San Francisco's existing multimodal transportation and environmental policies. Specifically, The LOS SAR concluded that the existing transportation impact analysis process under CEQA is:

- unpredictable and not transparent for project sponsors;
- inefficient for the Planning Department;
- inconsistent with the City's Transit First policy, which prioritizes transit, walking, and bicycling

to accommodate tripmaking in San Francisco.

The LOS SAR recommended that improvements to the transportation impact analysis process include revisions to the measure of transportation impacts, as well as to the process for reviewing transportation impacts under CEQA.

The SAR also recommended that the Authority convene a technical working group (TWG), including representation from the Planning Department's Office of Major Environmental Assessment, MUNI and Department of Parking and Traffic (DPT), user groups, and industry practitioners. The LOS TWG has refined the SAR recommendations for the Authority Board's approval and subsequent action.

Based on the LOS TWG discussions, two actions that reform the analysis of transportation impacts under CEQA were recommended to the Authority Board in July 2005: using a measure of automobile trips generated as the definition of a significant transportation impact, instead of roadway LOS; and adopting by ordinance a transportation impact mitigation fee program.

These new measures in the CEQA context would have some benefits for the CMP program as well. A revised auto trip generation measure would allow the Authority and the City to better understand the impacts of local land use decisions on the CMP network. The impact mitigation fee program could also be used to mitigate deficiencies on the CMP network, similar to the Congestion Management Fee approach being pursued by the Los Angeles County MTA. LA MTA is currently in the process of developing a nexus study for a "congestion management fee" program. This countywide fee program would allow for ongoing mitigation of deficiencies by having developers contribute to a fund that would fund a countywide program of transportation projects that would mitigate the effects of growth on Los Angeles County's CMP.

a. Auto Trips Generated Measure: The current measure and standard of significant impacts to transportation, roadway LOS, is a measure of delay to automobiles. This measure should be replaced by a measure and standard based on the number of automobile trips generated by a project.

The Transit First policy in the City Charter recognizes that some short-term auto congestion is a pre-

dictable and unavoidable consequence of implementing Transit First policies, since mode shift will occur gradually as the transit, bicycle and pedestrian networks are improved. As the SAR noted, the current measure of transportation impact – a measure of automobile delay – is inconsistent with the Transit First policy for this reason. A measure of auto trips generated, in contrast, recognizes that adding additional automobile trips to San Francisco streets is environmentally undesirable, but distinguishes those from automobile congestion impacts that may result from improving the city's networks for transit, walking, and cycling.

Automobile trip generation methodologies are well developed and would not require extensive further development, although more work is needed to establish a clear methodology for this particular application. The Planning Department's Guidelines for Environmental Review already include a methodology for auto trip generation that could be refined and improved for use as the CEQA impact standard. An appropriate threshold to define a significant increase in automobile trips would need to be defined. For example, the LOS TWG may define the significance threshold on an absolute (specific number of trips) or relative (% increase in trips) basis, taking a street's current level of vehicle demand and capacity into account.

The LOS TWG has identified possible supplemental impact methodologies, such as a measure of transit crowding, which may be important to retain in transportation impact analysis alongside the auto trip generation measure. In addition, system-level (e.g., person-delay) and more robust modal LOS measures are recommended for general transportation planning and analysis purposes that typically take place at the earlier conceptual planning and design phase of a project (prior to the environmental clearance stage), in addition to use in monitoring the performance of transit and bicycle networks for CMP purposes.

b. Transportation Impact Mitigation Fee:

A transportation impact mitigation fee (TIMF) is a development fee levied on new development in proportion to the expected impacts of that development on the transportation system. San Francisco currently has a transit impact development fee, the TIDF payment of which mitigates, in part, the

impacts of new development on MUNI transit service. The LOS TWG recommends extending or complementing the TIDF to cover all modes of transportation. The new fee revenues would fund a designated countywide program of transportation projects for all modes, designed to mitigate the cumulative impacts of countywide growth at the system level.

The TIMF program was recommended as one that would chiefly benefit CEQA transportation impact analysis process, but it would benefit the CMP program as well. It would allow for developers whose project impact the performance of the CMP network to contribute funds to a program that would fund a countywide set of multimodal projects intended to mitigate or offset the impacts of growth on the CMP system.

c. Roadmap: Once a specific methodology has been defined, the LOS TWG recommends that auto trips generated replace auto LOS as the CEQA transportation impact measure.

The new measure and standard would need to be adopted by resolution of the Planning Commission after a public review process. This action needs to be supported by evidence in the legal record - technical reports and analyses that explain the reasons for the new measure. Authority staff, working closely with the Planning Department and the LOS TWG, will undertake a technical analysis to support the change. This technical analysis should also include a description of how the new measure will be calculated and applied and any changes recommended over the way the city currently estimates auto trip generation for CEQA purposes.

Regarding the TIMF recommendation, the Board of Supervisors may adopt a fee program by ordinance. First, a nexus study must be prepared to determine the reasonable relationship between the projects that must pay the fee, the fee structure and level, and the mitigation projects that would be funded by fee revenues. Any new measure and standard for transportation impact – e.g., auto trips generated – must be ready to incorporate into the nexus study's evaluation. A countywide program of projects that the fee will be expended upon must also be identified, and the institutional mechanism to administer the revenues must be determined.

Over the next CMP cycle, the Authority will develop a work plan and budget for Phase 2 development of new transportation impact measures and guidelines, focusing on the above two recommendations. In particular, the scope of work for next steps would include developing the trip generation measure through trip generation rate research and development of refined superdistricts, among other activities; and initiating a nexus study to support a TIMF program.

In addition, the Authority will work closely with the TWG to develop supplemental multimodal impact measures for transit and bicycles. These measures can also be used in the CMP context to evaluate the performance of San Francisco's transit and bicycle networks. Thus, the SAR recommendations advance the next steps in developing "Tier 2" performance measures for all modes in the CMP.

4.4. Tier 2 Performance Measures Derived from Existing Data

In November 1999, San Francisco voters passed Proposition E which, among other things, amended the city charter to require the creation of service standards and milestones for Muni to attain. The MTA's Board of Directors updates these periodically. Table 5-B lists the service standards and milestones that directly pertain to the improvement of mobility. All numbers in the table are percentages.

5. Work Program Items - Key Milestones

- Identify Tier 2 performance measures to test as alternatives to conventional LOS measures, as well as applications to LOS monitoring methods and evaluation of transportation and Infill projects.
- LOS TWG Phase 2 work will continue. Authority staff will develop a work plan and budget for developing the two LOS recommendations (auto trip generation measure of impact, and a nexus study for the TIMF). Phase 2 workplan will involve developing technical reports and analyses to support the auto trip generation measure. This technical analysis will also include a description of how the new measure will be

calculated and applied and any changes recommended over the way the city currently estimates auto trip generation for CEQA purposes. Phase 2 workplan will also involve the development of a TIMF nexus study, identification of the countywide program of projects to be funded and the implementation mechanisms to administer the TIMF program.

- Coordinate with city departments to improve the availability and collection of data about level of service and performance of all modes, particularly "before and after" studies related to pedestrian, transit and bicycle travel.
- Aim to include transit speed monitoring as part of the next round of LOS monitoring effort.
- Continuously improve the San Francisco Model's capability to model all modes of transportation, including bicycle and pedestrian trips. This will be accomplished by developing mode-specific quality of service measures (e.g., for bicycles, transit, and pedestrians) through the LOS TWG Phase 2 workplan.

Table 5-A

**Transit Service
Frequency and Coverage Standards
Muni**

Frequency Standard

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**

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****LINE**

TIME PERIOD	Pittsburg/ Bay Point Millbrae	Dublin/ Pleasanton SFO	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 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 southwestern part of the City.

Table 5-A (cont.)**CALTRAIN****Frequency Standard**

30-minute headways during the peak, supplemented by express service at up to 5 minute headways.

1 hour headways off-peak, 30-minute headways on weekday midday service

Coverage Standard

The Caltrain system operates on a 77.2-mile route between San Francisco and Gilroy. There are 35 stations in the 19 cities that Caltrain serves, including four in San Francisco. Stations are spaced an average of 2.3 miles apart on Caltrain's route.

GOLDEN GATE TRANSIT**Frequency Standard**

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

Coverage Standard

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

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

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

¹ For commuter bus service, Golden Gate Transit's policy is to provide as many buses needed in order to meet demand. Currently, there are 22 bus lines providing express commuter service to/from San Francisco at frequent intervals during peak commuter hours Monday through Friday except holidays.

Table 5-A (cont.)**SAMTRANS****Frequency Standard**

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

Coverage Standard

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

Table 5-B**1999 Proposition E Service Standards and Goals**

STANDARD	FY	FY	FY	FY	FY	FY	FY	FY	FY
	99/00 Actual	00/01 Goal	00/01 Actual	01/02 Goal	01/02 Actual	02/03 Goal	02/03 Actual	03/04 Goal	03/04 Actual
Vehicles that run on time ²	46	65	65.5	70	71.9	75		85	
Scheduled service hours delivered	95.6	96.5	94.5	97	97.8	97.5		98.5	
Vehicles too full to board	0.15	<5	<5	<5	<5	<5		<5	
Peak period load factors (% of capacity)	Various	<85	>85	<85	>85	<85		<85	
Actual headways vs. scheduled	45	80	NO	85	NO	90		95	
Vehicle availability	99.6	98.5	99.1	98.5	99.4	98.5		98.5	

Source: San Francisco Municipal Railway *FY2005 – FY2025 Short Range Transit Plan*, 2004.

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